Financial Literacy as a determinant of financial inclusion in Tanzania.

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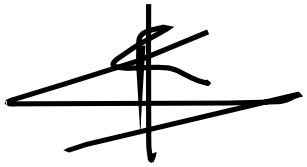
NOVEMBER 2022

CERTIFICATION

The undersigned certifies that she has read and hereby recommends for acceptance by the University of the Witwatersrand, Johannesburg, a thesis titled "Financial Literacy as a determinant of financial inclusion in Tanzania'' in fulfilment of the requirements for the degree of Doctor of Philosophy (Business Management) of the University of the Witwatersrand, Johannesburg.



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I, Peter Joseph Mmari, declare that this thesis is my original work that has not been presented and will not be presented at any other University for a similar or any other degree award.

……

Signature

Date: 7th November, 2022

DEDICATION

This thesis is dedicated to my parents for instilling in me the capability to understand and value the importance of education. Through education, I have realized the need for humankind to have a quality life and as my contribution to this need, I am compelled to add knowledge to the global community through this research. In addition, this work is also dedicated to my family (My wife, our son and daughter) for their support and their endurance while I was away and occupied with this work.

ACKNOWLEDGEMENT

This thesis presents many hours of hard work and dedication by the researcher in recording key milestones and lessons learnt during the research and interactions with colleagues and academicians. In view of this, first and foremost, I would like to thank God for making my PhD journey a success. If it was not for his grace, blessings, protection, guidance and favour, I couldn't have made it.

Secondly, I extend my heartfelt appreciation to my Supervisor, Dr Renee Horne, for her mentorship and belief in me to deliver this work since the early days of our engagement. Throughout this journey, she has tirelessly provided unreservedly support, never ceased to provide positive criticism and challenged me to improve my academic precision. This invaluable support has contributed significantly to the successful completion of this work, and it is my prayer that God should bless her labour and extend her territory. Thirdly, I exceptionally recognize the support of the Wits Business School staff and, specifically, Prof Odongo Kodongo, the PhD programme Director and Ms. Mmabatho Leeuw, the Programme Manager for their availability and guidance during the journey of my PhD and my stay at the WBS.

Lastly but not least important, I recognize and appreciate the encouragement and support from my Employer (Bank of Tanzania), my immediate work supervisors and fellow staff for providing a good working environment that supported my studies. Finally, in a distinct way, I appreciate the care, support, sacrifices and prayers from my immediate family (my wife, our children and parents). Their presence and support significantly contributed to my spiritual and mental sanity throughout this journey. I, therefore, pray that may God reward their devotion and continue to respond to their life desires.

ABSTRACT

Financial inclusion is considered to be an effective tool to reduce access and usage barriers in the banking sector. Despite its effectiveness, its benefits have not been fully realized by Tanzanians due to both supply and demand side limiting factors. Tanzania records a high level of financial exclusion in the banking sub-sector because 83 per cent of her adult population is un-banked. The high level of exclusion in banking though poses challenges to Tanzanians it is also a global concern and for that it continues to attract more research for effective interventions, (Demirgüç-Kunt, Klapper, Singer, Ansar, & Hess, 2018).

The empirical literature on financial inclusion suggests that financial exclusion in the banking sector is explained by various demand-side factors, including the high level of financial illiteracy in societies, (Chikalipah, 2017). In the context of Tanzania, information regarding the role of financial literacy in influencing financial inclusion in the banking sector is limited. In addition, the moderating effect of demographic variables on the ability of financial literacy to influence financial inclusion remains to be unknown and hence the need for this research. In efforts to address this gap, this study uses the theories of Planned Behaviour (TPB), (Ajzen, 1991) and the Technology Acceptance Model (TAM),(Davis, 1989; Venkatesh & Davis, 2000) to develop a measurement model for financial literacy and digital financial literacy as constructs hypothesized to influence individual's financial inclusion.

Following a positivist and quantitative research approach, this study employs the Structural Equation Modelling technique by using Smart Partial Least Square 3, software to examine the causal relationship between financial literacy and digital financial literacy with financial inclusion. Data for the study were collected through a cross-sectional survey conducted on a sample of 440 respondents from eight districts in Tanzania.

The study findings indicate that both financial literacy and digital financial literacy have a positive and highly significant influence on financial inclusion. Further, this relationship is found to be moderated by demographic factors. Specifically, the path relations between Financial literacy (FL) and Financial Inclusion (FI) are found to be strong for people with high income, high level of education, rural residents and the old. In the case of the relationship between Digital Financial Literacy (DFL) and FI, level of income and education are noted to have a moderating effect while differences in gender, residential location and age do not have a significant impact on the ability of digital financial literacy to predict financial inclusion.

The findings of this study, therefore, enriches the existing body of knowledge by extending the theories of Theory of Planned Behaviour and Technology Acceptance Model to examine the role of FL and DFL in predicting FI. In addition, this study informs policymakers and commercial banks on the dimensions of financial literacy and digital financial literacy and how these variables can improve the demand-side capability of consumers and thus effective in supporting financial education and financial inclusion initiatives in Tanzania and across similar developing economies.

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LIST OF ACRONOMY:

ATMs - Automatic Teller Machines

BOT – Bank of Tanzania

BRICS – Brazil, Russia, India, China and South Africa

DFL- Digital Financial Literacy

DFS- Digital financial services

FSPs- Financial Service Providers

ICT- Information and Computer Technology

KYC- Know Your Customer

MNOs – Mobile Network Operators

NCFI – National Council for Financial Inclusion

OECD – Organization for Economic Co-operation and Development

TAM - Technology Acceptance Model

TCRA - Tanzania Telecommunication Regulatory Authority

TPB - Theory of Planned Behaviour

USA - United States of America

CHAPTER ONE

INTRODUCTION

1.0 Background of the study

Equal opportunities for access to and use of financial services by businesses and individuals is commonly termed Financial inclusion. Financial inclusion is a global development agenda following its potential to create economic and social benefits for the disadvantaged and the poor whose standard of living is affected by limited or no access to financial services. Through the financial inclusion process, people, irrespective of their social status or ethnic groups, have an equal opportunity to access and use financial services and therefore engage in productive economic activities that are likely to improve their welfare. Studies such as,(Beck, Demirguc-Kunt, & Martinez Peria, 2005; Child, 2006; Galor & Zeira, 1993) argue that the absence of an inclusive financial system in the country leads to poverty. It is argued that limited or no access to financial services denies households an opportunity to access essential services such as access to credit, savings, education or investment in projects and businesses and therefore hamper economic development at large.

In efforts to address the financial exclusion problem, efforts are being made to facilitate access to financial services by various financial inclusion stakeholders both at the international and regional levels. These collaborations provide evidence of the role of financial inclusion as a tool to achieve economic growth and poverty eradication (Greenwood & Jovanovic, 1990) and (Lixin Xu, Clarke, & Zou, 2003). On the other hand, various countries have adopted financial inclusion policies, and they are busy implementing multiple financial inclusion initiatives to reduce both poverty and inequality in society as a means of attaining the Sustainable Development Goals of eradicating extreme poverty and reducing inequality all over the world (Chibba, 2009; Ma'ruf & Aryani, 2019).

In Africa, including Tanzania, countries are now committed to the Maya Declaration[1]to set financial inclusion targets and implement financial inclusion policy changes that aim to reduce financial exclusion, (Triki & Faye, 2013). These policy changes have led to several improvements such as: the development of proportionate and inclusive financial policies and regulatory frameworks; the adoption of technology in the delivery of financial services; the design of customer-centric financial solutions; and governments taking a leading role in improving consumers' capabilities for access and use of financial services, (Triki & Faye, 2013).

Despite the ongoing interventions to ensure an inclusive financial system across countries, the world continues to experience higher financial inclusion levels among the developed countries when compared to developing countries. These differences are acknowledged in literature with a proposition that they are explained by variations in demand-side characteristics and supply-side factors affecting financial inclusion, including existing limiting policies and regulatory environments across countries (Chikalipah, 2017; Demirgüç-Kunt & Klapper, 2013).

Generally, financial sectors are mostly dominated by banks due to their importance in the financial intermediation process, including their capability of responding to households' and businesses' financial needs. However, globally there about 1.7 billion adults (62 per cent of the world population) have no access to banking services, (Demirguc-Kunt, Klapper, & Singer, 2017). Studies suggest that a large proportion of the unbanked population is from Sub-Saharan Africa, while the number of banked populations varies significantly across the region. For instance, the percentage of adults with an account in a formal financial institution in Mauritius is 90 per cent while in South Sudan is 9 per cent, (Demirgüç-Kunt et al., 2018). It is evident that due to these national disparities, the majority of Africans have no access to banking services and therefore chose to facilitate their basic financial needs through access to microfinance institutions and informal markets. Such

[1] Maya Declaration is a commitment made by more than 66 members of the Alliance for Financial Inclusion (AFI), to set national financial inclusion targets, implement country policy changes and initiatives that aim to reduce the financial inclusion challenges in their countries. The first commitment was made by 57 member countries in the AFI network in the year 2011 at Riviera Maya, Mexico. To date countries, continue to implement various financial inclusion initiatives and report the performance of their targets to AFI.

providers mainly expose them to high costs, risks of abuse and unsustainable financial solutions from unregulated providers (Agrawal, 2008).

In Sub-Sahara African countries, still, a large proportion of the low-income population has limited uptake and usage of banking services (Demirgüç-Kunt et al., 2018; Evans, 2016; Oyelami, Saibu, & Adekunle, 2017; Zins & Weill, 2016). Despite the public demand for banking services, banks as financial intermediation agents have failed to reach most rural poor, the low income and the unbanked population in these countries. As a result, Africa records a low level of banking penetration and limited use of banking products and services (Chikalipah, 2017).

Existing financial inclusion studies, which are predominantly from either developed economies or outside Africa, for example, the USA, Asia, and Latin America, have identified various reasons for financial exclusion (Cámara & Tuesta, 2014; Chattopadhyay, 2011; Demirguc-Kunt et al., 2017; Iqbal & Sami, 2017; Sarma & Pais, 2011). In addition, those from Africa specifically identify infrastructure challenges, sparse population, high illiteracy levels, and high transactional cost to be among the critical barriers to access and use of banking services, Chikalipah (2017).

As a response to the financial inclusion challenges, African countries, including Tanzania, continue to implement various financial inclusion interventions to reduce the financial exclusion gap. However, these efforts have not resolved the challenges entirely, since the number of unbanked people remains significant. It is indisputable that both supply and demand sides interventions are required to ensure increased financial inclusion, (Paramasivan & Ganeshkumar, 2013; Zins & Weill, 2016). But most importantly, providing financial education to the general public is a necessary demand-side intervention that guarantees an improvement in the financial capability of existing and potential users of financial products and services,(French, McKillop, & Stewart, 2020)

Given the current developments in the financial sector and the sophisticated financial products and their delivery channels, the interactions between the financial service providers and customers require the consumers to have financial literacy as a particular skill to deal with service providers

while ensuring the safety of their financial transaction,(Lyons, Chang, & Scherpf, 2006). The importance of financial education both to individuals and the community at large has been over emphasized by scholars. For it is believed that people with adequate financial literacy can manage their consumption and saving behaviour properly, process financial information and compare the cost and benefits when making financial decisions for purposes of maximizing their expected net utility values (Lusardi & Mitchell, 2014). Consequently, this study therefore examines financial literacy in the context of Tanzanians as a determinant for financial inclusion.

1.2 Context of the Study.

Tanzania's financial sector is dominated by the banking sub-sector, which represents 69.9 per cent of the total financial sector assets. The industry has 53 deposit-taking banking institutions, dominated by ten large banks which hold 70.4 per cent of the total assets and the majority of these have concentrated in urban areas living the majority of Tanzanians who live in rural areas underserved and unbanked, BOT (2019b). On the other hand, the country records 86 per cent access to formal finances; however, only 17 per cent of adults are banked (FINSCOPE, 2017). The high financial access level is mainly attributed to payment services through Mobile Money services and micro-credit services through microfinance and financial cooperatives.

Similarly despite the low number of banked Tanzanians, active bank accounts in the country are at 6 per cent (FII, 2017). On the contrary, when compared to SADC peers, access to banking services in Tanzania stands to be low and hence continues to be a problem for people and the economy at large (Demirgüç-Kunt et al., 2018). The low uptake and use of banking services by Tanzanians is linked to the country's banking history, which starts from the colonial era, where the country had banks that were branches of multinational banks offering foreign trade finance to facilitate colonialism and trade priorities. Immediately after independence (1962-1965), a state-owned bank was established to compete with foreign banks and serve the indigenous Africans. However, after the declaration of a socialist state in 1967, the government nationalized all banks to form two state-

controlled banks. It was during this time, that the state monopoly constrained the growth of the banking sector, which led to a limited supply of financial products and services, low quality of customer services, price control by the state and bias on credit to the public sector at a cost-constrained credit to the private sector. As a result, the country experienced low levels of banking penetration in areas considered to have less or no public interest (Lwiza & Nwankwo, 2002).

In efforts to address the weaknesses of the state-owned banking regime, the country undertook major financial sector reforms that paved the way for the development of a robust regulatory and supervisory framework for the banking sector, and allowed competition through new local and foreign entrants in the market steered innovations through the development of new products, services, and delivery mechanisms and improved customer services. However, despite this success, at a micro level, the banking sector still experiences challenges to penetrate the majority of the rural and low-income population, leaving the majority of Tanzanians unbanked (Lwiza & Nwankwo, 2002; Rutihinda, 1993).

Both the first and second financial sector reforms in the country failed to resolve all the financial exclusion challenges. In response to this, Tanzania developed the National Financial Inclusion Framework as a strategic intervention that focuses on reducing access and usage barriers for financial inclusion in the country (NCFI, 2018). The framework was first developed in 2013 and revised four years later to be implemented for five years from 2018 until 2022. The framework is implemented under the oversight of the National Council for financial inclusion, which coordinates the public and private sector's collaborative efforts to provide resources to implement initiatives targeting to reduce the identified financial exclusion challenges in the country. The national financial inclusion initiatives, among others, focuses on improving the financial capability of Tanzanians through the implementation of the National Financial Education Framework (NFEF, 2016). The financial education framework is envisioned to increase the percentage of Tanzanians with confidence to engage with financial service providers and enhance individual financial capability for financial decision making and improved financial consumer protection. Despite the ongoing implementation

of the two frameworks, the country has not recorded remarkable progress in reducing the number of unbanked and financially illiterate Tanzanians.

Similarly, in the past decade, since 2007, when the Mobile Network Operators started issuing mobile money as added services, the country has recorded a success story in the adoption and use of Mobile Money payment services. These services have diffused very fast and are now commonly used by Tanzanians (Di Castri & Gidvani, 2014). However, the country continues to record a low adoption and use of other digital financial services, for instance, the use of electronic banking services. The Central Bank of Tanzania suggests that the country's electronic banking delivery model is still at an infant stage, diffusing very slow and with limited acceptance by the rural and low-income population, BOT (2019a).

Nevertheless, embracing developments in the financial sector through effective implementation of the Financial Education Framework provides an opportunity for the country to fast-track attainment of the country's financial inclusion goals, including businesses and households to accumulate savings, build assets for managing short-term and long-term financial needs, access capital that promotes investments and reduces unemployment, reduce the income inequality gap, and sustainable and inclusive economic growth, (Beck & De La Torre, 2006; Honohan, 2004). For Tanzania to record the envisaged financial inclusion milestones, it is necessary for issues that limit access and use of banking services to the underserved, the poor, and marginalized groups to be addressed with scientific solutions applicable in the Tanzanian environment to unlock the existing limitations.

1.3 Research Problem Statement

In December 2013, Tanzania launched the first National Financial Inclusion Framework 2014-2016, a Public-Private stakeholders' initiative that provides a roadmap for advancing access and use of financial services in the country. During this period, Tanzania made significant progress, including 12 per cent increased financial access points for people living in rural areas (mainly Microfinance

providers and Mobile Money Agents); development of information infrastructure including credit reference system and national biometric identification systems; and the development of national and international payment infrastructures. On the other hand, during this period, the country recorded in-significant growth in access to insurance services (i.e. 2 per cent) and a 1 per cent increase for Pensioners while access to banking continued to be low from 14 per cent recorded in 2013 to 17 per cent in 2017 (FINSCOPE, 2017). It is from this premise, Tanzania developed its second National Financial Inclusion Framework as a five-year national strategy in addressing persistent barriers to access and use of financial services to individuals and businesses (NCFI, 2018). However, despite these interventions and the progress made so far, the country continues to record a high level of unbanked population.

Previous financial inclusion studies have indicated that exclusion in the banking sector is explained by various supply and demand sides factors, including unaffordable financial cost, poor physical and communication infrastructure, low literacy level, policy and regulatory constraints, low levels of financial literacy, weak redress and financial consumer protection mechanisms and limited supply of demand-driven product and services, (Demirgüç-Kunt et al., 2018; Zins & Weill, 2016). However, the magnitude and impact of each of the identified financial inclusion barriers differ across countries and therefore requires scientific research to determine its significance.

Financial illiteracy is the factor of interest in this study, given the little attention given by scholars in examining its relationship with financial inclusion. Existing evidence from developed economies suggests that high financial illiteracy among people significantly contributes to their exclusion from accessing and use of banking services (Klapper, Lusardi, & Van Oudheusden, 2015). Similarly, other studies suggest that a financially literate is likely to demand and use banking services because financial education equips individuals with capabilities to; process financial information, apply numeracy skills to compare cost and returns when making choices among varieties of financial services, manage personal finances, including planning for short term financial needs and

retirements and to handle psychological factors that influence financial decision making, (Lusardi, 2008; Widdowson & Hailwood, 2007; Lisa Xu & Zia, 2012).

In Tanzania, the financially illiterate population is significantly high at 78 per cent, (FII, 2017). These findings are consistent with the findings of the Tanzania FinScope survey (FINSCOPE, 2017), which argues that 50 per cent of Tanzanians struggle to keep up with their expenses and cannot recall how much they have spent for the past one week; 44 per cent cannot manage their incidental expenses while 75 per cent of adults below 55 years have no retirement plans. In addition, another study noted that the level of financial literacy among Tanzanians varies due to demographic factors, (Lotto, 2020b). However, existing studies in Tanzania have not covered information about the attributes of financial literacy as such the contribution of financial literacy in explaining financial inclusion in the Tanzania banking sector remains unknown.

Similarly, given the developments in the global financial markets, financial technology has transformed the delivery of financial services to businesses and individuals through convenience, affordability, and an improved customer experience in accessing and using financial services (Cracknell, 2004; S. Gupta, 2013). However, in Tanzania, despite a Mobile phone penetration of 85 per cent, moderate Internet usage and high access to mobile money (46 and 44.6 per cent, respectively), TCRA (2019), Tanzania records a low level of adoption and use of digital platforms to access banking services. Electronic banking use cases in the country are mostly concentrated in urban areas (BOT, 2019a), while the non-users continue to perceive that such services are for a particular class of people in the community, thus leaving the majority in rural areas and low-income individuals underserved or unbanked. Even though various factors explain the low adoption of electronic banking services among Tanzanians, in this study, the researcher mirrors this type of exclusion from the digital financial literacy lens because across the globe, studies have reported a significant knowledge gap among individuals on issues related to digital financial platforms and their services thus contributes to low adoption of digital financial services,(Prasad, Meghwal, & Dayama, 2018).

In view of these, the study presents a conceptual framework that recommends individuals to have access to financial education that focuses on imparting individuals with both financial literacy and digital financial literacy so that they have the necessary confidence to engage with financial service providers and use banking services.

1.4 Research Objectives

General Objective: The purpose of this study is to examine financial literacy as the demand-side determinant of financial inclusion in the Tanzania banking sector.

Specific Objectives:

- Examine the relationship between financial literacy and financial inclusion
- Assess the relationship between digital financial literacy and financial inclusion
- Examine the role of socio-demographic factors in moderating the relationship between financial literacy and digital financial literacy with financial inclusion;

1.5 Research Questions

The Research problem poses the following three main questions.

(i) What is the relationship between financial literacy and financial inclusion?

(ii) What is the relationship between digital financial literacy and financial inclusion?

(iii) What is the role of sociodemographic factors in moderating the relationship between financial literacy and digital financial literacy with financial inclusion?

1.6 Significance of the Study

Financial inclusion researchers have placed less attention on demand-side determinants of banking financial inclusion; specifically, limited literature exists on the role of financial literacy on banking financial inclusion. This study extends from what is known in financial inclusion by reducing the existing knowledge gap on the relationship between financial literacy, digital financial literacy and financial inclusion in the context of Tanzania. This study is therefore considered beneficial because of the following specific issues;

Theoretically, the findings of this study contribute to the theoretical body of knowledge in two folds. First, as evidence in validating the Theory of Planned Behaviour by testing the pre-existing theoretical constructs (perceived control behaviour and Attitude) in explaining an individual behavioural intention and the actual use of banking services. Secondly, this study attempts to propose an extension of the perceived ease of use constructs by TAM to consider digital financial literacy among the key factors which influence the behaviour intention and actual use of banking services. This contribution is an extension of the already existing work of (Venkatesh & Bala, 2008), which extended the TAM theory(Davis, 1989) by suggesting that the perceived ease of use is influenced by control belief based on a person's ability to use the system. Further, (Venkatesh & Bala, 2008) proposed computer self-efficacy, computer anxiety, computer playfulness, facilitating conditions, and perceived enjoyment to be critical in influencing a person's ability to use new technology.

Empirically this study continues to uncover the demand-side limitations for financial inclusion in the banking sector. This contribution narrows the knowledge gap created by the majority of financial inclusion studies which focus on supply-side determinants or generalizing financial inclusion determinants to all financial sub-sectors(C. Boakye & N. Amankwah, 2012; Zins & Weill, 2016). In addition, the study provides the mapping of the level of financial inclusion in Tanzania and the reasons for its variations as influenced by differences in demographic characteristics.

Further, given the limited literature on digital financial literacy globally and in Tanzania in particular, this contributes to the body of knowledge a piece of scientific evidence on the effect of digital financial literacy in influencing financial inclusion.

On the other hand, the findings of this study provide a guide to financial Policymakers in assessing the progress made during the implementation of financial inclusion and financial education national strategies and pave the way for critical considerations when reviewing the frameworks or developing other national policies that support the financial education and financial inclusion agenda. Additionally, the findings of this study provide insights and trigger the need to broaden the scope of the current definition of literacy adopted in the Tanzania Financial Education Framework (NFEF, 2016), which limits the financial literacy concept and its measurement to the financial knowledge and skills dimensions while ignoring the independent contribution of financial behaviour and financial attitude dimensions in influencing individual's financial decision making. Similarly, through this study, the digital financial literacy gap, which was overlooked by policymakers when developing national financial education strategies, will now be clear and hence attract the deserved attention in the efforts of developing inclusive digital literacy policies in the country. Similarly, the findings of this study guide financial educators on how to prioritize and customize financial education programs to align with existing gaps among Tanzanians both in the aspects of financial literacy and digital financial literacy. Overall, the study findings will guide the financial education interventions in the country to ensure increased financial inclusion.

Considering that the Tanzania Financial inclusion framework, which is to be implemented from the year 2018 to 2022, has recognized the financial education framework as a tool to increase the use of financial services among Tanzanians. However, this presumption has limited support for scholarly work from the context of Tanzania. Therefore, this study provides not only evidence of this relationship but also the recommendations to ensure the financial exclusion gap among Tanzanians is narrowed in line with financial inclusion national targets.

In practice, the study provides the Financial Service Providers with necessary insights on the level of financial literacy among existing and potential banking customers in Tanzania. These facts will facilitate the design of customer-centric banking products, including the need to consider an individual's digital financial literacy level when designing products or choosing delivery channels for electronic banking services. In addition, the findings of this study shapes and improves the delivery of financial education interventions provided by banks.

Lastly, this study has employed a cross-sectional survey design and used a multi-dimensional approach to measure financial literacy and digital financial literacy. This attempt provides empirical evidence that contribute in reducing measurement gaps in financial education and limited demand-side financial inclusion studies (Cámara & Tuesta, 2014). Further, the use of Structural Equation Modelling (SEM) estimation technique extends the use of SEM for conducting business studies and, specifically, in financial inclusion studies. This method though is rarely used in financial inclusion studies, it is argued to be far better than Logit/ Probit, Ordinary Least Square, Multiple Regression models that are commonly used in financial inclusion studies, (Chin, 1998).

1.7 Delimitations

This study dwells in the field of behavioural finance with the need to improve the understanding of how human nature, including how people think and behave, can be incorporated into finance and economics, (Shefrin, 2002). In addition, the fact that people usually make biased and systematic mistakes in decision making then it is important that people are guided, encouraged and nudged towards making right choices that are in their best interest, (Obeng-Odoom, 2022). So improving the demand side capability of people to use financial services through financial education can be considered to be a good nudge because it will ultimately make people intuitive on issues related to finance. In view of this the study examines how financial literacy and digital financial literacy not only gives consumers freedom of choice in the use of financial services but how financial education

can be adopted by choice architect as a tool to help people make choices that will help them and not by influence of third parties.

The study does not focus on all determinants of financial inclusion, but on financial literacy and digital financial literacy as demand-side capabilities that influences financial inclusion in the banking sector. In addition, the study has also examined the role of socio-demographic factors in moderating the relationship between financial literacy and digital financial literacy with financial inclusion in the context of Tanzania.

1.8 Organization of the study.

The rest of the thesis is organized as follows: Chapter two provides a review of Technology Acceptance Model (TAM) and The theory of Planned Behaviour (TPB) as adopted theories in guiding the theoretical foundation of the study. In addition, the chapter provides empirical literature on financial literacy, digital financial literacy and financial inclusion, including the use of digital financial services. Chapter three provides details of the research design and rationale for its choice, details of how the cross-section survey was conducted, the choice of SEM as data estimation techniques and how Smart PLS SEM will be employed for analysis. The study presents an analysis of the demographic characteristics of respondents in chapter four. The analysis among others provides the profile of respondents in using various banking services. In chapter five, details on how the first order financial inclusion estimation model was developed is provided. In addition, chapter six presents the key assumptions and development of the second order financial inclusion estimation model indicating path relations among study variables. On the other hand, chapter seven presents the analysis of how various demographic variables moderates the relationships between the two main relations (FL and DFL) with financial inclusion. Chapter eight provides discussions of the study results including interpretation of the estimation results. Lastly, chapter nine provides the study's conclusion, contributions and its implications to academia, practitioners and policymakers for what has been resolved by the study while pointing out areas that require future research intervention.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents the theoretical framework that interlinks the Theory of planned behaviour (TPB) and Technology acceptance model theory (TAM) to guide the study on examining the influence of financial literacy and digital financial literacy on individual financial inclusion. In addition, the study provides empirical evidence of existing literature on financial literacy, digital financial literacy and financial inclusion. After review of what is known in financial education and financial inclusion, the study identifies gaps to inform the conceptual framework for this study and thus developing research hypotheses for examination.

2.1 Theoretical Review

Various theories have guided financial inclusion and financial literacy studies. For instance, the Financial Intermediation Theory, (Allen & Santomero, 1997) that consider Financial Service Providers (FSPs) as intermediaries which reduce the information asymmetry and cost among surplus and deficit units; The Life -cycle Hypothesis and the Permanent Income Theories,(Friedman, 1957; Modigliani & Brumberg, 1954) which stress on the need for financial consumers to be rational, forward-looking and possess the capability to process economic information, compare cost and benefits of available choices and make financial decisions or choices for purposes of maximizing their expected net utility values; the Theory of Planned Behavior ,(Ajzen, 1985, 1991) which assumes that individual desired behavior is influenced by behavioural intention which is attributed by subjective norms, attitude and perceived behavioural control; and technology adoption theories that often guide digital financial inclusion studies like, Technology Acceptance Model and the Diffusion of

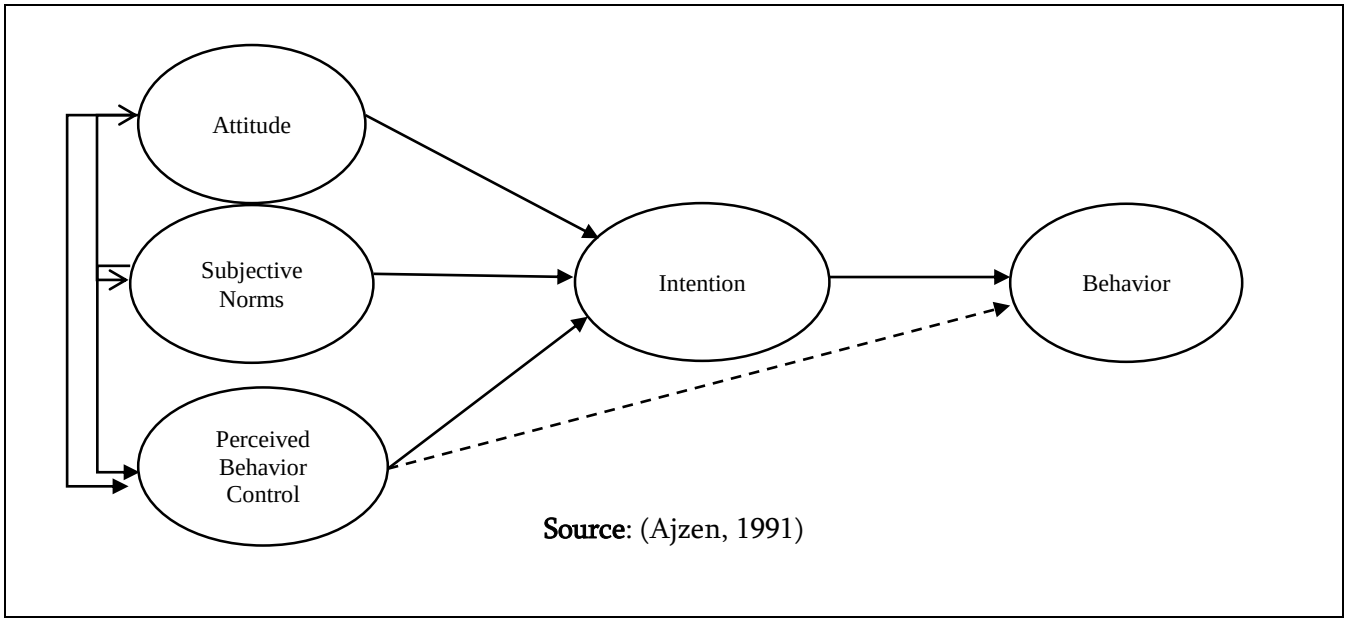
innovation theory (Davis, 1989; Rogers, 1962) which both assumes that technology adoption by individuals and businesses is influenced by both users and technology characteristics.

This study considers a multi-theory approach that leverages from more than one theory to construct a comprehensive proposition is adopted. The researcher finds the theory of Planned Behaviour (TPB), (Ajzen, 1985, 1991) as a basis for financial consumers to be financially literate and apply that capability to make sound financial decisions; and the Technology Acceptance Model(TAM), (Davis, 1989), which is linked to individual possession of digital financial literacy as a precondition necessary for the acceptance and use of electronic banking services, to be relevant theories underpinning this study.

2.1.1 The Theory of Planned Behavior (TBP)

The theory of Planned Behaviour (Ajzen, 1985, 1991) was derived from the theory of Reasonable Action. Both the TRA and TPB assume that individual behaviour is predicted by behavioural intention as a function of attitude and subjective norms. However, the TPB has added a construct which is the Perceived Behavioural Control (PBC) introduced by Ajzen (1991) in the original model to address the issue of personal control that was lacking in the TRA. This construct signifies that; individuals do not have complete control over the desired behaviour. Therefore, the theory assumes that the three constructs (Attitude, Subjective norms and Perceived Behavioural control) interact to predict individual desired behaviour.

Figure 1: The Theory of Planned Behaviour



Source: (Ajzen, 1991)

The theory constructs are indications of how hard people are willing to try or how much effort they are planning to exert to perform the behaviour. The stronger intention to engage in behaviour, the more likely it should be its performance; however, the intention is expressed in behaviour if an individual has volitional control over that behaviour.

This study, therefore, considers the TPB relevant in examining financial literacy as a determinant of financial inclusion. This is because TPB constructs can be related to financial literacy which can influence individual behavioural intention and in the case of this study the banking behaviour. In this study, attitude and perceived behavioural control constructs are considered effective in defining people's perceptions of their capabilities to engage in banking or how they positively or negatively consider the use of banking services. The perceived behavioural control can also be defined as an individual's perceptions of whether he/she has the resources, skills and opportunities necessary to influence the desired behaviour (Tucker, Jubb, & Yap, 2019). It is from this ground that this study

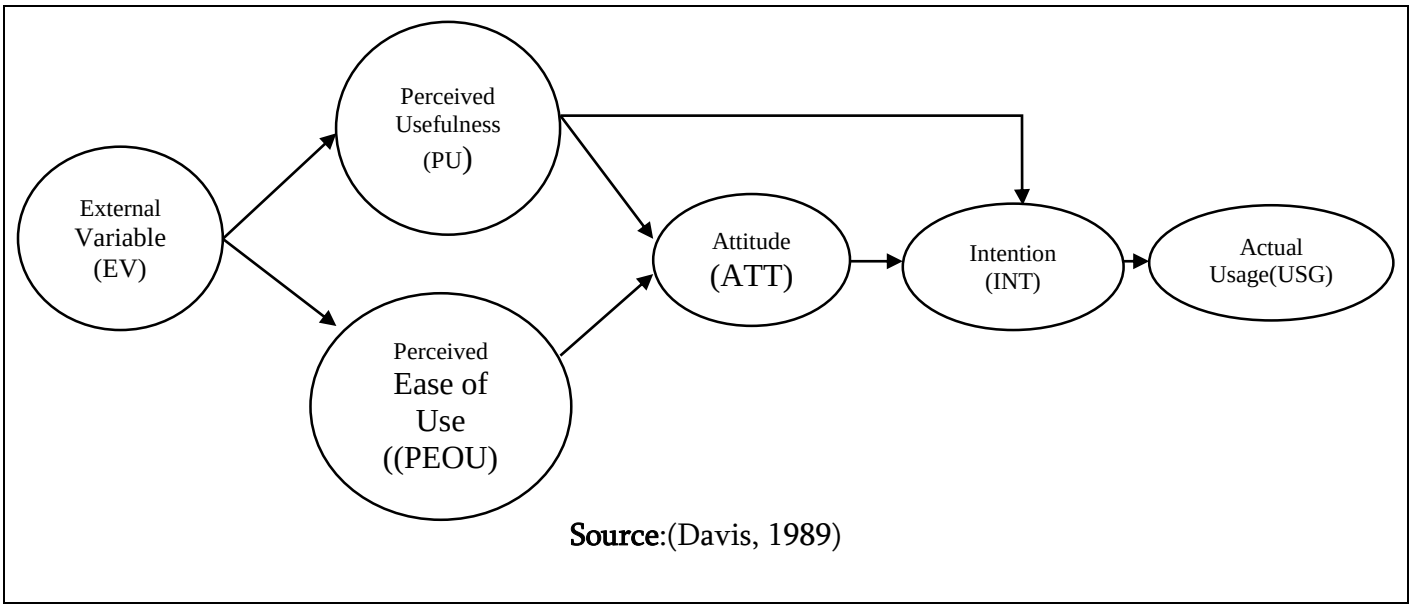
considers the financial literacy construct as a necessary capability required to influence the intention and actual use of banking services.

The use of this theory is supported by similar financial inclusion studies that have used the TPB to relate an individual's intention and use of financial services. The application of this theory in behavioural finance studies ranges in the field of financial investment, banking, financial literacy and digital banking as evidenced in studies such as (Alleyne, 2011; Garg & Singh, 2018; Hsu & Chiu, 2004; Hung, Parker, & Yoong, 2009; Kennedy, 2013).

2.1.2 The Technology Acceptance Model (TAM).

TAM is a theoretical model that defines the adoption and continued use of information and computer technology. The model was developed by Davis (1989) and is based on two theoretical constructs, which are the Perceived Usefulness (PU) and the Perceive Ease of Use (PEOU). The two constructs are claimed to be the critical determinants for the acceptance of new technology. Perceived usefulness is defined as the degree to which an individual believes that usage of technology will improve his performance, whereas, Ease of Use is the extent of an individual's belief that it does not require any effort to use an existing or new system.

Figure 2: Technology Acceptance Model



Source:(Davis, 1989)

TAM has been used by scholars globally to study perceptions of individuals and corporates on the adoption and use of ICT solutions, including electronic banking, as provided in Abeka (2012), Rumanyika and Mashenene (2014), and Abdinoor and Mbamba (2017). PU and PEOU influence behavioural intention on adoption and continued use of electronic banking, (Fonchamnyo, 2013). Similarly, in this study, digital financial literacy facilitates the PEOU of financial technology which in turn influences the attitude towards the adoption of electronic banking services. The behavioural intention referred to in the TAM influences the use of electronic banking technology, (Ammenwerth, 2019). As such TAM is adopted to guide the role of digital financial literacy to influence people's perceptions of banking technology and their willingness to strive to perform banking behaviour.

Venkatesh and Davis (2000) extended the TAM model to form TAM2 by identifying factors that influence perceived usefulness and usage intention. The study suggests that the acceptance of new or existing technology is significantly influenced by social influence processes (subjective norms, image, voluntaries) and cognitive instrumental processes (job relevance, output quality, results in

demonstrability and perceived ease of use). Further, TAM 2 was later extended to TAM 3 by identifying computer self-literacy, computer anxiety, computer play fullness, perception of external control and perceived enjoyment as determinants of perceived ease of use, (Venkatesh & Bala, 2008).

In this study ease of use as referred to in TAM 3 relates to digital financial literacy as a determinant for the ease of use of digital banking technology. The theory emphasizes that for people to accept and have continued use of digital banking they should find it easy to access and use the financial technology. Theoretically digital financial literacy provides people with the capability to facilitate ease of use of digital financial services. The said capability is associated with the ability of an individual to use digital platforms to do financial transactions including having technical resources needed to support the system (e.g. managing transaction risks and disputes). This is because when people gain knowledge and confidence about a technology they find it easier to use such a system (Hackbarth, Grover, & Mun, 2003).

In this study, TAM supports the proposition that digital financial literacy is a necessary capability for individuals to have the behavioural intention and actual use of digital banking services. The decision to use this theory is backed by the evidence from previous studies that have applied TAM to predict an individual's behavioural intention to adopt and continue using electronic banking services (Abadi, Ranjbarian, & Zade, 2012; S. K. Sharma, 2019).

This study intends to answer questions with regard to the ability of financial literacy and digital financial literacy to influence financial inclusion. Under the TPB and TAM the two constructs can be considered as control behaviour or a capability for an individual to engage in the use of banking services. In the context of this study, theoretically we can presume that, for one to accept and use banking services, it requires understanding of the benefits and risks of not doing the desired behaviour. On the other hand, the adoption and use of digital banking services requires an individual to develop a capability to interact with digital platforms, it is influenced by their perception of risk and their ability to manage such risks and the perceived benefits they will enjoy if the adopt the

proposed technology. In view of this thereof, this theoretical underpinning will guide the review of literature to allow the researcher examine the relevance and influence of both financial literacy and digital financial literacy in influencing financial inclusion

2.2 Empirical Literature Review

2.2.1 Definition of key terms and concepts used in the study

This section defines key concepts of financial inclusion, financial exclusion, financial literacy and digital financial literacy.

(a) Financial Inclusion

The definition of financial inclusion has been evolving, and scholars generally define it as referring to either demand-side needs or supply-side perspectives or a combination of the two perspectives. From the demand side, Financial inclusion is defined as access to a range of formal financial services (Leyshon & Thrift, 1995; Sarma, 2008), while the supply side considers it a process to provide the population with convenient and affordable access to formal financial services (Dev, 2006; Sinclair, 2001) or a combination of both as adult access to and effective use of a range of appropriate financial services from a regulated and sustainable financial institution and are delivered responsibly and safely to the consumer,(Atkinson & Messy, 2013; Demirguc-Kunt et al., 2017; Gupte, Venkataramani, & Gupta, 2012).

(b) Financial Exclusion

Financial exclusion is an inability to access necessary financial services in an appropriate form due to barriers including access, conditions, price, marketing, or self-exclusion in response to negative experiences or perceptions (Sinclair, 2001). There are two types of financial exclusion, first is involuntary exclusion, which happens when financial institutions outright refuse to accept certain households or businesses through marketing, pricing, or product design, personal eligibility criteria

and condition exclusions like minimum balance required to open an account and secondly, the voluntary exclusion, which occurs when people self-exclude by making an active and unconstrained choice not to uptake financial products due to poor quality or mismatch on financial needs, (Kempson & Whyley, 1999; Mohieldin, Iqbal, Rostom, & Fu, 2011). In addition, poor credit history, low income, lack of acceptable identity, bank transaction charges & fees, long distance from financial access points, psychological & cultural barriers, employment status, marital status, age, and academic qualifications are among the most recurring reasons for financial exclusion in the developed economies, (Devlin, 2005; Kempson, Atkinson, & Pilley, 2004; Sinclair, 2001).

Financial exclusion affects individuals, households, and businesses in many ways. Specifically, most people in low-income rural populations or less educated categories suffer from economic or social negative impacts of financial exclusion like social exclusion, which may cause social class and divisions in the society (Kempson & Whyley, 1999). Additionally, several conditions range from failure to access financial products and resources to much broader capabilities, for instance, limited access to education, healthcare and compromised security, use of inappropriate or fringe products and a prolonged state of poverty (Sinclair, 2001). Further, related studies have noted that financially excluded people rely on informal mechanisms and especially money lenders or immediate family or community members to access financial services. However, these services are generally accessible at high rates, prone to abuse and unsustainable, which ultimately leads to a vicious cycle of poverty due to over-indebtedness, (Agrawal, 2008; C. Boakye & N. O. A. Amankwah, 2012; Schindler, 2010), as compared to opportunities and better terms provided formal institutions like banks, (Demirguc-Kunt et al., 2017).

(c) Financial literacy

There exist a variety of financial literacy definitions, but scholars have not reached a consensus to have a standard definition. Hogarth (2002) makes a review of existing financial literacy definitions and noted that the definitions focus broadly on the understanding of economics and how household

decisions are affected by economic conditions and the possession of knowledge and skills for implementing financial decisions, including basic money management, budgeting, saving, investment and taking /managing insurance contracts. Huston (2010), defines financial literacy as the possession of knowledge about financial institutions and their products and services, financial skills and concepts, and the application of financial knowledge to manage money and make sound financial decisions. An individual with financial literacy can; process economic information, apply numeracy skills to compare cost and returns when making choices among varieties of financial services, possess the necessary financial capability to manage and use money, employ financial planning for short-term needs and retirements and the possession of skills to manage psychological factors influencing financial decision making, (Lusardi, 2008; Widdowson & Hailwood, 2007; Lisa Xu & Zia, 2012).

(d) Digital Financial literacy

Prasad et al. (2018) define Digital financial literacy (DFL) as the possession of knowledge or awareness about how to access and use online platforms for purchase and payment for goods and services or use of banking services. Also, other scholars have defined DFL as financial literacy in digital financial technology or financial literacy required to access and use digital financial technology platforms (Setiawan, Effendi, Santoso, Dewi, & Sapulette, 2020).

2.2.2 Determinants of Financial inclusion

The financial inclusion process aims to ensure that people in the community have inclusive access and use of a range of financial services, including insurance, pension, investment in securities,

payments and microfinance services at affordable terms and conditions. However, this process is determined by various supply and demand-side factors. For instance, demand-side factors may include individual characteristics and preferences. In contrast, the supply side comprises poor banking penetration, banks' unwillingness to serve the underserved, and high investment costs by financial service providers (Paramasivan & Ganeshkumar, 2013). Details of financial inclusion determinants are provided in the literature as discussed next;

(i) Demand-side Barriers

(a) Demographic Characteristics

Individual characteristics like gender, age, level of income, marital status, level of education, and occupation are identified to have a direct relationship with financial inclusion in most developing countries as provided in studies such as (Delafrooz & Paim, 2011; Evans, 2016; Izquierdo & Tuesta, 2015; Lea, Webley, & Walker, 1995; Roa, 2015; Tuesta, Sorensen, Haring, & Camara, 2015; Zins & Weill, 2016). Also, other studies have found that the geographical distance from where people live to their nearest financial access points influences their uptake and use of financial services, (En, Demirguc-Kunt, Klapper, & Peria, 2012).

(b) Financial literacy

Financially illiterate people lack the necessary financial skills and knowledge on matters relating to financial products and services and how to engage with financial institutions. Therefore, financial illiteracy subjects consumers at risk of incurring high transaction costs or borrowing at a high cost, becoming victims of over-indebtedness or being subjected to abuse due to compromised financial consumer protection practices (Lusardi & Tufano, 2015). Financial literacy is the critical subject matter in this study, and in-depth details are covered in item 2.4.

(c) Lack of Financial Identity

Some individuals or informal businesses lack the necessary documentation to prove a person's or business identity, income or possession of an asset to act as collateral when accessing credit. Given this, people may be restricted from opening a savings account or access to credit to some people is restricted due to either lack of collateral, income trail or Know Your Customer (KYC) challenges due to rules imposed by banks when complying with Anti-money laundering and credit appraisal regulatory requirements (Agrawal, 2008; Akudugu, 2013; Atkinson & Messy, 2013; Hannig & Jansen, 2010; Iqbal & Sami, 2017).

(d) Consumer Trust in banking institutions

Consumer trust in the banking sector is defined as the consumer's feeling of confidence and security with an assurance that the bank will take care of their perceived interest (Kumra & Mittal, 2004). Consumers' perceptions of trust vary depending on customer experience, type of banking service, and consumers' demographic characteristics (Järvinen, 2014). Studies suggest that some individuals may exclude themselves from uptake or discontinue the relationship and use of banking services due to lost or weakened trust (Akudugu, 2013; Chakrabarty, 2012; Järvinen, 2014; Roa, 2015).

(e)Behavioural characteristics

Delafrooz and Paim (2011) suggest that Personal behaviour, cultural preferences, and religious beliefs or conditions that come with financial products and services may affect consumer decisions to use banking services. Similarly, (Lea et al., 1995) noted that the complex psychological and behavioural variables affect consumer attitudes toward debt control skills.

Due to social norms and religious beliefs some people fails to engage with financial service providers. For instance, some people would only want sharia compliant product and services and when banks can offer that, some people are ready to avoid such services/service providers. In some other communities, women are not allowed to go out and be served with men either in the

Bank or through a bank agent, as such those people are likely not to use banking services not because they do not have demand for the services but they are compelled to comply with community laws.

In addition, the fact that some people do not have self-control in spending, are likely to do certain behaviour not because they want but to imitate others and because of their incompetent of inferiority complex they may shy away from engaging with banks and thus have limited access and use of banking services. However, people who are optimistic, risk lovers and those who wish to try new things are likely to use banking services.

(ii) Supply-side Barriers

(a) **Country legal and regulatory frameworks** may restrict banks from enrolling potential customers, expanding their branch network, or incurring additional costs that cannot be recovered in the short term when serving such customers. Such legal constraints were evidenced by (Kodongo, 2018) who argues that KYC rules imposed for client onboarding, capital adequacy and liquidity management requirements for banks limit the amount of capital available for intermediation and uptake of banking services by those who do not have an acceptable identity and therefore limits the financial inclusion process.

(b) **Poor physical or communication infrastructure** may limit individuals or businesses to access financial services due to the cost of access being high than what they can afford, (Atkinson & Messy, 2013). This is commonly the case in rural and remote areas where people are required to travel a long distance to reach the nearest financial access point, or financial service providers may choose not to provide their services in certain jurisdictions due to infrastructure limitations to support the delivery of services.

(c) **Market failures:** Information asymmetry and lack of competition in the market may result in Financial Service Providers(FSP) having limited information on prospective customer

characteristics. As a result, financial service providers choose to avoid selling their products to such people or decide to compensate for that risk by charging unaffordable rates, which exclude some people from the use of banking services. Also, market failures can exist when a few FSPs have monopoly power in the market, and they tend to compromise quality and unnecessarily charge high prices (Izquierdo & Tuesta, 2015).

(d) **Inappropriate Product and Services:** Due to increasingly complex financial markets, information asymmetry problems and failures in product designs, we experience a mismatch between what financial service providers offer to people compared to the desired financial solution, which is appropriate to respond to individual's needs. This imbalance continues to be among the reasons for either involuntary or voluntary financial exclusion of most people in our societies (Sinclair, 2001).

2.2.3 Financial Inclusion in Banking Services

As highly regulated institutions, banks are considered to have the institutional capabilities required to provide sustainable financial intermediation and, therefore, better placed to meet the immediate financial needs of the households and businesses. However, this is not the case in most developing countries where banking services penetration is still shallow and those with access still have low levels of uptake and usage of banking services. Nevertheless, Banks stand to be better placed to participate in the financial inclusion process through their roles in the provision of financial education, credit counselling, increasing financial access points through branches, ATMs, use of bank agents and designing financial inclusion products that meet the needs of the underserved, (Evans & Alenoghena, 2017; Pavithran & Raihanath, 2014).

Similarly, rural areas which are characterized by high-density populations that have no formal address, experience challenges of limited access to banking services due to the long physical distance to the nearest bank branches (Iqbal & Sami, 2017). However, through electronic banking, banks can easily reach small depositors from rural areas and the unbanked through channels such as Agency

banking and Mobile banking models. This is evidence of promoting a saving culture in society by increasing savings, which can be loanable for investment purposes to the rural households, (Bruhn & Love, 2014; Burgess & Pande, 2005; Paramasivan & Ganeshkumar, 2013). Further, banks are also considered effective in facilitating payment services, which in turn promotes a cashless economy and provides an efficient, convenient and transparent payment system (Demirguc-Kunt et al., 2017). Furthermore, through the intermediation process, banks offer loans to individuals to create potential investors in education and businesses that, in the long-term, accelerate economic growth and productivity (Dupas & Robinson, 2013).

Therefore, it is agreed that the financial inclusion process aims to ensure inclusive access and use of financial services to the people. So, if some people, especially the unbanked and the underserved both in rural and urban areas, lack banking services, then their economic situation is likely to be affected due to failure to access credit or save for future consumption, engage in investment activities and provide education to household members which in the long run is likely to reduce the in-equality gap and extreme poverty in society (Iqbal & Sami, 2017). Despite the evidence provided in the literature on the role of banks in facilitating financial inclusion, still, the majority of people in the world and Africa, in particular, remains unbanked due to various factors including; People who live with infrastructure challenges in high-density population in rural and remote areas, limited access to national identity, financial illiteracy, low level of income, high charges and rigid terms and conditions for banking accessing services,(Iqbal & Sami, 2017).

2.2.4 The Role of Financial Literacy in the Financial Inclusion Process

Globally, most financial consumers lack knowledge of financial concepts and skills to make informed decisions that are beneficial to their wellbeing. This knowledge is financial literacy, and it provides individuals and businesses with the necessary capability to have an awareness of financial matters, process financial information, and apply the knowledge to make decisions consistent with the traditional economic theory (Modigliani & Brumberg, 1954). Notably, it is believed that financially

literate consumers are likely to demand effective financial markets and accelerate financial inclusion (Behrman, Mitchell, Soo, & Bravo, 2012).

Financial literacy studies suggest that individuals' and households' ability to manage money for day-to-day consumption or long-term investment decisions are affected by their level of financial literacy. Further, it is argued that the identified effects are not limited to an individual level but extend to the entire economy because the un-informed consumers' influence is likely to compromise markets and cause financial fragility, unlike knowledgeable and capable consumers who facilitate financial market to be efficient and effective as it responds to the consumer needs, (Braunstein & Welch, 2002; Hogarth, 2002; Lusardi & Mitchelli, 2007).

Financial illiteracy is a significant global challenge, as evidenced in the global financial literacy study, which suggests that most developing countries and BRICS have low financial literacy levels when compared to developed economies, (Klapper et al., 2015). For instance, on average, 55 per cent of adults in developed economies are financially literate as compared to BRIC countries with an average of 28 per cent with high disparities ranging from 24 per cent in India to 48 per cent in South Africa while in other parts of Africa ranging from 15 per cent in Somalia to 45 per cent in Tunisia. Other studies suggest that in some countries, these variations can be explained by the limited use of local languages in the delivery of banking business such that the uneducated and those in the rural areas continue to perceive banking as a business for the affluent and the educated in the society, especially those who can speak English or French (Chikalipah, 2017).

The negative effects of financial illiterate also extend to subjecting people to committing poor financial decisions that may lead to a debt crisis, especially in mortgages, household bankruptcy and indebtedness. Further, the same may lead to instability in the financial system due to high default rates arising from irresponsible borrowings and improper allocation of funds due to limited financial skills required to analyse risk-adjusted returns when allocating resources for investment purposes (Diniz, Birochi, & Pozzebon, 2012; Huston, 2010; Lusardi & Tufano, 2009; Parrish & Servon, 2006).

To resolve all these challenges, countries are embarking on providing financial education programmes that aim at facilitating the understanding of mainstream financial services, understanding the risk and benefits of financial services, reducing information asymmetry among the unbanked and protecting consumers against unfair or discriminatory practices (Atkinson & Messy, 2013; Hannig & Jansen, 2010). Additionally, these programmes help consumers in dealing with psychological limitations in accessing and use of financial services and protect consumers from unfairness and abuse from complex financial products, including the necessary sophistication to match with financial markets' developments (Bernheim, 1995, 1998; West, 2012).

Studies conducted in Tanzania have also provided a piece of evidence on the role of financial literacy in the financial inclusion process. Studies conducted by (Lotto, 2020b) noted that men are more financially literate than women while the younger generation, people with high income, employed, and those with a high level of education, have a higher level of financial literacy. Similarly, other studies have suggested that household investment choices, SME Managers' financial control and planning and Youth skills to create a personal budget, track expenses, improve saving culture and financial decision making are influenced by an individual's financial literacy (Krause, McCarthy, & Chapman, 2016; Lotto, 2020a; Mabula & Dongping, 2019).

2.2.4.1 Factors influencing financial literacy

Various factors determine the variations in the level of financial illiteracy among individuals. Financial literacy studies indicate that most people who have low income, uneducated, women, youth, old population and the unemployed, have a low level of financial literacy and therefore affecting their financial behaviour and attitude towards savings, investments, retirement planning, participating in stock markets and managing their borrowings, (Al-Tamimi, 2009; Atkinson & Messy, 2013; Garg & Singh, 2018; Klapper et al., 2015; Lusardi, 2008; Lusardi & Mitchelli, 2007; Malombe, 2018; Worthington, 2006; Lisa Xu & Zia, 2012). These results were inconsistent with the conclusions recorded by (Al-Tamimi, 2009) when examining the relationship between Financial

literacy and Financial investments in the UAE, who noted that age, occupation, and level of income do not have any influence on an individual's financial literacy.

In addition, access to financial education provides an opportunity for individuals to acquire knowledge about financial concepts and develop positive financial behaviour, which is associated with a positive change in consumers' capability to make financial decisions (Lyons et al., 2006). Despite the recorded benefits of financial education, the world continues to have limited financial educators in developing and developed economies due to limited financial and technical resources (Braunstein & Welch, 2002). Further, it is noted that aged individuals lack interest and time to learn financial matters because they are engaged in other economic activities and cannot be trained as youth do in circular education or dedicated financial education programs (Parrish & Servon, 2006).

2.2.4.2 Behavioural Dimensions of Financial Literacy

The definition of Financial literacy has evolved over the years; previous studies provide various financial literacy meanings such as having the ability to make informed decisions regarding the use and management of personal finances; understanding economics and how household decisions are affected by economic conditions, and the ability to read understand and analyse financial matters for making optimal decisions. Much as there is a range of financial literacy definitions, scholars are having consensus on some of the key financial literacy concepts, which include; first, the possession of knowledge of and understanding of how to manage money, assets, tax issues and financial services and secondly, the ability to apply the knowledge and understanding to plan and implement the financial decision on daily life,(Hogarth, 2002).

The financial literacy study in the USA (Lusardi, 2008) identified financial knowledge and numeracy skills as a necessary dimension for a financial consumer to make informed choices. The study indicated that most people in the U.S population had high levels of financial illiteracy, which is explained by a lack of financial knowledge to understand both basic and complex financial concepts and limited numeracy skills to perform simple economic calculations, (Lusardi, 2008). Therefore,

their participation in financial markets, creating savings, planning for retirement and borrowing behaviour were considered inferior.

The financial knowledge dimension (Risk diversification, inflation, interest rate and interest compounding) used in the study by Lusardi (2008), was also used by (Grohmann, Klühs, & Menkhoff, 2018) to guide a cross-country study on the role of financial literacy on financial inclusion. In the cross-country study, the Simple OLS Regression method was employed to study the influence of financial literacy to account ownership in a formal financial institution and the use of a debit card. Among others, the author identified a positive and highly significant relationship between the possession of financial literacy and the use of banking services. On the other hand, Kempson (2009) developed a framework to guide the conduct of financial literacy baseline surveys in the world and emphasized the need for researchers to measure, among others, the following financial literacy dimensions; Personal Money management, financial planning and individual attitudes towards financial planning; financial knowledge and lastly consumers ability to choose appropriate products. These recommendations relate to a greater extent to dimensions proposed by (Lusardi, 2008) with the addition of the financial attitude dimension.

Considering the above evidence on how financial literacy is measured, it is evident that most financial literacy researchers have a consensus on how to measure financial literacy. This consensus was evidenced by (Huston, 2010) who conducted a thorough literature review on the measurement of financial literacy for the past decade, taking a sample of 72 individual financial literacy studies that used different 52 datasets. The study noted that many financial literacy studies had used similar four constructs when measuring individual financial literacy levels. The commonly financial literacy constructs used include; personal finance basics, borrowing, saving/investing and protecting resources concepts. Further, the study recommends personal finance awareness and the application of knowledge as crucial dimensions to be considered when measuring individual financial literacy.

Another evidence of financial literacy dimensions is highlighted in the OECD financial literacy study in 14 countries that noted the presence of a sizeable number of the adult population with low financial literacy levels across countries. The study recommends researchers have a standard financial literacy measurement framework that considers financial knowledge, financial behaviour and financial attitude dimensions. These dimensions are essential because when measuring financial literacy, it is vital to test basic knowledge of key financial concepts to capture the evidence of behaviour and individual attitude/ perceptions toward personal finance. This measurement framework has commonly been used in various financial literacy studies across middle and low-income countries, including South Africa, Jamaica, Lebanon, Turkey and Colombia, (Karakurum-Ozdemir, Kokkizil, & Uysal, 2019). Similarly, (Kempson, Perotti, & Scott, 2013) consider financial literacy as a financial capability that broadly includes financial knowledge and skills, financial behaviour and financial attitude dimensions. In this study, the authors applied these dimensions to develop a measure for individual financial literacy across twelve low and middle-income countries.

In addition, (Rai, Dua, & Yadav, 2019) used the Structural Equation Modelling Approach to study the association of financial knowledge, financial behaviour and financial attitude in explaining the financial literacy level among working women in India. The study concluded that both financial behaviour and financial attitude have a strong association with financial literacy as compared to financial knowledge. The same evidence on the use of these financial literacy dimensions (Financial knowledge, behaviour and attitude) is provided by (P. J. Morgan & Trinh, 2019 c) in their study of the determinants of financial literacy and its effects on savings behaviour and financial inclusion in Cambodia and Viet Nam. Further in their study, P. J. Morgan and Trinh (2019 c), after applying the Ordinary Least Square Regression to estimate the relationship between the study variables, it was noted that financial literacy is influenced by socio-demographic factors and has a positive and significant relationship with individual saving behaviour and financial inclusion.

2.2.5 The relationship between financial literacy and financial inclusion in the banking sector.

Grohmann et al. (2018) global study on the relationship between financial literacy and financial inclusion noted a positive and strong relationship between financial literacy and financial inclusion, as evidenced by increased access to and use of banking products and services. Similarly, financial literacy equips consumers with financial capability and the confidence to engage with the financial institution, as evidenced by (Van Rooij, Lusardi, & Alessie, 2012), who suggests a strong positive relationship between possession of higher levels of financial literacy and the likelihood of investing in stock markets, planning for retirement, and developing a saving behaviour. The role of financial literacy in facilitating financial inclusion is also evidenced in sub-Saharan Africa, as provided in the World Bank global financial literacy study that associated the possession of financial literacy with individual ownership of bank account and promotion of investment and saving behaviour among low-income individuals and minorities in the Sub Saharan-Africa countries (Lisa Xu & Zia, 2012).

Other financial literacy studies provide evidence of the existence of a positive and significant relationship between financial literacy and access to credit. Financial literacy and access to credit studies such as (Nkundabanyanga, Kasozi, Nalukenge, & Tauringana, 2014) suggest that it is through financial literacy, that individuals can understand credit as a product, keep the necessary records for evaluation of their creditworthiness and possess the capability to understand the terms of credit before making a credit decision. Moreover, these observations are supported by (Kidwell & Turrisi, 2004; Stango & Zinman, 2009), who argues that people with a low level of financial literacy struggle with debt management, including borrowing at high-interest rates coupled and fewer savings.

Cole, Sampson, and Zia (2009) provide another piece of evidence of how financial literacy influences the demand for financial services in developing countries like India and Indonesia. However, the study noted the limitation of financial literacy interventions to influence individuals to open a bank account as opposed to the use of small financial incentives that are effective in influencing the unbanked to open new accounts.

Further, financial literacy is proven to stimulate the demand for advanced financial solutions, including innovative financial services like electronic banking. And, the continuous responses to such demand create an opportunity for FSPs to extend their financial services to the unbanked and reduce inefficiencies in the financial market in line with the objectives of the financial inclusion process, (Atkinson & Messy, 2013; Lusardi & Mitchell, 2014). Financial literacy is also evidenced to stimulate the demand for financial services in the policy paper for expanding financial access by (Claessens, Honohan, & Rojas-Suarez, 2009), who proposes the need to stimulate demand for financial services by providing financial education and strengthening consumer protection by fostering informed and confident consumers.

Furthermore, financial literacy is considered to be effective in developing individuals 'saving habits and stimulating their engagement in investment and planning for retirement. As provided by (Behrman et al., 2012; Hsiao, Lin, & Dambaravdan, 2016; Jappelli & Padula, 2013), there is a positive correlation between financial literacy and wealth accumulation. In addition, financial literacy instils in people the necessary knowledge to handle financial disputes. The role of financial literacy to equip financial consumers to handle disputes and understand their rights is also proposed in studies such (Hogarth, 2002; Shen, Lin, Tang, & Hsiao, 2016) who argue that financially literate people rarely face financial disputes given their knowledge and aggressiveness in following up in resolving disputes faced when receiving financial services.

Despite the above evidence on the presence of literature that supports the positive relationship between financial literacy and financial inclusion, there exist studies that have established no relations between the two or identified an insignificant relation by proposing that having literacy is not necessarily a reflection of increased use of financial services, (P. Gupta & Singh, 2013; Robert, Natamba, Zulaika, Akankunda, & Esther, 2013).

2.2.5.1 Financial inclusion through Electronic banking

Electronic banking is a subset of electronic finance, which refers to the use of technology tools, platforms, and ecosystems to automate the delivery of banking products and services (Schaechter, 2002). The use of technology to deliver financial services provides innovative financial products and service models, increases access to finance, reduces transaction costs, and improves customer experience. The most common electronic distribution channels in the banking business include; ATMs, Internet banking, Telephone banking, Agency banking, Mobile banking, and Debit card payments services (Cracknell, 2004).

Specifically, electronic banking provides an opportunity to reach the low-income individuals in rural areas, the unbanked and the underserved in the society who previously had no access to banking services due to geographical distance from the nearest branch. Electronic banking channels such as ATMs, internet banking, Point Of Sale machines(POS), Agency banking, and Mobile banking technology have brought banking services closer to where people live than it was over the past few decades (Collins, Morduch, Rutherford, & Ruthven, 2009; Weissbourd & Ventures, 2002).

Further, technology innovations have broadened financial product choices, hence considered affordable and easily accessible to poor people. In most developing countries, we now witness a shift of perceptions by the low-income, and rural-based populations who believed that banks are for people with high incomes or their products are not tailored to match their financial needs, they are now having a positive mindset towards banking (Mago & Chitokwindo, 2014). Further, it has been established that technology has reduced both the perceived consumer's access barriers like inconveniences, travel costs and time for distance and queuing, and bank's investment cost, because the cost of building and operating a brick and mortar branch is no longer required. Through electronic banking channels, customers have access to a range of services, including cash deposits and withdrawals, sending remittances to their relatives via their mobile phones, paying bills either

through an Agent within walking distance or through a mobile platform and a potential customer opening a bank account through a retail outlet close to home, (Ivatury & Mas, 2008).

However, for electronic banking delivery channels and products to achieve scale, the comfortability in use is a must because electronic banking is an active technology that requires a change of consumer behaviour due to consumers' continuous interactions with technology, unlike passive technology, which is easy for consumers to adapt and use (Hogarth & Anguelov, 2004). For the desired change in consumer behaviour to happen people must have adequate digital financial literacy as discussed next in section 2.2.6 of this thesis.

2.2.5.2 Mobile banking

Tiwari and Buse (2007) define mobile banking as a subset of mobile commerce, whereby the bank uses a mobile electronic platform to offer banking services to its customers. In turn, an account holder can access information about his account status, transact in his account, apply for credit or participate in stock markets for listed banks.

The growing trend in the global adoption of mobile banking services is accelerated by the increased individual or households ownership of mobile phones, the presence of mobile money, which is a form of electronic money accessible through mobile phones and easily convertible to and from cash, and the great potential of the technology to reduce the cost of convenience through the delivery of real-time financial transactions, (Hannig & Jansen, 2010). The majority of Retail and Microfinance banks have also adopted the Mobile banking model due to its potential to improve customer retention by providing existing customers with increased quality of customer service and delivery, reducing transaction costs to consumers, providing a self-service experience, and access to information about the customer account or the bank, (Safeena, Date, Kammani, & Hundewale, 2012; Tiwari & Buse, 2007).

As a financial inclusion tool, Mobile banking provides banking services to the underserved and the unbanked who are not necessarily required to have a bank account. However, the adoption and use of the mobile banking model are negatively influenced by the level of customer trust in the model, low awareness of mobile banking, perceived credibility (security and privacy), perceived cost, computer literacy challenges, perceived risk, trust, limited and unstable internet coverage and compatibility, (Abdinoor & Mbamba, 2017; Adesinasi, 2012; Agwu & Carter, 2014; Benamati & Serva, 2007; Devlin, 1995; Nyamtiga, Sam, & Laizer, 2013; Servon & Kaestner, 2008). Despite several studies in this area, there is limited empirical evidence that highlights the role of digital financial literacy in influencing the adoption and use of mobile banking.

2.2.5.3 Agency Banking

Agency banking is an arrangement for a third party to offer a set of permissible banking services on behalf of a Bank as governed by an agency contract. Third parties that can be contracted by banks to deliver banking services mainly include retailers like Shops, Lottery outlets, pharmacies, supermarkets, bakeries, and institutions like Post office centres, Religious institutions, Savings groups, and Cooperatives. Agents usually have their core business and take the agency agreement as a supplementary business to provide permissible banking activities including cash deposit and withdrawals, bill and pension payments, money transfers, account opening and collecting credit application forms or account opening forms if restricted to open accounts, (Siedek, 2008).

Agency banking reduces both supply and demand sides financial inclusion barriers; from the supply side perspective, Banks through Agents can reach the low-income, the underserved, and the unbanked population from rural and sub-urban areas where physical branches do not exist, or it is not commercially viable to establish one. Whereas consumers benefit from saving the cost of time and money for travel to the nearest bank branch, time spent in long queues to be served in branches, reduced distrust and lack of confidence to engage with bank officials who are perceived by people

in rural areas to be strangers and sophisticated, (Kumar, Parsons, Urdapilleta, & Nair, 2006; Siedek, 2008).

Consumer's adoption and use of the agency banking delivery model are generally influenced by the perceived convenience of services by the consumer considering that agents may open too early and close very late than bank branches, less cost and transaction time due to proximity of an agent and absence of long queues, consumer sense of trust and security as they transact with someone familiar in the community which also make them not to feel offended when they deposit or withdraw small amounts, (Ivatury, 2009; Ivatury & Mas, 2008; Mas & Siedek, 2008; Ndirangu, 2013; Ombutora & Mugambi, 2013; Siedek, 2008).

To the best knowledge of the researcher, Lotto (2016) conducted a pioneer agency banking study in Tanzania and noted a gap in consumers' knowledge about how Bank Agents operate, a factor that has led to the majority having distrust of the model. Similarly, no study exists in Tanzania that links the adoption of agency banking with digital financial literacy.

2.2.5.4 Internet Banking

Despite the increase in internet coverage and access to personal and desktop computers or smartphones by most developing countries, still existing and potential bank customers face challenges that limit their adoption and the use of internet banking. Banks indeed adopt the internet banking delivery channel to save both individual and corporate customers to save costs, remain competitive in the market, and increase market share by attracting other internet users with the model. However, most developing countries like Tanzania experience a low rate of adoption and continued use of internet banking due to various demand-side and supply-side limiting factors.

A review of literature on individual determinants of internet banking identifies low levels of trust in the security of the bank's web systems, perceptions of compromised customer privacy, low levels of service reliability, absence of prior experience with technology, the complexity of the model,

perceived risk, demographic factors, and lack of adequate legal support on customer's internet-related disputes as demand-side factors that influence the adoption and use of internet banking negatively, (Gerrard & Cunningham, 2003; Lallmahamood, 2007; Larpsiri & Speece, 2003; Mattila, Karjaluoto, & Pento, 2003; Polatoglu & Ekin, 2001; Rotchanakitumnuai & Speece, 2003; Zheng, 2010).

Further, in the Tanzanian context, internet banking studies such as, (Abeka, 2012; Chille, 2018; Chuwa, 2015) identifies; low level of banking technology, internet access challenges, security, trust, consumer perceptions of compatibility, negative perception of complexity, perceived cost, risks and limited bank's support to customers have significant impact on the adoption of internet banking among Tanzanians.

2.2.6 Digital Financial literacy and the use of Digital Financial Services

Increasingly complex financial markets have created Digital Financial Services (DFS) as a replacement or modernization of traditional financial solutions like electronic banking. However, for consumers to easily access and use these services, having adequate digital financial literacy is necessary (OECD, 2018). Despite this fact, it is evident that the level of digital financial literacy in developing countries is low, and still, the gap has not received significant attention from researchers. Available DFL studies associate low uptake and use of digital financial services with the low level of digital financial literacy among existing and potential consumers. Studies such as, (P. Morgan & Trinh, 2019b) suggest that if consumers gain the necessary confidence in the digital financial platform, they are likely to use electronic banking and thus improve their state of financial inclusion.

Banking consumers require digital financial literacy to comfortably interact with the digital platforms for accessing information about a bank's product and services, understanding the product features and its associated risks and making optimal choices in making financial decisions or properly navigating across digital financial platforms. This precondition is a must because digital financial consumers are concerned with the way FSPs conduct promotions and design their products (Chille,

2018), the complexity of using the platforms (Adesinasi, 2012), influenced by the relative advantage of the technology solution in addressing their banking needs (Abdinoor & Mbamba, 2017), sensitive with data security and their privacy(Gerrard & Cunningham, 2003), their limitations in computer and technological skills (Laforet & Li, 2005) and how FSPs institute recourse mechanism in case of disputes (Mattila, Karjaluoto, & Pento, 2003; Ndirangu, 2013).

Setiawan et al. (2020) argue that many financial literacy studies have not critically analysed the role of digital financial literacy in influencing personal financial behaviour. Also, (P. J. Morgan, Huang, & Trinh, 2019) and (Prasad et al., 2018) in their DFL studies posits that, given the ongoing developments of financial technology among developed and developing economies, consumers need to have a high level of financial sophistication skills to effectively use digital financial services to avoid fraud and costly mistakes. The authors urge countries to recognize the importance of DFL and deliver financial education to protect consumers and allow them to have the necessary financial sophistication to make informed decisions when using digital financial services.

Further, (Servon & Kaestner, 2008) emphasize that, unless consumers have the appropriate digital literacy that entails technology and financial literacy, the adoption of electronic banking will be limited to a few individuals in the society. Furthermore, we note that a lack of digital financial literacy may trigger unsophisticated financial consumers to commit bad financial decisions due to impulsive behaviour or even accepting costly digital credit, which is mostly short-term (French et al., 2020; Panos & Wilson, 2020). Therefore, the provision of digital financial literacy to unsophisticated financial customers is argued to be an effective means of protecting users of technology-driven financial products and increasing trust in the delivery model and hence its usage, Malady (2016).

Another evidence of the relationship between financial literacy and the use of financial technology is provided by (P. Morgan & Trinh, 2019b) in their study on the effects of financial literacy on awareness and usage of financial technology in the developing country of Lao people's democratic

Republic. The study applied both Ordinary Least Square (OLS) and instrumental variable estimation methods and noted that higher financial literacy is significantly related to awareness of financial products and services. Further, the authors found that the level of financial literacy in Laos was very low compared to other Asian developing economies.

2.2.6.1 The Dimensions of Digital Financial Literacy

P. J. Morgan et al. (2019) proposes knowledge of digital financial product and services, awareness of digital financial risks, awareness of how to control digital financial risks and the understanding of consumer rights and redress procedures as key dimensions of digital financial literacy. The authors urge that consumers should be aware of various financial services delivered through digital platforms including digital credit, asset management, and payment services; understand digital financial risks arising from online fraud, cybersecurity and acceptance of digital finance contracts; understand how to control digital financial risks including how to protect themselves from risks arising from the use of digital platforms; and have the knowledge about their rights and how to seek recourse in case they become victims of loss, fraud or improper use of personal data as they use DFS.

Tony and Kavitha (2020) conducted a study on digital financial literacy and its impact on digital financial inclusion in Bangalore, India, by using data from a structured questionnaire administered to 200 individuals. The study applied Structural Equation Modelling for statistical analysis and found an inconsistency between awareness and digital financial product and services usage. The study tested the understanding of financial product and services dimension as independent variables and the use of digital financial services variables representing the dependent variable. The study findings indicated that India experiences a low level of digital financial literacy despite the positive and significant relationship between digital financial literacy and the use of digital financial services.

Setiawan et al. (2020) conducted a study to investigate the impact of DFL on saving and spending behaviour among millennials in Indonesian by using structural equation modelling to estimate the relationship among the study variables. The study employed four digital financial literacy variables,

which are; Knowledge of digital financial products and services, experience in using digital financial products and services; awareness of digital financial risk; and skills for controlling and managing digital financial transactions. The study findings indicated that DFL is influenced by socio-demographic factors and has a positive and significant influence on saving and spending behaviour through digital platforms by the millennials.

Prasad et al. (2018) mapped the level of digital financial literacy in Udaipur, India, using a descriptive survey design to examine the frequency of use of digital financial products (expenditure and investment) and the awareness of digital platforms as study variables. The study found that awareness about digital financial platforms influences the actual use of digital financial products and services. Further, it was noted that individuals who are less educated, mature, unemployed and women are likely to have low levels of awareness and usage of digital financial products and their platforms.

From the reviewed literature, it is evident that previous studies have adopted at least a few or all of the DFL dimensions consistent with the Policy Guidance on Digitalization and Financial Literacy (G20/OECD, 2018). The policy guide emphasizes members of the G20 and OECD network to promote the use of digital financial services by providing financial education, which builds core competencies for the safe use of digital financial services to the population. The author argues that awareness of digital financial products and services; awareness of unregulated and informal digital financial services; knowledge of digital financial services consumer rights and obligations; understanding of the implication of accepting digital contracts and digital financial product information disclosures before acceptance and use of products are vital competencies to influence the adoption and use of digital financial services.

2.2.7 Identified Gaps in Literature

Previous literature on financial inclusion predominantly focuses on the supply side determinants for financial inclusion and specifically on access to banking services. At the same time, less attention is placed on examining the demand-side determinants of financial inclusion. Among others researchers suggest that demand-side determinants for financial inclusion includes financial literacy. In addition we observe presence of contradicting result on whether there is a significant relationship between financial literacy and financial inclusion (Grohmann et al., 2018; Lisa Xu & Zia, 2012). While some studies have found the relationship between financial literacy and financial inclusion to be significant other studies have found this relationship to be insignificant and does not matter in financial inclusion,(P. Gupta & Singh, 2013).

In the context of Tanzania, previous financial literacy studies have examined how demographic factors explain the differences in the level of financial literacy (Lotto, 2020b); how financial literacy influences household investments (Lotto, 2020a); how financial literacy influences youth personal financial management and how financial literacy influences the financial planning and controlling ability of SMEs Managers, (Mabula & Dongping, 2019). However, to the best knowledge of the researcher, still, there is limited evidence on scholarly work that has examined the role of financial literacy in predicting financial inclusion in the banking sector.

Further, literature indicates how Financial Services Providers (FSPs) across the globe and Tanzania, in particular, are adopting financial technology as a tool to reach the underserved and the unbanked. FSPs have invested heavily in financial technology platforms to deliver banking services, following its potential to reduce operating costs and effectively reach the masses both in urban and rural. However, the demand and adoption of digital financial services have not grown as expected. In efforts to understand the demand side limitations for low adoption of digital financial services, this study relates this gap with digital financial illiteracy. In addition, studies have indicated that there is limited information on what is known about digital financial literacy and financial inclusion

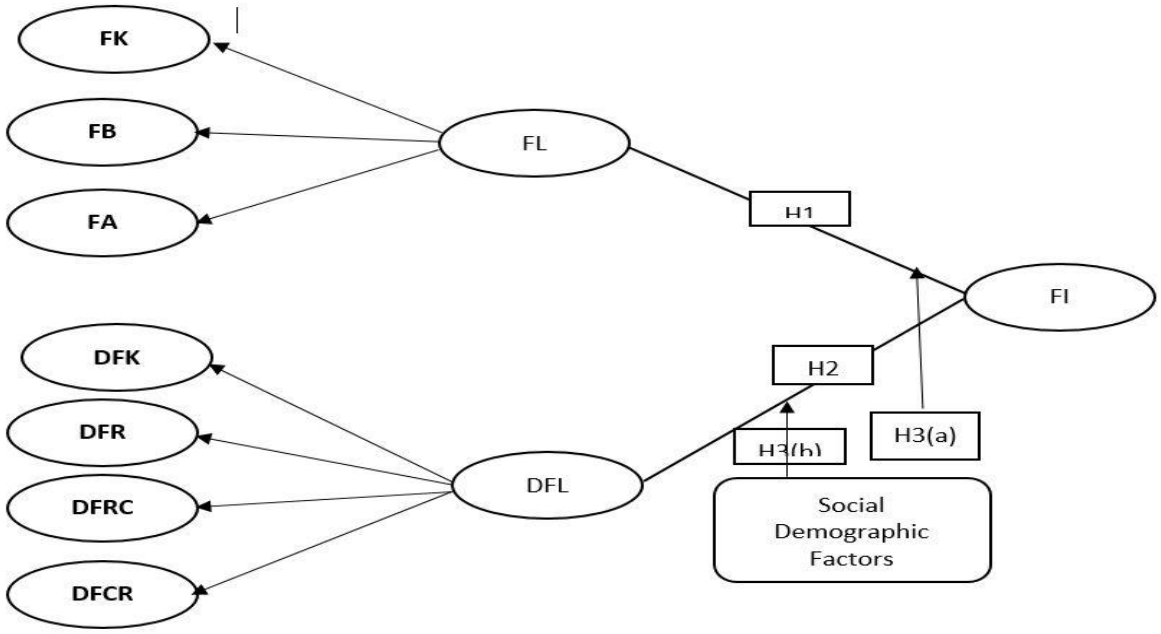
globally and Tanzania in particular, (Setiawan et al., 2020). Therefore, to reduce this gap this study seeks to examine the influence of digital financial literacy in financial inclusion.

Furthermore, the researcher has noted that financial inclusion is predominantly measured at a macro level, with limited evidence on measuring the same at a micro-level where financial exclusion is most experienced. For instance, Beck et al. (2005) measures financial inclusion by considering the number of branches and ATMs relative to population and area as indicators of access while the number of saving deposit and loan accounts relative to the population, and average loan and deposit size to GDP per capita representing the usage dimension. Cull and Scott (2010) challenges this approach by suggesting that the account approach provides little information about the account holder and may represent even individuals who do not use the service due to multiple accounts. To address this challenge studies such as Cámara and Tuesta (2014) and (Demirgüç-Kunt & Klapper, 2013) resolved this problem by emphasizing the need to consider multiple demand side dimensions to measure individual's financial inclusion. In line with this approach, this study adopts multiple demand side indicators in measuring financial inclusion in the context of Tanzania.

Lastly, most financial literacy, digital financial literacy and financial inclusion studies consider demographic variables to have either a direct effect on any of the three variables or act as control variables in the relationship between either financial literacy or digital financial literacy with financial inclusion,(Atkinson & Messy, 2013; Lotto, 2020b; Prasad et al., 2018; Zins & Weill, 2016). On the contrary, this study aims to expand the body of knowledge by examining the moderating effect of demographic factors on the relationship between financial literacy and digital financial literacy with financial inclusion.

2.3 Conceptual Framework

Figure 3: Conceptual framework.



Source: Own construct based on Literature Review (2020)

Figure 3 presents a conceptual framework that illustrates an argument that financial literacy and digital financial literacy have a positive influence on financial inclusion in the banking sector. Further, the framework proposes that socio-demographic variables moderates the relationship between financial literacy and digital financial literacy with financial inclusion. The conceptual framework implies that an individual who possesses financial and digital financial literacy is likely to stimulate the behavioural intention and the actual use of banking products and services and hence increased financial inclusion. Therefore, the study examines financial literacy and digital financial literacy as endogenous latent constructs that influence financial inclusion as an exogenous variable.

2.4 Hypothesis Development

The TPB (Ajzen, 1991) suggest that individual control behaviour like possession of knowledge, skills and attitude influence behavioural intention and actual performance of the desired behaviour. Based on the TPB and the evidence from literature, the researcher hypothesizes that; Individual's financial literacy level is explained by the possession of financial knowledge and positive financial behaviour and attitude. And therefore, there is a positive relationship between the possession of financial literacy and financial inclusion.

H1: There is a positive relationship between financial literacy and financial inclusion

In addition, the researcher has noted from the existing literature evidence of the relationship between the adoption of digital financial services and financial inclusion. However, as emphasized by the TAM (Davis, 1989; Venkatesh & Bala, 2008) perceived ease of use influences the adoption and use of technology. This study, therefore, examines DFL as a variable that facilitates ease of use to influence financial inclusion. In view of this, the study intends to validate if DFL predicts financial inclusion;

H2: There is a significant positive relationship between DFL and Financial inclusion.

The Perceived behaviour control construct under the theory of planned behaviour (TPB) implies that an individual requires access and possession of resources, skills and opportunities necessary to influence a certain desired behaviour, (Ajzen, 1991). However, in the reality of life individual's intentions or actual performance of certain behaviour is restricted by their variations in demographic characteristics.

The empirical literature provides evidence of the direct relationship between socio-demographic characteristics with both financial literacy and financial inclusion (Atkinson & Messy, 2013; Zins & Weill, 2016). However, limited evidence exists on the moderating effect of demographic variables in the relationship between financial literacy, digital financial literacy and financial inclusion. This

study, therefore, attempts to reduce this knowledge gap by testing the moderating role of socio-demographic factors on the relationship between both financial literacy and digital financial literacy with financial inclusion as guided by the following hypotheses;

H3a: Gender moderates the positive relationship between financial literacy and digital financial literacy with financial inclusion. Such that there is a significant difference between males and females.

H3b: Geographical location moderates the positive relationship between financial literacy and digital financial literacy with financial inclusion. Such that, the effect is stronger for respondents from urban.

H3c: Level of education moderates the positive relationship between financial literacy and digital financial literacy with financial inclusion. Such that, the effect is higher for individuals with a high level of education.

H3d: Income moderates the positive relationship between financial literacy and digital financial literacy with financial inclusion. Such that relationship is stronger for the high-income individuals.

H3e: Age moderates the positive relationship between financial literacy and digital financial literacy with financial inclusion. Such that the relationship is stronger with old individuals.

2.5 Conclusion

Previous financial literacy studies have positioned financial literacy as an individual capability that drives the demand for financial services and increases people's economic welfare as expressed by; the economic importance of financial literacy (Lusardi & Mitchell, 2014), its ability to change individuals' financial behaviour (Hsiao et al., 2016), ability to facilitate wealth accumulation, (Behrman et al., 2012), to reduce over-indebtedness (Lusardi & Tufano, 2015), to equip individuals

with the capability to handle and resolve financial disputes,(Shen et al., 2016) and provides awareness for the need to have retirement planning, (Lusardi & Mitchell, 2011). However, there are limited studies that have explored the effect of financial literacy on banking financial inclusion in the context of Tanzania (Lotto, 2020b).

In addition, it is evident that the low adoption and use of digital financial services are explained by limited awareness and risk involved in the use of financial technology, un-affordable cost, compromised privacy and poor communication infrastructure (Abdinoor & Mbamba, 2017; Agwu & Carter, 2014). However, less attention has been placed by researchers in the area of digital financial literacy, and therefore, limited studies exist that have mapped the level of digital financial literacy across countries or provided a piece of evidence for its influence on the adoption and use of digital financial services such as electronic banking,(Prasad et al., 2018).

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter provides a discussion on the methodology employed to examine the study's subject matter. Further, the chapter offers highlights and detailed explanations of the research paradigm, design, and the overall strategy that guided the research. Furthermore, this chapter provides the details of the inquiry method including the target population, sampling design, operationalization of study variables and the techniques used in testing the hypothesized cause-effect relationships among variables under examination.

3.1 Research Paradigm

A research paradigm is the general philosophical world's views of science on the research problem's nature, Healy and Perry (2000). In this study, based on the researcher's discipline orientation and past experiences, the study is aligned with a philosophical stance of natural science that considers distinct values and beliefs from facts. This philosophical view is known as Positivism and is anchored on the assumption that knowledge is acquired through observation and measurement of social realities to establish causal-effect relationships and predictions to generalize or create a law-like generalization by using a deductive approach to test theories.

The Positivism paradigm requires the researcher to challenge the traditional notion of the absolute truth of knowledge by recognizing that we can't be absolutely sure about the truth of knowledge about human behaviour and actions unless we have tested our assumptions (Comte, 1975; Creswell & Creswell, 2017; Muijs, 2010). Through empirical observations, the researcher is objectively independent and free from personal cognitive thinking (values and beliefs) and is relying on statistical tests of pre-determined hypothesized relationships to discover and confirm the truth and reality about human behavioural patterns (Aliyu, Bello, Kasim, & Martin, 2014; Lee, 1991; Schrag,

1992). Further literature suggests that the discovery of knowledge and verification of causal-effect relationships among study variables helps the researcher to generalize the study results from the sample outcomes (Aliyu et al., 2014).

This study, therefore, adopts the positivism research paradigm to confirm the cause-effect relationships between financial literacy, digital financial literacy, and socio-demographic characteristics with banking financial inclusion in Tanzania. This study adopted the positivist approach while aware of its criticisms. Literature suggests that the paradigm is built on the assumption that the happenings of human experiences being studied are prearranged and interrelated, and for that reason, realism and truth can be structured and deducible. Scholars with a different view critic the positivism approach since it is anchored on the belief that genuine, real and factual happenings are made through observations and scientifically proved through rational investigation and analysis (Schrag, 1992). The basis for dishonouring these assumptions is that the researcher is considered to be biased since the happenings are not natural but dependent on the researcher's observation and thus portray an idealistic ontology and not a natural science (Aliyu et al., 2014). In addition, the positivism approach is criticised for its assumption of truth considering atomistic (micro level) and independent events(Saunders, Lewis, & Thornhill, 2007).

To address the above-mentioned criticisms, this study ensured that the sampling technique to be employed in the study addresses the worries of pre-arranged observations, biased and reflect the outside reality of human interactions with the world. The study collects its data through the use of a cross-sectional survey that allowed capture observations directly from the source, the sample size was large to reflect adequate representation (440 respondents), sample locations were randomly selected to ensure observations are not pre-determined and the design of the survey tool was grounded on a theory of knowledge reasoning to align with general truth about realities of human behaviour. In addition, before testing the study hypothesis, confirmatory analysis was performed to ensure the reliability and validity of the study variables in explaining the observable truth in the realities of the world and human experience.

3.2 Research Approach

There are two categories of research approaches, the inductive and deductive methods of reasoning. Holloway (1997), suggests that the deductive research approach is used when the researcher starts with the pre-determined hypothesized relationship between study variables or theoretical frameworks and uses collected data to confirm or verify a theory. On the contrary, the inductive approach starts with data collection (participants' views) to develop ideas that explain specific patterns or themes, and after that, a theory is developed (ibid). The deductive research approach is applied when examining the relationship between theories governing the research and the research variables (Bahari, 2010; Bryman, 2016). Further, (Saunders et al., 2007) argue that when the deductive approach is applied, the researcher has an objective premise with hypothesized propositions backed by theoretical background and empirical literature and identifies an opportunity to advance knowledge after data testing and analysis of results.

In this study, the researcher being grounded in the TPB and TAM intends to examine the cause-effect relationship between financial literacy and digital financial literacy with financial inclusion. In addition, demographic factors are also hypothesized to have a moderating effect on the two main relationships. The fact that this study intends to confirm the application of the theories underpinning this study and test the existence of the hypothesized relationships between the independent, moderating and dependent variables. It is on these grounds, the study adopted the deductive research approach as a guide in the researcher's reasoning process to arrive at the study conclusions.

3.3 Research Design

Research design is the overall conceptual structure that guides how the research is conducted throughout the study period. The design provides a set of procedures and methods for how data is collected, measured and analysed to present the study results (Kothari & Garg, 2014). In this study,

the researcher employed a quantitative research design to test study hypotheses and confirm the application of TAM and TPB theories.

The quantitative research design involves a collection of either primary or secondary data, conducting data analysis, interpreting the analysis results and communicating the results through a research report. It is commonly used to answer study questions by verifying study hypotheses thus confirming if the hypothesized relationship between and among variables exists. Researchers who apply quantitative methods commonly study trends, attitudes and opinions of people through surveys or experiments. Therefore, in quantitative research one has to decide whether data shall be collected once (cross-section survey) or over periods (Longitudinal survey). Most times cross-sectional surveys involve data collected once from a primary source while longitudinal surveys may involve data collected through experiments across time period or data from secondary sources by tracking variables of interest over a certain period of time,(Creswell & Creswell, 2017).

This study, therefore, adopted a cross-sectional survey strategy and the use of a structured questionnaire to collect data about perceptions of a population from a sample for statistical analysis. In line with a proposition by (Creswell & Creswell, 2017; Ryan, 2006), during the operationalization of the study variables, the researcher observed the need to be unbiased and have control against alternative explanations to ensure that the study results can be generalized and replicated. In addition to that, the choice of the quantitative research design for this study is consistent with other related studies such as; financial literacy (Worthington, 2006), digital financial literacy (Setiawan et al., 2020), and financial inclusion (Chattopadhyay, 2011). In addition, the use of the cross-section survey method is commonly preferred when studying demand-side determinants for financial inclusion because it provides the researcher with an opportunity to gauge the variations in people's perceptions of the variable of interest in the research. Further, the use of a survey design in this study is considered to be appropriate due to its cost-effectiveness and less time required for data collection because it requires the researcher to collect data at one point in time, (Bryman, 2016).

3.4 Research Area

The study was conducted in four regions of Tanzania. These include the Dar-es-Salaam, Arusha, Simiyu and Mara regions. Dar- es- Salaam and Arusha regions were selected because they are the regions with a high level of financial inclusion in the country. In contrast, the regions of Simiyu and Mara record a low level of access and use of financial services in the country(FINSCOPE, 2017). Dar es salaam is known to have higher business densities and is a top commercial city in the country, while Arusha is a leading tourist destination in Tanzania and is vibrant in commercial activities. On the other hand, the regions of Simiyu and Mara are characterized by peri-urban and rural characteristics, and their people mainly engage in agricultural activities coupled with low levels of commercial activities. The selection of these regions is considered appropriate to represent the Tanzania population due to variations resulting from differences in their geographic locations, and social-economic characteristics.

3.5 Population and Sampling Design

3.5.1 Target Population

In research, the population is defined as the number of possible groups or elements that the researchers wish to include in the study to draw a conclusion, (Gray, 2013). This study's population is adult Tanzanians aged 18 years and above living in rural and urban areas. In Tanzania, adults from the age of 18 years and above are considered to be mature and qualify to engage in economic activities, earning income, owning a bank account or making financial transactions. It is for this reason the study targeted adults who are likely to be active or potential users of banking services.

Further to get adequate insights and diversity of perceptions from Tanzanians, the study population considered also all adults irrespective to whether they are from rural or urban areas of Tanzania. This was based on the fact that the possession of financial literacy, digital financial literacy and the

use of banking services applies to all irrespective of their geographical locations, gender, level of education or level of income.

3.5.2 Unit of analysis

The study targeted both existing and potential users of banking services among adults in Tanzania. Therefore, the unit of analysis and inquiry in this study was an individual financial consumer (banked and un-banked) represented by a respondent residing in the sampled regions of Tanzania.

3.5.3 Sample size

The researcher considered, among others, the purpose of the study, population size, and the need to manage the risk of selecting a bad sample or committing a sampling error to ensure a representative sample is determined. To ensure that, the researcher adopted the formula by (Israel, 1992; Yamane, 1967) to determine a minimum sample size required. Specifically, based on the study's nature, an error margin of ±5 per cent was accepted as a range in which the population is estimated and a 95 per cent confidence level that the sample will represent an actual population. Further, given the significant variability in the distribution of attributes under study due to heterogeneous populations, a large sample was considered to be appropriate.

Yamane (1967), sample size formula as provided in the work of (Israel, 1992), is described as follows, $n = \frac{N}{1+N(e)2}$ where n = Sample size, N= Population size and e= Level of Precision. After applying the population (N) of 1,134,271[2] and (e) value of ±0.05, the sample size determined was 400. This sample size is in line with (Yamane, 1967) published table that requires a population whose size is greater than 100,000 when maintaining the precision level of ±5 per cent at a 95 per cent confidence interval like in this study. A sample of 400 individuals is recommended. However, previous

[2] The population from selected streets is provided in the 2012 census report, and has been revised to reflect an annual average population growth rate of 2.7 per cent to reflect the current population estimates.

household surveys recommend a sample size to be increased to carter for non-respondents, (Martínez-Mesa, González-Chica, Duquia, Bonamigo, & Bastos, 2016). In addition, given that the survey was administered by research assistants who had facial contacts with respondents, the number of expected non -respondents was low and even if it appears it was managed by selecting the next possible respondent in the next household in a street or village. In this regard, an increase of ten per cent was considered reasonable to carter for no-respondents and therefore the sample size was increased to 440 individuals.

On the other hand, (McQuitty, 2004; W Lawrence, 2014) recommends that it is important to determine in advance a sample size that is consistent with the preconditions of a statistical analysis model to be employed in the study to minimize sampling biases and achieve adequate statistical power. Although there is an ongoing debate among scholars on the adequate sample size when using an SEM, the general rule of thumb recommends the minimum sample size to be at least 200 participants or 10 participants for every estimated parameter to ensure sufficient statistical power for data analysis,(Hoe, 2008). Therefore, a sample size of 440 employed in this study is in line with the general rule recommendation when using SEM for data analysis.

3.5.4 Sampling Design

This study adopted a two-stage stratified cluster sampling design whereby the first stage involved selecting primary sampling units (Streets or Village) based on probability proportional to size (PPS) selection and the systematic sampling technique to select households as secondary sampling units in the second stage.

3.5.4.1 Sampling Frame

The study sample frame consisted of 901 streets (403 for rural and 498 for urban) from purposely selected districts, as indicated in Table 1. The frame consisted of variables such as region, districts, ward, streets and number of households based on the 2012 population and housing census. It also

consisted of location (urban /rural) as a stratification variable. The urban and rural strata were then used for explicit stratification, which allowed the independent selection of samples for each domain. The researcher purposely selected streets /villages from eight (8) districts which were selected from four (4) regions that represent two (2) regions with high and another two (2) regions with low levels of financial inclusion in the country, respectively. The selection of districts ensured that both rural and urban criteria is maintained in each region. According to the latest Tanzania financial inclusion survey (FINSCOPE, 2017), the highly banked population in the country is in Dar-es-salaam (40 per cent) and Arusha (29 per cent) regions while Mara (7 per cent) and Simiyu (3 per cent) records lower levels of banking inclusion.

Table 1: Number of Streets/Villages by Location in the Sampling Frame

District	Number of Street/Villages		Total
	Rural	Urban	
Arumeru	86	0	86
Arusha Mjini	0	120	120
Bariadi	77	5	82
Bunda	98	0	98
Kinondoni	0	162	162
Maswa	96	0	96
Musoma	46	51	97
Temeke	0	160	160
Total	**403**	**498**	**901**

There were 1,134,271 households in the sampling frame, among them 182,235 from rural and 952,036 from urban. The urban distribution of households was calculated from the sampling frame and found to be 0.84, as indicated in Table 2. To distribute the number of households to be surveyed, the proportion of households in each district was produced.

Table 2: Number of Households in Selected Districts by Location

District Name	Location		Distribution		Total
	Rural	Urban	Urban	District	
Arumeru	56,938	0	0	0.0502	56,938
Arusha	0	269,162	1	0.2373	269,162
Bariadi	34,088	1,753	0.048	0.03160	35,841
Bunda	45,013	0	0	0.03968	45,013
Kinondoni	0	380,327	1	0.33531	380,327
Temeke	0	277,700	1	0.24483	277,700
Maswa	46,196	0	0	0.04073	46,196
Musoma	0	23,094	1	0.24483	23,094
Total	**182,235**	**952,036**	**0.8393**	**1**	**1,134,271**

3.5.4.2 Power Allocation

The population proportion to size measure (PPS) in each stratum was allocated by using the below formula.

$$n_j = nM_j / \sum_{j=1}^{J} M_j$$

Where M_j is the measure of the size of unit j and n is the design sample size, (ICF, 2012).

Using such allocation, it was found that there are large variations in the number of primary sampling units in the sampled frame. Some domains, such as Musoma had the least number of streets compared to Kinondoni (134 streets). To control such variations, it was necessary to oversample small domains and under-sample large domains using a power allocation of 0.5 for both rural and urban strata. To determine the number of streets/villages in each stratum (district), the sample size was allocated proportionally based on the number of households.

Table 3: Power Allocation of Sample Size

Domain / Stratum	Measure of Size	Individual Proportional Allocation	Proportion of Urban	Individual Power Allocation		
Arumeru	0.050	20	0.000	0	36	36
Arusha Mjini	0.237	95	1.000	78	0	78
Bariadi	0.032	13	0.049	5	23	28
Bunda	0.040	16	0.000	0	32	32
Kinondoni	0.335	134	1.000	92	0	92
Maswa	0.041	16	0.000	0	32	32
Musoma	0.020	8	1.000	23	0	23
Temeke	0.245	98	1.000	79	0	79
Total	**1.000**	**400**	**0.839**	**277**	**123**	**400**

3.5.4.3 Selection of Streets or Village

The number of households in the street was used as a measure of size. For the sample size of 440 respondents to be attained, the researcher targeted to administer a questionnaire to at least twenty-one people from twenty-one households in each street. This implied that 21 streets were required to be attended to meet the required sample size. Therefore, from a list of 901 streets/villages in the sample frame, twenty-one streets/villages were selected by using systematic random sampling with probability proportional to the street's size. This selection approach ensured that adult individuals are represented based on household location and proportion because streets with a greater number of households had a higher chance of being selected in the sample. The selection was made by generating a random number, calculating a systematic interval of streets, and from each interval, a street/village was selected until all 21 streets were identified.

3.5.4.4 Selection of Households and Individuals

In the second stage, 20 households were selected in each street, which led to 420 households required for the sample because each household gave one respondent. The number of households in each street was systematically selected from the total number of households in each street/village obtained in the sampling frame. Specifically, a special household selection template was used to

insert a list of total households in each street/village, followed by a fixed number of households (20) required in each street/village with a random start and a fixed interval in a sampling frame. Lastly, one adult individual as a unit of inquiry from each of the selected households was conveniently chosen based on their availability and readiness to participate. This convenience sampling technique was preferred because it ensures that every adult in the identified households has equal opportunities to be selected for the face-to-face interview (Creswell & Creswell, 2017).

Table 4: Allocation of Primary and Secondary Sampling Units

Domain / Stratum	Allocation of Primary Sampling Units			Allocation of Secondary Sampling Units		
	Urban	Rural	Total	Urban	Rural	Total
Arumeru	0	2	2	0	42	42
Arusha Mjini	4	0	4	82	0	82
Bariadi	0	1	1	10	26	36
Bunda	0	2	2	0	38	38
Kinondoni	5	0	5	96	0	96
Maswa	0	2	2	0	37	37
Musoma	1	0	1	28	0	28
Temeke	4	0	4	81	0	81
Total	**14**	**7**	**21**	**297**	**143**	**440**

3.6 Data Sources, Collection Methods and Research Assistants

During the survey, data was collected once at the same period in time through questionnaires administered by the researcher and his assistants. The choice of administering a questionnaire by using research assistants was based on a presumption that not all respondents had adequate knowledge to address the sections of the questionnaire adequately without the need for clarification. But above all, this approach also maximizes data validity and reduces measurement errors. The data collection exercise was done for eight weeks, including the two weeks of a pilot test which was meant to assess the reliability and validity of the research tool before the actual collection of data.

Jenkins and Dillman (1995) recommend that a good questionnaire should have; a well and straightforward layout, use correct wording and provide clear response categories to ensure that the respondents can comprehend the questions and be encouraged to participate. In this study, the researcher adopted the above-mentioned questionnaire design principles by ensuring that the survey questions have been tested in related previous studies, for instance, studies such as (Katoroogo, 2016; Lusardi & Mitchell, 2005; P. J. Morgan et al., 2019; OECD, 2013). Further, questionnaire items that were borrowed from related previous studies were modified or customized to fit the question context and questioning style that suits a developing country context.

Specifically, the research instrument was a structured questionnaire with closed-ended questions that required a respondent to provide his/her response from a multiple-choice or a Likert scale. The questionnaire had four sections, starting from a respondent's demographic characteristics, perceptions of financial literacy, perception of digital financial literacy, and status of financial inclusion. A sample questionnaire is provided in appendix no 1 of this thesis. Further, each study construct was measured by multiple items to ensure there is an adequate and comprehensive assessment of the study variable. The multiple items measurement approach is also recommended by (Nielsen, 2014), who argues that at minimum each construct should have at least four items for ease of running a reliability and hypothesis tests.

The questionnaire was designed on the Likert scale of 5 points (1 strongly disagree to 5 strongly agree), focusing on a composite score because of the reliability of the composite scores as compared to a single item. Data collection through questionnaires was considered relevant. After all, they are mostly used to collect data in field research because they are effective to measure perceptions, opinions and attitudes of individuals towards a research variable, (Hinkin, 1995). On the other hand, the choice of, a Likert scale of five points was adopted on the basis that the respondents were un-trained and therefore for them to assign a rating to categories beyond five does not add value since it has limited opportunity to further improve discrimination against the rated objective. The choice of five points is consistent with recommendations by (Elmore & Beggs, 1975), who argues that

individuals tend to subjectively be in the regions of extreme responses when the rate item is either important or not important and in the middle category when they are not sure or neutral. Therefore, a scale of five categories is considered appropriate to accommodate such un-trained respondents since no increased reliability due to applying additional rating categories (i.e. from 5 to 7 categories) was anticipated.

Before data collection, the researcher engaged two graduate economists to work as Research Assistants for collecting data in the capacity of administering questionnaires. The assistants were fluent both in Swahili and English languages, and this was because the questionnaire was translated into Swahili to accommodate most respondents who were not conversant with English. Before starting the collection of data, the research assistants attended a special training session that was aimed to impart them an understanding of the study objectives and define their role and what was expected from them including avoiding biases and the need to capture qualitative information that was equally important in the discussion part of this study. Further, in some instances especially in villages, local leaders were used to facilitate access to households in the community.

Regarding testing of the research instrument, the data collection tool was pre-tested through a pilot survey of 31 respondents in the Dar es salaam region. The pilot survey intended to refine the data collection instruments before use as it is widely recommended that the exercise is an important stage for ensuring face validity of the instrument, (R. L. Worthington & Whittaker, 2006). Results of the pilot survey revealed that in the case of digital financial literacy and financial inclusion variables some questions were not relevant to people that had no bank account or has never used a digital banking platform. Further, it was noted that some questions in the financial behaviour and financial attitude constructs were unclearly worded and hence were likely to conflict with what was intended by the researcher. In addressing these challenges questions that were difficult to be attended to by respondents who did not have a bank account or had a bank account bank and had never used digital platforms to access banking services were reworded to ensure that both users and non-users can give

their perceptions. Further, all the unclear questions were also reworded to provide clear and contextual meaning.

3.7 Operationalization and Measurement of Study Constructs

Research variables were categorized into three groups, namely the independent variables, moderating variables and the dependent variable. The independent variables are financial literacy and digital financial literacy, while socio-demographic factors are the moderating variable and financial inclusion is considered a dependent variable. The study constructs were measured by using item scales recommended in related literature and the theories of planned behaviour (TPB) and the Technology Acceptance Model (TAM). Research variables were operationalized in line with measures from previous financial inclusion studies, as discussed next.

3.7.1 Measuring Financial Literacy

Financial literacy literature provides evidence of various dimensions that have been used to measure the level of financial literacy among individuals; for instance, (Lusardi & Mitchell, 2014) used the financial knowledge dimension to measure the individual level of financial literacy, (Huston, 2010) used the financial knowledge and application of knowledge dimensions to measure financial literacy; (Hung et al., 2009) used financial knowledge and skills dimensions for the same while,(Atkinson & Messy, 2012; Norvilitis & MacLean, 2010; OECD, 2013) used the dimensions of financial knowledge, behaviour, and Attitude to measure the level of financial literacy among individuals. In this study, financial literacy variables were measured by assigning scores to respondents' responses about their perceptions of three dimensions of financial literacy, which are financial knowledge, financial behaviour and financial attitude. A person having higher percentages of correct answers than the median percentage of correct answers was considered to be financially literate. This methodology is in line with other financial literacy studies, including (Al-Tamimi, 2009; Gerek & Kurt, 2008; Oanea & Dornean, 2012).

In measuring the financial literacy variables, first, the Financial Knowledge (FK) construct was measured by examining an individual's knowledge and awareness of issues related to financial services and their providers; and their basic numeracy and financial concepts,(Atkinson & Messy, 2013). Secondly, the Financial Behaviour (FB) construct was measured by the scores of positive personal financial behaviours. Third, the Financial Attitude (FA) construct was measured by examining the capability of individuals to evaluate and make a judgement on key financial matters as represented by their degree of agreement or disagreement on various financial concepts. This measure of financial attitude is consistent with the theoretical definition that considers attitude to be a positive or negative response(evaluation) to performing a specific desired behaviour (Ajzen, 1991). Table 5 below presents the definition and measure for each of the financial literacy constructs.

Table 5: Operationalization and Measurement of Financial Literacy variables

SNO	LABEL	NAME	DEFINITION	Source
1	FK	Financial Knowledge and skills	The level of individual knowledge about financial concepts and skills	(Atkinson & Messy, 2012; Lusardi, 2008; OECD, 2013)
2	FB	Financial behaviour	The degree to which an individual use financial knowledge and skills to manage personal finances	(Atkinson & Messy, 2012; Lusardi, 2008; Lusardi & Mitchell, 2011; OECD, 2013)
3	FA	Financial Attitude	Personal ideas and perceptions that predict individual financial behaviour	(Kempson, 2009; Nicolini, 2006; OECD, 2013)

3.7.2 Measuring Digital Financial Literacy

Digital financial literacy was measured by the total of individuals' correct scores on their perceptions of knowledge of digital financial products; awareness of digital financial risks; possession of skills to control and manage digital finance activities; and their understanding of digital finance consumer's rights and redress procedures. The set of questions developed for each construct is consistent with

the theoretical foundations of TAM (Davis, 1989) and are borrowed from related digital financial literacy studies such as, (P. J. Morgan et al., 2019; Prasad et al., 2018; Setiawan et al., 2020). Table 6 provides a list of digital financial literacy indicators and their descriptions.

Table 6: Operationalization and Measurement of Digital Financial Literacy variables

SNO	LABEL	NAME	DESCRIPTION	Source
1	DFK	Knowledge of Digital Financial products	Awareness of different types of electronic banking products and services	(G20/OECD, 2018; Prasad et al., 2018)
2	DFR	Awareness of Digital Financial Risk	Awareness of potential negative implications resulting from the use of electronic banking	(Arenaza, 2014; P. J. Morgan et al., 2019)
3	DFRC	Skills to control and manage digital finance activities	Refers to individual awareness of how to control risks arising from the use of electronic banking products.	(G20/OECD, 2018; Setiawan et al., 2020)
4	DFCR	Knowledge of consumer's rights and redress procedures	Refers to Knowledge of digital financial services consumer's rights, obligations, and how to report complaints and seek recourse in case of disputes.	(G20/OECD, 2018; Malady, 2016)

3.7.3 Measuring Financial inclusion

Studies in financial inclusion have employed one up to four dimensions (indices) in measuring financial inclusion as provided in section 2.2.1 of this thesis. The dimensions are meant to explain the importance of each item in determining the level of financial inclusion achieved at an individual level or as a country. The dimensions involve aspects of access to financial services, the extent of use of a range of financial services and the level of quality of financial products and services.

In this study, financial inclusion is considered as a latent endogenous variable explained by access indicator items represented by ownership of a bank account and the proximity (within a 5-kilometre radius) of a respondent to a banking access point as used in the study by (Cámara & Tuesta, 2014); the usage indicator items represented a respondent's frequency of use of banking product or services

as applied in the study by (Triki & Faye, 2013); and quality indicator items represented respondent use of digital banking because it represents convenience of service, reliability and reduced access cost which is among the features of quality financial services. Table 7 below presents a list of each financial inclusion dimension and its indicator items.

Table 7: Operationalization and measurement of Financial Inclusion

SNO	LABEL	Item Name	Definition	Source
1	FI1&2	Access	Refers to the penetration and outreach of banking services and the ability of an individual to uptake the services	(Arora, 2010; Demirgüç-Kunt & Klapper, 2013; Grohmann et al., 2018; Gupte et al., 2012; Sarma, 2008).
2	FI 3-4	Usage	Actual use of banking products or services due to their permanent derived value and utility.	(Cámara & Tuesta, 2014; Chattopadhyay, 2011; Demirgüç-Kunt & Klapper, 2013; Grohmann et al., 2018; Triki & Faye, 2013)
3	FI 5-6	Quality	Actual use of digital banking as a proxy for reliability, the convenience of service and reduced access cost	(Ivatury & Mas, 2008; Lau, Cheung, Lam, & Chu, 2013)

3.7.4 Measuring Moderating variables

The moderating variables in this study are represented by the socio-demographic characteristics of respondents. These include gender, residential location, level of income, level of education and age. For ordinal variables (income, age and education), a selected category was considered as a dummy (1) and the unselected category as zero, while for nominal variables (gender and residential location), Male and Urban were considered as a dummy (1), otherwise Zero.

Table 8: Operationalization and measurement of Socio-demographic variables

SNO	LABEL	Variable Name	Description	Nature	Source
1	GEN	Gender	Sex of the respondent	Ordinal	(Atkinson & Messy, 2013; Lotto, 2018, 2020b)
2	RES	Residential location	Place of residence of a respondent	Nominal	(Atkinson & Messy, 2013; Chattopadhyay, 2011)
3	EDU	Education level	Individual highest level of education	Ordinal	(C. Boakye & N. O. A. Amankwah, 2012; Lea et al., 1995)
4	INCO	Income	Individual monthly income	Ordinal	(Kempson et al., 2004; Lusardi & Mitchell, 2011)
5	AGE	Age	Number of years lived by an individual	Ordinal	(Garg & Singh, 2018; Tuesta et al., 2015)

3.8 Data Analysis methods

Data analysis involves the preparation of data to ensure that data are free from errors resulting from the bias of respondents or failure to attend the questionnaire as expected. Once data are clean they are subjected to various statistical analysis tools for describing the data pattern or estimating the relationship among variables of interest by the researcher(Creswell & Creswell, 2017). In this study, both descriptive and inferential data analysis methods were used to analyse data collected from a cross-sectional survey. Details of how the analysis was performed are discussed next in chapter four.

3.8.1 Data Preparation

In this study after the data collection excise, data was labelled in line with the conceptual model constructs and indicator item definitions. Thereafter data quality was assessed through the identification of missing values, outliers and common method bias. In a cross-sectional survey, data cleaning is important due to several benefits realized from the process as explained in the below sections;

- Management of Missing values

During data collection, researchers are likely to incorrectly input data during the data entry stage or some respondents' intentional or un-intentional non-response to some questions and therefore their responses remain missing. If such missing data fields are left without rectification they are likely to negatively impact some statistical tests and may lead to erroneous results. Therefore, such data problems can be resolved by removing such individuals from the sample size or if the respondents are traceable they can be asked to respond before starting data analysis(Saunders, Lewis, & Thornhill, 2009). In this study, therefore, missing data were treated by removing such respondents since there were very few incidences of such following the use of face to face interviews which ensured to a great extent each question is attended to unless the respondent is not willing to answer that question.

- Management of Outliers

Outliers are the responses that stand out to be unique (unusually high or low values) from the rest of the values in the data set. Such values in a data set are not desirable because they do not represent the study population and are therefore likely to affect statistical results. Such effects include affecting the normality of data distribution due to affected mean and inflated standard deviation,(Saunders et al., 2009). Given the manageable sample size and data quantity, in this study data sorting and filtering through the excel tool were used to assess if there are any outliers in the pattern of the responses.

- Assessment of Common Method Bias (CMB)

In PLS-SEM common bias method is a systematic error variance resulting from a common measurement method. CMB causes variations in the pattern of indicator responses resulting from weaknesses in the measurement models and not a network of causes or effects in the model (Kock, 2015). CMB can be caused by instruction in the questionnaire that may influence the same pattern of responses or implicit social influence whereby responses are induced by social influence from respondents' peers. Once CMB is not treated it tends to inflate or deflate path coefficient results

during the estimation of path relations. This is because the use of PLS-SEM requires the study variables to be latent and therefore made up of multiple items, if such items have high collinearity then they are likely to inflate the path coefficients. Literature suggests that much as issues of collinearity are addressed by confirmatory factor analysis through assessment of convergent and discriminant validity but these methods do not effectively identify the common bias method problems as such collinearity test is recommended as an effective measure to identify contamination of CMB in a model (Chin, Thatcher, & Wright, 2012; Kock, 2015).

Collinearity test is performed by the assessment of Variance Inflation Factor (VIF) conducted automatically in Smart PLS-SEM. When results indicate that VIF is greater than 3.3 it implies that the study constructs are collinear and the model might be facing CMB contamination. Studies have recommended several procedural and statistical controls to deal with CBM issues before and after collection data, these include indicator removal, indicator re-assignment and latent variable removal or aggregation. In addition, procedural treatments may include ensuring that questions in the research instrument are clear, ensuring anonymity of respondents, avoiding ambiguous items and diversifying of survey scales between the independent and dependent variables, (Kock, Berbekova, & Assaf, 2021).

In this study, CMB challenges were addressed during the design of the research instrument and by ensuring a quality measurement model by dropping items that had collinearity issues and maintaining items whose VIF were within the acceptable threshold. This was achieved by designing research questions that were simple free of complex items and easy to understand but also through the assessment of the variance inflation factor for the research constructs.

- **Normality Test**

In inferential statistics, a normality test is conducted to assess if data are normally distributed and it implies that the researcher's assumptions are valid and thus probabilities can be estimated through the normal curve. Normal distribution implies that all the measures of central tendency which are

the mean, median and mode fall at the same point. When using multivariate analysis, researchers have to test the survey data to assess its normality before the determination of the complex relationships that exist among study variables as a means to ensure the robustness of the estimated model. Kolmogorov-Smirnor D test and Shapiro Wills W tests are mostly recommended for testing the normal distribution of data, (Shapiro & Wilk, 1965).

In Structural Equation Modeling normality assumptions vary if one is employing a covariance-based or variance-based SEM. Covariance-based SEM such as AMOS are effective for large sample sizes and assume normality in data distribution unlike variance-based SEM such as Smart-PLS which is appropriate for small sample sizes and assumes non-normality, (Awang, Afthanorhan, & Asri, 2015). Skewness and Kurtosis are among the measures of data distribution in the sample. Skewness refers to the measure of symmetry in a data distribution pattern whereas Kurtosis is a measure of the combined weights of the tails relative to the rest of the distribution, (McNeese, 2016). Therefore, a normal distribution data has a skewness of zero (0) and kurtosis of three (3), (Blanca, Arnau, López-Montiel, Bono, & Bendayan, 2013).

This study has adopted Smart PLS which is an SEM technique that doesn't assume normality because normality increases with increased sample size, (Henseler, Ringle, & Sarstedt, 2015). However, to ensure generalization and understandability to readers who are not conversant with PLS-SEM, this study assessed the skewness and kurtosis of the sample data to determine the extent of compliance with normality requirements. The general rule of thumb for determining normality in PLS-SEM is when Skewness is between $^{-}1$ and $^{+}1$ and Kurtosis ranges between $^{-}2$ and $^{+}2$, (C. Sharma & Ojha, 2020)

3.8.2 Descriptive Analysis

Respondents' profile and characteristics were described by the use of frequency and percentage as recommended by (Leech, Barrett, & Morgan, 2005), who argues that descriptive analysis is appropriate for giving the general outlook of the study sample and provide not only characteristics

of individuals but also the useful information on the distribution of study variables. In this study, the descriptive analysis involved a description of respondents' demographic and usage of financial services profiles.

3.8.3 Inferential Analysis

Secondly, for inferential analysis and hypothesis testing, the Structural Equation Modelling (SEM) techniques through the Smart Partial Least Square 3 software were employed to examine the presence of a causal relationship and the strength of that relationship between the independent and dependent study variables.

3.8.3.1 Structural Equations Modelling (SEM)

SEM is a second-generation multivariate technique used to describe causal relationships between multiple variables (Hoe, 2008). SEM simultaneously combines the measurement model for confirming the fitness of model constructs through validity and reliability tests; and the structural model that determines the relationships between independents and dependent study variables by estimating path coefficient, model fit indices and regression weights. Further, SEM has been confirmed to have more advantageous compared to the first-generation techniques such as Principal Component Analysis, Factor Analysis, Discriminant Analysis or Multiple Regression because it allows for the researcher to have greater flexibility, including to model relationships among multiple predictors and criterion variable; construct un-observable latent variables; model errors in measurement for observed variable and perform confirmatory analysis between the theory and data,(Chin, 1998).

This statistical technique is recommended when a researcher wants to establish a causal contribution or influence of one variable to another on data sourced from individual perceptions or behaviour as opposed to when using experiments (Hair, 2010). In addition, SEM is considered to be credible in unveiling direct and indirect relationships among any combination of observable and

unobservable(latent) variables and is known for its strong ability to define a model that estimates a set of multiple and inter-related dependent relationships (McQuitty, 2004).

In this study, the direct and indirect relationships between FL and DFL as independent latent variables with financial inclusion (FI) as the dependent latent variable were estimated by the use of Smart PLS-SEM. This method is based on the composite model and its objective is to maximize the variance explained in the dependent variable. Models developed by the PLS-SEM technique normally have the outer (measurement) and the inner (structural) models, (Hair Jr, Matthews, Matthews, & Sarstedt, 2017).

3.8.3.2 Model Specification

Measurement models in PLS-SEM can either be specified as reflective or formative models. In reflective measurement models, indicators are a set of representatives of items which reflect or explain the latent construct. The assumption in reflective models is that, indicator items can be used interchangeably and if any of the indicators is dropped the conceptual domain of the latent construct is not affected. On the other hand, in the formative model, each indicator represents a dimension of the variable and therefore they cannot be used interchangeably while removing an item from the measurement of the latent construct affects the meaning of the variable. In addition, once the variables under examination are complex and have multiple layers of constructs literature suggests that such variables can be modelled as Higher-Order Models (HOM) also known as Second-Order Models. In such Models, a HOM is explained by the first model which is known as First Order Model(FOM), (Joseph F Hair Jr, Sarstedt, Ringle, & Gudergan, 2017)

In this study, FL and DFL are considered as second-order reflective –reflective constructs while FI is a first-order reflective construct. FL and DFL are both represented by multiple items that are in layers (first and second layer) while FI is represented by an item in only one layer. Details of how the exogenous and endogenous latent variables were modelled are provided in the conceptual framework provided in Figure 3 of this thesis.

3.9 Evaluation criteria of the measurement Model

In exploratory research design researchers apply either Exploratory Factor Analysis (EFA), Confirmatory Composite Analysis (CCA) or Confirmatory Factor Analysis (CFA) to identify common items that represent a factor through exploration of response patterns and statistically confirm the measurement theory in line with the conceptual model. For instance, EFA is a technique that is used to discover patterns of latent constructs by exploring the data set when testing predictions, and it is an essential step in building variable metrics, (Child, 2006). To ensure that EFA results are valid and reliable, Yong and Pearce (2013) recommend that the researcher must ensure that the study population is heterogeneous, study variables are continuous, the sample size is at least 300, and each variable must have at least five observations, the factor loading for observable items should be at least 0.4 but not exceeding 0.9. EFA is therefore recommended to be applied in a study where there is an absence of prior hypotheses about factors or patterns of measured variables, (Joe F Hair Jr, Howard, & Nitzl, 2020).

On the other hand, for a long time now, quantitative research models including covariance-based structural equation modelling approaches have employed the CFA method to examine both the qualitative and statistical reliability of indicators, multi-item constructs, content validity, convergent validity and discriminant validity. This method confirms a set of indicators that measures a specific latent construct. Brown and Moore (2012) indicate that CFA in SEM first provides confirmation on the relationship between the observed and latent variables and secondly facilitates the researcher to determine the number and the nature of factors that account for variations and covariations among a set of construct items.

Recent literature on SEM technique recommends Confirmatory Composite Analysis (CCA) to be an appropriate procedure for confirming measurement models in PLS-SEM, (Joe F Hair Jr et al., 2020). Confirmatory Composite Analysis in PLS-SEM examines the quality of the measurement model to ensure that there is adequate reliability and validity in the measures of the study constructs. Several

evaluation criteria are used to indicate the good quality of the measurement model, these include assessment of factor loadings in a construct, indicator reliability, composite reliability, Average Variance Extracted (AVE), Discriminant Validity and Predictive validity,(Joe F Hair Jr et al., 2020).

3.10 Factor Loading

Factor loading is a measure of how much the dimensions of a factor are accounted for by the study variable. In reflective measurement models such as these in this study, factor items are expected to have a high correlation because each item explains the measured latent construct. The general rule in PLS-SEM requires that, for a good quality measurement model of the latent construct, the measured construct must be explained with at least three-factor items while the factor loadings (standard regression weights) not be less than 0.5 (Wolfinbarger & Gilly, 2003; Yong & Pearce, 2013). In this study factors were maintained in the measurement, models were exceeding 0.6 and each latent construct had more than three items.

3.11 Reliability and Validity

In this study, the assurance of the trustworthiness of the research instrument used was provided after analysis of the reliability and validity test as explained in sections 3.11.1 and 3.11.2.

3.11.1 Reliability

Reliability refers to the extent to which the structured questionnaire as a tool for data collection and the data analysis techniques employed in this study will deliver results that are free from errors, consistent and stable despite the change of observers or lapse of time (Ellis & Levy, 2009; Joppe, 2000; Saunders, Lewis, & Thornhill, 2003). In quantitative research design, a study is considered reliable when its results are consistent over time, accurately represent the population, and can be replicated when a similar measurement method is employed, (Drost, 2011). In this study, the researcher ensured reliability by adapting validated research questions and the use of both Swahili

and English language in the questionnaires to ensure that respondents are free to use the language in which they are conversant and affluent.

Further, the correlation of responses to each question with others was tested by using Cronbach's Alpha method by calculating internal consistency and composite reliability coefficient. Mohsen and Reg (2011) posit that Cronbach's Alpha provides a measure of internal consistency, which describes the extent to which all the items in a test instrument measure the same construct. Furthermore, (Taber, 2018) recommends that a Cronbach Alpha of 0.6 -0.7 is acceptable for the statistical internal consistency of the research instrument. In this study, the statistical level of 0.6 Cronbach Alpha was adopted for determining that the research instrument has internal consistency.

Furthermore, composite reliability (CR) was used to assess the internal consistency of the variables.CR indicates how well a set of items in a scale measures the same construct in a test. In the reliability test, CR values from 0.6 and above are recommended to achieve the required level of reliability of the latent construct among variables,(Ahmad, Zulkurnain, & Khairushalimi, 2016; Hair, 2009). These analyses were important because they provide an opportunity for the researcher to assess how operationalized variables measure what they are meant for in alignment with the theoretical orientation (J. F. Hair, 2010). Otherwise, any observed non-alignment was fixed to ensure reliable results (Saunders et al., 2003).

3.11.2 Validity

Validity refers to the magnitude in which the responses of the questionnaires real measure what it is meant to measure by the researcher. In this study, the researcher understands that it is essential for the research instrument to be validated to ensure that its scores provide meaningful and useful inferences. In this regard, model validation includes the content and construct validity of the research instrument, (Creswell & Creswell, 2017; Greener, 2008). Further, in this study, the validity of data was also preserved through clarity, understandability, and appropriateness of questions that were designed based on theories underpinning the study.

It is known that content validity refers to whether items on a given test reflect the theoretical domain of the latent construct it claims to measure, (Morse, Barrett, Mayan, Olson, & Spiers, 2002). For achieving content validity, a pilot study to test the survey instrument was conducted to ensure that the items in a given test accurately reflect the theoretical domain of the latent construct it measures. In addition, the content validity in the questionnaire items was ensured by aligning the study dimensions and its indicators with previous studies that have used similar variables coupled with consultations with professionals and practitioners in the fields of financial literacy, digital banking, and financial inclusion to assess its coverage in the theoretical domain. Specifically, the questionnaire items were developed from TPB and TAM theories and previous financial literacy,(Atkinson & Messy, 2012; Norvilitis & MacLean, 2010; OECD, 2013) and digital financial literacy,(Prasad et al., 2018; Setiawan et al., 2020) studies.

With regard to construct validity, this refers to the extent of how well the questions in the research instrument conform with theoretical expectations and the hypothesis they are measuring, (Mello & Collins, 2001). The construct validity also examines the quality of the structural equation model. In testing construct validity, the researcher examined the scale used by employing convergent and discriminant validity tests, (ibid). Convergent validity examines whether the items included in the study constructs meet the same unobservable variable, (Bagozzi & Baumgartner, 1994). Previous studies recommend a general rule for accepting results when testing the convergent validity of the model. The rule requires the Average Variance Extracted (AVE) to be at least 0.4 or 0.5, (Bagozzi & Baumgartner, 1994; Fornell & Larcker, 1981) respectively. In this study, all loadings in the measurement model achieved the minimum recommendation of at least 0.5 AVE as indicated in Table 17 in chapter 4.

On the other hand, the discriminant validity test intends to demonstrate a lack or very low correlation among different constructs, (Fornell & Larcker, 1981). This type of construct validity test checks if one scale can be distinguished from other scales measuring different concepts. In this study discriminant validity was assessed by using three criteria namely; Fornell- Larcker criterion,

Heterotrait -Monotrait (HTMT) ratio and Cross loadings. The general rule for validating that the measures of variables are not related is when the inter-factor correlations are less than the square root of the AVE, the HTMT ratio is not greater than 0.9 and for Cross loadings, each item in a construct must load well in its construct other than all other constructs, (Henseler et al., 2015).

Table 9: Measurement Model Acceptance criteria

SN	Criterion	Description	Minimum Threshold	Reference
1	Factor loading	measure how much the dimensions of a factor are accounted for by the variable	0.5-0.7	(Yong & Pearce, 2013)
2	Cronbach's Alpha(CA)	a measure of internal consistency	0.6	(Taber, 2018)
3	Composite Reliability(CR)	measures how well a set of items in a scale measures the same construct in a test	0.7	(Hair, 2009)
4	Average Variance Extracted (AVE)	measure of variance captured by a construct in relation to the amount of variance	0.5	(Bagozzi & Baumgartner, 1994)
5	Cross -Loading	Measures if one dimension is distinguished from the rest in a construct	each item in a construct must load well in its construct other than in other constructs	(Henseler et al., 2015)
6	Fornell and Larcker	Measures if one dimension is distinguished from the rest in a construct	inter-factor correlations should be less than the square root of the AVE	(Fornell & Larcker, 1981)
7	HTMT	Measures if one dimension is distinguished from the rest in a construct	0.85- 0.90	(Henseler et al., 2015)

3.12 Evaluation Criteria for the Structural Model

PLS-SEM technique identifies and validates causal relationships between latent constructs through path significance by using bootstrapping analysis method. The technique provides an estimation of path coefficients, the coefficient of determination (R^2) which indicates the amount of variance for each construct as explained by the model, and the effect size (f^2) as a measure of the practical impact for each of the exogenous latent variables to the endogenous latent construct as represented by changes in R^2 and the predictive relevance of the endogenous variable(Q^2), (J. F. Hair, Risher, Sarstedt, & Ringle, 2019). For purposes of structural model assessment, this study is guided by criteria and acceptance threshold values provided in Table 10.

Table 10: Structural Model assessment criteria

SN	Criterion	Description	Threshold	References
1	R^2 of an endogenous latent construct	How much of the variation of the endogenous latent construct is explained by the exogenous latent construct (in-sample predictive power)	0.75,0.50 and 0.25 for substantial, moderate and weak respectively,	(J. F. Hair et al., 2019)
2	Q2	The measure of model prediction relevance through sample re-use. It indicates the out-of-sample prediction ability	0, 0.25, 0.50 for small, medium and large respectively	(J. F. Hair et al., 2019)
3	B-coefficient	The measure the sign, magnitude and the significance of the correlation between exogenous and endogenous latent constructs	• $\beta = -1 \geq 1$ • T value > 1.645 • P< 0.05	(Sarstedt, Ringle, & Hair, 2017).
4	f^2	measures the size of the effect in the R^2(coefficient of determination) following the removal of a	0.02, 0.15, and 0.35 for small, medium and large respectively	(Cohen, 1988).

		certain exogenous construct in a model.		
5	q^2	Measures the relative impact in Q^2 (predictive relevance) following the removal of a specific construct in a model	0.02, 0.15, and 0.35 for small, medium and large respectively	(Cohen, 1988).
6	Goodness of fit	The ability of the model to predict with reasonable accuracy	Standardized Root Mean Square Residual; (SRMR) value not exceeding 0.08	(Hair, Sarstedt, & Ringle, 2019)

3.12.1 Estimation of the Path Coefficient and determining the significance of the path model.

Path coefficients estimation through bootstrapping procedure defines how relevant and significant is the hypothesized relationship among constructs in the model (path model). The significance of the path coefficient is determined by empirical t-value and p-value results. For one-tailed tests with a significance level of 5% like in the case of this study, the general rule for statistically significant is when the t-value is greater than a critical value of 1.645. In addition, the P-value is used to assess the probability of erroneously accepting path coefficients as significant while they are not. The rule of thumb for signifying a significant relationship is when the p-value is not exceeding 0.005, (Sarstedt et al., 2017).

3.12.2 Assessing coefficient of determination (R^2)

The structural model analysis also involves establishing the coefficient of determination as a measure of the combined effect of exogenous latent (independent) variables on the endogenous latent (dependent) variable. R^2 is also referred to as in-sample predictive power because it represents the amount of variance in a dependent construct explained by all the independent constructs, (Hair et al., 2019).

3.12.3 Determination of Relevance effect size (f^2)

Relevance effect size in a structural model is used to identify the relevance of each independent variable to the dependent variable. This is determined by estimating the path model twice to determine differences in R^2. First, when the proposed model is complete and secondly when a specific exogenous latent construct is omitted from the model. The change in R^2 following the omission of one construct from a model is referred to as relevance effect size (f^2), (J. F. Hair et al., 2019). This measure evaluates if there is a substantial impact when a specific construct is omitted from the path model. Cohen (1988), sets a guideline for categorising effect sizes in the structural model by proposing thresholds that when f^2 is equal to and not exceeding 0.02, 0.15 and 0.35 represent small, medium and large effects in the exogenous latent variable in the model respectively.

3.12.4 Determination of Prediction Relevance (Q^2)

Prediction relevance also referred to as the out-of-sample predictive power (Q^2) is the ability of the path model to predict the originally observed values and its parameter estimations, (Geisser, 1974). In PLS-SEM the blindfolding procedure is used to determine the prediction relevance of the model. The procedure involves a systematic elimination of data points of endogenous indicators in a measurement model of a certain latent variable through parameter estimation, followed by replacement of eliminated data with predictive sample data and finishes by re-estimating the model parameters. This procedure is done to determine the predictive validity of the model (Q^2) and it is an indicator of how survey data can be reconstructed with the help of a model and the parameters, (Sarstedt et al., 2017).

The difference between the predicted model estimates and the original values is assessed to determine the extent of the differences, the general rule is when the difference is small then the better the Q^2. This is because when the predicted value is close to the true original values, the prediction error is very minimal. On the other hand, when, the Q^2 value is greater than zero it indicates that the path model has predictive relevance for a certain endogenous construct, (ibid).

3.12.5 Determination of Predictive Effect Size (q2)

Predictive effect size (q^2) is a measure of the relative impact of predictive relevance for a specific endogenous latent construct. This measure is used to assess the contribution of specific exogenous latent constructs to an endogenous construct predictive relevance (Q^2). q^2 value measure of 0.02, 0.15 and 0.35 indicates small, medium or large predictive relevance respectively, (Henseler, Ringle, & Sinkovics, 2009).

3.12.6 Model Validation

Before testing for causal relationships and their significance, first, the multi-collinearity test was conducted to check if there is a collinearity problem within the data set. Value Inflated Factor (VIF) was used to detect the collinearity problem (Robinson & Schumacker, 2009). The general rule of thumb is, that VIF in all predictors should be less than five (5) to indicate that there is no collinearity problem among the variables (Hair, C. M. Ringle, & M. Sarstedt, 2011b).

In addition, data were checked for missing data and outliers to ensure that such anomalies in the data set do not affect the analysis or its results. Much as statistical analysis also requires researchers to check on the normality of data before analysis, in this study this was not an issue given that the use of variance-based SEM by Smart PLS does not require a normality test since its assumptions are based on non- normality. After data clean-up and ensuring the measurement model reliability and validity, then the developed structural model was subjected to diagnostic tests (model fit test) to ensure it does not violate the underlying assumptions or lead to misleading conclusions. In this case, (Hu & Bentler, 1995) recommends the Standardized Root Mean Square Residual (SRMSR), as an appropriate measure for model fitness.

Though SRMR is used as a proxy for model fitness when using Smart PLS-SEM, it is argued that the test is not necessary because the method considers error variance in model estimation contrary to covariance-based SEM that minimizes bias at an expense of lowering the predicting power. In PLS-

SEM the amount of explained variance of the endogenous construct in a model is maximised by minimizing the combination of bias and error variance. Therefore, this recommendation was given on the basis that SRMR quantifies the divergence between empirical and implied model correlation matrices as opposed to estimating parameters for minimizing the divergence,(Hair et al., 2019). However, despite this disclaimer, SRMR continues to represent model fitness and for that reason, it is employed in this study.

3.12.7 Assessment of the Moderation Effect

A moderator is a variable that affects the strength and/or the direction of a relationship between exogenous and endogenous latent constructs in a structural model, (Henseler & Fassott, 2010). In this study, the relationships between financial literacy and digital financial literacy with financial inclusion are hypothesized to be moderated by demographic characteristics such as gender, level of education, residential location, level of income and age.

There are various approaches to examining the effect of moderating variables in a structural path model. The commonly known are PLS interaction-effect and Multi-Group Analysis (MGA) approaches, (Henseler et al., 2009). The interaction effects approach is used when the moderator is a continuous variable and the estimation of the proposed path model when run includes the main effect model and the interaction term (a product between indicators of the exogenous latent variable and the indicators of a latent moderator variable). In this case, the moderation effect is recognised when the interaction term's effect is significant (i.e. not equal to zero). On the other hand, the MGA approach is recommended when the moderator or an exogenous construct is a categorical variable. The MGA usually tests the moderating effect by assessing whether there is a significant structural path difference across pre-defined groups in the data set (subsamples) following the influence of the moderating variable,(Chin, 1998). In this study, the hypothesized moderating relationship involved reflective latent constructs and categorical moderating variables and therefore MGA is an appropriate method for assessing the moderating effect.

3.12.8 Importance –Performance Map Analysis (IPMA)

IPMA is a technique used to assess the practical significance of the research to identify the importance and the performance of each attribute in the confirmed relationship between study variables. Martilla and James (1977) have provided an importance-performance grid as a framework to assess the level of importance and performance of attributes in research. The Grid provides a plot of study constructs and their implications in terms of required management attention and action in relation to its importance and ability to influence the performance of the dependent variable.

SmartPLS3 Software provides a module to assess the IPMA in empirical studies and it is considered beneficial since it provides additional results and findings on the PLS-SEM analysis. Specifically, it provides an opportunity to combine the path coefficient (importance dimension) results and performance dimension results for each indicator in a model. In addition, IPMA facilitates managers and practical interventions since one can prioritize a specific construct to improve a certain target construct. Also, the analysis can be extended at an indicator level to identify the relative importance of each indicator in a construct and therefore directs more relevant and specific managerial action required for addressing the identified research gap, (Ringle & Sarstedt, 2016).

To improve the analysis of the PLS-SEM model and enrich the conclusion of the study analysis, this study, therefore, adopts the IPMA technique to analyze the importance of each construct and their respective indicators on financial inclusion and thereafter provide the practical recommendations for necessary and effective interventions, (Sarstedt, Ringle, Smith, Reams, & Hair Jr, 2014).

3.13 Ethical Considerations

During the study, the researcher complied with research ethics as required by the University Human Research Ethics Committee (Non-Medical) and was approved to proceed with data collection under clearance certificate number H21/02/14. Among others, the researcher ensured that the respondents are only adults aged 18 years and above; placed special attention to respondents' right to anonymity

and privacy; ensured respondents the freedom to withdraw at any stage when felt uncomfortable proceeding with the interviews; and observed COVID19 protocols when conducting interviews.

In addition, the respondents were informed of the purpose of the study and the implications for their involvement through the participant information sheet. In view of this, they had the opportunity to choose to participate or not since they were required to provide verbal consent for their participation before attending the questionnaire. To ensure the validity of information, they were asked to confirm in advance that they will share valid information and they allow the researcher to collect, use, and protect personal data and information they have provided during the research.

Lastly, contact details for the researcher, supervisor and the University Human Research Ethics Committee (Non-Medical) were shared with respondents for reporting any ethical complaints during or after the research. Other than the aforesaid, when writing this thesis, as a means of displaying ethical writing the researcher has acknowledged the work of other scholars by providing proper citations.

3.14 Research Plan

The below plan guided the researcher during the implementation of this study.

Table 11: Research Activity Plan

SNO	ACTIVITY	START DATE	END DATE
1	Proposal Writing	March 2020	October 2020
2	Proposal Examination and Approval	December 2020	December 2020
3	Ethics Committee Approval	January 2021	March 2021
4	Pilot testing	April 2021	April 2021
5	Data Collection	May 2021	July 2021
6	Data Analysis	August 2021	December 2021

7	Thesis Writing	December 2021	April 2022
8	Submission for Examination	June 2022	October 2022
9	Implementation of Examiners comments	November 2022	November 2022

3.15 Conclusion

This chapter provided details of a systematic process for conducting this quantitative research to draw results that are provided and discussed next in the following chapter. In this study, the researcher confirms that data was collected smoothly, and all challenges encountered during the data collection exercise were well managed and had no impact on the analysis process. Therefore, relevant data to respond to research questions and the study hypothesis were obtained as expected.

CHAPTER FOUR

DATA PRESENTATION

4.1 Introduction

This chapter presents procedures for data preparation and analysis of respondents' demographic characteristics and financial services profiles. Prior to analysis, the survey data were cleaned and assessed for compliance with the assumptions of the SEM technique and the Smart PLS software.

4.2 Data Preparation

In this study, the collected data were coded and cleaned as preparation for onward analysis. Specifically, the data file was checked for completeness to identify any inconsistencies and illogical data captured during data entry that requires rectification before data analysis. Subsequently, after checking data completeness and rectification, a unique code was assigned to each item to allow easy referencing of all the construct items and their respective study variables ready for analysis. Specifically, the analysis of missing data (non-responses) and outliers was conducted as provided next.

4.2.1 Missing value Analysis

In this study missing items were identified through manual checking of each item in the excel sheet through filtering of each response to assess the completeness of the responses for each question. During this analysis, it was noted that among the 442 questionnaires, two respondents had missing data on three cases for items related to financial behaviour questions (FA3, FA5 and FA6) which were dropped (ignored) as a means of treating the data and at the end, the data set remained with 440 completed questionnaires.

4.2.2 Outliers

In this study, outliers were examined for each construct item and it was noted that there were no outliers save for a few items whose responses were read as a string instead of values. The specific items with strings were changed to values as a criterion for acceptance in the PLS-SEM.

4.3 Normality Test Results

Smart PLS-SEM doesn't assume normality because of normality and therefore researchers are not required to ensure data normality once variance-based SEM is employed in the analysis, (Henseler et al., 2015). The method applies the bootstrapping method to estimate the causal relationship of variables, this method is believed to perform robustly when data are non-nominal, however, it is recommended that skewness must be reasonable not to represent significant variations from the normal distribution, (Hair, 2010). Therefore, to ensure generalization and understandability to readers who are not conversant with PLS-SEM, this study assessed the skewness and kurtosis of the sample data to determine the extent of compliance with normality requirements. The general rule of thumb for determining normality in PLS-SEM is when Skewness is between $^{-}1$ and $^{+}1$ and Kurtosis ranges between $^{-}2$ and $^{+}2$, (C. Sharma & Ojha, 2020)

Results of the normality assessment indicated that all the variables save for one item (FI4) had skewness and kurtosis within the acceptable range and therefore confirms that survey data collected from the sample was normally distributed. For remedy FI4 was removed from indicator items of the dependent variable to remain with items that explain well the population. Details of the data distribution are indicated in Table 12.

Table 12: Results of the Normality Assessment Test

Variable	Missing	Mean	Median	Min	Max	Standard Deviation	Excess Kurtosis	Skewness
AGE	0	1.51	2.00	1.00	2.00	0.50	-2.01	-0.02
GENDER	0	1.50	1.00	1.00	2.00	0.50	-2.01	0.02
LOCATION	0	1.68	2.00	1.00	2.00	0.47	-1.44	-0.75
EDU	0	1.60	2.00	1.00	2.00	0.49	-1.86	-0.39
INCOME	0	1.28	1.00	1.00	2.00	0.45	-1.06	0.97
EMPLOYMENT	0	1.24	1.00	1.00	2.00	0.43	-0.52	1.22
FK1	0	3.29	3.00	1.00	5.00	1.01	-0.54	-0.34
FK2	0	3.24	3.00	1.00	5.00	0.88	-0.24	-0.06
FK3	0	2.92	3.00	1.00	5.00	1.08	-0.70	0.01
FK4	0	3.29	4.00	1.00	5.00	1.02	-0.65	-0.39
FK5	0	3.29	3.00	1.00	5.00	0.95	-0.37	-0.31
FK6	0	3.27	3.00	1.00	5.00	0.93	-0.45	-0.23
FK7	0	3.30	3.00	1.00	5.00	0.95	-0.15	-0.34
FB1	0	3.49	4.00	1.00	5.00	0.88	-0.46	-0.43
FB2	0	3.20	3.00	1.00	5.00	0.93	-1.01	-0.13
FB3	0	2.83	3.00	1.00	5.00	0.98	-0.52	0.02
FB4	0	3.33	4.00	1.00	5.00	1.02	-0.42	-0.52
FB5	0	3.11	3.00	1.00	5.00	1.09	-0.81	0.01
FB6	0	3.31	4.00	1.00	5.00	0.94	-0.58	-0.42
FB7	0	3.00	3.00	1.00	5.00	1.02	-0.85	-0.10
FA1	0	3.46	4.00	1.00	5.00	0.95	-0.25	-0.59
FA2	0	3.02	3.00	1.00	5.00	0.85	-0.67	0.05
FA3	0	2.98	3.00	1.00	5.00	0.97	-1.00	-0.25
FA4	0	3.24	3.00	1.00	5.00	0.92	-0.48	-0.12
FA5	0	3.15	3.00	1.00	5.00	1.06	-0.79	-0.37
FA6	0	3.09	3.00	1.00	5.00	1.04	-0.74	-0.42
FA7	0	3.21	3.00	1.00	5.00	1.03	-0.35	-0.40
DFK1	0	3.27	4.00	1.00	5.00	1.17	-0.81	-0.45
DFK2	0	3.09	3.00	1.00	5.00	1.07	-0.85	-0.28
DFK3	0	3.16	3.00	1.00	5.00	1.18	-0.87	-0.44
DFK4	0	2.91	3.00	1.00	5.00	0.95	0.07	-0.07
DFK5	0	2.66	2.00	1.00	5.00	1.25	-1.29	0.18
DFR1	0	3.15	3.00	1.00	5.00	1.19	-0.91	-0.26
DFR2	0	3.31	3.00	1.00	5.00	0.96	0.04	-0.27
DFR3	0	3.21	3.00	1.00	5.00	0.90	-0.43	-0.10
DFR4	0	3.35	4.00	1.00	5.00	1.09	-0.94	-0.19

DFR5	0	2.91	3.00	1.00	5.00	0.84	0.18	0.32
DFR6	0	3.51	4.00	1.00	5.00	1.10	-0.98	-0.39
DFRC1	0	3.34	3.00	1.00	5.00	1.00	-0.62	-0.26
DFRC2	0	2.79	3.00	1.00	5.00	1.00	-0.84	-0.11
DFRC3	0	3.25	3.00	1.00	5.00	0.90	-0.27	-0.46
DFRC4	0	3.18	3.00	1.00	5.00	0.89	-0.42	0.17
DFRC5	0	3.38	3.00	1.00	5.00	0.98	-0.72	-0.01
DFCR1	0	3.20	3.00	1.00	5.00	0.79	0.20	-0.32
DFCR2	0	3.30	3.00	1.00	5.00	0.84	-0.66	-0.47
DFCR3	0	3.39	3.00	1.00	5.00	0.83	-0.51	-0.08
DFCR4	0	3.23	3.00	1.00	5.00	0.77	0.34	-0.36
DFCR5	0	3.43	3.00	1.00	5.00	0.78	0.06	0.05
FI1	0	0.38	0.00	0.00	1.00	0.49	-1.78	0.48
FI2	0	0.51	1.00	0.00	1.00	0.50	-2.01	-0.03
FI3	0	0.37	0.00	0.00	1.00	0.48	-1.71	0.55
FI4	0	0.06	0.00	0.00	1.00	0.24	11.51	3.67
FI5	0	0.34	0.00	0.00	1.00	0.47	-1.54	0.68
FI6	0	0.23	0.00	0.00	1.00	0.42	-0.30	1.31

4.4 Common Bias Method assessment (CBM)

In this study was Common Bias Method was assessed by conducting the collinearity test to determine the Variance Inflation Factor (VIF) through Smart PLS-SEM. The acceptable rule of thumb for the study constructs to be free from collinearity and common bias variance is when the VIF of a factor item does not exceed 3.3, (Kock, 2015). Details of the Variance Inflation Factor of the Structural Model are provided in Table 13.

Table 13: Value Inflation Factor for the First and Second Order items

Construct	VIF
DFCR	2.19
DFK	2.36
DFR	1.75
DFRC	2.56
FA	2.15
FB	1.97
FK	2.12

DFL	3.30
FL	3.30

4.5 Demographic Characteristics of the Respondents.

This section explores the collected data of individual financial consumers sampled both from rural and urban areas of Tanzania. The nature and characteristics of respondents are described as a mechanism to allow the researcher to build a premise of the respondent profiles in relation to the research questions and their objectives. Although the main research question is to examine the relationship between financial literacy, digital financial literacy and financial inclusion, the effect of variations in demographic characteristics in this relationship is also an aspect of interest in the study since it provides an opportunity to understand the variations in financial behaviour among individuals. The categorical data for gender, residential location, level of education attained, age, level of income and employment status were selected since they highly explain individual financial behaviour (Delafrooz & Paim, 2011). Details of key respondent's demographic characteristics are described in the next section;

4.5.1 Residential Location

In the study sample, 297 of the respondents were residing in urban areas while 143 were from rural. The large proportion of people from urban is a result of sampling more respondents from urban areas due to significant variations in population size of the selected regions when compared to rural areas. This study adopted a purposive two-stage stratified cluster sampling technique where regions with high levels and those with the lowest level of financial inclusion were selected. From the four regions selected rural and urban strata were selected and from the sample frame number of streets/villages were selected by using the probability proportional to size selection technique thereafter in each selected street or village a number of households were systematically selected to reach the conveniently available respondent. Due to this, the number of urban and rural residents was not

equal, however, the two stratum are well represented considering the proportionate selection in relation to population size in the areas selected as sample locations.

4.5.2 Gender

Respondents' gender had both Male and female individuals from both rural and urban areas where data was collected. Results indicate that there were 218 males and 222 females, equivalent to 49.5% and 50.5% per cent, respectively. This profile is in line with the Tanzania household budget survey(NBS, 2020) which indicates that female account for 52 per cent of the population while male accounts for 48 per cent.

4.5.3 Age

The age profile of respondents indicated that a significant proportion of the respondents were in the two age groups, i.e. 26-35 (31.1%) and 36 -54 (30.7%). According to the Tanzania household budget survey,(NBS, 2020) provides that this is the most active and energetic workforce in the country. Hence considered to be economically active and likely to demand financial services including owning a bank account.

4.5.4 Level of education

The result indicates that 26 (5.9%) respondents had not attained any formal education, 152 (34.5%) had primary school education, 124 (28.2%) had attained secondary school education, 80 (18.2%) had certificate/diploma, and 58 (13.2%) were graduates from higher learning institutions. This result indicates that the majority of Tanzanians have only attended either primary or secondary school and on the other hand the country has a few people who have not attended formal education and those who are graduates.

4.5.5 Employment

Among the 440 respondents,108 (24.5%) were employees, 224 (50.9%) entrepreneurs/self-employed in micro and small businesses, 73 (16.4%) farmers and 36 (8.2%) were unemployed. The result indicates that in general most of the respondents were engaged in small businesses as self-employed, followed by public and private sector employees. In Tanzania majority of the self-employed are mainly vendors and individuals involved in micro and small businesses.

4.5.6 Level of Income

Respondent's levels of income were varying across groups[3]. The results indicated that 61 (13.9%) respondents had income below the minimum wage rate for the private sector, which is TZS 65,000, and 255 (58.0%) had slightly above the minimum wage for the private sector but within the threshold of the minimum wage rate for public servants, i.e. 65,000 to 400,000; 104 (23.6%) had income within the range of TZS 400,000 plus and 1,000,000. While 20 (4.5%) people had income above TZS 1,000,000. This indicates that the majority of Tanzanians' income is within the category of TZS 65,000 to 400,000 and those within 400,000 plus to 1,000,000.

Table 14: Cross Tabulations of Demographic Characteristics

SN	Details	Category	Frequency	Percent
1	Gender	Male	218	49.5%
		Female	222	50.5%
2	Residential Location	Urban	297	67.5%
		Rural	143	32.5%
3	Age (years)	18-25	81	18.4%
		26-35	137	31.1%
		36-54	135	30.7%

[3] TZS 2300 is equivalent to 1 USD

		55 and Above	87	19.8%
4	Income (TZS)	Below 65,000	61	13.9%
		65,000-400,000	255	58.0%
		Above 400,000 -1,000,000	104	23.6%
		Above 1,000,000	20	4.5%
5	Employment status	Employee	108	24.5
		Self employed	224	50.9
		Farmer	72	16.4
		Un -employed	36	8.2
6	Education level	No formal education	26	5.9
		Primary	152	34.5
		Secondary	124	28.2
		Diploma	80	18.2
		Graduates and above	58	13.2

Source: Field Data (2021)

4.6 Financial Services Characteristics of respondents

The financial characteristics of respondents represented by the type of financial services in use are provided in sections 4.4.1 and 4.4.2.

4.6.1 Respondents financial services profile

Out of 440 respondents, 169 (38.4%) respondents had bank accounts. Among the banked, 162 (36.8%) had savings in their bank accounts and on the other hand, only a few respondents, 27 (6.1%), had borrowings from banks. In addition, the un-banked were noted to be active users of other alternative financial services such as Mobile Money payments (96.8 per cent), Saving in SACCOS (18.8 per cent) and borrowing from SACCOS (17.5 per cent).

Table 15: Respondents' Financial Services Profile

SN	Details	Frequency	Per cent
1	Own a Bank account	169	38.41
2	Save in the Bank	162	36.82
3	Borrow from a Bank	27	6.14
4	Bank Transfer	54	12.27
5	Use Mobile Money Payments	426	96.82
6	Save in a SACCOS	83	18.86
7	Borrowing from a SACCOS	77	17.5

Source: Field Data (2021)

4.6.2 Use of Digital Banking Services

With regard to the use of digital banking, the analysis indicates that there were significant variations in the use of digital banking across respondents. Among the 169 banked individuals, 167 (98.8%) were using ATMs, 149 (88.2%) had used agency banking in the past one year, and 20 (11.8%) had used their debit cards for payments through Point of Sale (POs) machines,100 (59.2%) were using mobile banking. On the other hand, data analysis indicated that only 8 (4.7%) of the respondents had used internet banking. In addition, it was also noted that 22 individuals among the 440 respondents had digital loans provided by banks through MNOs. Further analysis indicated that 12 respondents of those who had digital loans, had accessed the same without owning a bank account.

Table 16: Respondents Digital Banking Profile

SNO	Type of Digital banking	Frequency	Percentage
1	ATM	167	37.9
2	Agency	149	33.8
3	Use payment Card	20	4.5
4	Mobile banking	100	22.7
5	Internet	8	1.8
6	Digital loans through MNOs	22	5

Source: Field Data (2021)

4.7 Chapter Conclusion.

This chapter has indicated how data were prepared for analysis including remedies for missing data and outliers. With regard to data normality, skewness and excess kurtosis results indicated that the variables were normally distributed and hence considered to be fine for further analysis. In addition, to ensure good statistical results, study data were assessed for Common Method Bias through analysis of Variance Inflation Factor (VIF), results indicated that the variables in the model were free from collinearity and common method variance.

The descriptive analysis of the respondent's characteristics indicated that the survey was attended by 49.5 per cent males and 50.5 per cent females. In terms of geographical distribution, 67.5 per cent of the respondents were from urban and 32.5 per cent from rural. Respondents' age ranged from 18 to 55 and above years, with mixed academic backgrounds ranging from those who had not attended any formal education to graduates and above. In terms of employment status, the study sample included the unemployed who were 8.2 per cent and the rest were either self-employed or formally employed. In addition, the respondent's income profiles represented all the groups of the population ranging from those whose income was below and above the public sector minimum monthly wage rate.

With regard to the use of financial services, the result indicated that only 38 per cent of the respondents had banks accounts and mainly used saving deposit services (36 per cent), followed by bank transfers (12 per cent) while only a few had borrowed from banks (6 per cent). On the other hand, results indicated that, other than banking services, the majority of the respondents mainly use Mobile Money services (96 per cent) and saving and/or borrowing from Savings and Credit Cooperatives Societies (18 per cent) as their alternative financial services.

CHAPTER FIVE

Structural Equations Modelling and Measurement Models

5.0 Introduction

This chapter presents how the measurement models for both the independent and dependent variables were developed and assessed for quality checks. In this study financial literacy and digital financial literacy are conceptualized to influence financial inclusion. This section, therefore, indicates how the Structured Equations Modelling (SEM) technique through the use of Smart PLS - 3 software was used to model the study constructs and assess their reliability and validity in measuring the study constructs.

5.1 Multi-collinearity

SEM technique assumes a non-normality distribution of data and therefore its assumptions require the researcher to ensure that there is a limited linear relationship across study variables commonly referred to as multi-collinearity. In SEM when a researcher has two or more latent variables in the hypothesized model and the variables are highly correlated then you have a data problem that is likely to affect the interpretation of regression. When the data set has an acceptable degree of multi-collinearity, the effect of an individual latent variable on the dependent variable cannot be estimated with certainty due to increased standard error, (Field, 2009).

In this study, the degree of collinearity among the predictors of financial inclusion was analysed by using the Value Inflated factor (VIF). The general rule requires that for data to have no or be within an acceptable collinearity range, the VIFs of an item should be less than five, (Hair, Ringle, & Sarstedt, 2011a)

Table 17: Measurement Model Collinearity test results

Factor Item	VIF
DFCR2	1.57
DFCR3	1.49
DFCR4	1.60
DFCR5	1.58
DFK1	1.72
DFK2	1.86
DFK3	1.65
DFK5	1.72
DFR1	1.71
DFR2	1.49
DFR4	1.22
DFR6	1.53
DFRC1	1.60
DFRC2	1.64
DFRC4	1.58
DFRC5	1.65
FA2	1.22
FA3	1.32
FA4	1.30
FA6	1.39
FA7	1.43
FB1	1.33
FB3	1.34
FB5	1.46
FB7	1.31
FK1	1.53
FK3	1.55
FK4	1.42
FK6	1.31
FK7	1.34

5.2 Measurement Model Formulation and Validation

During the conceptualization of the path relations between the independent and dependent variables as presented in Figure 3 of this thesis in the conceptual framework the variables under study were not supported by data. In this regard, Smart PLS-SEM was used to develop and test if the proposed factor structure for financial literacy, digital financial literacy and financial inclusion are consistent with sample data. To facilitate this, a measurement model to identify and confirm the alignment of constructs with their respective indicator variables was developed. Measurement models are used to validate the theoretical relationships between observed indicators and their respective latent constructs. Details of how this was done are explained in the sections below.

5.2.1 Financial Literacy and Digital Financial Literacy Measurement Models

In this study, financial literacy and digital finance literacy predictor variables were specified as reflective - reflective second-order latent variables which are hypothesized to have a positive and significant relationship with financial inclusion. In this regard, the measurement of the two exogenous latent constructs was conducted in two stages. The first stage involved estimation of the measurement model for the lower-order constructs followed by estimation for the higher-order constructs by using the embedded two-stage approach (Sarstedt, Hair Jr, Cheah, Becker, & Ringle, 2019).

The Financial Literacy (FL) measurement model is specified based on the TPB which had three dimensions with twenty-one indicator items. Financial literacy(FL) as an unobservable construct has three dimensions namely financial knowledge(FK), financial behaviour (FB) and financial attitude(FA). In addition, each of the financial literacy dimensions had seven questions.

On the other hand, Digital Financial Literacy (DFL) measurement model is specified based on the theory of TAM and represented by four digital financial literacy dimensions with 20 items. The DFL

dimension includes; digital financial knowledge (DFK), awareness of digital financial risks (DFR), awareness of digital financial risk control (DFRC) and awareness of digital finance consumer rights and redress mechanisms (DFCR). Each of the digital financial literacy dimensions had five questions except for "awareness of digital financial Risks (DFR)" which had six items.

5.2.2 Measurement Model for Financial inclusion

With regard to the dependent variable, financial inclusion is specified as a latent variable represented by six items which are owning a bank account (FI 1), Proximity to a banking access point (FI2), saving in a bank (FI3), borrowing from a bank (FI4), Use of agency banking (FI5) and the use of mobile banking services (FI6).

5.2.3 Evaluating the Quality of the Measurement Models

5.2.3.1 Factor Loading Results for Financial Literacy Measurement Model

In selecting which factors to be retained in the measurement model, the study considered the quality of factor loadings for each item in the constructs as a criterion for consistency. Factor loading measures how much the dimensions of a factor are accounted for by the variable, Yong and Pearce (2013). In this study through the use of PLS-SEM, factor analysis was run to determine the quality of outer loadings for each indicator. Results thereon indicated that seven items of the financial literacy construct had factor loadings below the threshold of 0.6 and therefore they were removed from the measurement mode since it was considered to have a minimal contribution in explaining the latent variable, thus failing to fit in the measurement model. All the indicator items that had loadings above 0.6 were retained in the measurement model and thus ensured good quality and reliable measurement model. The results of the indicator loadings for the measurement model are provided in Table 20.

Following the removal of seven items which were conceptualised in the original FL measurement model and were not fitting well in the FL measurement model, the revised model had fourteen items

explaining the financial literacy construct. Table 18 provides a list of items removed from the FL measurement model due to weak loadings.

Table 18: Items dropped in the formulation of the financial literacy measurement model.

SNO	Constructs	Items removed	Code
1	Financial Knowledge	Understanding the time value of money	FK2
		Understanding the concepts of diversification	FK5
2	Financial Behavior	I usually pay my bills and debts on time	FB2
		I often save for emergencies and expenses that require a large sum of money	FB4
		When doing transactions, I usually spend within my budget	FB6
3	Financial Attitude	I better spend my money today than worry about saving for the future	FA1
		I often pay my bills when I have money, not because of due dates	FA5

5.2.3.2 Factor Loading Results for Digital financial literacy measurement model

Similarly, factor analysis and assessment of factor loading results for the measurement model for all the four digital financial literacy dimensions were conducted. After assessing the loading results, five items with either loading below 0.6 or loading above 0.6 but their inclusion in the model was

weakening the discriminant validity of the model were removed. In that regard, sixteen items were retained to represent the DFL measurement model.

Table 19: Items dropped in the formulation of the digital financial literacy constructs

SNO	Constructs	Items removed	Code
1	Digital financial knowledge	I have the competence and knowledge to access and use electronic banking	DFK4
2	Awareness of Digital Financial Risks	I can be exposed to online fraud and cyber-security attacks when using electronic banking	DFR3
		The use of electronic banking increases the risk of miss-use of my personal data by third parties	DFR5
3	Awareness of Digital Financial Risk Controls	I usually consult experts or Bank Officers for things that I don't know regarding electronic banking	DFRC3
4	Awareness of Digital Finance consumer rights and redress mechanisms	I know my rights and obligations when using electronic banking products and services.	DFCR1
		When I face transactional challenges or fraud when using electronic banking platforms, I know how to obtain redress	DFCR2

Financial literacy and Digital financial literacy items presented in Tables 18 and 19 respectively imply that though these items were included in the research instrument because they are supported by literature and the theories of TPB and TAM in measuring financial literacy and digital financial literacy dimensions, however in the context of Tanzania they are found to be irrelevant in measuring these constructs. This signifies that respondents' responses have inadequate variations and hence the

similar pattern of responses has resulted in weak loadings that fail to meet the minimum criteria for retention in the measurement model.

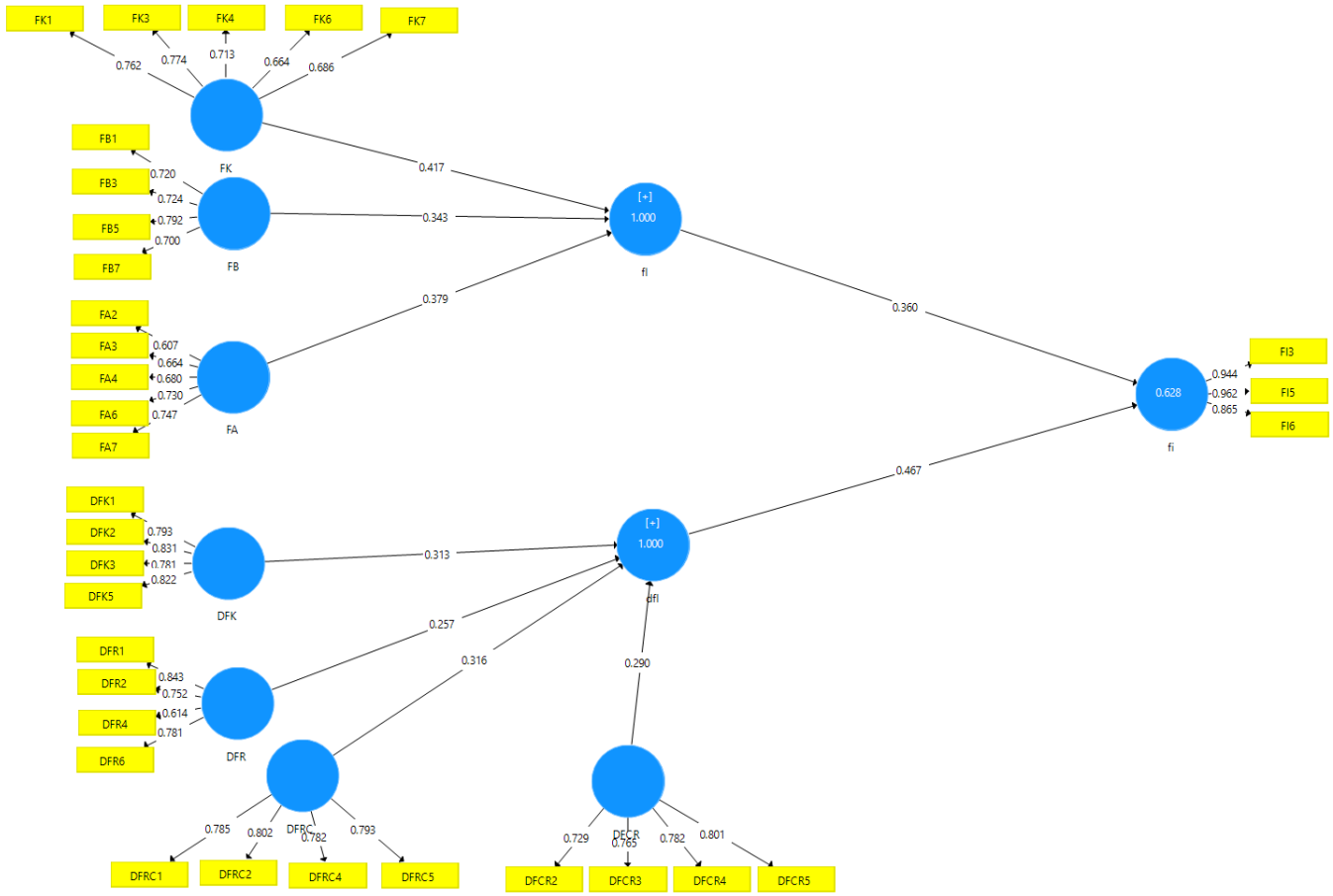
For instance, concerning financial literacy dimensions, most respondents perceived to have an understanding of the time value of money and diversification concepts, spending within their budget, saving for future expenses and paying their bills timely. Given the pattern of the responses factor loading for these items was weak because they cannot uniquely explain differences in characteristics across respondents. In this study, data were collected both from rural and urban areas, and the fact that Tanzania is still a developing country and is within the low band of the middle-income category was achieved in the year 2021. Some of these responses may have been influenced by the low income (i.e. saving for the future, paying bills on time and spending within budget) while understanding the time value of money and the need for diversification may be learnt from life experiences or influenced by peers) as such there might so significant variations on the same concerning the banked and the unbanked.

On the other hand, in the case of a dropped item for digital financial literacy, the pattern of responses implied that most respondents had an idea of how to access electronic banking services, at least they were aware that one can suffer financial loss or reputational damages through cyber-attacks when using electronic financial services, understands the need to consult bank experts in case of challenges when using electronic banking services and awareness of digital financial consumers rights. This pattern of responses in the context of Tanzania is a reflection of spill over effects on the use of mobile money services that were adopted since 2017 and therefore after all this time it has exposed the majority of SIM wallet owners to have some basic understanding of how to access such services, at least have a hint on digital finance risks and through the experience of resolving mobile money challenges to agents some people might have perceived to know about digital banking services.

Table 20:Factor Loadings

Items loadings	DFCR	DFK	DFR	DFRC	FA	FB	FK
DFCR2							
DFCR2	0.729						
DFCR3	0.765						
DFCR4	0.782						
DFCR5	0.801						
DFK1		0.793					
DFK2		0.831					
DFK3		0.781					
DFK5		0.822					
DFK5							
DFR1			0.843				
DFR2			0.752				
DFR4			0.614				
DFR6			0.781				
DFRC2				0.802			
DFRC4				0.782			
DFRC5				0.793			
DFRC5							
FA2					0.607		
FA3					0.664		
FA4					0.680		
FA6					0.730		
FA7					0.747		
FB1						0.720	
FB3						0.724	
FB5						0.792	
FB7						0.700	
FK1							0.762
FK3							0.774
FK4							0.713
FK6							0.664
FK7							0.686

Figure 4: First-order Measurement Model



Source: Author's own work

5.3.2 Internal Consistency Reliability and Convergent Validity for the Measurement Models

The internal consistency of the measures of financial literacy and digital financial literacy was established by determining the Cronbach's Alpha (CA) and Composite Reliability (CR) of the dimensions of the construct. The general rule for acceptance for reliability tests requires CA and CR values to range from 0.6 to 0.9 because within that range it indicates higher levels of reliability. Also when the values are higher than 0.95 the item is considered to be redundant for it reduces the construct validity, (J. F. Hair et al., 2019).

Factor analysis was performed in the Smart PLS-SEM for purposes of assessing the quality of the measurement models, results indicated that Cronbach's Alpha for all the factors in the two constructs

(FL ad DFL) ranged from 0.71 to 0.82 while the Composite Reliability ranged from 0.81 to 0.88. These results were above the minimum thresholds of 0.6 for CA and 0.7 for CR respectively, (Fornell & Larcker, 1981; Hair, 2009; Taber, 2018).

After conducting the reliability test for the measurement model, a convergent validity test was performed. Convergent validity measures the extent to which a construct converges to explain the variance of its items. The indicator for this measure is the Average Variance Extracted (AVE) of all the items in a construct and it represents the mean of the squares of each indicator loading in a construct. The minimum acceptable threshold for AVE is 0.5, indicating that the construct explains at least 50 per cent of the variance of its items, (J. F. Hair et al., 2019).AVE results for all the constructs in the measurement model ranged from 0.5 to 0.6. These results were acceptable because they are above the minimum threshold of 0.50. Table 21 provides the details of the reliability and convergent validity assessment results for the developed measurement model.

Table 21: Internal Consistency Results

SNO	Constructs	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
1	DFCR	0.77	0.85	0.59
2	DFK	0.82	0.88	0.65
3	DFR	0.74	0.84	0.57
4	DFRC	0.80	0.87	0.63
5	FA	0.72	0.82	0.47
6	FB	0.72	0.82	0.54
7	FK	0.77	0.84	0.52

5.3.3 Assessment of Constructs Discriminant Validity using Fornell –Larcker Criterion

Discriminant validity is the extent of the distinction of one construct from the rest in a measurement model. (Fornell & Larcker, 1981), provides a metric to measure discriminant validity by setting a criterion that requires each construct AVE to be compared to the squared inter-construct correlations of the same construct and all other constructs in the measurement model. The

acceptable general rule is when the factor's AVE is higher than its squared correlations with all other factors in the model,(Henseler, Hubona, & Ray, 2016).

Results of inter-construct correlations and square roots of AVEs indicated that the Fornell and Larcker criterion was established. This was evidenced by the fact that each construct in the measurement model shared more variance with its block of indicators than the rest.

Table 22: Fornell –Larcker Criterion Results

Constructs	DFCR	DFK	DFR	DFRC	FA	FB	FK
DFCR	**0.769**						
DFK	0.619	**0.807**					
DFR	0.566	0.604	**0.752**				
DFRC	0.694	0.707	0.552	**0.791**			
FA	0.617	0.705	0.502	0.666	**0.688**		
FB	0.644	0.666	0.497	0.619	0.645	**0.735**	
FK	0.632	0.679	0.488	0.676	0.676	0.638	**0.721**

5.3.4 Assessment of Discriminant Validity using Cross loadings criterion

Another alternative method for assessing discriminant validity is through an assessment of discriminant validity at the construct items level. Item discriminant refers to the extent to which two items measuring the same construct (theoretical proposed concept) are distinct from each other, (Chin, 1998).

In this study, the measurement items' discriminant validity for each construct was examined by using the (Chin, 1998), criterion. This metric requires the researcher to examine cross-loadings within factor loading and ensure that the loading of each item within the construct is higher than all of its cross-loading in a column and row. Results, as provided in Table 23, indicate that high loading was associated with factors that relate to each other.

Table 23: Cross loadings for measurement items for constructs in a measurement model

Construct	DFCR	DFK	DFR	DFRC	FA	FB	FK	FI
DFCR2	**0.729**	0.438	0.418	0.471	0.379	0.367	0.396	0.392
DFCR3	**0.765**	0.480	0.432	0.523	0.524	0.539	0.527	0.560
DFCR4	**0.782**	0.423	0.392	0.520	0.439	0.462	0.455	0.482
DFCR5	**0.801**	0.554	0.493	0.612	0.543	0.595	0.555	0.684
DFK1	0.464	**0.793**	0.396	0.522	0.512	0.467	0.472	0.370
DFK2	0.494	**0.831**	0.501	0.600	0.578	0.521	0.547	0.444
DFK3	0.438	**0.781**	0.463	0.489	0.518	0.543	0.514	0.402
DFK5	0.589	**0.822**	0.573	0.653	0.651	0.609	0.643	0.642
DFR1	0.536	0.575	**0.843**	0.551	0.491	0.501	0.508	0.642
DFR2	0.403	0.369	**0.752**	0.395	0.332	0.313	0.302	0.476
DFR4	0.329	0.370	**0.614**	0.284	0.314	0.262	0.272	0.300
DFR6	0.406	0.470	**0.781**	0.386	0.348	0.377	0.344	0.435
DFRC1	0.541	0.587	0.397	**0.785**	0.496	0.458	0.489	0.463
DFRC2	0.594	0.574	0.459	**0.802**	0.555	0.531	0.591	0.580
DFRC4	0.555	0.520	0.461	**0.782**	0.508	0.483	0.494	0.565
DFRC5	0.503	0.555	0.427	**0.793**	0.545	0.485	0.563	0.563
FA2	0.355	0.387	0.273	0.456	**0.607**	0.353	0.387	0.344
FA3	0.375	0.519	0.337	0.429	**0.664**	0.424	0.418	0.345
FA4	0.428	0.452	0.324	0.460	**0.680**	0.435	0.476	0.481
FA6	0.457	0.524	0.375	0.436	**0.730**	0.497	0.503	0.478
FA7	0.493	0.530	0.404	0.511	**0.747**	0.492	0.525	0.556
FB1	0.428	0.496	0.352	0.427	0.454	**0.720**	0.481	0.433
FB3	0.448	0.454	0.351	0.457	0.445	**0.724**	0.439	0.500
FB5	0.530	0.562	0.477	0.511	0.561	**0.792**	0.530	0.551
FB7	0.485	0.435	0.262	0.421	0.424	**0.700**	0.419	0.474
FI3	0.686	0.569	0.618	0.666	0.639	0.681	0.632	**0.944**
FI5	0.668	0.554	0.606	0.655	0.624	0.646	0.619	**0.962**
FI6	0.574	0.495	0.533	0.580	0.530	0.514	0.566	**0.865**
FK1	0.473	0.533	0.365	0.494	0.522	0.514	**0.762**	0.449
FK3	0.494	0.515	0.405	0.529	0.577	0.521	**0.774**	0.577
FK4	0.459	0.515	0.354	0.515	0.416	0.419	**0.713**	0.449
FK6	0.379	0.427	0.261	0.436	0.450	0.400	**0.664**	0.391
FK7	0.469	0.454	0.365	0.461	0.456	0.432	**0.686**	0.485

5.3.5 Assessment of Discriminant Validity using HTMT ratio criterion

Recent research has challenged the Fornell and Larcker criterion for determining discriminant validity and has proposed the Heterotrait -Monotrait (HTMT) ratio as an additional measure for discriminant validity in PLS-SEM on the basis that, the previous measure does not perform well when the indicator loadings have a slight difference, (Henseler et al., 2015). HTMT ratio represents the mean value of the item correlations across constructs relative to the geometric mean of the average correlations for indicators measuring the same construct, (Henseler et al., 2015). Its general acceptance rule for this metric is that HTMT ratio should not exceed 0.90 (ibid).

After running the Factor analysis in PLS-SEM discriminant validity results indicates that all the constructs in the measurement model met the HTMT ratio criterion since they were within the maximum threshold of 0.90, thus confirming the discriminant validity in the financial literacy and digital financial literacy measurement models was established.

Table 24: HTMT Ratio Results

Constructs	DFCR	DFK	DFR	DFRC	FA	FB	FK	FI
DFCR								
DFK	0.768							
DFR	0.735	0.755						
DFRC	0.879	0.864	0.699					
FA	0.818	0.907	0.673	0.880				
FB	0.858	0.860	0.656	0.816	0.889			
FK	0.816	0.847	0.627	0.862	0.900	0.853		
FI	0.818	0.662	0.749	0.801	0.789	0.819	0.779	

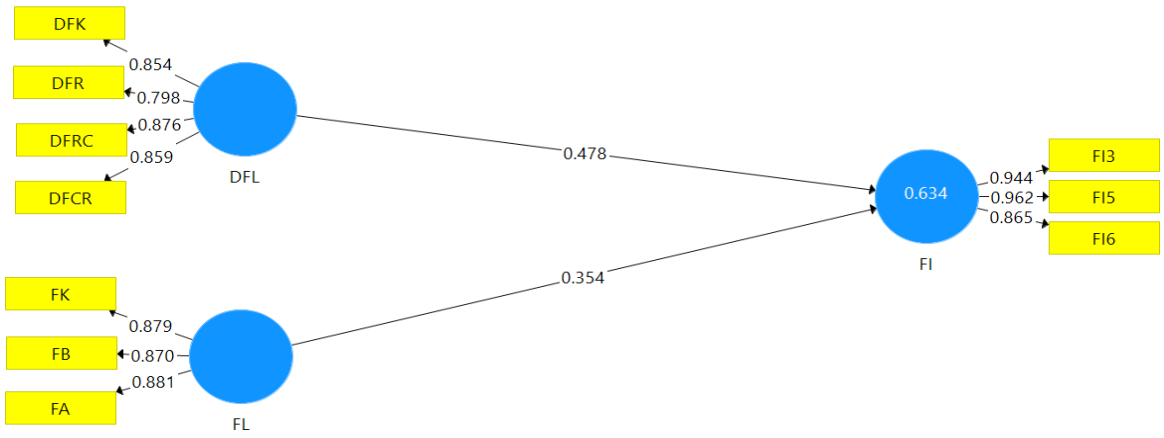
5.4 Measurement model for Higher-Order Constructs

In this study financial literacy and digital financial literacy are specified as second-order reflective-reflective constructs. In Higher Order Models (HOM), the first-order constructs define the attributes of the second-order measurement constructs. Literature suggests that there are at least three approaches for operationalising second-order constructs (HOM). First, the Repeated Indicator Approach, which is a method that measures the second level constructs by using observable variables from the first order indicators. Secondly is a Two-Stage Approach, this approach estimates the scores of the first-order constructs and thereafter uses the indicators of the first order to estimate the second level construct measures. Lastly, the Hybrid Approach is a method that splits the indicators of the first order construct into two halves and uses one half for estimating the first order and the other for estimating the second level construct measures therefore indicators are not repeated,(Bradley & Henseler, 2007).

In this study, a two-stage approach was employed in specifying the measurement model for the second-order latent constructs. This was done by analysing the first model (first-order) and taking the scores of its latent variables regression results and including them in the original data file as additional indicators for modelling the second-order measurement model, (Becker, Klein, & Wetzels, 2012). The two-stage approach was selected following its strong ability to minimize parameter bias in a structural model.

The HOM measurement model which is presented in figure 5 was made up of two indicators namely financial literacy (FL) and digital financial literacy (DFL). FL had three indicators while DFL had four indicators and all the items in the two constructs had factor loadings above the threshold of 0.6. After developing the HOM, the same was tested for reliability and validity as discussed in section 5.5.

Figure 5: Second order Measurement Model



Source: Authors' own work

5.5 Assessing the Quality of the HOM

Before conducting the structural model analysis, the HOM is required to be subjected to reliability and validity tests to confirm its quality in line with the criteria set for acceptance of SEM, (Henseler et al., 2015). In this regard, the developed higher-order model was evaluated for construct reliability and convergent validity by using Cronbach's alpha, composite reliability and Average Variance Extracted (AVE) criterion respectively. Results revealed that the HOM met the minimum thresholds for internal consistency and convergent validity as provided in Table 25.

In addition, the HOM was also tested for discriminant validity by using three criteria, these are Fornell –Larcker Criterion, (Fornell & Larcker, 1981), Cross loadings,(Chin, 1998) and HTMT, (Henseler et al., 2015). Table 26 and 27 indicate provides discriminant validity assessment results which indicate that the Fornell –Larcker Criterion and Cross loadings test for discriminant validity were established. With regard to the HTMT two construct items had HTMT below the limit of 0.9 while one item was slightly higher than the minimum threshold of 0.90. HTMT results are provided

in Table 28. On the other hand, considering that DFL and FL are different in theoretical meaning and items between the two constructs had no significant cross loadings, hence no item was incorrectly assigned to a factor it does not related with and therefore we consider that the discriminant validity was established.

In addition to that, an assessment of HTMT inferences between DFL and FL through bootstrapping analysis was conducted to further confirm if HTMT upper and lower boundaries (confidence intervals) do not include the value of 1. It is recommended that when the HTMT inferences of a factor are below one then discriminant validity is established, (Henseler, Hubona, et al., 2016; Henseler et al., 2015). Results indicated that at a 0.95 confidence interval, all the constructs in the structural model had HTMT intervals below 1 as provided in Table 29.

Table 25: Second order constructs Reliability test results

Construct	Cronbach's Alpha	Composite Reliability	AVE
DFL	0.869	0.911	0.718
FI	0.914	0.946	0.855
FL	0.850	0.909	0.769

Table 26: Fornell –Larcker Criterion results for the second-order constructs

Constructs	DFL	FI	FL
DFL	0.848		
FI	0.771	0.925	
FL	0.829	0.750	0.877

Table 27: Cross loadings Results for the second order construct

Construct	DFL	FI	FL
DFCR	**0.859**	0.697	0.720
DFK	**0.854**	0.585	0.779
DFR	**0.798**	0.635	0.566
DFRC	**0.876**	0.687	0.745
FK	0.731	**0.656**	0.879
FA	0.733	**0.649**	0.881
FB	0.716	**0.668**	0.870

FI3	0.752	0.944	**0.743**
FI5	0.736	0.962	**0.718**
FI6	0.646	0.865	**0.612**

Table 28:HTMT Ratio Result

Constructs	DFL	FI	FL
DFL			
FI	0.860		
FL	0.965	0.848	

Table 29: HTMT Ratio Inferences

Constructs Correlations	HTMT	5.00%	95.00%
FI -> DFL	0.860	0.829	0.890
FL -> DFL	0.965	0.941	0.990
FL -> FI	0.848	0.814	0.881

5.6 Conclusion:

Chapter five has defined digital financial literacy and financial literacy latent constructs as provided in the developed measurement models. Specifically, it provides the details on how the first and the second-order reflective –reflective model was developed with constructs indicators that fitted well in the measurement models. In addition, procedures for testing construct reliability, convergent validity and discriminant validity of the measurement model by using Smart PLS-SEM are provided. Lastly, this chapter confirms that the study measurement model passed the reliability and validity test and hence paving a way for structural analysis for testing the hypothesized path relations.

CHAPTER SIX

Structural Model Assessment

6.0 Introduction

In PLS-SEM after specifying and developing measurement models for predictor variables, the next step is to estimate the structural (inner) model. This approach is referred to as a two-stage approach and is mostly preferred by researchers over the one-stage model. The two-stage approach evaluates the measurement model first to confirm the study constructs and thereafter the structural model to evaluate the causal relationship between hypothesized latent variables. On the other hand, the one-stage approach evaluates both the measurement model and structural model simultaneously, (Anderson & Gerbing, 1988).

To analyse the structure model, it was necessary to perform the value inflation factor to ensure there is no collinearity between predictor variables and the followed by the structural model assessment quality criteria such as coefficient of determination, relevance effect size, prediction relevance and model fit tests. Details of how each test was conducted and its results thereon are provided in section 6.1 to 6.6 below.

6.1 Collinearity Test for the Inner Model

The collinearity between structural model constructs was assessed by conducting the Value Inflation Factor (VIF). Assessment of VIFs is important because, higher VIFs imply that there is a presence of collinearity issues among study constructs and therefore likely to produce biased regression results, (J. F. Hair et al., 2019). Literature suggests that for a good structural model that has no collinearity problems the VIFs for the study constructs should be less or equal to 9 (Craney & Surles, 2002). However, in PLS-SEM a conservative threshold of VIFs not exceeding five (5) is recommended, (Hair et al., 2011a).

Analysis of inner model VIFs were conducted by path analysis in the SmartPLS-SEM and its results indicated that financial literacy and digital financial literacy had VIFs of FL is 3.19 and DFL of 3.20 respectively. These results were below the maximum threshold of five (5) and therefore confirm that there is no linear relationship between the constructs of the proposed model.

6.2 Assessing the level of the Coefficient of Determination (R2)

The coefficient of determination was established by conducting the bootstrapping analysis procedure. Results indicated that the sample predictive power (R^2) which measures the variance of each endogenous construct in the model was 0.634 indicating a moderate explanatory power,(J. F. Hair et al., 2019). On the other hand, (Chin, 1998) suggests that when R^2 is less than 0.67 (i.e. 67 per cent), then it should be categorized as moderate. Therefore, in the context of these results, it implies that variations in a unit of financial literacy and digital financial literacy cause a positive and moderate change in financial inclusion. Results of the coefficient of determination are provided in Table 31.

Table 30: Coefficient of determination results

Variable	R^2	Standard Deviation	T- Statistics	P- Values
FI	0.63	0.03	24.66	0.000

6.3 Assessment of the Relevance Effect Size (f^2)

The hypothesized path models were examined to determine the effect of financial inclusion R^2 value as a result of the removal of each of the predictor constructs. In the case of removal of DFL from the structural model, f^2 was noted to be equal to 0.19 indicating a medium effect size in the structural model. On the other hand, when FL was omitted from the model, the effect size was 0.11 which is considered a small effect size. This indicates that the indirect relationships in the model do not have

a significant effect to undermine the considerable direct effects of DFL and FL constructs on FI. Results of f^2 effects sizes are provided in Table 32.

Table 31: Effect Sizes results

Path relations	f^2	Standard Deviation	T Statistics	P -Values
DFL -> FI	0.19	0.04	4.48	0.00
FL -> FI	0.11	0.03	3.37	0.00

6.4 Assessment of the Prediction relevance (Q2)

In this study, the predictive relevance of the path model (Q^2) was established by conducting the blindfolding analysis while maintaining an omission distance of seven (7). Blindfolding results indicate that the structural model has a medium prediction relevance (i.e. q2=0.51) for financial inclusion.

6.5 Assessment of the Predictive effect size (q2)

In this study, the predictive effect size was computed manually. The computation involved determining Q2 when a specific construct is omitted from the path model and compared with the Q2 value of the original path model. The analysis of q2 effect sizes was guided by the below formula.

$$q^2 = \frac{Q^2 \text{ included} - Q^2 \text{ excluded}}{1 - Q^2 \text{ included}}$$

After calculating the q^2 for the two constructs (DFL and FL), the results indicated that FL constructs had a small predictive relevance effect on financial inclusion since their effect size was above 0.02 but below 0.15 while DFL had a medium effect size as provided in Table 29.

Table 32:Predictive effect results

SN	Construct	Q^2 included	Q^2 excluded	q2
1	DFL	0.511	0.453	0.119
2	FL	0.511	0.480	0.063

6.6 Model Goodness of Fit

Given that this study used Variance based analysis techniques and aimed at estimating the causal and predictive relations of DFL and FL on financial inclusion. Some literature suggests that for studies such as this, researchers need not estimate the goodness of fits like in confirmatory studies and those that use covariance-based SEM techniques for analysis. This evidence is provided, (Hair et al., 2019) who argue that PLS-SEM estimates causal-predictive relations within the path model by maximizing the amount of explained variance (error variance) of the dependent variable in the model, unlike other covariance-based approaches.

Despite the precautions provided by (Hair et al., 2019), model fitness in PLS-SEM is measured by Standard Root Mean Square Residual (SRMR) as a metric for explaining the extent of model validation. Although, a tested threshold for SRMR has not been provided, (Hu & Bentler, 1998) suggests that SRMR below 0.08 is considered to be a conservative threshold for indicating the acceptable fitness of a structural model. In this study, after path analysis results indicated that the estimated model was found to have an SRMR of 0.06 below the conservative threshold of 0.08 indicating that the estimated structural model is fit to estimate FI.

6.7 Assessment of the Path Models

Given that the study objective was to test the relationship between two main path models (FL > FI and DFL > FI) and the third objective which has five indirect relationships on the main path models.

This section, therefore, presents the analysis of the two main paths while the other five indirect path models which involve the moderating effect of demographic moderators on the two main paths are provided in chapter seven. The main two main path models are consistent with the study objectives that aim at examining the relationship between financial literacy and financial inclusion and examining the relationship between digital financial literacy and financial inclusion. These two main objectives are linked to the below hypotheses;

H1: There is a significant positive relationship between financial literacy and financial inclusion.

H2: There is a significant positive relationship between digital financial literacy and financial inclusion.

6.8 Determining the Significance and relevance of the Path Models

During path analysis, Smart PLS3 bootstrapping procedure was conducted to assess the direction and magnitude of the path regression coefficients (β). Results revealed that a unit change in the digital financial literacy (DFL) construct causes a change of 0.48 in financial inclusion (FI) at the t-statistic value of 10.14 and P-value of 0.000. On the other hand, a unit change in financial literacy (FL) results in a change of 0.35 on financial inclusion at the t-statistic value of 7.38 with a P-value of 0.000.

Sarstedt et al. (2017) recommend that, when reporting path model bootstrapping results, it is important to also report the confidence interval of the significance of path coefficients. Confidence Interval (CI) is another way of confirming the significance. The general rule for acceptance suggests that after employing the Bias-corrected bootstrapping procedure confidence intervals of the path estimates should not equal to zero. CI results for the two path models ranged from 0.27 to 0.40 for the lower boundary and 0.43 to 0.56 for the upper boundary respectively, hence above zero and thus confirming the significance of the path models.

In this study, path analysis results have indicated that DFL has the strongest effect on financial inclusion as compared to financial literacy. Considering that the general rule of thumb for

bootstrapping results for hypotheses with a single tail and at a 95 per cent confidence interval, the path model is considered to be significant when the t statistic value is above 1.645 and below the p-value is below 0.005. Analysis results as provided in table 30 confirmed that both FL and DFL have a positive and highly significant relationship with financial inclusion.

Table 33: Path Estimation Results

Hypothesis	Path relations	Path Coefficients	Standard Deviation	t -values	p -values	95% Confidence Intervals	Significance ($p < 0.05$)
H1	FL -> FI	0.35	0.05	7.38	0.000	(0.27; 0.43)	Yes
H2	DFL -> FI	0.48	0.05	10.14	0.000	(0.40; 0.56)	Yes

Note: FL= Financial Literacy, and DFL =Digital financial literacy

6.9 Results of the Hypothesis Testing

Based on the bootstrapping analysis the results are consistent with the predicted positive relationship between financial literacy and financial inclusion, thus supporting hypothesis 1. Considering the strength of the path coefficient, the level of significance and its confidence intervals, [(β=0.35), $p<0.01$, CI (0.27; 0.43)] this implies that financial literacy has a significant positive influence on financial inclusion. In addition, digital financial literacy results [(β=0.48), $p<0.01$, CI (0.40; 0.56)] also indicated a significant influence on financial inclusion.

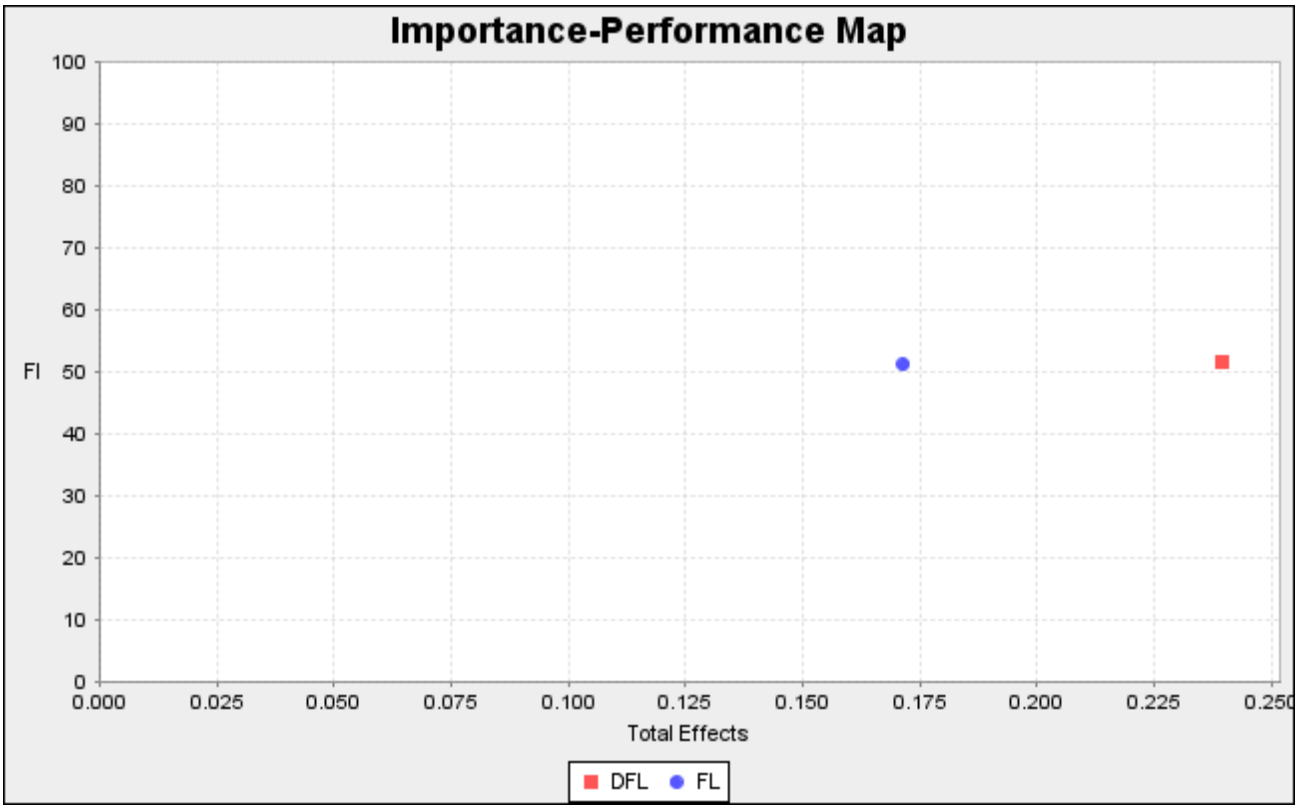
6.10 Importance –Performance Matrix Analysis of path Modelling Results.

IPMA of the two main path models was examined using the IPMA analysis tool in Smart-PLS 3 to provide sound interpretation and further analysis of the path models. This analysis allows the researcher to determine the importance level of a construct by examining the magnitude of the path coefficient and its level of performance. Before conducting the IPMA, the researcher ensured that the criteria required for performing the analysis in Smart-PLS are met. Specifically, the set criteria

were met because all indicators in the model were measured using a metric scale, the scale was the same for all the indicators and the outer weights of all the indicators in the model had a positive sign as proposed by Ringle and Sarstedt (2016).

Results of the IPMA are provided in a matrix where the y-axis shows performance while the x-axis shows the importance of a construct to the dependent variable. In this study as presented in Figure 6 overall results of the IPMA indicated that DFL has high importance (0.24) in the influence of financial inclusion relative to financial literacy (0.17) as explained by their beta coefficients. - Similarly, DFL (51.5) had slightly higher performance compared to FL (51.2).

Figure 6: Overall Importance –Performance Matrix



Importance – Performance Map Analysis at an Indicator Level

The importance-performance Map analysis was also conducted at an indicator level. The results as shown in the matrix in figure 7 and their details are provided in table 34. The analysis indicates that in terms of relative importance the indicators for each construct are ranked as follows; for digital financial literacy, the level of importance is ranked as follows, 1. DFCR: 2. DFRC; 3DFR; 4.DFK. while for financial literacy, high importance is on financial behaviour (FB) followed by financial knowledge (FK) and then financial attitude (FA).

On the other hand, the performance for each construct is ranked as follows; for digital financial literacy 1. DFR; 2. DFK; 3. DFCR and DFRC and for financial literacy construct, financial attitude (FA) was found to have high importance followed by financial knowledge (FK) and then followed by financial behaviour (FB). The details of the magnitude of importance and performance are provided in Table 34.

Figure 7: Indicator Importance – Performance Map

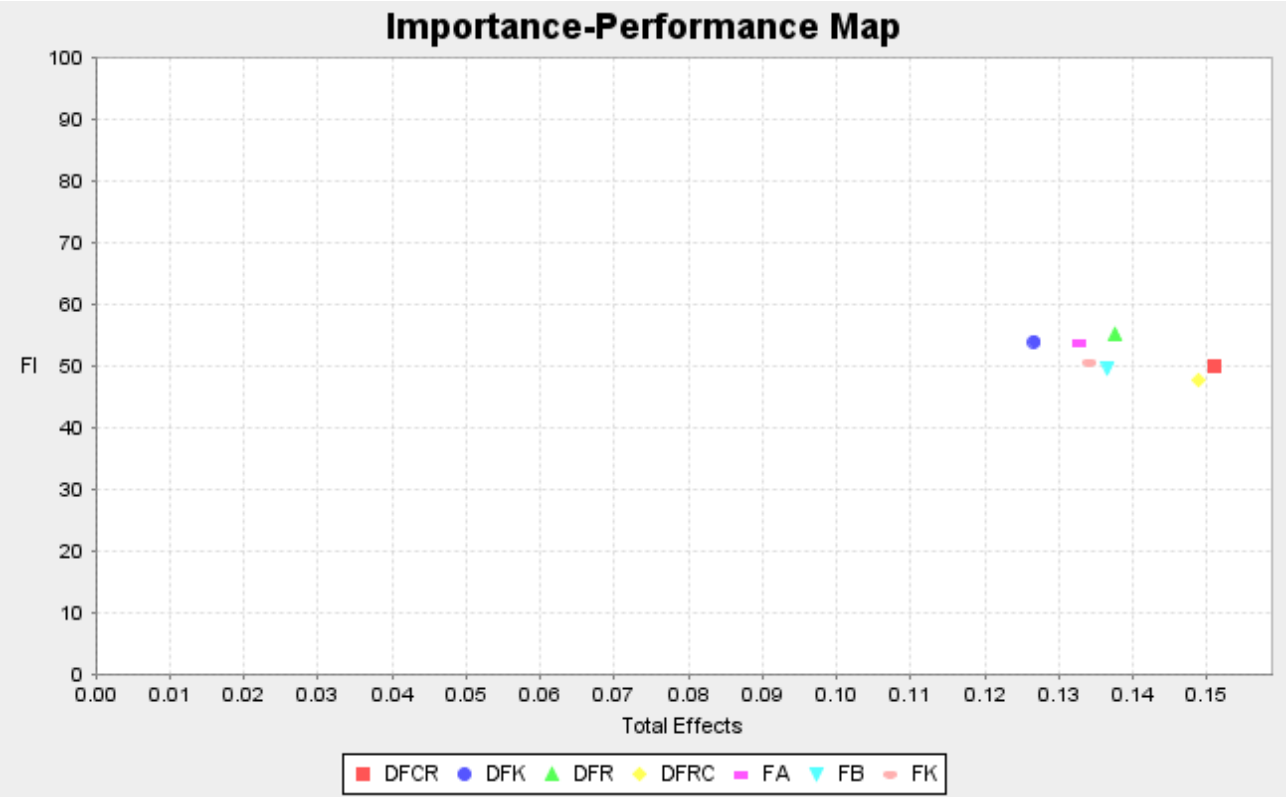


Table 34: Indicator Importance and Performance for Financial Inclusion

The managerial implication of the IPMA map is that financial educators, banks and policy makers should give high priority to the provision of digital financial literacy (DFL) relative to financial literacy (FL) given its high importance and high performance. On the other hand, at the indicator level when imparting knowledge about DFL, priority should be given to DFR, followed by DFK, DFCR and then DFCR based on their performance in influencing financial inclusion. Whereas in the case of FL, priority in financial literacy should be pressed on financial attitude (FA), followed by financial knowledge (FK) and lastly financial behaviour (FB), this ranking is based on the influence of its performance on financial inclusion.

Indicator	Indicator Importance	Indicator Performance
DFCR	0.064	50.0
DFK	0.054	53.9
DFR	0.058	55.2
DFRC	0.063	47.6
FA	0.056	53.6
FB	0.058	49.6
FK	0.057	50.5

6.11 Conclusion.

Chapter six develops a structural model for predicting FI by using DFL and FL as exogenous latent constructs by using the Smart PLS-SEM technique. The developed model was tested for reliability, validity and fitness and met the minimum criteria for acceptance. Further, the hypothesized main path models were analyzed through bootstrapping analysis. Results of the study path analysis have indicated that financial literacy and digital financial literacy constructs fitted well in the structural model. The model explanatory power on financial inclusion as represented by the coefficient of determination (R2) is 79%, while its predictive relevance (Q2) is at 0.64. Furthermore, DFL is found to have high importance and performance in the model when compared to FL.

CHAPTER SEVEN

Estimating the Moderating Effect of Social demographic characteristics

7.0 Introduction

After examining the relationships between FL and DFL and FI, this study also examined the moderating effect of respondents' demographic characteristics on the two path models. Specifically, testing hypotheses 3 (a) to 3 (f) which include;

H3a: Gender moderates the positive relationship between financial literacy and digital financial literacy with financial inclusion. Such that there is a significant difference between males and females.

H3b: Geographical location moderates the positive relationship between financial literacy and digital financial literacy with financial inclusion. Such that, the effect is stronger for respondents from urban.

H3c: Level of education moderates the positive relationship between financial literacy and digital financial literacy with financial inclusion. Such that, the effect is higher for individuals with a high level of education.

H3e: Level of income moderates the positive relationship between financial literacy and digital financial literacy with financial inclusion. Such that relationship is stronger for the high-income individuals.

H3f: Age moderates the positive relationship between financial literacy and digital financial literacy with financial inclusion. Such that relationship is stronger for old individuals.

The PLS -MGA approach is based on a non–parametric assumptions and therefore considered to be an appropriate module for estimating the influence of categorical variables such as gender, residential location, level of income, level of education and age on the relationship between financial literacy and digital financial literacy with financial inclusion across sub-samples. In addition, PLS-SEM is known to be compatible with interval scaled variables, as such categorical variables that had

more than two categories (e.g. levels of education) were transformed into two groups by forming dichotomous dummy variables, (Henseler & Fassott, 2010). The grouping for forming sub-samples for categorical analysis was guided by median scores, such that values of a moderator variable above the median value were considered as high and otherwise as low.

7.1 Assessing Measurement Invariance of Composite Models

Before conducting the Multi-Group Analysis to examine the influence of the moderating variable across groups, it is recommended that the analysis should be preceded by the procedure for assessing the measurement invariance of the composite model. Measurement invariance is a technique that assures whether or not, that measurement models provide measures of the same attributes regardless of the conditions in understanding or observing a phenomenon. This analysis technique is performed to confirm if group differences estimations in the path relations are not influenced by measurement errors resulting from distinctive content and/or meaning of the latent variables or idiosyncrasy across the groups, (Henseler, Ringle, & Sarstedt, 2016). Specifically, this technique helps the researcher assess whether the differences in survey responses are not an attribute of group-specific understanding and interpretation of survey contents,(Anwar, Zaki, Thurasamy, & Memon, 2021).

Henseler, Ringle, et al. (2016) provides a three steps procedures to follow when conducting the Measurement Invariance of Composite Model (MICOM) analysis. First, the procedure directs the researcher to ensure Configural Invariance (CI). CI is a procedure done outside the PLS model before MICOM analysis and is meant to ensure that between the two groups under assessment; data is collected by using the same survey instrument, data is not segregated when developing the structural model, and the same factor structure (same constructs and items in each construct) are used across groups and the same configurations are employed in the measurement model between the two groups, (ibid). The second step of MICOM analysis involves an assessment of the compositional invariance (checks if the composite scores are equal across the groups) while the third step ensures the equality of composite mean values and variances across the groups.

Both the second and third steps are performed in Smart-PLS 3 by using the Permutation Test. With regard to decision rules, compositional invariance referred to in step two is established when the correlation of composite scores between the first and the second group (original correlation) is compared to the 5% quantile, the quantiles scores should be less or equal to the composite score correlation. Further, the permutation p-value greater than 0.05 implies that the composite correlation is insignificantly lower than one. In addition, the equality of means and variances across groups referred to in the MICOM procedure as step three is achieved when the test results indicate both equal means and variances ratio, (Cheah, Thurasamy, Memon, Chuah, & Ting, 2020).

For a researcher to proceed with the analysis of the moderating effect in the path model, the MICOM test has to achieve either partial or fully measurement invariance. Partial measurement invariance is established when configural and compositional. On the other hand, fully measurement invariance is established when the first two steps have been achieved and both conditions of step three are established, otherwise, if none or one of step three conditions are established, then the researcher will consider the MICOM results as partial invariance, (Henseler, Ringle, et al., 2016).

In this study, the configural invariance was established by ensuring that the same measurement model is applied for all the examined groups. Specifically, the measurement model across groups had an equal number and the same construct indicators, the same data treatment procedures were employed and the same algorithm settings were maintained in the Smart PLS software for each of the groups under comparison. Secondly, the compositional invariance and composite's equality of mean values and variance were assessed after performing a permutation test in Smart PLS.

Results of the permutation test indicated that partial invariance across the groups under comparison was established. On the other side, full invariance was not achieved following differences in mean values and variances across groups. Detailed Permutation Results for step two and step three of the MICOM procedure are presented in Tables 34 -38.

Table 35: Measurement Invariance Results for Gender groups

Construct	CI	OC	5%-QT	COI	MOD	CI	EMs	VOD	CI	EVs	FI
DFL	Yes	1.00	0.99	Yes	-0.345	(-0.161, 0.159)	No	-0.160	(-0.172,0.180)	Yes	No
FI	Yes	1.00	1.00	Yes	-0.195	(-0.160, 0.162)	No	-0.148	(-0.138,0.136)	No	No
FL	Yes	1.00	1.00	Yes	-0.264	(-0.151, 0.159)	No	-0.160	(-0.148,0.140)	No	No

Key:
CI= Configural Invariance, OC= Original Correlation, QT= Quantile, COI= Compositional Invariance, MOD= Mean Original Difference
CI=Confidence Interval, EMs=Equality of Means, VOD=Variance Original Difference, EVs=Equality of variances and FI=Fully invariance

The result indicates that partial measurement invariance was established and therefore acceptable for MGA analysis which is presented in section 7.2.

Table 36: MICOM Results for Geographical location groups

Construct	CI	OC	5%-QT	COI	MOD	CI	EMs	VOD	CI	EVs	FI
DFL	Yes	0.99	0.98	Yes	0.809	(-0.178, 0.162)	No	0.247	(-0.169,0.195)	No	No
FI	Yes	1.00	1.00	Yes	0.477	(-0.182, 0.151)	No	0.461	(-0.136,0.154)	No	No
FL	Yes	0.99	0.99	Yes	0.989	(-0.185, 0.154)	No	0.371	(-0.151,0.180)	No	No

Key:
CI= Configural Invariance, OC= Original Correlation, QT= Quantile, COI= Compositional Invariance, MOD= Mean Original Difference
CI=Confidence Interval, EMs=Equality of Means, VOD=Variance Original Difference, EVs=Equality of variances and FI=Fully invariance

The result indicates that partial measurement invariance was established and therefore acceptable for MGA analysis for the moderation effect of geographical differences in the path models as presented in section 7.2.

Table 37: MICOM Results for education level groups

Construct	CI	OC	5%-QT	COI	MOD	CI	EMs	VOD	CI	EVs	FI
DFL	Yes	0.989	0.999	No	-1.505	(-0.152, 0.157)	No	-0.965	(-0.183,0.162)	No	No
FI	Yes	0.994	0.999	No	-1.122	(-0.165, 0.153)	No	-2.432	(-0.143,0.130)	No	No
FL	Yes	0.997	0.999	No	-1.514	(-0.151, 0.159)	No	-0.689	(-0.157,0.155)	Yes	No

Key:
CI= Configural Invariance, OC= Original Correlation, QT= Quantile, COI= Compositional Invariance, MOD= Mean Original Difference
CI=Confidence Interval, EMs=Equality of Means, VOD=Variance Original Difference, EVs=Equality of variances and FI=Fully invariance

The result indicates that Partial measurement invariance has not been established and therefore it is not clear whether the differences in the two groups are a result of statistical differences, (Henseler, Ringle, et al., 2016).

Table 38: MICOM Results for income groups

Construct	CI	OC	5%-QT	COI	MOD	CI	EMs	VOD	CI	EVs	FI
DFL	Yes	0.976	0.998	No	1.675	(-0.165, 0.157)	No	0.494	(-0.174,0.198)	No	No
FI	Yes	0.999	0.999	Yes	1.792	(-0.187, 0.158)	No	-0.024	(-0.145,0.159)	Yes	No
FL	Yes	0.999	0.999	Yes	1.622	(-0.179, 0.165)	No	0.792	(-0.154,0.172)	No	No

Key:
CI= Configural Invariance, OC= Original Correlation, QT= Quantile, COI= Compositional Invariance, MOD= Mean Original Difference

CI=Confidence Interval, EMs=Equality of Means, VOD=Variance Original Difference, EVs=Equality of variances and FI=Fully invariance

The result indicates that Partial measurement invariance was established and therefore acceptable to proceed with the MGA to test the moderation effect of income differences in the path models presented in section 7.2.

Table 39: MICOM Results for Age groups

Construct	CI	OC	5%-QT	COI	MOD	CI	EMs	VOD	CI	EVs	FI
DFL	Yes	0.999	0.999	Yes	0.182	(-0.153, 0.165)	No	-0.298	(-0.184,0.171)	No	No
FI	Yes	1.000	1.000	Yes	0.053	(-0.147, 0.166)	Yes	0.010	(-0.125,0.148)	Yes	No
FL	Yes	1.000	1.000	Yes	0.252	(-0.147, 0.157)	No	-0.342	(-0.166,0.142)	No	No

Key: CI= Configural Invariance, OC= Original Correlation, QT= Quantile, COI= Compositional Invariance, MOD= Mean Original Difference.

CI=Confidence Interval, EMs=Equality of Means, VOD=Variance Original Difference, EVs=Equality of variances and FI=Fully invariance.

The result indicates that Partial measurement invariance was established and therefore acceptable for MGA for the moderation effect of age differences in the path models as presented in section 7.2.

7.2 Multi-Group Analysis for demographic moderating variables

Smart PLS software provides four approaches for comparing two groups' specific structural path models. These include; the Henseler's bootstrap based MGA, the Parametric test, the Welch-Satterthwait test and the Permutation Test. The key difference among these methods is that, while the PLS-MGA and permutation approaches are considered to be conservative and are based on the non-parametric assumption the other two (parametric and Welch-Satterthwait) are considered to be lenient because they are prone to type one error and assumes a normal distribution of data contrary to Smart PLS assumptions, (Cheah et al., 2020).

Given that the third objective of the study is to examine path differences between categorical moderators, Henseler's bootstrap MGA method was adopted in the assessment of the moderating effect of demographic variables both on the relationship between DFL and FI; and FL and FI. The choice of this analysis approach is based on its strength, suitability for assessing group differences when the sample size is not necessarily equal and its alignment to the non-parametric assumption which is consistent with the PLS-SEM technique, (Henseler et al., 2009). In addition, the general rule for determining a presence of a moderating effect in the path model at a five per cent significance level is when the p-value of the differences between specific path coefficients across groups is below 0.05 or higher than 0.95(ibid).

7.2.1 PLS- MGA for Gender

In this study, the moderating indicator gender is a categorical variable with two groups (male and female) therefore it did not require further grouping to be compatible when using the MGA technique. The two groups included 218 males categorized in the first group and 222 females in the second group. Through the bootstrapping analysis procedure in the MGA module, parameter estimates (path coefficients and standard error) between the two groups were assessed to identify if there is a significant difference between the two groups.

PLS-MGA results for the moderating effect of gender in the relationship between DFL and FI indicate that females have a strong relationship (β=0.495) than their counterparties males (β=0.465). On the other hand, results of the moderating effect of gender in the relationship between FL and FI indicate that the relationship is stronger for males (β=0.366) than for their counterparties females(β=0.337). Table 39 indicates the

Table 40: Bootstrapping results for Gender differences

Path	Path Coefficients (Female)	Path Coefficients (Male)	STDEV (Female)	STDEV (Male)	T-Values (Female)	T-Values (Male)	P-Values (Female)	P-Values (Male)
DFL -> FI	0.495	0.465	0.063	0.070	7.870	6.646	0.000	0.000
FL -> FI	0.337	0.366	0.064	0.073	5.221	4.995	0.000	0.000

In addition, to assess the significance of the path difference between males and females when it comes to its effect on the influence of digital financial literacy and financial literacy on financial inclusion the p values of the two paths were analyzed. Results indicated that the recorded difference noted in the two path models is not statistically significant because their p-values are above the maximum threshold of 0.005. This result implies that the ability of DFL and FL to influence financial inclusion is not affected by gender differences. Detailed results of the significance assessment of the moderator gender are provided in Table 40.

Table 41: PLS-MGA results for Gender

Path Model	Path Coefficients-diff (F v/s M)	P-Value(F vs M)
DFL -> FI	0.031	0.371
FL -> FI	0.029	0.618

7.2.2 PLS-MGA for Geographical Location

Geographical location is also hypothesized to have a moderating effect on the structural model predictors and therefore influence the relationship between DFL and FL with financial inclusion. In the data set, this categorical variable had two groups. First, the respondents from rural (n=143) were categorized as group one and later the respondents from urban (n=297) were categorized as group two.

After running the PLS-MGA analysis, results indicated that for the relationship between DFL and FI, the path model is strong (β=0.487) for urban residents than it is for their counterparties in rural(β=0.409). Whereas, in the case of the relationship between FL and FI, the path model is found to be strong (β=0.506) for rural residents than it is for their counterparties in urban(β=0.331). Details of the MGA results are provided in Table 41.

Table 42: Bootstrapping results for geographical differences

Path	Path Coefficients (RURAL)	Path Coefficients (URBAN)	STDEV (RURAL)	STDEV (URBAN)	T-Values (RURAL)	T-Values (URBAN)	P-Values (RURAL)	P-Values (URBAN)
DFL -> FI	0.409	0.487	0.059	0.059	6.953	8.953	0.000	0.000
FL -> FI	0.506	0.331	0.061	0.059	8.305	5.627	0.000	0.000

An assessment of the significance level was conducted to determine whether the observed differences in the two paths are statistically significant by examining the p-values against the set criteria. Results of the analysis of the p-values suggest that the residential location moderator does not have statistical significance in the relationship between DFL and FI. This position is supported by p-value results of 0.17 which is above the maximum threshold of 0.05. On the contrary, with regard to the effect of the residential location on the relationship between FL and FI, results confirm

that there is a positive and significant difference between the two groups as supported by the P-value result of 0.98 above the minimum threshold of 0.95. Results of the significance level of the differences between rural and urban are provided in Table 42.

Table 43: PLS-MGA results for Geographical location

Path Model	Total Effects - diff (RURAL - URBAN)	P-Value (RURAL vs URBAN)
DFL -> FI	0.078	0.174
FL -> FI	0.175	0.979

7.2.3 PLS –MGA for Education status

Education status moderator had five categories, the un-educated, primary education, secondary education, diploma/certificate and graduates. To test the moderating effect of this variable using the PLS-MGA technique, respondents were grouped into two categories. The first group had respondents who possess a high level of education (Secondary school, Diploma holders and Graduates) and was named as the Educated and secondly, those with a low level of education (un-educated and primary school level) were categorized as the second group namely low- education.

The Multi-Group-Analysis was performed first to determine if there is any difference between the two groups. Results indicated that the differences in the level of education among people matter in the relationship between digital financial literacy and financial literacy with financial inclusion. For instance, in the relationship between DFL and FI positive path coefficient differences between the educated and those with low education were observed. The relationship was found to be strong (β=0.484) to the educated as compared to the uneducated (β=0.275) as reflected by the beta coefficients in the path model results provided in Table 43.

Similarly, on the relationship between FL and FI, it was noted that the relationship is strong (β=0.439) for the un-educated as compared to the educated (β=0.304) as reflected by the beta coefficients in the path model results. This result implies that if the un-educated are allowed to access financial education their likelihood to be financially included (use banking services) will increase.

Table 44: Bootstrapping results for education status

Path relations	Path Coefficients (Educated)	Path Coefficients (Low Education)	STDEV (Educated)	STDEV (Low Education)	T-Values (Educated)	T-Values (Low Education)	P-Values (Educated)	P-Values (Low Education)
DFL >FI	0.484	0.275	0.055	0.047	8.879	5.829	0.000	0.000
FL -> FI	0.304	0.439	0.056	0.059	5.429	7.469	0.000	0.000

In determining the statistical significance- of the path differences between the educated and the low-educated when it comes to the ability of DFL in influencing financial inclusion. It was noted that the difference between the two groups is considered to be significant since its p-value is below the maximum threshold of 0.05 as provided in Table 44. In addition, with regard to the relationship between FL and FI, a 13.5 per cent significant difference between the educated and low-education individuals was noted at a p-value of 0.95 in line with the minimum threshold of 0.95. The two-path result implies that the level of education has an impact on the influence of FL on financial inclusion.

Table 45: PLS-MGA results for education status

Path relations	Path Coefficients-diff (Educated v/s Low- education)	P-Value(Educated v/s Low- education)
DFL -> FI	0.210	0.003
FL -> FI	0.135	0.950

7.2.4 PLS –MGA for Income groups

The income of respondents in this study was categorized into four categories as provided in chapter four of this thesis. However, for purposes of conducting the MGA in Smart PLS-SEM, people with income not exceeding TZS 400,000 were grouped as the first group namely Low- income. Secondly, respondents whose income was above TZS 400,000 were categorised as a second representing high-income individuals.

The MGA procedure was performed to test the moderating effect of income on the relationship between digital financial literacy and financial literacy with financial inclusion. Result suggests that in the relationship between DFL and financial inclusion the difference between high income and low-income individuals is strong (β=0.452) for high-income people as compared to low-income individuals (β=0.262) as reflected by the beta coefficients in the path model results in Table 45.

On the other hand, in the relationship between FL and financial inclusion, the path model results suggest that this relationship is strong (β=0.283) for the low-income individuals than with their counterparties high-income people (β=0.103), as provided in Table 45.

Table 46: PLS-MGA results for income groups

Path relations	Path Coefficients (High-income)	Path Coefficients (Low-income	STDEV (High - income)	STDEV (Low - income)	T-Values (High - income)	T-Values (Low-income)	P-Values (High - income)	P-Values (Low-income)
DFL -> FI	0.452	0.262	0.085	0.061	5.294	4.259	0.000	0.000
FL -> FI	0.103	0.283	0.082	0.053	1.264	5.373	0.103	0.000

To determine whether the identified differences between the low income and high-income people in the two path relations are significant. The p-values were assessed and compared with the minimum thresholds for acceptance in MGA tests. Results indicated that there is a positively

significant (19 per cent) impact on the differences between the high-income people as compared to the low-income people when it comes to the ability of DFL to influence financial inclusion. This result is signified by the p-value outcome that indicates to be at 0.04 below the maximum threshold of 0.05.

Another interesting outcome of the relationship between FL and FI, an 18.0 per cent significant difference between the high and low-income individuals was established at a P-value of 0.968 above the minimum threshold of 0.95. The result signifies that when the low-income people are given financial education, their likelihood to be financially included is high as compared to those with high income. Details of the significance level results as represented by the p-values are provided in Table 46.

Table 47: PLS-MGA results for income groups

Path relations	Path Coefficients-diff (High income - Low income)	P-Value (High income vs Low income)
DFL -> FI	0.191	0.039
FL -> FI	0.180	0.968

7.2.5 PLS –MGA for Age groups

For MGA purposes, respondents' age groups were categorized into young and old. Young included respondents aged 18 -25 and 26-34 years while the old included respondents aged 35 years and above. The MGA results on the relationship between FL and financial inclusion indicated that age has a positive impact on the relationship between financial literacy with financial inclusion. Further, this relationship was noted to be strong (β=0.464) for the old aged respondents than for the young respondents(β=0.267), implying that when aged individuals are subjected to financial education programs their likelihood to engage in the use of banking services is higher as compared to young individuals.

On the other hand, the relationship between DFL and FI. The relationship is noted to be positive and strong (β=0.513) for young individuals as compared to the old (β=0.424). This result implies that young people are more likely to understand digital financial literacy education than the old people and therefore if allowed to access such education programmes their impact on financial inclusion is likely to be high. Details of the path coefficient differences are provided in Table 47.

Table 48: PLS-MGA results for age groups

Path relations	Path Coefficients (Old)	Path Coefficients (Young)	STDEV (Old)	STDEV (Young)	T-Values (Old)	T-Values (Young)	P-Values (Old)	P-Values (Young)
DFL -> FI	0.424	0.513	0.061	0.068	6.992	7.542	0.000	0.000
FL -> FI	0.464	0.267	0.062	0.069	7.434	3.891	0.000	0.000

In determining if the identified path differences in the relationship between the two constructs and financial inclusion, it was noted that; In the case of the relationship between FL and FI, the result shows that a 19.7 per cent difference in the two path models was observed and the difference is considered to be statistically significant since its p-value result is at 0.98 above the minimum threshold of 0.95.

However, in the case of the relationship between DFL and FI, an 8.9 per cent path difference was recorded between young people and the old, but the observed difference is not statistically significant since its p-value results (0.166) are above the minimum threshold of 0.005. Results of the significance level test between the two path models are provided in Table 48.

Table 49: PLS-MGA results for age groups

Path relations	Path Coefficients-diff (Young - Old)	P-Value(Young vs Old)
DFL -> FI	0.089	0.166
FL -> FI	0.197	0.983

7.3 Conclusion

This chapter provided descriptions of how the sample was grouped into two groups for each of the five moderators (gender, geographical location of residence, level of education, level of income and age). Before conducting the MGA for testing the moderation effect, across moderators, the measurement invariance was established through the use of the Permutation method in Smart PLS to confirm that there are no measurement in-efficiencies in the path models.

Thereafter, the moderation effect was tested by PLS- Multi-Group Analysis (MGA) method in Smart PLS 3. Results suggest that level of education and level of income had a positive and significant moderating effect on the relationship between the two predictors (DFL &FL) with financial inclusion. In addition, gender is noted to have an insignificant moderating effect on the relationships between DFL and FL with financial inclusion. On the other hand, age and residential location differences were found to have a positive and significant moderating impact on the relationship between FL and FI. A summary of the moderation effect result is provided in Table 49.

Table 50: Summary of Moderation results.

SNO	Moderator	Path Model	Direction	Significance	Hypothesis
1	Gender	DFL -> FI	Positive	No	Rejected
		FL -> FI	Positive	No	Rejected
2	Residential Location	DFL -> FI	Positive	No	Rejected
		FL -> FI	Positive	Yes	Accepted
3	Level of education	DFL -> FI	Positive	Yes	Accepted
		FL -> FI	Positive	Yes	Accepted
4	Level of income	DFL -> FI	Positive	Yes	Accepted
		FL -> FI	Positive	Yes	Accepted
5	Age	DFL -> FI	Positive	No	Rejected
		FL -> FI	Positive	Yes	Accepted

In view of these results, hypothesis 3 aimed at examining the moderating effect of demographic factors is hereby accepted for the level of income and level of education in the path model between the two constructs(DFL&FL) and FI. Also on the path between FL and FI, it is accepted for the moderator's age and residential location and rejected for moderator gender. Whereas for the case of the relationship between DFL and FI it was rejected for the moderator's gender, residential location and age.

CHAPTER EIGHT

DISCUSSION OF THE STUDY RESULTS

8.1 Introduction

This chapter provides discussions of the results presented in chapters six and seven of this thesis. The discussion of the results is based on the research objectives, tested hypothesis in the context of Tanzania and in the body of knowledge as a contribution to the theoretical and empirical literature. In this study, the Theory of planned behaviour(TPB) and Technology acceptance model (TAM) were referred to in the development of the conceptual framework which hypothesized people's decision for using banking services (herein referred to as financial inclusion) is influenced by financial literacy and digital financial literacy.

First, the study links financial literacy dimensions (financial knowledge, financial behaviour and financial attitude) with the perceived behaviour control and attitude constructs of the TPB to predict financial inclusion. Secondly, digital financial literacy dimensions as represented by digital financial knowledge, awareness of digital finance risks, awareness of digital finance risk controls and awareness of digital finance consumer's rights and redress mechanisms indicators are linked to the perceived ease of use, a theoretical construct of TAM3 to also predict financial inclusion.

In addition, the conceptual model also predicts a moderating effect of an individual's demographic characteristics on the relationships between financial literacy and digital financial literacy with financial inclusion. Demographic indicators hypothesized to have the moderating effects on the main study path models were gender, residential location, level of income, level of education and age.

8.2 Discussions on Financial Profile of Respondents

The government of Tanzania through a national financial inclusion strategy desires to have a state where banking services are accessible to male and female adults despite their differences in the levels of income, education, residential and employment status. In this study, descriptive analysis results indicate that 38.4% of Tanzanians own a bank account and among these, at least three per cent of the accounts have not been transacted in the past year and therefore they are dormant. Despite the low level in the number of the banked, this study indicates that Tanzania has made significant progress in the use of banking services since the last FINSCOPE survey in 2017. The most recent demand-side financial inclusion surveys reported that the country had a banking inclusion of 17% for individuals and 12.3 % per household respectively, (FINSCOPE, 2017; NBS, 2020).

In addition, this study has revealed that the majority of Tanzanians are not active in the use of banking services. For instance, other than savings accounts, only 6 per cent of the respondents have borrowed from banks and 12 per cent have made payments through their bank accounts. However, the unbanked mostly use non-bank financial services especially mobile payment services through MNOs, and basic savings or credit services through SACCOS as their alternative financial services are considered to be the reliable services that save the majority of the people.

The high concentration in the use of mobile money services and microcredit and basic saving in community groups is a reflection of high levels of mobile phone ownership by adults as such the handsets saves as a platform for accessing mobile money payment services. This phenomenon implies that the short term transactional needs of the unbanked are mostly accommodated by the Mobile Money Operators. On the other hand, 18 per cent of respondents have loans from microcredit institutions and therefore it is a reflection that these institutions offer such services with less

stringent conditions and are easily trusted and accessible by people unlike in the banking sector where access to personal loans is at 6 per cent of the adult population.

Similarly, in respect of the use of digital financial services, the study has revealed that Tanzania continues to record a low usage of digital banking services. For instance, it has been found that digital banking use cases are skewed to the ordinary electronic banking services such as ATMs (38 per cent) and POS through agency banking (34 per cent). However, despite the evidenced success stories on the ability of digital banking to reduce customer's inconveniences and bank's operational costs, the use of other sophisticated electronic banking services such as internet banking and digital credit is very minimal as represented by 4.7 per cent for internet banking and 5 per cent for digital loans granted by MNOs partnering with banks. These results provide evidence to justify the importance of digital financial literacy in promoting the use of digital banking products.

8.3 Discussions on the hypothesized path models and results

In this section, the meaning of the tested hypothesis, its results and the implication of the study results to the research objectives and research questions is hereby discussed in the context of Tanzania while compared with the existing empirical literature.

8.3.1 Financial literacy and Financial inclusion

Financial literacy as broadly defined in section 2.2.1 of this study, is a capability that facilitates people to know financial concepts, services and their providers, exhibit good financial behaviour and possess positive attitudes toward financial services. In this study, financial literacy was hypothesized to influence financial inclusion. This hypothesis is consistent with objective 1 of the study which intended to examine the relationship between financial literacy and financial inclusion. After examining whether there is a relationship between FL and FI, this study established that one unit change in financial literacy results in a change of 0.35 on financial inclusion at the t-statistic value of 7.34 with a p-value of 0.000. This result implies that there is a positive and significant

relationship between financial literacy and financial inclusion and therefore this study confirms that in the context of Tanzania, financial literacy predicts financial inclusion.

The evidenced ability of financial literacy to influence financial inclusion implies that when people have the necessary capability to understand the sophistication of the banking business including awareness of banking products and services, how they operate and their benefits then they are likely to demand and use banking services. This result is consistent with previous financial literacy studies which suggest that financially illiterate people are unlikely to desire or have an interest in the use of banking products and services because of their limited knowledge and fear to engage with banks,(Lyons et al., 2006).

This argument is backed by the fact that with access to financial education a person possesses knowledge about various banking products and can easily differentiate their features, and hence likely to make an appropriate banking decision. In this study, we have witnessed the ability of each financial literacy dimension in explaining financial literacy and its importance in influencing financial inclusion. For instance, the financial knowledge dimension is considered to be important because people need to have knowledge of the time value of money and benefits for accumulating savings to appreciate and take personal initiatives to have personal savings account in a bank. This is because forgoing today's consumptions for purposes of generating future cash inflows through bank savings is not a simple thing for everyone to do but rather an application of financial knowledge as a means of managing personal finances,(Lusardi, 2008).

When analysing the profile of respondents, this study has revealed that a significant proportion of Tanzanians who are economically active are engaged in self-employment (owners of micro and to earn income. Therefore, this being the case with the evidenced low levels of banking inclusion in the country, it implies that a majority of the working class in the country are at risk of being financially illiteracy due to the low participation in banking. This situation can be a reflection of limited knowledge on matters related to banking. In this case, we observe a low appetite for banking

by small business owners and this can be linked with their negative perception and worries to save their money in banks as opposed to evolving their funds in the business as working capital. Therefore, such illiterate small business holders who are not banked need to have access to financial education to change this mentality because if they are not having savings in formal institutions like banks once subjected to business risks, they are likely to lose a significant portion of their business investments for failure to manage risks through diversification of investment portfolios or face challenges in having working capital to smooth their personal consumption and business financing needs.

In addition, this study has indicated that financial literacy influences the adoption and use of banking services. Therefore, for the country to reduce the level of financial exclusion in the banking sector it is important to prioritise the provision of financial education to shape and instill positive spending and saving behaviour among the people. It is true that financial literacy has been proven to influence people to develop a positive financial behaviour by spending within their budgets because they learn the importance of setting aside savings for rainy days and setting long-term financial goals including planning for retirement,(Cole et al., 2009; Lisa Xu & Zia, 2012). So it is important that this behaviour should be natured within individuals to stimulate the demand for banking services, (Cole et al., 2009; P. J. Morgan & Trinh, 2019 c).

Similarly, it is known that people who demand credit from banks, need to have the knowledge of how to file a loan application, skills to compute the cost of a loan for making credit decisions after comparison with other providers and understand how to register and handle a loan related complaint or dispute. Specifically, when making credit decisions a person is required to apply numeracy skills to determine the cost of credit which include interest expenses and application fees. In addition, one might need to know the credit policy/terms of a bank is aspiring to borrow from, say determining if the bank charges a simple interest rate or compound interest rate and its implication in payment instalments throughout the credit lifetime. Given such demanding knowledge and information before making the right credit decisions, then it is very likely that the financial illiteracy individual

would refrain from accessing bank credit due to fear to engage with a formal financial institution or general perceptions of the bank's un-friendly credit terms of which they cannot verify due to limited knowledge.

In this study, we note that only 6.1 per cent of Tanzanians borrow from banks. This implies that the rest are borrowing from the Microfinance sector and the informal credit providers. Therefore if there is a significant portion of people served by the informal sector and probably due to their limited knowledge about bank credits then they are likely to borrow at a high cost from money lenders or microfinance institutions, (Nkundabanyanga et al., 2014). On the other hand, the high cost and unsustainable loans from the informal money lenders can pose the risk of over-indebtedness the financial illiteracy since they lack the necessary skills required to manage debts including having a low appetite for excessive credit lines beyond a person's repayment capacity, (Gerardi, Goette, & Meier, 2010; Lusardi & Tufano, 2009). Therefore, for Tanzania to improve the demand for personal loans from banks, the government and financial education stakeholders should develop national financial education programmes which among others shall focus on building knowledge to financial consumers to understand the loan application process, necessary documentation acceptable by banks for credit appraisal and possessing the necessary skills for making right credit decisions and managing debts.

In this study, the construct of the Theory of Planned Behaviour, (Ajzen, 1991) which are individual's financial attitude and perceived behavioural control have conceptually been linked with the dimensions of financial literacy (i.e. knowledge, behaviour and attitude). The estimation results have confirmed the ability of financial literacy to predict the use of banking services. This result, therefore, implies that, for one to desire a banking service there must be a motivation arising from an individual's positive financial attitude and knowledge about banking (banking concepts, products and their features) and understanding of the benefits of being banked. Similar findings on the evidence of financial literacy to predict banking behaviour were found in studies such as, (Atkinson & Messy, 2013; Jappelli & Padula, 2013; Lusardi, 2008) who noted that financial literacy helps people

to manage complex financial products such as banking products and improve their saving behaviour. In addition, the ability of financial literacy to influence financial inclusion is also provided by,(Lusardi & Mitchell, 2011) who emphasizes that financial literacy is effective in facilitating people to make financial choices for improving their standard of life and wellbeing.

Conclusively the first research question in this study is answered by the study results confirming that there is a causal relationship between financial literacy and financial inclusion. The outcome of this study contributes to the existing financial literacy knowledge by providing evidence from Tanzania on how financial literacy can be an effective tool to provide the unbanked with the capability to engage with banks and cope with complex financial products and services. Given the importance of this new evidence, countries need to have financial education interventions which involve collaborations between the government and the private sector. It is believed therefore that national financial education programmes targeting the unbanked are likely to raise their demand and actual use of savings deposits, credit and bank payments services.

8.3.2 Digital financial literacy and financial inclusion

Digital financial literacy (DFL) as defined in section 2.2.1 of this thesis refers to awareness of how to access and use digital platforms for the purchase of goods and services including making financial transactions,(Prasad et al., 2018). In this study, DFL was hypothesized to influence financial inclusion (i.e. banking behaviour). DLF which is associated with the computer literacy construct as explained in TAM 3 is considered to be a necessary capability that people require to interact and use digital finance systems. The research question of whether digital financial literacy influences financial inclusion was answered by the analysis results of hypothesis 2 which was accepted after confirming the existence of a positive and significant influence of DFL on financial inclusion.

The confirmed relationship was evidenced by the path coefficient results which implies that a unit change in DFL is likely to influence 0.48 units to change in financial inclusion. Theoretically, the study findings are consistent with the Technology Acceptance Model (i.e. TAM3), (Venkatesh &

Bala, 2008) theory which has extended the ease of use dimension of TAM to incorporate aspects of computer literacy as necessary knowledge for technology adoption. These findings imply that once the un-banked have gained knowledge about digital banking platforms and have the necessary confidence and ability to interact with such systems, they will find it easier to use electronic banking (Hackbarth et al., 2003). Similar findings on the ability of DFL to predict the use of banking services are evidenced in studies such as (Andreou & Anyfantaki, 2019; Prasad et al., 2018; Setiawan et al., 2020) which found that consumers with digital finance awareness had a strong preference on the use of digital banking unlike those who are illiterate on digital finance matters because they lack both information technology skills and trust in the digital finance services.

Literature suggests that digital financial illiteracy limits people to use banking services especially those delivered through digital platforms since they lack the necessary preconditions. The majority struggle in making financial choices because they have limited knowledge of the features of digital banking products, they face access limitations including lack of experience and inability to interact with digital platforms and cannot verify if the service provider or a platform is authorised by the government or relevant regulators, (P. J. Morgan et al., 2019). In addition, some risk-averse people choose voluntarily to avoid the use of digital banking services due to fear of the unknown digital finance risks due to limited knowledge of risks and risk control mechanisms to manage them.

In this study, we have noted that the majority of the respondents have limited knowledge of digital banking issues, for instance, awareness of financial loss and reputational damage resulting from cyber-crime and misuse of personal information by third parties. Similarly, low awareness of digital risk controls remains to be a challenge to both the unbanked and even some of the banked Tanzanians. This was evident because in this study some of the respondents were noted to have a high appetite or were already users of digital credit without or with limited knowledge of the risks of indebtedness following their limitations in handling tricky marketing campaigns and understanding the terms of online loan contracts from the online credit providers.

In addition, the witnessed low usage of digital banking services in Tanzania can be related to low knowledge among people on issues related to digital finance consumer rights, responsibilities and consumer protection mechanisms. As a result of this, people who are digital finance illiterate likely to lack the confidence to engage with service providers or respective regulators for seeking recourse in case of service complaints or aggrieved by a bank,(Malady, 2016). Therefore, it is important that digital financial literacy programmes should address core consumer protection issues such as teaching people how to deal with fraud, theft, financial loss and miss-use of personal data when they are using digital banking services so that such knowledge can build their confidence in engaging with competent authorities for seeking recourse and thus encourage increased use of digital banking services.

Previous digital finance studies suggest that the users of digital finance platforms face potential risks such as inadequate information from suppliers, inadequate client care, insufficient transparency, abusive pricing, fraud and compromised data security and privacy, hence they require digital financial literacy to understand and manage such risks, (Arenaza, 2014). Therefore, consistent with previous studies, the findings of this study confirm that digital financial literacy is an important determinant of banking financial inclusion in Tanzania. Given that DFL accelerates the use of digital banking services then users of financial services will benefit by enjoying increased access and improved quality of banking services. This is because the unbanked and people that use traditional banking delivery channels once they switch to digital platforms they will enjoy convenience due to time-saving and accessing services at any time and anywhere and the inter-operability between digital banking with other service providers such as merchants, mobile money issuers and having the ability to enjoy self-services in a banking platform.

Therefore, the conclusion of the second hypothesis answers the second research question by confirming that digital financial literacy has a causal relationship with financial inclusion. As such the Government should prioritise the provision of digital finance literacy to people to support them understand digital banking products, their risks and how to manage such risks arising from the use

of digital financial platforms including developing the ability to engage with authorities to handle customer complaints. On the other hand, banks are urged to improve the way they handle customer complaints so that they can improve people's confidence in the use of digital banking products and services.

8.4 Moderating effect of Demographic variables

The moderating effect of gender, residential location, level of education, level of income and age on the relationship between financial literacy and digital financial literacy with financial inclusion was measured by comparing the impact of each moderator on the structural path models among the groups. The results as presented in chapter seven indicate that in the relationship between DFL and F1, level of income and level of education moderators were noted to have a positive and significant impact on the path model while gender, residential location and age differences have an insignificant impact on the relationship with DFL and FI. In addition, the moderation analysis results indicated that when given financial education the rural residents, educated, high-income people and the old are likely to have a high level of financial education than their counterparties. However, gender differences are noted to have an insignificant moderating effect on this relationship. The discussion on the impact of each moderator is discussed in the next section;

8.4.1 Gender

Previous studies on financial literacy, digital financial literacy and financial inclusion have provided evidence of the direct relationship of these variables with gender. For instance,(Atkinson & Messy, 2013; Lotto, 2020b; Prasad et al., 2018) posits that women are likely to be financially illiterate and have low levels of digital financial literacy such that they are potentially excluded from the financial system and specifically from the use of banking services and its associated digital banking products. These studies underscore unequal opportunities for asset ownership, formal education and cultural limitations to be the major reasons for the reported financial inclusion gender gap.

On the contrary, this study considers gender as a moderator and aimed at establishing whether gender disparities among Tanzanians have a significant impact on the relationship between the constructs of FL and DFL with financial inclusion. Moderation analysis results as provided in chapter seven has confirmed that gender disparities do not matter when it comes to the ability of digital financial literacy and financial literacy to influence financial inclusion in the banking sector.

Similar indifferences results in the effect of gender on financial literacy were also observed by (P. J. Morgan & Trinh, 2019 c) in their study of determinants of financial literacy in Cambodia and Viet Nam. The authors noted that females from Viet Nam had higher levels of financial literacy than their men while in Cambodia male individuals had higher levels of financial literacy compared to women. In addition,(CHÂU, 2019) noted that gender plays a less important role in influencing individuals to engage in the use of financial services.

The study findings may either imply that due to the high levels of financial and digital finance illiteracy in the country, males and females once they get access to financial education they are likely to have the same response towards the use of banking services. On the other hand, the moderator gender has no influence in the two path models (DFL and FI; FL and FI) it is might be a reflection of the progress made in addressing gender gaps and discrimination on access to education to the extent that irrespective of gender differences among people in the community, still once they acquire financial or digital finance literacy they are expected to behave the same on issues related to the use of financial services.

Therefore, the hypothesis that males who acquire financial literacy or digital financial literacy behave differently than their counterparties females when it comes to the intention to accept and use banking services was not accepted. Banking institutions and financial policy makers should therefore consider providing financial education without considering gender differences.

8.4.2 Location

This study found that the residential location of a person does not have a significant impact on the relationships between DFL and financial inclusion. This implies that residing in rural or urban areas doesn't impact the ability of digital financial literacy to predict financial inclusion. Therefore, irrespective of whether a person is from a rural or urban once exposed to the same package of digital finance literacy programmes their perception, intention towards use and the actual use of banking services are likely to be the same.

Further, in relation to the causal relationship between financial literacy and financial inclusion results indicated that this relationship is moderated by residential location such that rural residents are likely to have a greater impact on the use of banking services once they have access to financial education. This finding implies that people in rural areas are more vulnerable to financial illiteracy and once given the appropriate financial education the impact of such intervention on the overall financial inclusion is likely going to be significant. For the basis of the argument, it might be fine to also consider that the urban residents might have other reasons to attract them to use banking services and if they are not active users it is because of other reasons and not residing in urban because mostly such residents have an adequate supply of financial access points unlike in rural areas where unless one understands the importance of using formal financial institutions will remain unbanked and uses primitive ways of managing personal finances.

In previous financial inclusion and financial literacy studies there incidences of reported differences between people from rural areas when compared to urban. Specifically, urban dwellers are associated with high levels of financial literacy and financial inclusion while the rural residents are associated with low financial literacy and low financial inclusion, (En et al., 2012; Sarma & Pais, 2011). However, this study extends such previous research and provides additional insights on the impact of residential location as a moderator in the when people who reside in rural areas are given financial

education they are likely to have increased trust in the banking sector and understand what is required by such institutions to access their services and thus likely to save and borrow from banks.

8.4.4 Level of education

In this study measurement invariance for education as a moderating variable was not established. However, analysis of the MGA results for the two path models confirms that education level moderates the relationship between digital financial literacy and financial literacy with financial inclusion. This is because, through formal education, people have the opportunity to acquire knowledge and skills some of which are important for making financial decisions. For instance, through formal education, a person can gain numeracy skills and have knowledge and understanding of financial services and their providers.

It is therefore very likely that the highly educated people when given financial education they are likely to demand and have continuous use of banking services. It is on this basis the level of education is found to have a moderating effect both on the relationship between financial literacy and financial inclusion, and between digital financial literacy with financial inclusion. Therefore, for countries to gain a significant impact on financial inclusion in the banking sector, financial education initiatives that focus on DFL and FL should target the educated and be streamlined in the education system to record a significant impact.

This result is consistent with some of the financial literacy and digital financial literacy research that found that level of education have an impact on influencing financial inclusion through improvement in access and use of financial services,(Amari & Anis, 2021; Zins & Weill, 2016). Conclusively the study finds that the level of education significantly impacts the ability of both DFL and FL to influence financial inclusion.

8.4.5 Income

Literature has associated low income with the absence of a stable income source and may also represent a person who is not active to engage in economic activities or having a low paying job that to a large extent may or may not even be enough to cover personal or household consumption needs. In financial inclusion studies level of income has been associated to influence the use of financial services. Studies such as (Demirguc-Kunt, Klapper, Singer, & Ansar, 2018; Sarma & Pais, 2011), found that high-income people are likely to demand a saving account for saving their surplus income or setting aside a portion of their incomes to cover future and unforeseen expenses.

In this study, the level of income was assessed as a moderator on the relationship between DFL and FL constructs with financial inclusion. Results of the moderation analysis have indicated that the level of income has a significant impact on this relationship. As such high-income people when allowed to access basic financial literacy are likely to have higher and more active participation in the use of banking services. This is the case because high income may attract demand for financial services such as a need to save for security purposes, the need for a modern way of managing excess income after meeting consumption needs or the need for financial solutions to manage the business or personal financial transactions. Further, we can also associate the high-income people with investments, this is because investments need capital that can be obtained from accumulated savings or borrowings. Therefore, in any case, an investor is likely to use banking savings because he/she needs to save to accumulate investment or working capital, otherwise one has to demand credit from banks as long as it has collateral acceptable by banks and therefore become an active user of banking services.

Similarly, with regard to the relationship between digital financial literacy and financial inclusion, the level of income was confirmed to still exert a positive significant effect on the relationship. It may be fine to argue that high-income people are likely to afford electronic devices such as computers, smart phone, laptops and iPad because such devices can accommodate bank applications

that facilitate access and use of digital banking services. The high-income people most probably will be the people who has active participation in economic activities and therefore they would demand electronic banking services to enjoy convenience of services and the need to manage time by saving the time lost in long distance travels and ques in bank branches or their agents. As such these people once given digital financial literacy they are likely to use digital platforms to access and use banking services for making payments of bills or purchase goods and services and many other electronic banking services.

The findings of this study are consistent with a study conducted in Malaysia by Jonubi and Abad (2013) who found that differences in income level among people matter in the relationship between financial literacy and savings behaviour. This study, therefore, suggests that when implementing financial education intervention priority should be placed to high-income people to record significant impact in at a short time while strategically the government should consider addressing the un employment rate and continue to promote and implement entrepreneurship and agribusiness policies that will cause the majority of Tanzanians to be economically active and therefore participate in the financial ecosystem.

8.4.6 Age

Age was hypothesized to moderate the relationship between the two main constructs (FL and DFL) in this study with financial inclusion. Results of the moderation effect of age in the two path models indicated that; in the case of the relationship between FL and financial inclusion, significant impact is observed when the elderly person possesses financial education. This result implies that elderly people are once given financial education are likely to use banking services as compared to young people. The nature of this relationship can be explained by differences in personal characteristics between the elderly and young adults. Old people are expected to be mature and therefore keen on personal finance management, they have life experiences that can shape their financial behaviour

and the pressure to handle the household's financial responsibilities positions the old people to demand banking services more as compared to young adults.

This study, therefore, confirms that age moderates the relationship between FL and FI consistent with previous similar studies such as the study by (Amari & Anis, 2021; Warsame, Lasyoud, & Abdalla, 2021) on financial literacy and financial inclusion in Oman. The authors of this study confirmed that age has a moderating effect on the relationship between FL and FI and the impact is higher in older people as compared to young adults. This insight implies that more aged adults are likely to have a vast knowledge of the financial system and therefore once given financial education they are likely to demand and use banking services.

On the other hand, results of the analysis on the moderating effect of age on the relationship between DFL and financial inclusion indicated that age does not moderate the relationship between DFL and FI. This result implies the impact of DFL in predicting the use of banking services in the same bot to the youth and the old people. This finding can be related to the evolution and maturity of mobile money services in Tanzania and considering that it is the widely used digital financial service in the country, the same has provided a learning opportunity through experience but also paved a way for the understanding of general issues related to digital financial services such that there is no significant difference between young adults and the old people when it comes to the ability of DFL to influence FI.

CHAPTER NINE

CONCLUSIONS

9.0 Introduction

This chapter provides a summary of key findings presented in chapters six and seven, the implications of the study results in the development of national policies, in practice and managerial decisions and the conclusion of the study. In addition, the chapter provides highlights of the study's limitations and recommendations for future research. Specifically, section 9.1 provides a brief discussion of the key findings of the study in relation to the research questions and objectives; section 9.2 specifies the significance of the study while section 9.3 provides details of the implications of the study results and the rest of the sections discusses the limitations of this research and opportunities for future research.

9.1 Key Findings

Given that the study aimed at establishing whether there is a relationship between financial literacy and financial inclusion; whether digital financial literacy has a causal relationship with financial inclusion; and lastly whether demographic variables have a moderating effect on the relationship between FL and FI or between DFL and FI. A summary of the answers to these research questions is discussed next;

9.1.1 Financial literacy and financial inclusion

Objective one, intended to examine the ability of financial literacy to influence financial inclusion. The relationship has been the two variables was estimated in Smart PLS as presented in chapter six and the results indicate that there is a positive and significant relationship between financial literacy and financial inclusion. This result implies that, if people have an opportunity to access financial

education either through public programs or offered by the private sector (financial institutions and non-profit financial organizations) then financial inclusion in the banking sector is likely to increase.

Therefore, Financial literacy which is measured by financial knowledge, financial behaviour and financial attitude is confirmed to potentially have a causal relationship with financial inclusion. Emphasis should therefore be placed on the provision of financial education programmes that focuses on imparting knowledge through awareness of financial concepts and financial skills; shaping people's financial behaviour through developing their capabilities and perceptions towards savings, responsible borrowing, trust in formal financial institutions and creating investments for their retirement lives; and lastly helping people to have a positive attitude towards the use of formal financial services, need for continuous learning on financial matters and spending within their budget. If this is implemented such a level of financial literacy will increase people's demand for banking services and increase financial inclusion in the country.

9.1.2 Digital financial literacy with financial inclusion

In research objective two, which intended to determine the role of digital financial literacy in predicting financial inclusion, the analysis results similarly reveal a presence of a positive and significant causal relationship between digital financial literacy and financial inclusion. This result signifies that people who possess digital financial literacy can easily access and use financial services and especially those provided through digital banking platforms.

It is therefore important that providers of financial education should equip people with digital financial literacy to encourage the use of digital banking services. Specifically, the literacy programmes can focus on building knowledge about digital financial services, awareness of risks arising from the use of digital finance platforms, informing people and building their capability on how they can control and manage digital finance risks and lastly teaching them about complaints handing procedures to ensure that they understand their rights and seek recourse when aggrieved with service providers.

9.1.3 The moderating effect of demographic variables on the relationship between FL and DFL with FI

Objective three, of this research, involved the examination of socio-demographic variables (Gender, residential location, level of income, level of education and age) that were hypothesized to have a moderating effect on the relationships between FL and DFL with FI. These hypotheses aimed to answer key research questions intended to establish whether being a male or female, differences in income level; possessing low education as compared to highly educated; residing in urban as compared to rural areas and being elderly as compared to young adults, if it matters when it comes to the ability of financial literacy and digital financial literacy to influence financial inclusion.

Results of the analysis of the moderation effect for all the demographic moderators indicated that the impact of digital financial literacy on financial inclusion is significant when DFL is given to the educated and high-income individuals while differences in gender, residential status and age have no significant impact on this relationship. Given that the level of income and education are confirmed to have a moderating effect on the relationship between DFL and FI, then investment in formal education and active participation in economic activities should be the government's priority to ensure that there is an increase usage of banking services in the country.

On the other hand, with regard to assessing the impact of demographic moderators on the relationship between FL and FI, the study findings suggest that individuals residing in rural areas, the elderly, educated and high-income people who possessing financial literacy are likely to have a significant impact on the ability to develop their financial capabilities and thus likely to use banking services as compared to their counterparties. Similarly, it is noted that the ability of financial literacy to influence financial inclusion is the same across gender groups (i.e. Male and female).

The findings on the moderation effect imply that banking institutions and the government should not hesitate to develop and implement financial education programs that target women because the impact of such interventions is similar to their counterparties males. In addition, the study identifies high opportunities for improved financial participation if the educated, high income and elderly

people improve their financial capabilities through access to financial education. Therefore, financial education programmes can be effective if they target people at their workplaces, academic institutions and in community and social groups where mostly elderly people are found. Such interventions are likely to have a significant short term impact whose effects can extend to families and the community at large.

9.2 Contribution and Significance of the study

This study contributes to the body of knowledge in several ways. First, it provides evidence for applying the TPB and TAM theories to develop measurement models for financial literacy and digital financial literacy constructs as predictors of financial inclusion in the context of Tanzania's banking sector. This study, therefore, confirms the relevance of the two theories in explaining human behaviour that influences consumers who have an intention to use banking services.

Secondly, this study has developed a financial inclusion estimation model through the use of Smart PLS-SEM. The developed financial inclusion model has confirmed the ability of financial literacy and digital finance literacy constructs to predict financial inclusion. This, therefore, extends the use of SEM in undertaking business research. Thirdly, given the statistical evidence on the significance of both financial literacy and digital financial literacy in influencing the use of banking services in Tanzania, the findings of this study saves as a guide to the existing and potential financial educators on how best they can design and prioritize the delivery of financial education programmes in the country.

During the time of this study, Tanzania was yet to have a national financial education programme. However, financial literacy interventions in the country were delivered through formal education settings, marketing campaigns by banking institutions or special literacy programmes for vulnerable groups delivered by financial NGOs. Despite the existence of such few programmes the demand is huge and therefore leaves the majority un-attended, hence they are not inclusive, un-affordable and some of their themes and contents may not be aligned with scientific proven dimension of financial

literacy. To address this gap, this study, therefore, provides tested dimensions of FL and DFL that have been confirmed to have an influence on FI. The dimensions and indicators for the two constructs can save as a guide in the development of financial education learning themes and teaching materials

Details of the study's implications in behaviour finance, the banking sector and financial inclusion at large are discussed in the next section.

9.3 Study Implications

This section provides details of the study implications as drawn from the results and discussion sections. The implications are grouped into theoretical, empirical and practical aspects. Theoretical implications point out the contribution of the study to the theoretical domain while the empirical contribution explains the specific contribution of this study to the body of knowledge and policy development on matters related to financial literacy and financial inclusion. In addition, the study has provided several practical implications for banking executives, developers of banking products, financial educators and the users of banking services.

9.3.1 Theoretical Implications

Several theoretical implications can be drawn from this study, first, this study provides the evidence in applying financial attitude and perceived behaviour control constructs in TPB to develop the financial literacy construct which is hypothesized to influence people's banking behavior in the context of Tanzania. The study findings propose that an increase in financial inclusion in the banking sector will happen when people acquire financial literacy as a necessary skill to have control (motivation to desire and use) over their banking behaviour. In this study financial literacy which is measured by FK, FB and FA plays an important role in influencing people's banking behaviour. Therefore, through access to financial literacy, people develop knowledge and skills on financial matters and acquires positive behaviour and attitudes towards management of personal finances,

saving and responsible borrowing. As such these attributes are likely to influence the demand for financial services and ultimately lead to the use of banking services.

Secondly, the ease of use construct in the theory of TAM has guided the formulation of the DFL construct which is also found to have an influence on financial inclusion. The ability of DFL to significantly influence FI contribute to the existing theoretical literature by extending the TAM to explain the relationship between digital financial literacy and financial inclusion in the banking sector. The relationship between DFL and FI exists because, DFL equips people with the skills required to understand the features of digital finance products and their risks, develop their abilities to engage with the digital platforms and understand how to manage risks arising from digital financial services. Theoretically, the ease of use as explained in TAM is improved when an individual has digital financial literacy as such when people have the ability to interact and find it easy to use the modern (electronic) banking delivery channels then it is very likely that the use of banking services will increase.

Thirdly this study identifies that the relationship between FL and DFL constructs with FI is moderated by differences in the level of the income and level of education. In addition, age and residential location differences are found to have a significant influence when it comes to the ability of FL to influence FI. These results on the moderation effects of demographic- characteristics continues to unfold financial literacy and digital financial literacy as it provides additional understanding on the two complex and multi-dimensional phenomena including providing an evidence of its theoretical relationship with behavioural finance theories and financial inclusion.

9.3.2 Empirical Implications

Empirically, the findings in this research provide additional knowledge in the field of behavioural finance, by extending knowledge on the determinants of financial inclusion by considering the combined effect of FL and DFL in predicting financial inclusion in the banking sector. Academicians

and researchers can make reference on this evidence of the causal relationship between financial literacy and digital financial literacy with financial inclusion in the context of Tanzania.

On the other hand, this study has provided insightful information on the mapping of financial inclusion in the Tanzania banking sector. Results have revealed that Tanzania continues to record low levels of banked population (38 per cent) and low access to personal credit from banks (6 per cent). On the other hand, with regard to the use of digital banking, the majority of the banked people are found to be users of traditional electronic banking services such as ATMs, however, the use of sophisticated electronic banking products such as the internet, agency banking and mobile banking continues to be low. This situational analysis results are likely to inform policy intervention but above all it unveils investment opportunities in the Tanzania banking sector.

In addition, this study proposes a banking sector financial inclusion prediction model. The model considers DFL and FL as demand-side determinants for predicting financial inclusion in the banking sector. Therefore, given the strong predictive power of DFL and FL on financial inclusion, countries including Tanzania should plan to develop and implement national financial education programs which are centered on nurturing individuals' financial knowledge, financial behaviour and financial attitude as a means of improving their financial literacy levels. And, on the other hand, improve the digital finance literacy among people by developing and implementing awareness programmes focusing on digital finance products and services, awareness of digital finance risks and their control mechanisms and understanding of digital finance consumer rights and protection mechanisms.

Further, the moderating effect of the demographic characteristics in the model offers a valuable extension of the theories of TPB and TAM to explore complex relationships in the field of financial inclusion since most previous research had focused on the direct relationship of demographic characteristics with either of FL, DFL and FI. The existence of demographic moderators' effect in the model provides additional knowledge which implies that having financial literacy and digital financial literacy by itself does not bring a greater financial inclusion impact as compared to when

the differences in the people's level of education and income are also addressed. Further, this study identifies that gender differences do not matter when it comes to the ability of FL and DFL to predict financial inclusion, but in the case of age, young adults are found to have low levels of financial literacy as compared to matured adults. Therefore, as a response to these findings, governments should prioritize narrowing the financial illiteracy gap, by creating an enabling environment for people to actively participate in economic activities to generate income and prioritize financial literacy programmes for youth as a means of engaging them in the banking system.

9.3.3 Policy Implications

Reducing financial exclusion among Tanzanians and across the globe has been a collaborative effort of both the public and private sectors for a long time now. To that effect, the findings of this study provide a guide for the Government and financial sector regulators on how to incorporate financial literacy and digital financial literacy in the national strategies for accelerating financial inclusion. This study has provided recent definitions of FL and DFL concepts and how they are measured. These concepts are important in guiding either development or reviews of national financial education and financial inclusion strategies. In Tanzania for instance, its strategies for financial education and financial inclusion, (NCFI, 2018; NFEF, 2016) are due for reviews. To leverage from these results, the review of the Tanzania National Financial Education Framework (NFEF) can incorporate digital financial literacy and financial behaviour concepts in the strategy and develop strategic initiatives on these themes as they plan to implement the financial education strategy. In addition, the study has provided details on how each of the FL and DFL dimensions is relevant in building positive financial behaviour and equipping individuals with the necessary capabilities to influence their motivation to use banking services

On the other hand, the Government can also consider incorporating financial literacy and digital financial literacy into the existing school curriculum as a strategy for improving the financial capabilities of the youth to engage with financial service providers and use financial services.

Streamlining FL and DFL in the school system can be done by incorporating either in a primary and/or secondary level syllabus some relevant themes for DFL and FL learning outcomes or uplifting financial education as an extra-circular subject. This strategy can be effective in shaping the financial behaviour of students when they are still at a young age. In addition, through local government settings, the government also develop financial literacy programs which are targeting community groups. This strategy can be effective in scaling financial education programs within a short time and at a reasonable cost as compared to other means. This is because community learning clubs mostly use financial educators who are known by the community thus making it easy to relate with the trainees and such study settings can easily provide students with an opportunity to put the theories into practice.

Similarly, given the potential of DFL to influence financial inclusion through digital banking the Governments can develop and implement financial policies that focus to enable financial consumers to have knowledge of electronic banking products, understand their providers, have awareness of risks arising from digital finance platforms and how to manage risks arising from the use digital banking products. Much as DFL is found to be an effective tool for managing digital finance transaction risks and building consumers' confidence in the use of electronic banking services. Financial policymakers and Regulators should put in place effective national strategies to deliver digital financial consumer protection education. Such programs are necessary for providing consumers with the ability to engage with service providers including how to defend for their rights. Among others customer-centric consumer protection frameworks should require banks to improve their complaints handling mechanisms and enhance their disclosures to include product features and contractual terms before establishing relationships with their customers.

9.3.4 Managerial implications

The ability of FL and DFL to influence the demand and use of banking services provides an opportunity for banking institutions to increase their market share if they engage in the delivery of

free or affordable financial education programmes. Such programmes can be effective in imparting financial knowledge to the un-banked and especially when they are customized to respond to banking knowledge gaps among consumers in line with their socio-demographic profiles.

Banks and other financial institutions should consider the theoretical dimensions of FL and DFL as provided in the measurement models in chapter five of this thesis, to identify financial illiteracy gaps among existing and potential customers for effective development and implementation of tailor-made financial education interventions. In implementing financial education programmes, financial educators are encouraged to teach their trainees issues related to financial knowledge, and financial skills and provide them with opportunities to practice the acquired skills.

This study has also revealed that there is a significant difference in banking inclusion among Tanzanians due to variations in their demographic characteristics. As a response to this fact, banks are encouraged to invest in consumer behaviour research so that they are informed of the characteristics of their potential and existing customers' preferences to improve the design of their products so that they can be customer-centric and delivered easily accessible and affordable channels. Such a response will bridge the gap between banks and non-bank institutions in making financial product and services attractive and affordable to low-income people and rural residents. Nonetheless, banks remain with an opportunity to complement the weaknesses of the informal institutions (un-sustainability, long term cost to the customers, compromised quality and consumer rights) by offering products that meet the needs of low profile individuals at affordable terms.

In addition, banks that offer digital banking products and services should consider providing digital finance literacy programmes through online platforms and other relevant media channels in a way that is user-friendly and easily accessible to the uneducated, low-income people and both rural and urban residents. Specifically, DFL delivered through online platforms should be tailored in such a way that the features of digital banking products (e.g. agency, internet and mobile banking), their

risks and control mechanisms are known to people. The use of digital platforms to offer DFL is expected to steer demand and confidence for digital banking solutions.

Lastly, the study has provided information about alternative financial services that people mostly use other than banking services. It is interesting to see people save and borrow from informal credit providers, saving groups, financial cooperatives and microfinance institutions while only a few use banks. This information unveils opportunities for banks to create linkages and cooperate with informal groups, financial cooperatives and microfinance institutions to bring more people into the banking net.

9.3.5 Methodological implications

The majority of financial inclusion studies employ Logit/ Probit, Ordinary Least Square and Multiple Regression models or the Principal Component analysis statistical techniques, (Chin, 1998) in estimating relationships between variables with financial inclusion. On the contrary, this study has used the Structural Equations Modelling technique to predict financial inclusion by using FL and DFL as predictor variables. In this regard, this study provide evidence on the efficacy of SEM in handling DFL and FL as multiple and multidimensional variables in estimating financial inclusion.

Secondly, considering the cost and time required to conduct demand-side surveys, there have been limited demand-side financial inclusion studies since the majority are inclined to the use secondary data and focus on the supply-side barriers for financial inclusion, (Cámara & Tuesta, 2014).In efforts to reduce this gap, this study uses demand-side survey data from a cross-section survey conducted in Tanzania. Characteristics of respondents in this study reflect that of most developing economies and therefore the findings and recommendations of this study can be generalized to Tanzania's peer countries.

Lastly, this study has developed a measurement models for financial literacy and digital financial literacy. The FL construct is measured by using financial knowledge, financial behaviour, financial

attitude dimensions while the DFL construct is measured by four dimensions including digital financial knowledge, awareness of digital finance risks, knowledge on how to control risks emanating from use of digital finance platforms and awareness on digital finance consumer rights and redress mechanisms. These models can guide future research in the field of financial literacy and digital financial literacy

9.4 Limitations

Data used for this study were collected through a cross-sectional survey that involved the collection of data at one point in time. However, the study variables (financial literacy, digital financial literacy and financial inclusion) relate to the financial behaviour of people and are subject to change over time because they are not static. Therefore, in the presence of adequate resources (time and money), experimental design research might be more insightful and may extend the findings of this study provided it shall involve multiple data points (i.e. before and after providing financial education to the treated samples).

In addition, this study examines the role of FL and DFL in predicting financial inclusion in the banking sector. However, the researcher understands that financial inclusions involve access and use of financial services other than banking, these include insurance, pension, investment in securities, microfinance and payment services. Since the rest of the financial sector was not within the scope of this research, exploring the role of FL and DFL in the range of financial services would provide additional literature in the body of knowledge including indicating the extent and magnitude of the contribution of these predictors in each financial sub-sector.

Lastly, this study applied a quantitative research approach to examine the relationship between FL and DFL with financial inclusion. However, the use of the quantitative methods may limit the incorporation of qualitative information that captures other psychological and behavioural factors that explain the state and contribution of financial literacy and digital financial literacy in financial

inclusion. In this regard, similar future studies should consider the use of mixed-methods to extend the findings and discussions for the study results.

9.5 Areas for Further Studies

Given the limitations of this study and what has been accomplished the researcher recommends the following; First, future financial inclusion studies should focus more on the demand side determinants for financial inclusion given the knowledge gap in this area. This recommendation intends to reduce information asymmetry on the status and determinants of financial literacy, digital financial literacy and financial inclusion in most developing countries and Tanzania in particular. In this regard, researchers and research funders are argued to align their focus to studies that examine the demand side determinants for financial inclusion to support existing efforts to narrow the level of financial exclusion among developing countries. Specifically, financial inclusion research should seek to understand the depth of people's financial capabilities, financial consumer protection and their financial welfare as drivers of financial inclusion.

Secondly, since this study applied a cross-sectional survey research design similar future studies can consider adopting an experimental research design to explore more the effectiveness of financial literacy and digital financial literacy in predicting the use of banking services through bank account ownership; access to credit and saving in banks; and the use of digital banking products and services.

Thirdly, in this research digital banking services represents a proxy for the quality of banking services following its ability to reduce cost and improve the convenience of services. However, future studies can consider examining the status, people's perceptions and drivers of the quality of banking services in Tanzania. This can be examined first by considering the quality of services as a predictor variable or as the dimension of financial inclusion,(Philip & Hazlett, 1997). The findings of such studies shall inform banks on what to prioritize to attract the unbanked or those who voluntary excluded themselves from the banking system due to a compromised quality of banking services.

Fourthly, future studies can also consider taking a holistic approach to addressing barriers to financial inclusion in the banking sector by examining both the demand side and supply-side determinants of banking financial inclusion in Tanzania. Such studies shall provide important insights that can direct and steer the Government to have a coordinated way of addressing barriers to financial exclusion in the banking sector through collaborative efforts among financial policymakers, regulators and the providers of banking business, (Triki & Faye, 2013).

Lastly much as this study examines the role of digital financial literacy in influencing banking financial inclusion, future research can be the relationship between financial technology and financial inclusion in the banking sector. Among the eastern African countries and Tanzania specifically, much has been studied on mobile financial services and less on digital banking. Evidence from developed economies suggests that the adoption of digital banking among others is influenced by both technology and individual characteristics, (Abdinoor & Mbamba, 2017; Agwu & Carter, 2014). However, a lot is yet to be known in the context of developing countries like Tanzania. Therefore, studies in the area of digital banking and financial inclusion in Tanzania and similar developing economies are encouraged.

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Appendices

Appendix 1 Questionnaire

QUESTIONNAIRE FOR RESEARCH ON FINANCIAL INCLUSION

INDIVIDUAL QUESTIONNAIRE

Introduction:

My name is Peter Mmari, a student and researcher from the University of Wits in Johannesburg, South Africa. This research project is purely academic research that is set to examine *"The role of Financial literacy as a determinant of Financial Inclusion in Tanzania."* You are randomly selected to answer this questionnaire, and your participation is entirely voluntary. This survey seeks to assess how possession of financial literacy and digital financial literacy influences the access and use of quality banking services, including electronic banking products and services. Your response will be treated with the strictest confidentiality, which complies with the ethical standards of the University of the Witwatersrand and satisfies all the required research ethics among SADC member states, including the United Republic of Tanzania.

You can contact my Supervisor: at Renee.Horne@wits.ac.za or the researcher at 2396706 @students.wits.ac.za. If you have any queries, concerns or complaints regarding the ethical procedures of this study, please feel free to contact the University Human Research Ethics Committee(non-medical),telephone+27(0)-11-717-1408; email:hrec-medical.researchoffice@wits.ac.za/Shaun.Schoeman@wits.ac.za.

Do you consent to participate in this research? Yes [ ] No [ ]

SECTION I: Demographic characteristics of Respondents

Please provide the appropriate response by ticking (√) on the space provided in the response options.

1. What is your Age? Ranging from 18 years and above.
   Young Adult: 18-25. [ ]; Adults 26-35. [ ]; Middle aged Adult: 36-54 [ ]; Old: above 55 [ ]
2. What is your Gender? Male: [ ] ; Female: [ ]
3. Which among these describes your residential location? Urban: [ ] Rural: [ ]
4. What is your highest level of education: No formal education [ ] Primary [ ] Secondary [ ] Diploma/Certificate [ ] University /College Graduate [ ]
5. What is your monthly income in TZS?
   Below 65,000 TZS [ ]; 65,001 TZS to 400,000 [ ]; 400,001 TZS to 1,000,000 [ ]; Above 1,000,000 TZS [ ]
6. What is your employment status?
   Employee [ ] ; Self-employed[ ]; Farmers [ ]; Unemployed[ ]

SECTION II: Questions related to the respondent's level of Financial Knowledge

7. Below is a list of statements about financial concepts and skills. Please kindly indicate by ticking (√) in the space provided whether the information is true or false.

CODE	Statement					
		Strongly Disagree	Dis-agree	Not Sure	Agree	Strongly Agree
FK		1	2	3	4	5
FK1	An investment that earns you huge profits can also make me lose a lot of money.					
FK2	I'm aware that I can buy more goods now than in the future with the same amount of money					
FK3	I know how to calculate the cost of a loan from a bank					
FK4	I have adequate numeracy skills to handle money transactions					
FK5	When I invest in different types of income-					

	generating activities, the risk of losing money decreases					
FK6	When I borrow for a long period, the interest rate will most likely be high					
FK7	I know how to resolve complaints when aggrieved by a financial service provider.					
FB						
FB1	I have long term financial goals and I work towards achieving them					
FB2	I usually pay my bills and debts on time					
FB3	I have a written down budget, and I consistently track my spending					
FB4	I often save for emergencies and expenses that require a large sum of money					
FB5	I compare the price and quality of service across financial providers before applying for a loan or a saving product.					
FB6	When doing transactions, I usually spend within my budget					
FB7	I have saved for my retirement/old age					
FAT						
FAT1	I better spend my money today than worry about saving for the future					
FAT2	I usually tend to postpone financial decisions					

	because I am not sure if it's the wrong or right thing to do.					
FA3	I usually have time to learn and read information about managing my finance.					
FA4	I find monitoring my saving or loan account statement boring					
FA5	I often pay my bills when I have money, not because of due dates					
FA6	I find borrowing from banking institutions safe than using informal providers					
FA7	I have adequate knowledge to choose appropriate financial services for me					

SECTION III: Digital Financial literacy

8. Kindly consider Agency banking, Mobile banking, or Internet banking services to provide your opinion on digital financial literacy in the response space provided

CODE	**Statement**					
		Strongly Disagree	**Dis-agree**	**Not sure**	**Agree**	**Strongly Agree**
DFK		**1**	**2**	**3**	**4**	**5**
DFK1	I have a good understanding of electronic banking products and services					
DFK2	I know very little about the pros and cons of digital financial services					

DFK3	I have the competence and knowledge to access and use electronic banking					
DFK4	I understand that some digital financial product and services are informal or not authorized by the Government					
DFK5	I have experience in using electronic financial services					
DFR						
DFR1	I am aware of the risks arising from the use of electronic banking					
DFR2	I am likely to incur a financial loss when using electronic banking					
DFR3	I can be exposed to online fraud and cyber-security attacks when using electronic banking					
DFR4	A high appetite for digital loans can lead to indebtedness					
DFR5	The use of electronic banking increases the risk of miss-use of my personal data by third parties					
DFR6	I trust electronic banking service providers to the extent that I care less					

	about understanding terms and conditions of their services					
DFRC						
DFRC1	I have a PIN for protecting myself from digital finance risks					
DFRC2	I usually change my PIN at least once after every two months					
DFRC3	I usually consult experts or Bank Officers for things that I don't know regarding electronic banking					
DFRC4	I usually read and verify the terms and conditions of digital finance products before I accept a service.					
DFRC5	Strictly, it is not a good idea to share my PIN with close friends and family					
DFCR						
DFCR1	I know my rights and obligations when using electronic banking products and services.					
DFCR2	When I face transactional challenges or fraud when using electronic banking platforms, I know how to obtain redress					

DFCR3	Banks have no right to use my personal privacy data without my consent or permission from authorities.					
DFCR4	I often face difficulty when transacting using electronic banking channels					
DFCR5	My Bank is capable of resolving challenges that may arise when using electronic banking products and services.					

SECTION IV: Financial Inclusion

9. Below is a list of questions about the Access and Usage of banking services. Please, kindly choose the right statement that works in your situation by ticking (√) in the space provided.

CODE	Statement	YES	No
ACCESS			
FI1	I have a national ID acceptable by Banks		
FI2	I can access either a bank branch, an ATM or bank Agents within 5km from where I live.		
FI3	I have an active bank account		
USAGE			
F4-1	I have saved in a bank for the past twelve months		
F4-2	I have borrowed from a bank for the past twelve months		
F4-3	I have used my bank account to pay my bills or transfer to another account		
Quality			
F5-1-6	I have used the following Digital financial products		

	• Payment card		
	• ATM		
	• Agency		
	• Mobile banking		
	• Internet banking		
	• Digital loans		
Use of Non-bank services			
F7	Other than Bank services, I also use the following services;		
F7-1	• Save in a SACCOS		
F7-2	• Borrow at a SACCOS or Microfinance company		
F7-3	• Mobile Money Payments		

Thank you very much for your time and valuable responses.