FINANCIAL LITERACY, DIGITAL FINANCE AND FINANCIAL INCLUSION AMONG RURAL WOMEN IN KENYA.

AMUGUNE MILDRED KASAYA

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DECLARATION

This research thesis is my original work and has not been presented for an award of degree in any other University

Signature: ..... Date: 30/10/2025

Amugune Mildred Kasaya

D86-9347-2021

This research thesis has been submitted for examination with our approval as University Supervisors.

Signature: ..... Date: 31/10/25

Prof. Joséphat Mboya Kiweu
Department of Business & Finance,
Machakos University.

Signature: ..... Date: 06-11-2025

Prof. Charles Ombuki,
Department of Economics,
Machakos University.

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ABSTRACT

Financial inclusion is a key pillar to global development. Several efforts have been put in place across the globe to improve financial inclusivity levels. Despite the efforts, in Kenya there is a considerable percentage who are yet to be financially included. Rural women make up a majority of those who are financially excluded yet they are important agents for transformational economic change. Several studies have concentrated on individual variables in isolation in relation to financial inclusion. This study sought to jointly analyze the influence of financial literacy and digital finance on financial inclusion among rural women in Kenya. Specifically, it sought to assess the influence of financial literacy on financial inclusion, investigate the role of digital finance on financial inclusion, establish the interaction effect of financial literacy and digital finance on financial inclusion and analyze rural women's perspectives on financial inclusion among rural women in Kenya. The study was anchored on the Financial Literacy Theory, Social Learning Theory, Diffusion of Innovation Theory and the Vulnerability Theories that helped address the objectives. A descriptive cross-sectional research design was adopted to help gain an understanding on how the independent variables; financial literacy and digital finance influenced financial inclusion among rural women in Kenya at a specific point in time. The target population was rural women in Kenya who were purposively selected from seven regions to represents financial inclusivity in Kenya on a sample of 1000. The standard Global Findex database as well as the FinAccess questionnaires were adopted and modified for collection of primary data. Data was analysed using descriptive statistical analysis, partial least square structural equation model (PLS – SEM) and Chi-square test of Independence. The study revealed that financial literacy with a positive path coefficient of 0.466, explains approximately 21.7% of the variance in financial inclusion, digital finance explains (0.728) approximately 53.0% of the variation while digital literacy (a combination of financial literacy and digital finance) explains up to 56.1% of the variation in financial inclusion among rural women in Kenya. Rural women perspectives were also found to explain about 18.7% of variance in financial inclusion. Further analysis using the Chi-square revealed that there is a statistically significant association between digital financial literacy and financial inclusion among rural women in Kenya ($\chi 2=397.64 > 6.635$). This study concludes that there is a strong interconnection between financial literacy and digital finance where both play a pivotal role in determining the level of financial inclusion among rural women. It adds that while challenges exist, there are clear opportunities for intervention and improvement and that the success of financial inclusion initiatives will depend on addressing both the knowledge and behavioral gaps identified in this study. The study recommends designing of localized financial literacy programs for understanding of basic financial concepts, enhancing digital infrastructure and accessibility, creation of awareness on financial products and services and creation of targeted interventions that will build trust on digital financial services among rural women in Kenya.

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ACRONYMS

ADF	Average Digital Finance
AFI	Alliance for Financial Inclusion
ASAL	Arid and Semi-Arid Lands
ATM	Automated Teller Machine
CAPI	Computer Assisted Personal Interview
CBWAS	Central Bank of West Africa
CHFC	China Household Finance survey
DFL	Digital Financial Literacy
FAO	Food and Agriculture Organization
FII	Financial Inclusion Insight
FinAccess	Financial Access
FINTECH	Financial Technology
FNI	Formality – Neutrality Index
FSI	Formality – Sensitive Index
G20	Group of Twenty
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
IDA	Indonesian Stock Exchange
IFI	Index of Financial Inclusion
IMF	International Monetary Fund
INFE	International Network on Financial Education
MENA	Middle East and North America
NACOSTI	National Commission for Science & Technology Innovation
NCR	National Cash Register

NFCS	National Financial Capability Study
NGEC	National Gender and Equality Commission
OECD	The Organization for Economic Cooperation and Development
OLS	Ordinary Least Square
PLS-SEM	Partial Least Squares Structural Equation Modelling
POS	Point of Sale
PPCA	Polychromic Principle Component Approach
RCI	Relative count Indicators
SCI	Simple Count Indicators
SIFI	Synthetic Index of Financial Inclusion
SME	Small and Medium Enterprises
UK	United Kingdom
UN	United Nations
WAEMU	West African Economic and monetary Union

OPERATIONAL DEFINATION OF TERMS

Digital Finance: Refers to the delivery of traditional financial services through mobile phones, personal computers, the internet or cards that are linked to a reliable digital payment system as a way of extending financial services to the financial excluded population (Yang et al., 2020).

Digital Financial Literacy: Refers to having knowledge, skills, competencies and confidence to use digitally delivered financial products and services safely to make informed financial decisions as per ones economic and social circumstance (Lyons & Kass-Hanna, 2021a).

Digital Financial Services: Are financial services delivered through alternative delivery channels like mobile phones, personal computer, internet, cards linked to a reliable digital payment system (Yang et al., 2020).

Financial Inclusion: Refers to Individuals and businesses having access to and are able to use a range of useful and affordable financial products and services including transactions, payments, savings, credit, and insurance that meet their needs and are delivered in a responsible and sustainable way (World Bank, 2025).

Financial Literacy: An individual's state of being aware of financial services, having knowledge about the financial services and

	possessing the required skills to access and effectively use the financial services to get out of poverty (Lyons & Kassh-hanna, 2021a).
Fintech:	Refers to the delivery of financial and banking services through modern technological innovation (Ozili, 2018).
Internet Technology:	Refers to the ability of the Internet to transmit information and data through different systems (Ozili, 2018)
Rural Woman:	Refers to one who reside and has developed a livelihood in the village (Agbo & Issa, 2017)

CHAPTER ONE:
INTRODUCTION

1.1 Background of the Study

Financial inclusion has been recognized by the G20 as a key pillar to global development (United Nation, 2023). This recognition has made financial inclusion to be a worldwide government concern. Many governments across the globe are putting efforts to solve this challenge and achieve high levels of financial inclusion by having little or no restrictions when opening a bank account, transferring most of the financial services to mobile technology and even putting limited interest on credit facilities (Ozili, 2020). Widarwati et al. (2022) notes that, limited opportunities to access financial services by vulnerable and needy groups is a global policy problem, which when left unresolved can slow economic growth and worsen economic inequality.

Financial inclusion means that individuals and businesses have access to and are able to use a range of useful and affordable financial products and services including transactions, payments, savings, credit, and insurance that meet their needs and are delivered in a responsible and sustainable way (World Bank, 2025). It is the process of ensuring access to financial services and timely and adequate credit by vulnerable groups who suffer most from economic hardship and are at the highest risk of exclusion (Ozili, 2024).

Financial inclusion enables the use and access of a broad range of affordable and quality financial products and services (World Bank, 2022). It aims at reducing poverty and inequality among the society while encouraging economic growth and development. Financial inclusion is as a major policy objective of bringing the excluded population into the formal financial sector by most of the developing and emerging countries

(Ozili, 2020). However, achieving true financial inclusion necessitates more than just access to digital financial services, it requires financial literacy to ensure individuals effectively use the services (Grohmann et al., 2018).

Globally, according to the World Bank's Global Findex survey 2021, account ownership in banks or regulated institutions like micro finance, credit unions and mobile money service providers among the adults has reached 76% a 50% increase in a span of 10 years. Similarly, account ownership in developing economies has increased by 8 percentage point to 71% from 63%, showing an attempt of working towards financial inclusion (DemirgüçKunt et al., 2022). In the USA, 95% of the adult population according to the Global Findex (2021) report own an account with a financial institution or a mobile money provider. In South Asia, out of a population of over 1.9 billion, the same report notes that the financial inclusion rate is 68% falling below developing economies that stood at 71%.

Accordingly, it is noted that around 116 million adults in the developing countries of Europe and Central Asia still had no bank account (DemirgüçKunt & Muller, 2019). Out of this 60% are women. By being unbanked, women are living on the edge of exclusion and vulnerability. With Sub-Saharan Africa there has been a significant progress in financial inclusion, specifically through mobile money. For instance, Ghana as a country has adopted the Momo platform while Uganda has the MTN mobile money demonstrating how mobile money can easily reach the remote areas allowing them to access financial services. Additionally, in South Africa, the Global Findex report of 2021 notes that financial inclusion stands at 91%. However, regardless of the high uptake of financial services, it is evident that women in most of these regions often have

a lower mobile money ownership as compared to the men. This low uptake is associated with factors like phone ownership and digital literacy which tend to lock women out.

Kenya as a nation has not been left behind, and in the development blue print, Vision 2030, it has set out the financial sector priority goals which include financial inclusion. Statistically, according to the FinAccess Survey (2024), the overall financial inclusion index as measured by financial access in Kenya stands at 84.7% up from 83.7% in 2021. This remarkable progress in financial inclusion can be attributed to the outstanding growth of digital finance and mobile money. In 2007, Mobile money was pioneered by M-Pesa providing a new financial product that was accessible to a majority of the population regardless of social status and location. Mobile money does not require ownership of a bank account, this led to an increase in mobile money accounts from 1.27million in 2007 to 80.8 million in 2024, with 82.3% of the households in Kenya using the accounts to meet their financial needs (FinAccess Survey, 2024). These accounts are spread across the country facilitating access for the population in rural areas.

However, even with access to financial services having spread across the country, statistical analysis as shown in the FinAccess Survey (2024) reveal that Kiambu County is leading with 96% of its population being financially included while other counties like Bungoma, Narok and Migori having 78%, 73.1% and 72.9% of its population being financially included thus not meeting the overall financial inclusion threshold that stands at 84.7%.

Additionally, the FinAccess deep dives report (2023) on measuring Kenya's financial inclusion journey using the degree of usage of financial products and diversity across individual products (represented by Formality-Neutral Indicators 1&2 (FNI); Formality

Sensitive Indicators 1&2(FSI); Simple Count Indicators (SCI) and Relative count Indicators (RCI)) notes that in as much as financial inclusion has made significant progress in Kenya over time, it has not reached an optimal level as evidenced by the fact that there are still many individuals who remain either partially or fully excluded from the financial sector.

For instance, as seen in figure 1.1 that represents financial exclusion trend in Kenya from 2006 to 2021, it is clear that 34% of the population are fully excluded as they lack access to financial products that are easily available to others.

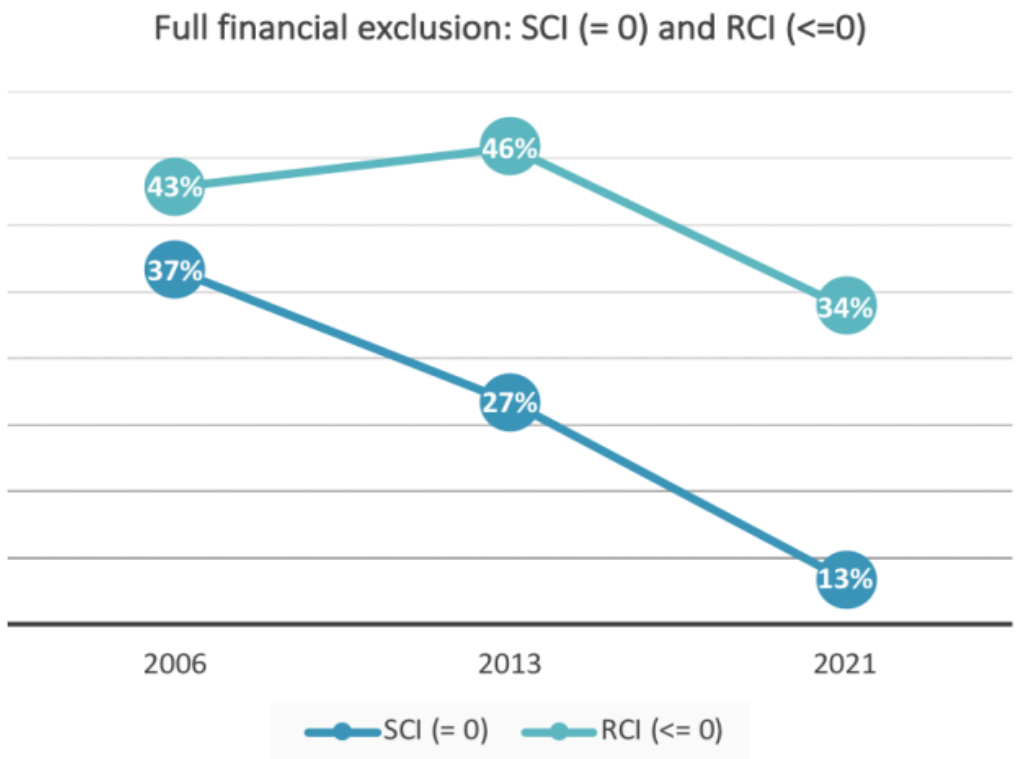


Figure 1.1 Financial Exclusion Over Time

Source: 2023 FinAccess Deep Dive Report

With regards to the gender gap in Kenya, it is also evident from the FinAccess deep dive report (2023) that the usage gap between men and women between 2006 and 2021 increased in absolute terms with largest gender gap as measured by the use of formal

financial products and exclusivity standing at -11.8% and -12.9% respectively as shown in Table 1.1 below.

Table 1.1: Gender Gap in Financial Inclusion

Indicator	2006			2013			2021		
	Male	Female Gap	Gap (%)	Male	Female Gap	Gap (%)	Male	Female Gap	Gap (%)
FNI1	2.30	-0.05	-2.2%	2.62	-0.09**	-3.4%	3.87	-0.23***	-5.9%
FNI2	2.47	-0.07	-2.8%	2.85	-0.12**	-4.2%	4.06	-0.26***	-6.4%
FSI1	2.97	-0.30***	-10.1%	3.61	-0.35***	-9.7%	5.54	-0.49***	-8.8%
FSI2	4.52	-0.90***	-19.9%	6.25	-0.99***	-15.8%	9.68	-1.14***	-11.8%
SCI	1.85	-0.09*	-4.9%	2.58	-0.13**	-5.0%	3.91	-0.18***	-4.6%
RCI	1.05	-0.19***	-18.1%	1.47	-0.26***	-17.7%	2.02	-0.26***	-12.9%

Source: 2023 FinAccess Deep Dive Report

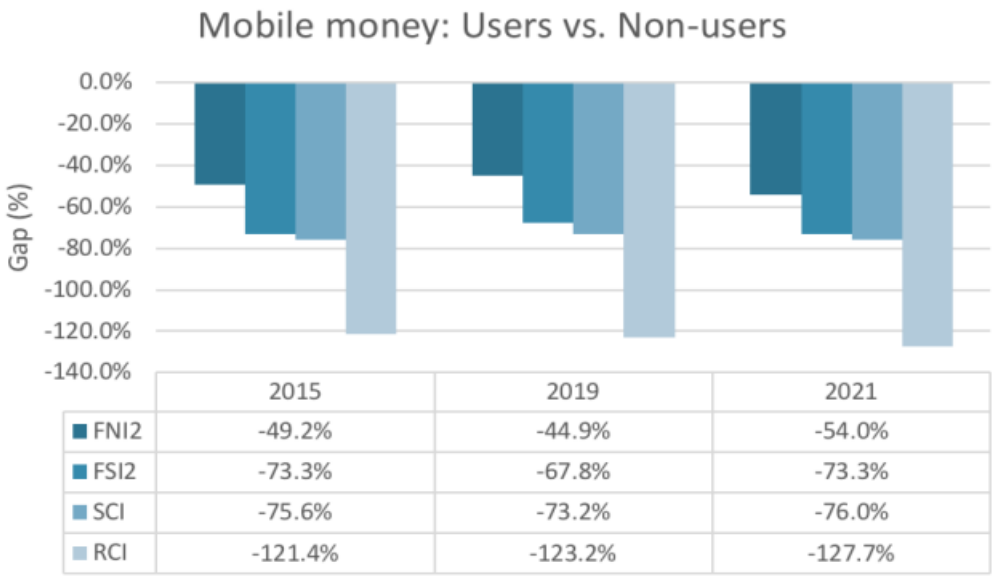
With respect to the residence gap between rural and urban population in terms of usage of formal products, there has been a decrease in the gap as shown by FSI2 indicator in Table 1.2. However, there is still a significant gap when it comes to access to financial products that are widely used in urban areas like pension, insurance and credit.

Table 1.2: Residence Gap in Financial Inclusion

Indicator	2006			2013			2021		
	Urban	Rural Gap	Gap (%)	Urban	Rural Gap	Gap (%)	Urban	Rural Gap	Gap (%)
FNI1	2.59	-0.39***	-15.1%	3.15	-0.91***	-28.9%	4.23	-0.75***	-17.7%
FNI2	2.71	-0.41***	-15.1%	3.37	-0.93***	-27.6%	4.41	-0.76***	-17.2%
FSI1	3.31	-0.74***	-22.4%	4.26	-1.35***	-31.7%	6.08	-1.25***	-20.6%
FSI2	5.06	-1.53***	-30.2%	7.18	-2.37***	-33.0%	10.59	-2.39***	-22.6%
SCI	2.18	-0.55***	-25.2%	3.26	-1.17***	-35.9%	4.48	-1.02***	-22.8%
RCI	1.36	-0.60***	-44.1%	2.08	-1.21***	-58.2%	2.71	-1.28***	-47.2%

Source: 2023 FinAccess Deep Dive Report

Finally, when it comes to the usage of mobile money, the FinAccess deep dive report (2023) notes that between 2013 and 2021 the financial inclusion gap between users and non-users of mobile money measured by access to financial products has substantially increased as shown in figure 1.2. The report notes that if an individual does not have access to mobile money, then she is at risk of being excluded from accessing other financial products irrespective of formality.



	2015	2019	2021
FNI2	-49.2%	-44.9%	-54.0%
FSI2	-73.3%	-67.8%	-73.3%
SCI	-75.6%	-73.2%	-76.0%
RCI	-121.4%	-123.2%	-127.7%

Figure 1.2 Financial Inclusion Gap (Between Users & Non-Users of Mobile Money

Source: 2023 FinAccess Deep Dive Report

Therefore, regardless of the progressive increase in financial inclusion in Kenya for the past few years, it is evident that a significant portion of the population a majority of whom are women residing in rural areas are either partially or fully excluded from the financial sector with limited or no access to a meaningful range of financial products like credit, savings, pension and insurance. Policy makers are thus interested in establishing the key drivers hindering financial inclusion especially for different segments of the population so that these can be addressed towards the achievement of Vision 2030.

Financial Inclusion is enabled through digital Finance. Digital finance is a means of extending financial services to the financially excluded and undeserved population in the community like women (Yang et al., 2020). It facilitates payments via mobile devices which has been of great help to individuals, households and community at large in managing personal assets while at the same time providing more convenient access to finance and financial services thus greater financial inclusion. For instance, through a mobile money account, an individual can easily access varied financial services like credit without necessarily having to visit the traditional banking hall. Therefore, digital finance provides opportunities to promote financial inclusion by reducing financial services costs (Asian Development Bank, 2017).

Most governments have therefore adopted digital finance and embraced digital financial services as an efficient means of promoting financial inclusion (Better Than Cash Alliance, 2024). This has seen most of the financial services transferred to the digital platforms like mobile phones, ATMs, and computers whereby individuals can access and get required services at their convenience and comfort.

However, in as much as this is a positive move towards financial inclusion, Ozili (2018) notes that the ability to access and even use the digital finance has remained a limiting factor as a majority of people and more so women in rural communities are financially illiterate. Additionally, the World Bank Global Findex survey report (2021) noted that, two thirds of the unbanked worldwide indicated that if they opened an account, they would require help operating it, an indication of financial illiteracy. A third of the mobile money account holders also noted that they could not use their mobile money account without the help of their family members or agents (Global Findex Report, 2021). Out of this, rural women are 7% more likely to need help than men and urban

women when using their mobile money account, an indication of being financially illiterate.

Operation and utilization of technology to access financial products and services requires financial literacy. According to Lyons and Kass-hanna (2021) financial literacy is an individual's or community's awareness and knowledge about available financial products and services and how best to access and use them. For instance, a rural women will only demand and access financial services that they are aware of. If they have no knowledge and information about the products and services, they will not demand for them thus remain financially excluded. Asha (2020) emphasized that financial literacy promotes rural women's increased participation in economic life influencing how they save, how they invest and how they manage their financial affairs. Literacy on financial matters is very important and thus financial literacy enables access to digital finance which enhances financial inclusion.

The origin of gender-based financial exclusion lies in barriers to access, lack of reasonable cost, lack of financial and digital literacy and skills, and gender biases and sociocultural norms (OECD, 2018). Additionally, digital tools and skills are not equally available among for rural women, rural households, and low-income adults, who tend to lag in terms of access to digital technologies and skills. Worldwide, roughly 327 million more men than women have a smartphone (OECD, 2018) which is partly attributed to lack of literacy skills, ID ownership, and poor product design. Women are disadvantaged in many ways, hindering their ability to access value adding finance. For instance, on average, women are less educated than men, earn less income and own fewer assets making them less likely to be considered or targeted in design of finance solutions

More so, contemporary empirical investigations confirm that despite significant technological advances, women across Sub-Saharan Africa (SSA) continue to face systemic and structural exclusion from formal financial systems, limiting their ability to achieve full economic participation. Realizing gender equality in financial markets is not merely an ethical imperative, for instance, an analysis from the McKinsey Global Institute estimates that fully incorporating women into the economy could add $12 trillion to global GDP by 2025, underscoring the necessity of addressing this gap.

Studies from South Asia and Sub-Saharan Africa emphasize that rural women equate meaningful inclusion not merely with account ownership but with reliable, low-cost access to savings, credit, payments, and insurance that map onto seasonal income flows and caregiving responsibilities (Koomson, Villano, & Hadley, 2020; Rahman & Khatun, 2024). In Ghana, rural women's narratives and quantitative indicators link inclusion to shock-coping capacity and reduced vulnerability; yet distance to formal providers, documentation constraints, and trust barriers remain salient (Koomson et al., 2020). In India, work with self-help group (SHG) members finds that perceived value of accounts depends on frequency of use, mobile ownership, and SHG tenure, underscoring the social infrastructure of women's groups as an enabling platform (Kumar & Raghavendra, 2018).

The rise of Digital Financial Services (DFS), particularly mobile money, has drastically reshaped the access landscape. Between 2014 and 2024, mobile money adoption among women in SSA increased from 11 percent to 47 percent. This technology has delivered tangible benefits. For example, studies in Kenya have shown that mobile money increases women's control over their personal finances, with the effects being greater for women than for men (Kipchumba & Sulaiman, 2021). Furthermore, DFS can

mitigate time poverty, a crucial barrier for rural women, by saving users significant travel and waiting time for transactions (UN Women, 2019).

Digital channels especially mobile money and agent networks are perceived as reducing travel time, enhancing privacy, and improving control over small but frequent transactions, which can be crucial for petty trade and remittances in rural contexts (Jack & Suri, 2018/2022 updates; Rahman & Khatun, 2024). However, women emphasize that digital trust is fragile, there are literacy gaps (both general and digital), there is fear of fraud, and lack of recourse in agent disputes which curtail active use (Kumar & Raghavendra, 2018). Evidence across Ghana, Kenya, and Bangladesh suggests that when rural women can translate access into habitual use through familiarity, peer learning, and reliable local agents then empowerment and financial control improve, with flow-through benefits to household consumption smoothing (Koomson et al., 2020; Rahman & Khatun, 2024).

However, the proliferation of access has not universally translated into economic empowerment. In a critical examination utilizing the 2021 Kenya FinAccess Household Survey data, researchers found a statistically significant negative effect of FinTech adoption on women's economic empowerment ($\beta = -0.1664$, $p < 0.05$). This counterintuitive finding suggests that while digital services may increase access to accounts, they are insufficient on their own to overcome deeper structural and gendered constraints within the financial ecosystem.

Exclusion is profoundly reinforced by systemic institutional practices and entrenched societal norms. Empirical studies focusing on microfinance interventions across SSA confirm that formal credit access remains disproportionately low for women; only 23

percent of women had access to microloans in 2024, compared to 41 percent of men. This structural disparity is often underpinned by normative pressures. For instance, in West Africa, research shows that norms associating entrepreneurship with masculinity can lead financial institutions to unconsciously privilege male applicants (Kabiru et al., 2022). Additionally, analysis of Kenyan land ownership data from 2014 to 2022 reveals consistently lower rates for women, reflecting the persistent impact of patriarchal norms and the weak enforcement of legal protections. The resultant economic vulnerability is reinforced as women are often relegated to insecure, low-paying roles within the informal sector.

A significant second-order barrier is the social risk associated with digital adoption. Restrictive social norms surrounding women's mobile phone ownership and mobility can translate into real dangers. Research indicates that owning a device or exchanging information online can increase a woman’s risk of online harassment and gender-based violence (UN Women, 2019; UN Women, 2022). Consequently, non-use of DFS by rural women is often a rational choice to minimize acute social danger rather than a matter of simple technological illiteracy.

Financial literacy (FL) which is defined as the integration of knowledge, attitude, behavior, and skills for informed financial decisions is consistently established as a significant positive predictor of financial inclusion outcomes, including account ownership and credit access (Falak et al., 2022; Hussain et al., 2021). Studies across SSA have quantified this impact, observing that participation in financial literacy training programs increases the probability of financial inclusion for women by 7% (Koomson et al., 2020). Crucially, recent research focusing on rural women in Kenya has demonstrated that while both financial literacy and digital finance are individually

beneficial, the interaction between the two factors creates a stronger positive effect on formal financial inclusion than either factor in isolation. This finding highlights the need for integrated policy interventions that combine financial education with digital access to genuinely bridge the inclusion gap and ensure effective usage.

Little research has been done specifically on the relationship between financial literacy, digital finance and financial inclusion. Most of the studies focused on different aspects of financial literacy as well as digital finance and their relationship with financial inclusion and not specifically on the relationship between the two and how they influence financial inclusion. For instance, Askar et al. (2020) focused on aspects of financial literacy and the implication on different aspects of an individual's life. The findings indicate that financial literacy is very important as it enables effective decision making that more often than not influence individuals' wellbeing. Other studies such as Yang et al. (2020); Hussain et al. (2018) and Ozili (2018) focused on digital finance and financial literacy though their concern was on how individuals make financial choices. Among the studies that were done there is none that specifically showed the relationship between financial literacy and digital finance.

Yang et al. (2020) who looked at digital finance and financial literacy, an empirical investigation of Chinese households. The study revealed that a majority of the households possess limited financial literacy due to their low level of sophistication thus limiting their demand for digital finance. However, this study mainly focused on how financial literacy influenced digital finance choices and not the entire aspect of access and usage as proposed in this study. Ozili (2018) studied the impact of digital finance on financial literacy and noted that digital finance is an enabler of the usage of financial services and thus further collaborative research needs to be done to better

understand the relationship between digital finance, financial inclusion and digital financial inclusion. There is therefore a clear need to delve into research on how financial literacy intersects with digital finance in promoting financial inclusion among rural women in Kenya.

1.1.1 The Concept of Financial Literacy

Different authors have defined the term financial literacy in different ways thus to date, there is no widely accepted definition for financial literacy that has been universally adopted (Lyons and Kass- Hanna et al., 2021). Askar et al. (2020) defines financial literacy as the people's understanding of financial concepts, as well as their skills and ability to manage money and make informed financial decisions. On their part, Carlin and Robinson (2020) look at financial literacy as people's ability to make financial decisions in their own best short-term interests. Hassan and Hoque (2021) looks at financial literacy as having proper knowledge and skills of making right decisions in choosing financial products and services.

Additionally, Lyons and Kass-hanna (2021) definition sees financial literacy as an individual's or community's awareness and knowledge about available financial products and services and how best to access and use them. This definition is important because it refers not only to being aware and having knowledge about the digital financial products and services, but also includes the aspect of access and use which are very crucial for this study as it aims at analyzing how rural women can easily navigate digital platforms to access financial services and use them for their wellbeing (Zhang & Sherraden, 2022).

Therefore, in this study, financial literacy is seen as an individual's state of being aware of financial services, having knowledge about the financial concepts and services and possessing the required skills to access and effectively use the financial services to improve their financial wellbeing. Financial literacy is critical for decision making at individual, household and community level (Hassan & Hogue, 2021). It involves having basic knowledge about financial services, being able to access them and finally being able to use the financial services for personal well-being.

Financial literacy ranging from numeracy and interest-rate comprehension to knowledge of fees, product features, and consumer rights consistently predicts higher levels of financial inclusion among rural women. In Southern Africa, literacy is associated with increased probabilities of having and using formal accounts and savings instruments among rural women, even when controlling for income, education, and location factors (Nanziri & Leibbrandt, 2018). In Ghana, women with higher financial capability measures are more likely to engage in formal savings and to maintain resilient financial behaviors that cushion against idiosyncratic shocks (Koomson et al., 2020).

Kenyan evidence indicates that literacy improves both the breadth (number of formal services used) and depth (frequency and amounts) of inclusion among rural women, with especially strong effects on saving discipline and the use of formal remittance channels (Gikunda & Gitau, 2021). Among SHG members in India, financial literacy correlates with active account use and savings regularity, mediated by group-based learning and the availability of mobile channels (Kumar & Raghavendra, 2018). Mechanistically, literacy appears to enhance product understanding, reduce fear of

hidden charges, and enable error resolution, thereby fostering habitual use rather than one-off sign-ups.

1.1.2 The Concept of Digital Finance

Ozili (2020) defines digital finance as the delivery of traditional financial services through mobile phones, personal computers, the internet or cards that are linked to a reliable digital payment system. For digital finance to be complete, there has to be a technological device which can be used to deliver the financial services. Digital finance therefore, includes all products, services, technology or infrastructure that enable individuals and communities to have access to payments, savings, and credit facilities through the internet without the need of visiting the bank or financial service provider (Ozili, 2018).

Digital finance is a means of extending financial services to the financially excluded and undeserved population in the community like women (Yang et al., 2020). It facilitates payments via mobile devices which has been of great help to individuals, households and community at large in managing personal assets while at the same time providing more convenient access to finance and financial services thus greater financial inclusion. In rural areas, digital finance plays a major role of improving peoples (low income and poor) access to basic financial services leading to greater financial inclusion. Through digital finance, the underprivileged are able to transact and access basic financial services from the comfort of their homes making them financially included.

When these financial services are delivered using alternative delivery channels other than the traditional way, they are called digital financial services. Digital Financial

Services are financial services delivered through alternative delivery channels like mobile phones, personal computer, internet, cards linked to a reliable digital payment system (Yang et al. 2020). These services can be delivered through bank led models like those provided through mobile phones including e-mobile am mobile money. They can also be delivered through non-bank led models like internet and telecommunication providers (United Nations, 2023). All these financial services rely on digital technology for their delivery and use by customers otherwise called Fintech. Fintech according to Ozili (2018) is the delivery of financial and banking services through modern technological innovation. It uses software, mobile applications, and other technologies created to improve and automate traditional forms of finance for businesses and consumers. Fintech is used to improve and automate the delivery and use of financial services.

For instance, a Fintech provider, uses a technology platform, whether online or offline, to provide new financial services or to improve the delivery of existing financial service for their customers (World Economic Forum, 2025). This basically means that new financial services or existing financial services are made accessible through technology that can be connected to the internet or not. Internet technology is an enabler of Fintech, and refers to the ability of the Internet to transmit information and data through different systems (Ozili 2018). It is basically the ability of the bank to incorporate internet via technological innovation to interact with its customers. On its own, internet technology does not qualify to be Fintech as other services and information other than financial services can be accessed. For it to be Fintech, it must have the concept of financial services being accessed and delivered using technology.

Digital finance lowers transaction costs, relaxes geographic constraints, and offers privacy and fine-grained control over small-value transactions, all of which are pivotal for rural women. In Ghana, mobile money access and use predict higher probabilities of formal account ownership and use of savings/credit among rural women; effects are stronger where agent density is higher and network reliability reduces failed transactions (Koomson et al., 2021). In Kenya and across East Africa, mobile money adoption is linked to increased financial participation, income smoothing, and in some cases occupational shifts among women; crucially, rural agent networks and social learning facilitate adoption (Jack & Suri, 2022).

In Bangladesh, women's digital financial inclusion is associated with improved household welfare outcomes higher consumption and better shock response pointing to the role of digital channels in enabling timely transfers, secure savings, and more frequent microtransactions (Rahman & Khatun, 2024). Across settings, agent banking and mobile wallets reduce travel time and queuing costs, while receipt digitization supports record-keeping for microenterprises operated by rural women (Gikunda & Gitau, 2021). Nonetheless, the literature cautions that digital divides device access, connectivity, agent recourse mechanisms can constrain the inclusion benefits, and that DFS impacts are maximized when paired with basic financial and digital literacy (Kumar & Raghavendra, 2018; Koomson et al., 2021).

1.1.3 The Concept of Digital Financial Literacy (Financial Literacy and Digital Finance)

Studies that explicitly consider both financial literacy and digital finance find complementary, often synergistic, effects on financial inclusion among rural women. In rural Ghana, the joint presence of digital financial services (DFS; particularly mobile

money) and higher financial literacy is associated with greater odds of formal account ownership, formal savings, and use of credit/insurance, even after controlling for income, education, and distance (Koomson et al., 2021). Interaction terms in microdata analyses indicate that literacy enhances the likelihood that DFS access translates into active and diversified use, suggesting that literacy operates as a capability that converts digital access into inclusion outcomes.

In rural Bangladesh, Rahman and Khatun (2024) show that women's digital financial inclusion (mobile accounts, frequency of digital transactions, and use for savings/receipts) is linked to better household welfare, with qualitative and quantitative evidence implying that basic financial literacy and digital confidence mediate uptake and continued use. Similarly, evidence from Kenya points to a reinforcing relationship where foundational financial literacy understanding fees, transaction steps, and record-keeping reduces perceived risk and fosters sustained mobile-money use for formal saving and microenterprise payments among rural women (Gikunda & Gitau, 2021). Across contexts, literacy appears to shift women from passive access to active, multi-feature use, while digital channels reduce logistical barriers and costs, together expanding functional inclusion.

1.1.4 Rural Women in Kenya

Women make up slightly more than half of the Kenyan population, with a majority of them residing in the rural areas providing farm labor (Mwangi, 2018). Therefore, the participation of majority of these rural Kenyan women in financial related contribution is minimal as compared to their male counterparts. According to World Bank Group (2021) their minimal participation makes them least contributors in the financial sector and even appear reliant on men for financial contributions and decision making.

The Financial Sector Deepening Kenya (2024) note that the financial roles conferred to men in Kenya appear more superior than those given to women giving them an opportunity to be the main beneficiaries of financial inclusion. Due to this most of them migrate to urban areas, leaving most women responsible for the running of the affairs at their rural homes and also making rural women most financially excluded (Mwangi, 2018). Thus, financial exclusion trickles down to increased poverty denying rural women opportunities for empowerment leading to a retarded economy (Financial Sector Deepening Kenya, 2024). Eliminating this disparity through women financial inclusion would spur economic growth by reducing poverty and decreasing unemployment thereby destabilizing this status quo (World Bank Group, 2021).

Agbo and Isa (2017) define rural women as those who reside or live in the village or interior communities (a geographical area located outside urban areas or towns). They are women who have settled and developed a livelihood in the village. They play a major role of supporting their households and communities at large to generate income, achieve security and improve their overall wellbeing (Mmuozoba, 2022). Rural women are important for transformational economic, environmental and social changes across the globe though more often than not are constrained in their roles by education and health care challenges (UN, 2021). Rural women are mainly found in low skilled, low productivity and low paying jobs with long working hours coupled with poor working conditions (UN, 2021). These rural women more often than not have the same culture, religion and even vocation. Some of them are literate, some are semi-illiterate but most of them are illiterate limiting their equitable access to opportunities, resources and services (Agbo & Isa, 2017).

1.2 Statement of the Problem

The UN Women Africa survey (2022) notes that the women constitute about 60% of the 74% of Kenyans living in the rural areas and approximately 13.1 million women live in rural areas providing farm labor (NGEC, 2021). That means women constitute the majority of the population in rural areas. According to FinAccess (2024) Kenya's financial inclusion index stand at 84.7% but the exclusion rate for the rural population stood at 12.6% majority of whom are women.

Rural women are primarily the financial managers, home protectors, providers of daily needs and investors (KNBS, 2021), responsibilities that require a certain level of financial understanding for beneficial family financial decisions Unfortunately, most of these rural women are trapped in vicious cycles of low levels of literacy, low employment income, low savings and poor access to credit (Manta, 2019). Chidnma (2021) states that financial inclusion for women requires that women have access and control over a wide range of financial products and services. If rural women are not equipped with sufficient knowledge about digital finance and are not comfortable with financial technology, then they will not in any way demand for the digital financial services thus remain financially excluded regardless of all efforts.

Several studies including Fanta and Mutsonziwa (2021); Widarwati et al. (2022); Al-Smadi (2022); point the fact that that, Kenyan rural women specifically lacked financial knowledge and are digitally challenged hence find themselves financially excluded. It is evident from these studies that financial inclusion is multidimensional, that is, it requires financial literacy as well as knowledge of digital finance which are limiting factors among rural women. It is on this basis that this study will contribute to existing

literature by investigating how financial literacy and digital finance influence financial inclusion of rural women in Kenya.

1.3 Objectives of the Study

The general objective of this study was to assess the influence of financial literacy and digital finance on financial inclusion among rural women in Kenya

Specifically, the study sought to;

i. To estimate the extent to which financial literacy influences financial inclusion among rural women in Kenya.
ii. To establish the influence of digital finance on financial inclusion among rural women in Kenya.
iii. To investigate the interaction effect of financial literacy and digital finance on financial inclusion among rural women in Kenya.
iv. To analyze the rural women perspectives regarding financial inclusion among rural women in Kenya

1.4 Research Questions

The specific objectives will be addressed by the following research questions:

i. To what extent does financial literacy influence financial inclusion among rural women in Kenya?
ii. How does digital finance influence financial inclusion among rural women in Kenya?
iii. What is the interaction effect between financial literacy and digital finance on financial inclusion among rural women in Kenya?
iv. What are the perceptions on financial inclusion among rural women in Kenya?

1.5 Significance of the Study

This study makes a significant and multi-faceted contribution to the existing body of knowledge on financial inclusion, particularly within the context of rural women in Kenya. The research investigates the complex barriers to financial inclusion, providing a nuanced understanding that extends beyond traditional metrics of access to encompass deeper issues of financial literacy, digital adoption, and service usage. The findings offer a comprehensive perspective that is both theoretically relevant and practically applicable, providing valuable insights for various stakeholders.

1.5.1 Contribution to Rural Women

The findings of this study will contribute directly to the empowerment of rural women by providing them with the knowledge and skills necessary to make informed financial decisions. The research highlights the low levels of financial literacy and lack of understanding of basic concepts such as interest rates, budgeting, and savings. By illuminating these challenges, the study provides the basis for designing targeted interventions that will help rural women reduce their vulnerability to exploitation, build their financial security through access to savings and credit, and ultimately promote their financial independence.

1.5.2 Implications for Financial Service Providers

This research will be a crucial resource for financial institutions, mobile network operators (MNOs), and fintech companies. It offers an empirical understanding of the combined impact of low financial literacy, low digital adoption, and mistrust in digital services. The study's recommendations provide a practical roadmap for these providers to develop more effective and targeted interventions. Specifically, it guides them to design localized financial literacy curricula; develop user-friendly and tailored financial

products; Invest in expanding digital infrastructure and providing affordable internet access; build trust by creating awareness campaigns that educate rural women on the safety and security measures of digital financial services.

1.5.3 Guidance for Policymakers and Government Agencies

Policymakers and government agencies will benefit from the study's insights, which can inform the design of more effective policies and regulations. The research provides valuable, evidence-based recommendations to guide government programs and initiatives aimed at promoting financial inclusion. By highlighting the need for detailed, region-specific needs assessments to understand and address unique barriers, the study empowers these bodies to create interventions that are not only inclusive but also culturally and economically relevant, thus fostering genuine financial empowerment.

1.5.4 Contribution to Academia

This study makes a significant contribution to the academic discourse by providing a comprehensive resource for researchers and academicians seeking to understand and address the gender gap in financial inclusion in Kenya. The research provides specific data and recommendations on the relationship between financial literacy, digital finance, and financial inclusion, offering a robust foundation for future theoretical models and empirical studies. By focusing on the unique challenges faced by rural women, the study provides a reference point for subsequent research that aims to bridge this critical gender gap.

1.6 Scope of the Study

Financial Inclusion is a very important component of economic development. This study examined aspects of financial literacy and digital finance and their influence on financial inclusion among rural women in Kenya specifically from seven regions that

display high levels of financial exclusion. The regions include; Western, Nyanza, Eastern, Central, Coastal, North Eastern and Rift Valley.

Geographically, the study focused on rural women across Kenya to assess the national landscape of financial literacy, digital finance and their influence of financial inclusion. The choice of rural women was based on the fact that being residents of the village, majority of whom are limited in terms of access to education, job opportunities, health care and credit access. However, despite the challenges, they play a crucial role in supporting their households and communities at large to generate income, achieve security and improve their overall wellbeing. Rural women form part of the transformational economic change that is needed across the globe for global development. This change is only possible if the key limitations are addressed leading to equitable access to opportunities, resources and services thus financial inclusion.

The target population was all rural women in Kenya. Data was collected using questionnaires that were administered and analyzed in the year 2024.

1.7 Limitations of the Study

The primary objective of this study was to establish the influence of financial literacy and digital finance on the financial inclusion of rural women in Kenya. While this objective was successfully achieved, the research process encountered several limitations that are important to acknowledge and address. The following section outlines these constraints and the strategic measures employed to mitigate their impact, thereby ensuring the integrity and reliability of the study's findings.

1.7.1 Inherent Trust and Confidentiality Concerns

A significant initial challenge was the inherent lack of trust among some rural women, which presented a potential barrier to obtaining accurate and comprehensive information. The sensitive nature of financial topics, coupled with previous experiences of exploitation, could have inhibited participants from sharing candidly. To mitigate this, a robust ethical framework was established at the outset of each interview. Participants were provided with a clear, verbal explanation of the study's purpose, explicitly stating that all data would be used strictly for educational purposes and would remain confidential and anonymous. This proactive approach to building rapport was critical in fostering an environment of trust, which enabled more open and honest responses.

1.7.2 Socio-Political Disturbances during Data Collection

The data collection period in June 2024 coincided with significant socio-political disturbances, including widespread public demonstrations against the proposed finance bill. This created a high-risk environment and logistical challenges that slowed down the data collection process and compromised the safety of the research assistants. To overcome this unforeseen limitation, the research protocol was immediately adapted. The data collection period was extended to compensate for lost time, and a revised schedule was implemented to ensure the safety of the research team. Research assistants were advised to operate within a controlled timeframe (8:00 a.m. to 5:00 p.m.) and were instructed to avoid the field on designated days of planned demonstrations (Tuesdays and Thursdays). These measures prioritized the well-being of the team while ensuring the study's timely completion.

1.7.3 Language Barriers and Interpretation

While the survey instrument was in English, the diverse linguistic landscape of rural Kenya posed a potential barrier to effective communication and data interpretation. The risk of misunderstanding complex financial concepts could have led to insufficient or inaccurate information. This limitation was overcome by leveraging the expertise of locally-based research assistants who were proficient in the specific regional languages and local dialects. These assistants were trained not only in research methodology but also in the ethical and accurate interpretation of questions and responses. This approach ensured that participants fully understood the survey questions, thereby enhancing the quality and reliability of the data collected.

1.7.4 Logistical and Time Constraints

The study's design, which involved face-to-face data collection across seven distinct and geographically remote regions, presented significant logistical and time-related challenges. The extensive travel required was both time-consuming and expensive. To address these constraints, a decentralized data collection model was adopted. Two research assistants were assigned to each region, and a strict 10-day data collection window was set per region to maintain efficiency. Furthermore, by employing research assistants who resided in the specific rural areas, logistical costs were significantly reduced and local community engagement was facilitated.

1.7.5 Geographical and Population Scope

This study's findings are limited to rural women within seven specific regions of Kenya. The research did not include the Nairobi region, which is classified as purely urban. While this focus allows for a deeper and more targeted analysis of the rural context, the findings may not be generalizable to urban women or to rural women in other parts of

Kenya. This delimitation was a deliberate choice to ensure a focused and in-depth exploration of the study's core research questions, and future research could expand upon this to provide comparative analysis between rural and urban populations.

CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

This chapter focuses on a review of existing literature in line with the research objectives to get a better understanding of the research problem. The focus is on the review of theories, empirical review, the conceptual framework and research gaps related to financial literacy, digital finance and financial inclusion of rural women. Theories supporting the different objectives are analyzed in theoretical review while the empirical review provided the research gap and a better understanding of the research problem.

2.1 Theoretical Review

In understanding, explaining and making predictions about the influence of financial literacy and digital finance on financial inclusion, this study was guided by the financial literacy theory, social learning theory, diffusion innovation theory and the vulnerable group theory.

2.1.1 Financial Literacy Theory (FLT)

The Financial Literacy Theory (FLT) was developed and championed by Lusardi and Mitchell (2008). The core proposition of Financial Literacy Theory posits that individuals with higher levels of financial literacy are significantly better equipped to make informed and optimal financial decisions compared to those with limited financial knowledge. The theory proposes that financially literate individuals demonstrate superior ability to utilize financial products and services effectively, thereby achieving enhanced financial wellbeing and economic outcomes. Specifically, the theory suggests that financially literate individuals can engage confidently in financial discussions,

develop comprehensive long-term financial plans, and respond appropriately to economic events and market changes that impact their financial circumstances.

Financial Literacy Theory according to Lusardi and Mitchell (2008) operates on several key assumptions namely: (1) that financial knowledge directly translates into improved financial behavior and decision-making; (2) that individuals have access to financial products and services once they acquire the necessary knowledge; (3) that financial markets operate efficiently and provide fair access to all participants regardless of socioeconomic status; (4) that financial education can be effectively delivered and absorbed across diverse populations; and (5) that the relationship between financial literacy and financial outcomes is linear and consistent across different demographic groups and economic contexts.

Despite its widespread acceptance, Financial Literacy Theory has faced several criticisms from researchers and practitioners. Huston, (2020) argues that the theory oversimplifies the relationship between knowledge and behavior, noting that structural barriers often prevent individuals from acting on their financial knowledge. Fernandes et al. (2014) conducted a meta-analysis revealing that financial education interventions have minimal impact on financial behaviors, suggesting that knowledge alone is insufficient. Additionally, critics argue that the theory fails to adequately account for systemic inequalities, cultural factors, and institutional barriers that may prevent certain populations from accessing financial services regardless of their literacy levels (Collins & O'Rourke, 2010).

In the context of examining the influence of financial literacy, digital finance, and financial inclusion among rural women in Kenya, Financial Literacy Theory provides

a crucial theoretical foundation for understanding the barriers and facilitators to financial participation. The theory directly relates to the research objective on the influence of financial literacy on financial inclusion by suggesting that limited financial literacy among rural Kenyan women may serve as a significant impediment to accessing formal financial services, thereby hindering their financial inclusion. Specifically, when rural women lack fundamental financial knowledge, they may struggle to understand, navigate, and effectively utilize digital financial services offered through mobile money platforms and other technological innovations that are increasingly prevalent in Kenya's financial landscape.

The theory underscores the critical importance of implementing comprehensive financial literacy programs specifically designed for rural women, focusing on essential skills such as budgeting, saving, responsible borrowing, and digital finance navigation. By enhancing these competencies, such programs can serve as catalysts for promoting greater financial inclusion among this vulnerable population, ultimately contributing to their economic empowerment and improved livelihoods.

2.1.2 Diffusion Innovation Theory

The Diffusion Innovation Theory was developed by Everett M. Rogers, who first published his seminal work, Diffusion of Innovations, in 1962. Rogers, a professor of rural sociology, synthesized research from various fields to create a universal framework for understanding how new ideas and technologies spread through a social system (Rogers, 1962). The theory's core proposition is that the adoption of an innovation is a social process influenced by four key elements: the innovation itself, communication channels, time, and the social system (Rogers, 2003).

The theory posits that individuals adopt an innovation through a five-stage decision-making process: knowledge where the individual becomes aware of the innovation; persuasion that allows them to form an attitude toward the innovation, either favorable or unfavorable; decision where individuals decide to adopt or reject the innovation; Implementation that allows individuals to begin to use the innovation and confirmation where individuals then evaluate the results and decide to continue or discontinue its use.

Additionally, Rogers also proposed that not everyone adopts an innovation at the same time. Instead, people can be classified into five adopter categories based on their "innovativeness" (Rogers, 2003). These categories include innovators, early adopters, early majority, late majority, and laggards which follow a normal, bell-shaped distribution when plotted against the time of adoption, which is a key tenet of the theory (Rogers, 1962).

Accordingly, the Diffusion of Innovation theory operates on several core assumptions (Rogers, 2003). The first assumption states that the innovation is an idea, practice, or object perceived as new by the adopting individual or unit. This basically means that an innovation could be an old technology in one part of the world, but if it is new to a rural Kenyan woman, the diffusion process starts from that point of perceived novelty (Rogers, 2003). This assumption highlights that the psychology of the individual adopter is central to the theory, not just the technology itself. For example, a woman who has only ever used cash transactions would perceive mobile money as a new and potentially risky idea, even if it's been in use for years.

Secondly, communication about the innovation occurs within a social system, a network of interconnected individuals or units. Rodgers notes that diffusion is not a random process. It happens through communication channels, primarily within a social system that is a network of interconnected people who share a common goal or context (Rogers, 2003). For instance, for rural women, the social system could be a women's savings group (chama), a village, or even a community of market traders. This assumption is crucial because it suggests that the adoption of digital finance by a rural woman is not an isolated event but is influenced by her interactions with peers, family, and community leaders.

Thirdly, the theory assumes that the diffusion process is not instantaneous; it occurs over time. Basically, the theory rejects the idea of instantaneous adoption. It assumes that diffusion is a gradual process that unfolds over time, from the initial awareness of an innovation to its eventual widespread adoption or rejection (Rogers, 2003). This "time" element is critical as it allows for an analysis of the stages of adoption among rural women and identify the factors that might accelerate or slow down the process at each stage.

Fourthly, the theory assumes that the characteristics of the innovation influence the rate of adoption. This assumption is key as it emphasizes that the attributes of the innovation itself determine how quickly the innovation will be adopted (Rogers, 2003). These attributes include: Relative Advantage that considers whether the innovation is perceived as better than the idea it supersedes? For instance, for a rural woman, is mobile money a clear improvement over traditional savings boxes or traveling to a distant bank?

Compatibility that is concerned with whether the innovation is consistent with the existing values, past experiences, and needs of the potential adopters? For instance, a digital savings app might be more readily adopted if it can be integrated with existing informal savings practices like chamas; complexity that focusses on how difficult it is to understand and use the innovation; trialability that asks, can the innovation be experimented with on a limited basis? For instance, mobile money's ability to be tried with very small amounts of money like sending ten Kenya Shillings significantly increases its appeal and reduces perceived risk and lastly, observability that focuses on the results of the innovation, whether they are visible to others. This is important as it emphasizes that when a woman sees a neighbor successfully using digital finance to receive a payment or a loan, it can persuade her to adopt it herself.

Lastly, the theory assumes that the process of adopting innovation is inherently rational. This assumption proposes that individuals make informed and rational decisions about whether to adopt an innovation based on their evaluation of its costs and benefits (Rogers, 2003). While this has been criticized for being overly simplistic, it is a foundational principle of the theory. It suggests that financial literacy and digital finance skills are crucial because they empower a rural woman to make a more rational and informed decision about whether to use a financial product, rather than relying on chance or a lack of understanding. This links directly to your study's focus on the role of knowledge in decision-making.

Despite the widespread of the Diffusion of Innovation Theory, there has been significant criticism labelled against it. To begin with, the theory has been criticized for its inherent bias towards promoting an innovation, often assuming that the innovation is universally beneficial and its adoption is always a positive outcome. It tends to blame

individuals who reject an innovation for being "laggards" without considering legitimate reasons for rejection, such as cultural incompatibility, high cost, or lack of local relevance (MacVaugh & Schiavone, 2010).

Additionally, the theory is also often criticized for being too simplistic and failing to adequately account for the complex social, cultural, political, and economic contexts that can significantly hinder or facilitate diffusion. For example, it may overlook systemic issues like poor infrastructure, lack of trust in institutions, or gender inequality, which are particularly relevant in the context of digital finance adoption among rural women (Deligiannaki & Ali, 2011). Lastly, the theory is criticized for its five-stage process that is considered to be too linear to capture the messy, non-linear reality of innovation adoption. In practice, individuals may skip stages, revisit decisions, or adapt the innovation to their own needs, a process known as "re-invention" (Rogers, 2003).

This study seeks to investigate the influence of financial literacy and digital finance on financial inclusion among rural women in Kenya. The Diffusion of Innovation theory provides a crucial lens for understanding this relationship. The theory links directly to the study's objective by explaining the disparities in digital finance adoption: The theory's concept of adopter categories that include innovators, early adopters, and laggards, helps to explain why not all rural women in Kenya adopt digital financial services at the same pace. This helps the study analyze the disparities in adoption and identify factors that influence a woman's position on the adoption curve, such as her level of financial literacy or her social network's influence.

Additionally, the theory highlights the structure of the adoption process when it comes to innovation. The five-stage decision-making process provides a framework for analyzing how a rural woman moves from simply hearing about M-Pesa or a mobile banking app (knowledge stage) to actively using it for savings or loans (implementation stage). The study can investigate the role of financial literacy in each of these stages, for instance, how it helps a woman transition from the persuasion stage to the decision stage by enabling her to evaluate the pros and cons of a digital financial product.

More so, the diffusion of innovation theory helps identify the key catalysts to adoption of digital finance. By applying the attributes of innovation, the study can examine how the perceived relative advantage (like convenience of mobile banking over traditional banks), compatibility (like alignment with existing communal savings practices), and observability (like seeing a neighbor successfully use mobile money) of digital finance influence its spread among rural women. The theory therefore provides a model for how financial literacy and digital finance combine to become a catalyst for greater financial inclusion, moving beyond a simple cause-and-effect relationship.

2.1.3 Social Learning Theory

The Social Learning Theory was proposed by Albert Bandura in 1977. Bandura's theory emphasizes the role of cognitive factors in human learning. The central proposition of the Social Learning Theory is that individuals can learn new behaviors and attitudes by observing and imitating others' actions within a social context (Bandura, 1977). This process, is known as observational learning or modeling, and is influenced by both environmental and cognitive factors.

The Social Learning Theory posits that learning occurs through four main processes: attention where by the observer must pay attention to the model's behavior; retention where the observer must be able to remember the behavior through creation of a mental representation or image of the action; reproduction where the observer must be physically and mentally capable of reproducing the behavior and motivation where the observer must be motivated to perform the behavior. Motivation is often influenced by the consequences they observe the model receiving, a concept known as vicarious reinforcement (Bandura, 1977). If the model is rewarded, the observer is more likely to imitate the behavior.

The Social Learning Theory operates on several key assumptions (Bandura, 1977). The first assumption is that learning is a cognitive process unlike pure behaviorism. Social Learning Theory assumes that learning can occur without an immediate change in behavior. An individual can learn by simply observing and storing information mentally from what they have observed. Secondly, the theory assumes that human behavior is a result of the interaction between personal factors like beliefs and skills, environmental factors like social norms and infrastructure, and the behavior itself. Finally, the theory also assumes that people are more likely to imitate models who are similar to them, are perceived as high-status, or are seen as being rewarded for their actions.

While widely influential, the Social Learning Theory has faced some criticism. Critics of this theory argue that it overemphasizes on observational learning without fully accounting for all types of learning, especially in complex or abstract situations where direct observation is not possible(Schunk, 2012). The focus on observational learning may be too narrow to account for the full spectrum of human behavior and learning. The theory is most effective at explaining concrete, observable actions but is less

equipped to explain how individuals acquire complex, abstract, or creative skills that don't have a clear model. For instance, it's difficult to explain how an artist learns to paint in a new style or how a musician composes a novel piece of music solely through observation. Furthermore, some studies show that individuals don't always imitate what they see. They may internalize the observed behavior and then adapt or modify it based on their own cognitive processes, a phenomenon that complicates the simple "observe and imitate" model (Schunk, 2012).

Additionally, the Social Learning Theory faces criticism because it largely ignores biological and hormonal influences on behavior, focusing almost exclusively on social and environmental factors (Bandura, 1977). A significant criticism, particularly of its earlier iterations, is that it largely discounts the role of biological and genetic influences on behavior. The theory positions behavior as a product of social and environmental factors, overlooking the fact that temperament, hormonal levels, and neurological predispositions can play a powerful role in an individual's actions and responses (Bandura, 1977). For example, a person with a genetic predisposition for anxiety may respond differently to a social situation than someone without, regardless of what they observe. The theory's reciprocal determinism model, while acknowledging the interaction between the individual and the environment, has been critiqued for not giving enough weight to these innate biological factors that can constrain or enable an individual's capacity for learning and behavior.

Lastly, the theory is criticized for raising ethical concerns regarding its application, as it implies that any observed behavior, positive or negative, can be learned and imitated. The theory raises significant ethical concerns, especially regarding the modeling of negative or violent behaviors. The core tenet that "any observed behavior’ can be

learned and imitated" implies a heavy responsibility on what is modeled in society, particularly for children and vulnerable populations. Bandura's own "Bobo doll" experiment demonstrated that children who observed an aggressive adult model were more likely to imitate the aggressive behavior (Bandura et al., 1961). This finding has been used to fuel debates over the influence of media violence on youth behavior, suggesting that exposure to violent content can lead to imitative acts. The theory's application in this context can be problematic, as it shifts some of the responsibility from the individual to their social environment, raising questions about accountability and moral agency (Bandura, 1977).

This theory relates well with the study objective of investigating the influence of financial literacy on financial inclusion among rural women in Kenya. The Social Learning Theory provides a strong framework for understanding the social dynamics of this process. The theory provides a conceptual basis for explaining how rural women can acquire knowledge of financial services, particularly digital ones, through peer observation and modeling within their communities. Instead of relying solely on formal training programs, a woman can observe a neighbor or a family member successfully using M-Pesa to withdraw money or make a payment and then imitate the behavior.

Additionally, the theory highlights the importance of social networks and community groups, such as the Kenyan chama (savings and credit cooperative), in facilitating financial inclusion. Within these groups, a woman who is a "financial pioneer" can act as a model, and the successes she achieves like getting a loan to expand her business can serve as a form of vicarious reinforcement for others, motivating them to adopt similar financial behaviors (Ngechu, 2017).

A core concept of the theory is self-efficacy whereby observing other women successfully navigate digital finance can build a rural woman's belief in her own ability to do so, a crucial mediating factor that links financial literacy to actual use. This means that financial literacy programs for rural women may be more effective when they incorporate a peer-learning or mentoring component. As Social Learning Theory suggests, this will build the confidence needed for sustained engagement with financial services. The theory therefore helps to explain how social context can either accelerate or hinder the adoption of financial products and services.

2.1.4 Vulnerable Group Theory (VGT)

The Vulnerable Group Theory advanced by J. D. Von Pischke focuses on the systemic barriers that prevent certain segments of the population from accessing formal financial services (Von Pischke, 1991). The central proposition of this theory is that individuals who are poor, uneducated, geographically isolated, or marginalized like rural women and the youth are inherently vulnerable to financial exclusion.

The theory posits that this vulnerability is not a result of individual failings but of structural barriers within the financial system itself. These barriers include: geographical exclusion that involve physical distance to brick-and-mortar banks; socio-economic exclusion that stems from a lack of formal collateral, low income, and high transaction costs; informational exclusion due to low literacy, lack of financial knowledge, and inadequate access to information about financial products.

The theory advocates for targeted interventions and the development of specialized financial products and services to address these vulnerabilities. It argues that a one-size-fits-all approach to financial services is ineffective for vulnerable populations and that

deliberate, inclusive strategies are required to integrate them into the formal financial sector (Von Pischke, 1991).

The Vulnerable Group Theory rests on several key assumptions, to begin with, the theory assumes that the primary cause of financial exclusion for rural women in Kenya is not a lack of demand for financial services, but rather structural and systemic barriers within the financial system itself (Von Pischke, 1991). This assumption directly challenges the notion that rural women are financially excluded simply because they do not want to participate in the formal economy. Instead, it posits that barriers such as a lack of physical bank branches, complex and expensive loan application processes, and the absence of collateral like land titles often owned by men are the true obstacles. In relation to the study, this means that even if a rural woman desires a loan or a savings account, her ability to access it is hindered by these structural issues. Mobile money, while a significant innovation, must still overcome systemic hurdles like inconsistent network connectivity and the high cost of data or smartphones to be truly inclusive (FinAccess, 2021).

Additionally, the vulnerable group theory assumes that targeted, group-specific interventions are more effective than one-size-fits-all policies in addressing the unique vulnerabilities of marginalized groups. The Vulnerable Group Theory suggests that a general policy aimed at increasing financial inclusion for all Kenyans will not be as effective as a strategy specifically designed to meet the needs of rural women (Von Pischke, 1991; Johnson & Sherraton, 2007). Such targeted interventions could include financial literacy programs delivered in local languages, mobile banking interfaces designed with low-literacy users in mind, and loan products tailored to the needs of small-scale farmers or entrepreneurs. This assumption validates the focus of the study

on rural women, arguing that their gender, location, and economic context necessitate a unique approach.

More so, the theory implies that financial inclusion is a societal objective that requires deliberate effort from policymakers and financial institutions to ensure a more equitable distribution of financial opportunities. The Vulnerable Group Theory operates on the premise that financial inclusion is a societal objective that requires deliberate and proactive efforts from policymakers and financial institutions. It is not something that the market will achieve on its own (World Bank, 2023). This assumption implies a responsibility on the part of the government and financial sector to ensure equitable access to financial services. This is particularly relevant for the study as it justifies the role of government-led initiatives, such as the Central Bank of Kenya's Financial Inclusion Agenda, and partnerships with private companies like Safaricom to expand mobile money services. It acknowledges that the ultimate goal of financial inclusion is to improve the overall financial well-being of the population and reduce poverty, which benefits all of society (UNCDF, 2020).

The theory also recognizes that vulnerability is not just about income, it is a multidimensional concept that includes social, gender, and geographical factors (Chant, 2018). In the context of rural women in Kenya, this means their vulnerability to financial exclusion is a combination of their geographical location since they are living in remote areas with limited infrastructure; gender-based barriers caused by traditional norms that may limit their control over financial assets and decision-making power and low literacy since they have educational disadvantages that make it difficult to understand complex financial products.

These assumptions encourage a holistic view of financial exclusion, suggesting that simply providing a mobile phone or a loan is not enough. Effective interventions must address all these dimensions of vulnerability to truly empower rural women and promote sustainable financial inclusion (UN Women, 2022).

While Vulnerable Group Theory provides a useful framework, several critics argue that the theory can oversimplify complex social realities, lumping diverse groups into a single "vulnerable" category. It may not adequately differentiate between the distinct barriers faced by, for example, a rural woman versus an urban woman or youth (Chant, 2018). Another criticism labelled against the theory is that by framing certain groups as "vulnerable," the theory can sometimes lead to a paternalistic approach where financial services are "given" to people rather than designed with them. This may undermine self-reliance and local ownership of financial solutions (Johnson & Sherraton, 2007). The theory's focus on the supply-side of financial services like what banks and institutions should offer and less on the demand-side like the behavioral and psychological reasons why people may not use services, even if they are available may not fully account for factors like financial self-efficacy, trust in institutions, or cultural preferences.

This theory relates well with the study objective of analyzing the rural women's perspectives concerning financial inclusion with the aim of coming up with actionable strategies that will help address the perceived barriers ensuring rural women are financially included. The Vulnerable Group Theory provides a critical theoretical foundation by directly addressing the central problem. The theory validates the study's focus on rural women as a vulnerable group. It acknowledges that their financial exclusion is not a random occurrence but a predictable outcome of systemic barriers

like geographical isolation, low literacy, and gender-based discrimination (UN Women, 2022). The Vulnerable Group Theory confirms that rural women face unique challenges that require specific attention and not a generalized approach to financial services.

Additionally, the theory provides a framework for evaluating how interventions like financial literacy programs and the introduction of digital financial services can effectively address the vulnerabilities of rural women. This is key for the study as it seeks to examine whether these interventions are truly targeted and context-specific, for instance, by analyzing if mobile banking services are designed with simple interfaces for a low literacy audience or if financial education is tailored to a woman's specific needs as a farmer or a small-business owner.

Lastly, the Vulnerable Group Theory emphasizes on both access and the quality of products; whether they are "affordable and appropriate". This aligns well with the study as it seeks to not just measure whether rural women have a mobile money account but also to assess whether they are using it in a way that truly improves their lives which is a key measure of successful financial inclusion (FinAccess, 2021).

2.2 Empirical Review

This section reviews both local and international studies available concerning the topic of study in an attempt to demonstrate whether financial literacy and digital finance have an influence on financial inclusion of rural women

2.2.1 Financial Literacy on Financial Inclusion

Financial literacy is an individual's or community's awareness and knowledge about available financial products and services and how best to access and use them (Lyons & Kass-hanna, 2021). It is a prerequisite for financial inclusion since no matter the

availability of financial products and services, lack of financial knowledge will prevent or hinder access to financial services. Olawumi and Fapetu (2023) analyzed 283 rural agrarian dwellers in South Africa, using Higher-Order Structural Equation Modeling to determine the pathway to a sustainable livelihood. They established that financial literacy positively and significantly influences financial inclusion (measured by a strong standardized coefficient of $\beta=0.452$), and subsequently, this improved financial inclusion facilitates the achievement of a sustainable livelihood. The study stressed that enhanced financial knowledge is critical for assisting the rural population with accessing requisite funding and financial services.

Fanta and Mutsonziwa (2021) examined the link between financial literacy and financial inclusion using secondary data obtained from the Financial Inclusion Insight (FII) survey of 2016. The survey was to measure adoption and use of digital financial services, track individual's access to financial services and evaluate service performance among digital financial service agents and customers. The study suggested that efforts to promote financial inclusion must be accompanied by financial literacy campaigns in both Kenya and Tanzania. It is on this basis that this current study seeks to fill this gap by examining the influence of financial literacy on financial inclusion of rural women.

More so, Salvatore et al. (2018) carried out a study to measure the level of financial literacy among Italian adults. Using a sample of 2500 persons aged between 16-65 in Italy a survey was conducted to measure literacy, numeracy and problem-solving skills of the population. The findings of the study revealed that financial literacy is low among the least educated, the elderly and the women which gives a substantial financial literacy gap between Italy and other G20 countries. In addition, Breitbach and Waltstad

(2022) analyzed financial literacy and financial behaviors of young adults of ages 18-34 in United States using the National Financial Capability Study (NFCS) data set of 2007 – 2009 and found out that young adults in the US have significantly lower levels of financial literacy than middle age and older adults. Low financial literacy levels hinder access and usage of digital finance. This current study seeks to assess the influence of financial literacy on financial inclusion of rural women.

Similarly, Showkat et al. (2024) investigated the impact of financial literacy on women's economic empowerment particularly through the use of digital financial services using the structural equation modelling in Smart PLS 4. The study employed quantitative approach grounded in an extended Technology Acceptance Model (TAM) and the theory of planned behavior to analyze the relationships among financial literacy, digital financial services and economic empowerment among women on a sample of 386. The findings revealed that financial literacy significantly amplifies the benefits of digital financial services in promoting women empowerment. Therefore, there is a need to prioritize financial literacy initiatives within digital platforms to maximize their effectiveness.

Askar et al. (2020) investigated the impact of financial literacy and poverty reduction in Indonesia. Secondary data obtained from a nationally representative survey in Indonesia (Financial Inclusion Institute database, 2014) with a sample of 6000 respondents from 24 out of the 34 provinces in Indonesia was used. The Polychromic Principle Component Approach (PPCA) was employed in constructing a financial literacy index that was used to assess individual financial and digital literacy. A series of questions were used covering numeracy and capacity to do calculations, understanding inflation, interest rates and risk diversification. Each correct answer was

assigned a score of 1 using the polychromic principle component approach (PPCA) indicating high financial literacy levels. The results revealed that financial literacy plays an important role in reducing poverty regardless of the financial measure used. The study also noted that individuals with higher levels of education have high financial literacy which is key in poverty reduction. This is because a financially literate person is able to easily access banking services like credit which will help him make wise decisions like investing and in the end provide for daily needs and eventually be financially included leading to economic development. On the other hand, the study noted that low financial literacy is one of the barriers to access banking.

Additionally, Kumar and Bansal (2020) examined the mediating role of access to banking services between the financial level and financial wellbeing of selected individuals residing in National capital region of India. The study employed a sample of 476 conveniently selected individuals 18 years and above residing in NCR India. Financial literacy variables analyzed in this study were financial knowledge, financial behavior and financial attitude. Cross sectional research design was adopted for assessing the association between variable. Agarwalla et al. (2013) and OECD (2013) questionnaire involving financial literacy, access to financial services and financial wellbeing were employed. The results of the study indicated that financial literacy helps in enhancing financial knowledge and in developing skills of individuals so that they can compare and choose the best finance-oriented products and services which in the end increase their access to banking services. The study further concluded that without access to banking services, financial literacy alone cannot enhance financial wellbeing among individuals. To fill this gap, the current study will focus on both financial

literacy and access to digital finance as influencers of financial inclusion of rural women.

Yang et al. (2020) conducted an Empirical Investigation on whether Chinese household's possessed adequate financial literacy to make digital financial decisions and to what extend financial literacy attracts digital finance. The study used 2015 – 2017 wave China Household Finance Survey (CHFS) with a sample covering 29 provinces and 83 cities. 37,340 households of 2015 and 40,011 households in 2017 generating a sample of 19,859 was used. Digital finance questions on whether one has used digital finance, mobile payments, internet financial products and interest debts were used. Three questions were used to check financial literacy revolving around interest rates, effect of inflation and financial risk of stocks and bonds. It was found out that financial literacy is critical for households to make financial decisions.

The study noted that rapid growth of digital finance requires households to be well equipped with financial literacy and knowledge. Low levels of sophistication among households was attributed to lower usage of digital finance. The study further noted that when the community is not sophisticated, the adoption and usage of digital finance become very slow calling for aggressive financial literacy that will help inform the community of the available financial services as well as how to use the digital devices leading to financial inclusion.

Agwu and Akwara (2021) studied 350 women entrepreneurs in rural Nigeria and found that a higher level of financial understanding translates directly to a greater likelihood of accessing and utilizing formal financial services for their businesses. Similarly, a mixed-methods study by Shukla, Soni, and Agrawal (2020) on 400 rural women in

Uttar Pradesh, India identified that low financial literacy remains a major bottleneck, significantly impacting women's confidence to approach banks, understand complex product features, and transition to active digital usage. These studies underscore the consensus that knowledge is essential for overcoming the intimidation factor often associated with formal institutions

Finally, Koomson and Appiah (2023) extended this analysis to financial resilience among 4,500 rural women across Ghana and Nigeria, confirming that while digital inclusion improves formal inclusion and resilience, the effect sizes are significantly higher for women above the median literacy level. The collective evidence from these later studies decisively underscores that digital literacy gaps and agent distance constrain the full effect of DFS, arguing compellingly that targeted literacy training coupled with agent-network expansion yields the largest, most sustainable inclusion gains for rural women. Collectively, the empirical evidence leaves little doubt that financial literacy is the key for unlocking the benefits of financial access. Strategies focused solely on establishing accounts or increasing agent density are insufficient; to ensure active utilization, confidence, and subsequent empowerment, interventions must incorporate tailored training designed to enhance financial knowledge, attitude, and behavior among rural women.

2.2.2 Digital Finance on Financial Inclusion

Digital finance is a means of extending financial services to the financially excluded and undeserved population in the community like women (Yang et al., 2020). It facilitates payments via mobile devices which has been of great help to individuals, households and community at large in managing personal assets while at the same time providing more convenient access to finance and financial services thus greater

financial inclusion. In rural areas, digital finance plays a major role of improving peoples (low income and poor) access to basic financial services leading to greater financial inclusion.

Widarwati et al. (2022) investigated the effect of digital finance on financial inclusion on Indonesian Banking industry. Yearly data from the banking industry from the Indonesian Stock Exchange (IDX) 2013- 2019 with a sample of 6 banks were used. Digital finance was measured in terms of internet banking and mobile banking and the average digital finance (ADF) measurement was used to measure the internet and mobile banking transactions. Panel data regression model was employed to test the hypothesis. The findings revealed that digital finance impacts financial inclusion through digital financial services that facilitate access to financial services. Therefore, increasing and decreasing internet banking and mobile banking influence credit penetration.

Using cross-sectional microdata from Ghana, Koomson et al. (2021) analyzed a large rural women subsample and concluded that digital financial services adoption significantly increases the likelihood of formal financial inclusion, including formal account ownership and usage of formal savings, credit, and insurance products. Their findings indicated that these effects were strongest in areas where agent density was high, confirming that digital financial services primarily functions by reducing access frictions. Similarly, Batista and Vicente (2020) employed a randomized encouragement design involving over 1,500 rural households in Mozambique and found that facilitated access to mobile money significantly increases usage and formal financial engagement, particularly in secure transfers and savings, suggesting DFS acts as a nudging tool toward formalization. This finding is further corroborated by Gikunda and Gitau

(2021), whose cross-sectional survey of 800–1,200 rural women in Kenya used multivariate logistic regression to show that the intensity of mobile money use strongly predicts formal account ownership and active usage, especially among micro-entrepreneurs who leverage the digital platforms for business transactions.

A Randomized Controlled Trial (RCT) by Field et al. (2021) involving thousands of rural women workers in India demonstrated the causal impact of receiving direct digital wage payments into bank accounts. By measuring account activity and independent withdrawals, the researchers found that digital payments significantly increased women's active account use and formal savings, confirming that using digital financial services channels (bank-linked mobile features, ATMs) for income delivery enhances formal inclusion where physical agent or ATM access is provided. Parallel findings from a cluster RCT in Niger by Aker et al. (2019), which compared cash transfers to mobile money delivery for thousands of women beneficiaries, showed that mobile delivery increased women's savings and the frequency of formal-like financial behaviors. The study concluded that lower transaction costs and reduced time needed for cash-out correlated with greater subsequent engagement with other formal financial channels.

Jack and Suri (2018) utilized longitudinal data in Kenya and found that expanded mobile money access increases women's long-run participation in formal financial systems, with rural women realizing larger marginal gains as agent networks matured. This suggests that digital financial services infrastructure acts as a sustained driver of financial integration. Most recently, Rahman and Khatun (2024) conducted a rural-focused household survey in Bangladesh and found that digital financial inclusion substantially increases the probability of formal account use and savings among rural

women. They concluded that intensified mobile money use mediates these gains in formal inclusion and directly contributes to a higher capacity to cope with economic shocks, reinforcing the central role of digital financial services intensity in achieving sustained financial stability and welfare improvements. The evidence is consistent: digital financial services is not merely an alternative service but a functional prerequisite that catalyzes active, long-term participation in the formal financial economy for rural women.

More so, Kan and Sun (2022) investigated the impact of digital finance on innovation and research and development of technology. Financial data on technology based on SMEs on the growth enterprise market from 2013 – 2020 (China Growth Enterprise Market Listed Company data) was used. Fixed effect model was employed to test the impact of digital finance and financial flexibility on enterprise research and development investment from the external environment and the internal mechanisms. The findings revealed that digital finance through breadth of coverage, depth of use and degree of digitization has a positive impact on research and development investment of technological based SMEs.

Accordingly, Lakhouil and Segdali (2024) examined the impact of digital finance on financial inclusion in Morocco. The study adopted a quantitative methodology based on a sample of 454 individual bank customers. Data was analyzed using structural equation modelling to examine the relationship between digital finance and users' access, quality, use and financial wellbeing. The findings of the study revealed that digital finance significantly enhances user access and financial wellbeing facilitating financial inclusion. The study further highlights the importance of supporting financial innovation while ensuring consumer protection as well as inclusion of vulnerable

populations. Additionally, Durai and Stella (2019) sought to analyze the impact of digital finance in bringing about financial inclusion among people. Digital finance according to the study included internet banking, mobile banking, mobile wallets, credit and debit cards. Financial inclusion on the other hand included convenience, adaptability, affordability, security, user friendly, and accurate timing. Well-structured questionnaires with multiple choice and Likert scale questions were used to get data that was analyzed using one way ANOVA to compare means. The study findings revealed that digital finance has a significant impact on financial inclusion in as much as it has some negative issues like security and affordability.

Moreover, Ali and Alam (2024), using a Probit Regression Model on 400 women, established that mobile money adoption is significantly and positively related to women's financial inclusion, demonstrably improving saving habits and formal borrowing. In rural Bangladesh, Khandaker and Jahan (2023) used a mixed-methods approach with 320 women and concluded that DFS usage significantly increased women's financial inclusion and autonomy, enabling them to save securely, receive remittances directly, and manage household finances with less reliance on male relatives. These micro-level findings collectively illustrate that DFS acts as a tangible channel for secure transactions and independent financial management.

Morsy (2020) conducted an econometric analysis of Global Findex data from 141 countries and found that mobile money is a powerful tool for closing the gender gap in account ownership, particularly among the poor, less educated, and rural populations in developing economies. This large-scale evidence suggests that mobile money successfully lowers the entry barrier imposed by traditional banking on rural women,

significantly increasing the probability of a woman having a formal account at either a bank or mobile money provider.

Shen et al. (2018) analyzed the effect of financial literacy, digital financial product usage on financial inclusion using a cross-sectional research design on a sample of 218 individuals from different areas in China. Partial Least Squares (PLS) regression was employed to estimate the relationships. Questionnaires for measuring the different variables were used. Financial literacy variables included financial knowledge, financial skills, financial attitudes and ability to make sound judgements and decisions. These variables were measured based on education levels, income, commercial loans, credit card, shared and commercial insurance. Digital financial product usage was measured using internet consumer product, internet financial product, internet loan and crowdfunding. Financial inclusion was measured based on price inclusion, geographical inclusion and self-inclusion. The study suggested that improving financial literacy of residents and popularizing the internet usage can promote the usage of digital financial products and achieve the goal of advancing financial inclusion. The study considered digital financial product usage which is different from this study that will consider financial literacy, digital finance and financial inclusion.

Additionally, Amnas et al. (2023) explored the potential of financial technology to promote financial inclusion. The study sought to understand why people use FinTech and how it affects their access to financial services by taking into account the mediating role of digital financial literacy and the moderating effect of perceived regulatory support. The study used the partial least squares structural equation modelling (PLS-SEM) on a sample of 608 FinTech users in India. The research findings revealed that FinTech positively impacts financial inclusion making it easier for individuals to get

into formal financial services. The study also indicated that trust and perceived security concerns are essential in promoting the utilization of FinTech services.

Uzoma et al. (2020) used data from 27 sub-Saharan African countries to investigate the relationship between Digital Finance that was measured by the share of people using ATMs and Financial Inclusion that was measured by actual use and quality of financial services. The actual use of financial services was measured using deposit accounts in commercial banks for every 1000 adults while. The findings indicated that there is a positive association between digital finance and financial inclusion. Further, Siddik and Kabiraj (2020) examined the influence of Digital Finance on Financial inclusion using data on 189 countries from 2004 to 2016. The measure of digital finance in the study was usage of ATMs which will contribute significantly to this study.

Al-Smadi (2022) investigated the association between digital finance and financial inclusion in the Middle East and North Africa (MENA) region using secondary data from the World Development Indicators database and the International Monetary Fund's Financial Access Survey covering 189 countries. The study measured financial inclusion using access, availability and usage of financial services while digital finance was measured by the number of ATMs. The results of the study revealed that digital finance enhances access to, availability of and use of financial services in MENA region and overall financial level.

Ma (2022) on the other hand examined the effect of digital finance on economic development. The study employed data from 31 provinces in inland China from 2013 – 2021 which was obtained from Peking University China digital Financial Inclusion Index and China Statistical yearbook. A two way fixed effect model estimation and a

moderating effect analysis was used to determine whether digital finance affected economic development. The study noted that digital finance contributes to economic development by attracting foreign direct investment and optimizing the industrial structure.

Tiony (2023) used secondary data to examine the expansion of digital financial services in Kenya and their impact on financial inclusion. Digital financial services were measured using indicators like mobile money service uptake and usage of digital financial services. Financial inclusion was indicated by account ownership, use of financial services, credit availability and insurance coverage. Both regression and descriptive analysis of existing data was done and it was found that adoption of digital financial services especially mobile money platforms like Mpesa have grown substantially increasing access to banking services, formal savings and credit facilities. The operationalization of digital financial services as uptake of mobile service and usage of digital financial services contribute largely to this study.

The role of digital financial services, particularly mobile money, in promoting financial inclusion among rural women has become a central theme in recent development literature. These services are increasingly recognized as a potent mechanism for extending formal financial access by overcoming the acute geographical and institutional barriers traditionally faced by women in remote areas. Empirical studies confirm that digital financial services provide a direct channel for secure transactions, enabling enhanced autonomy and participation in the formal economy.[1]

However, the effectiveness of digital financial services is not uniform, and new barriers linked to infrastructure and capability have emerged. Banga and Tiwari (2021)

employed Binary Logistic Regression on 600 rural Indian households and identified that while access to digital infrastructure specifically smartphone ownership and network coverage and digital literacy are the most significant positive determinants of digital financial inclusion, a persistent gender gap remains. Rural women are less likely to be digitally included than men, despite the general availability of digital financial services. This suggests that while digital finance is a potent tool for inclusion, its full potential cannot be realized until the foundational challenges of access to necessary digital infrastructure and the uniform acquisition of digital literacy skills are comprehensively addressed across the gender divide in rural settings.

2.2.3 Financial Literacy and Digital Finance on Financial Inclusion

Digital finance provides the financial tools, while financial literacy provides the skill to effectively utilize that tools for sustained personal and household welfare gains. Asongu and Odhiambo (2019) performed country-panel Generalized Method of Moments (GMM) and Instrumental Variable (IV) estimation, spanning 2011 to 2017 across over 40 Sub-Saharan African (SSA) countries. Their macro-level analysis, which measured financial inclusion using gender-disaggregated indicators, found that the positive effect of mobile penetration on female financial inclusion is significantly larger where female financial literacy is higher. This effect was particularly pronounced in rural-dominant countries, suggesting that for widespread inclusion gains, policy must simultaneously address both infrastructure and knowledge deficits.

Focusing on Ghana, Koomson et al. (2020) utilized instrumental variable regression and endogenous treatment models on a subsample of over 3,000 rural women observations. They integrated digital finance use and financial capability measures into

an overall inclusion index, concluding that digital finance use strengthens the positive effect of financial literacy/capability on financial inclusion, ultimately reducing poverty and vulnerability. The authors emphasized that the combined presence of digital access and literacy yields the largest overall inclusion gains for rural women.

Iriobe, Akinyede, and Iriobe (2024), using Structural Equation Modeling on 210 women, explicitly found a substantial and beneficial direct relationship between financial literacy and financial inclusion. Crucially, the study model identified that financial inclusion partially mediates the relationship between financial literacy and women's economic empowerment (WEE). This sequence of findings indicates that financial literacy serves as the necessary prerequisite that enables engagement with the formal sector, and it is through this active engagement that women acquire the tools and autonomy required for measurable WEE.

Further Gikunda and Gitau (2021) sampled 600 rural women Self-Help Group (SHG) members in Kenya using multivariate logistic regression. Their findings, which included an interaction term for financial literacy and mobile-money usage, revealed that both variables independently raised the odds of formal financial inclusion, but the interaction was positive and significant, confirming that the benefits of mobile money are amplified when women possess prior financial knowledge, particularly if they have SHG participation and basic phone access. Similarly, Abor and Amidu (2022), studying 800 rural women microentrepreneurs in Ghana, found clear complementarity between literacy and digital financial services intensity. Women with higher literacy test scores extracted greater practical inclusion benefits from digital financial services, such as increased active saving and microinsurance uptake. Furthermore, they established that

exposure to training programs resulted in persistent positive effects on financial behavior six to twelve months post-intervention.

Koomson and Danquah (2021), using propensity score matching on a subsample of over 2,000 rural women in Ghana, demonstrated that while digital financial services use alone increases inclusion, the joint presence of digital financial services and above-median financial literacy effectively doubles the likelihood of active formal usage. They noted that network agents played a crucial role in alleviating distance constraints, thereby magnifying the effects even among less educated rural women. This finding is echoed by Rahman and Khatun (2024), who, using a two-wave panel survey and instrumental variables across 1,200 rural women in Bangladesh, found that the increase in formal inclusion driven by DFS adoption was 30–40% larger among financially literate women. They concluded that digital literacy gaps and distance to agents are the primary constraints on the full realization of DFS benefits. Critically, Koomson and Appiah (2023) extended the analysis to financial resilience among 4,500 rural women in West Africa, confirming that while digital inclusion improves formal engagement and the ability to cope with shocks, the effect sizes on both inclusion and resilience are significantly higher for women above the median literacy level. The evidence is conclusive: for the least literate women, the benefits of digital inclusion tend to plateau without the complementary provision of targeted capability training.

This finding resonates with the econometric analysis conducted by Banga and Mahajan (2021) among 400 rural women in India, which confirmed that while digital inclusion positively impacted proxies for women's empowerment such as decision-making power and control over income this beneficial effect was significantly stronger for women who possessed higher initial financial literacy. Literacy, in this context, acts as a

necessary moderator, enabling women to fully internalize and leverage digital access for personal gain.

Beyond simply maximizing the positive effects of digital access, digital financial services is shown to be a causal driver of behavioral change and increased financial autonomy. A rigorous Randomized Controlled Trial (RCT) conducted by Afridi, B., et al. (2025) in rural Pakistan demonstrated the causal pathway: the digital financial services training intervention substantially improved women's financial knowledge, digital confidence, and self-efficacy. This increase in capability directly led to increased usage of digital financial tools (specifically mobile wallet transactions) and better personal savings practices, thereby promoting genuine financial inclusion through enhanced self-determination. This shift toward autonomy is further supported by Singh and Sharma (2024), who, using Structural Equation Modeling (SEM) on 385 Indian women, established that Digital Financial Literacy significantly leads to better Financial Decision-Making (FDM), which, in turn, strongly influences women's intention toward investment. Digital financial literacy, therefore, moves women beyond basic transaction use, acting as a major facilitator for independent financial choices and the uptake of more sophisticated financial products.

Finally, digital financial literacy is linked directly to enhanced financial well-being and augmented household income. Li et al. (2024) analyzed a large sample of rural households in China and found that digital financial literacy has a significant income-increasing effect on rural residents. The mechanism analysis revealed that digital financial literacy achieves this outcome by augmenting income derived from financial assets, such as digital investments and credit. The study concluded that the benefits of digital credit and investment opportunities are especially pronounced in households

with higher initial financial literacy. Overall, the converging evidence highlights that digital financial literacy is the key complementary component: it enhances self-efficacy, enables independent decision-making, and ensures that the technical facility provided by digital finance is translated into sustained increases in financial well-being and income, thereby unlocking the full empowerment potential for rural women.

2.2.4 Rural Women Perspectives on Financial Inclusion

The empirical literature on rural women's financial inclusion presents a dual narrative. One of significant empowerment through digital access, and another of persistent limitations imposed by deep-seated structural and socio-cultural barriers. Recent studies highlight that while technological solutions like mobile money accelerate financial access, their effectiveness is fundamentally contingent on pre-existing financial capability and the dismantling of non-financial constraints.

Siddik and Zaman (2022) utilizing Structural Equation Modeling (SEM) with a sample of 280 rural women entrepreneurs in Bangladesh, identified that the perceived usefulness and perceived ease of use of Digital Financial Services (DFS) are the primary drivers for adoption. Crucially, they found that higher DFS adoption significantly contributed to enhanced financial management capabilities and a greater sense of perceived financial security. Extending this to broader empowerment outcomes, Banga and Mahajan (2021) conducted a quantitative econometric analysis of 400 rural women in India, measuring digital payment usage against decision-making power and control over income. The findings affirmed that digital financial inclusion, particularly mobile money, significantly and positively impacted women's decision-making power and control over their income within the household. However, the

positive effect was stronger only for women who possessed higher initial financial literacy, introducing the first layer of complexity to the digital solution.

Kumar and Raghavendra (2018) conducted a cross-sectional survey utilizing logistic regression and probit models among a sample of 540 rural Self-Help Group (SHG) women in Karnataka, India. Measuring account ownership, usage frequency, and savings behavior, their findings highlighted that individual factors such as education and mobile phone ownership significantly increased the odds of active account use. Importantly, they found that social intermediation provided by SHG tenure helped convert mere access into consistent usage, while low digital literacy and physical distance to banks remained primary barriers. Building on this, Doss, Meinzen-Dick, Quisumbing, and Theis (2019) utilized multi-country household surveys, analyzing data from approximately 2,500 households across Ethiopia, Malawi, and Nigeria to study gender and financial inclusion within agricultural contexts. The multivariate analysis, measuring individual account ownership and control over income, confirmed that women's individual account ownership lagged men's, but observed that mobile money was effective in narrowing these gaps in areas with dense agent networks. A key finding was that existing mobility constraints and lower phone ownership suppressed usage, even when access was technically available, underscoring systemic gender-based obstacles.

Koomson et al. (2020) examined the relationship between financial inclusion and poverty among 2,093 rural women in Ghana using propensity score matching and endogenous treatment regression on household survey data. By measuring formal and informal account ownership and correlating it with multidimensional poverty indices, they concluded that financial inclusion substantially reduces the likelihood and

intensity of multidimensional poverty among rural women, with the strongest effects channeled through savings and mobile money rather than formal credit. Extending the analysis to intra-household dynamics, Barboni and Field (2021) employed a robust Randomized Controlled Trial (RCT) design with 3,000 rural married women in Bangladesh. Their study measured the impact of providing private mobile money accounts and training on savings balances, expenditure control, and remittance receipt privacy.

The results causally demonstrated that offering private accounts increased women's private savings and perceived control over household expenditures, while reducing the leakage of remittances to other household members, thereby improving their agency and emergency resilience. The enduring impact of digital expansion was further documented by Jack and Suri (2022), who used panel data and a difference-in-differences approach to study the gendered effects of M-PESA agent expansion in rural Kenya across approximately 1,500 households. They found that increased agent density was longitudinally associated with higher women's labor-market participation and non-farm enterprise formation, showing that the gains from Digital financial services translated directly into economic empowerment, particularly for women with personal phone access.

Despite evidence of positive impact, more recent research continued to highlight persistent and nuanced barriers to full inclusion. Agyekum et al. (2021) used a mixed-methods approach, surveying 402 rural women micro-entrepreneurs in Northern Ghana and conducting eight focus group discussions. Their findings indicated that while DFS helped with basic payments and savings, traditional barriers like collateral requirements, distance/transport costs, and documentation remained the top obstacles

for accessing formal credit products. The study also noted the critical role of social capital within Village Savings and Loan Associations (VSLA) in fostering savings discipline.

The necessity of complementary factors was reinforced by Chirwa and Manjolo (2023), who surveyed 1,146 rural women smallholder farmers in Malawi. Their cross-sectional analysis found that while handset ownership and trust in the system were positively associated with adoption, the influence of peer effects and social network influence was paramount. Finally, the most recent study by Rahman and Khatun (2024), using instrumental variables (2SLS) on a sample of 2,780 rural women in Bangladesh, provided causal evidence that active DFS use (beyond just ownership) improves women's household decision-making power and is associated with better child nutrition outcomes. Crucially, their findings stressed that training and agent reliability are indispensable complements to technology, ensuring effective and beneficial usage.

While digital financial services offer technical access, several studies underscore the persistence of non-financial barriers that convert mere access into limited usage. Adegbite and Machethe (2020) employed a Mixed-Methods approach, combining a survey of 350 rural women and Focus Group Discussions (FGDs) in South Africa to map out barriers to inclusion. The study conclusively found that socio-cultural factors such as lack of independent control over finances, patriarchal decision-making, and male guardianship over property ere the most significant barriers to both accessing and actively using formal financial services.

This institutional constraint is reinforced by the qualitative synthesis of household and community studies across Africa and Asia conducted by Djurfeldt, Dzanku, and Isinika

(2018). The synthesis highlighted that gender biases and patriarchal systems severely limit rural women's access to credit and agricultural inputs, regardless of their engagement in high-value economic activities. The authors concluded that many financial inclusion efforts are often gender-blind and fail to address the underlying structural inequalities in asset ownership necessary for securing credit.

Ozturk and Topal (2019) utilized Probit and Logit regression analysis on a sample of 512 rural women participants in microcredit programs in Turkey to determine the predictors of financial access and usage. They found that while low education and distance to banking services were significant deterrents, participation in social networks (such as Microcredit or Self-Help Groups) was the strongest positive predictor of formal financial access and usage. This emphasizes the necessity of community-based and mobile solutions that leverage social capital to overcome physical and informational barriers. Collectively, the evidence suggests that full financial inclusion requires interventions that are not only technologically enabled but also culturally informed, with financial literacy and social support systems designed specifically to navigate and mitigate existing socio-cultural and institutional inequalities.

2.3 Research Gaps

With Despite the growing body of literature on financial inclusion, a comprehensive examination of the factors influencing financial inclusion among rural women in Kenya remains critically underexplored. This study addresses several key gaps in existing research, providing a more holistic and contextually relevant understanding of the challenges and opportunities for this demographic.

2.3.1 Contextual Gaps

The existing body of literature, while confirming the strong synergistic relationship between financial literacy and digital finance across Africa, exhibits a significant contextual gap concerning the specific challenges and behaviors of rural women in Kenya. This demographic is numerically vital, constituting 60% of the rural population where the financial exclusion rate remains high at 12.6%. These women are central agents in local economies, yet their distinct financial needs and behaviors have been largely overlooked in favor of broader regional or national analyses.

While the most comprehensive micro-level evidence related to Kenya comes from studies focusing on the longitudinal impact of M-PESA agent density (Jack & Suri, 2018; 2022) and the interaction effects observed within Self-Help Groups (SHGs) (Gikunda & Gitau, 2021), this concentration is problematic. Firstly, this narrow scope offers limited insight into the financial behaviors of rural women who are not affiliated with SHGs or microcredit programs, thereby excluding a large, less-organized segment of the excluded population.

Crucially, however, the digital finance context in Kenya is now highly specific and complex due to the rapid proliferation of high-interest digital credit products (e.g., Fuliza, Tala). The current literature focuses overwhelmingly on the positive outcomes related to savings, remittances, and enterprise formation, but severely lacks a detailed contextual analysis of how the complementary roles of financial literacy and digital access specifically influence debt management, over-indebtedness, and the safe use of these high-interest digital loan products among rural Kenyan women. Given the risks associated with rapid digital lending, understanding how financial and digital literacy mitigate these dangers is paramount. Therefore, this thesis aims to integrate the specific

local financial product landscape into the investigation of literacy and usage among rural women.

2.3.2 Knowledge Gaps

While the macro-level necessity of synergy between literacy and digital access is well established across Sub-Saharan Africa (SSA) (Asongu & Odhiambo, 2019; Koomson et al., 2020), a significant knowledge gap persists in the precise measurement and theoretical separation of the underlying mechanisms. The existing literature consistently confirms that the positive effects of Digital Financial Services are amplified by Financial Literacy, but it often fails to provide a nuanced understanding of *how* these two factors intersect to shape financial behavior and drive inclusion for specific populations like rural Kenyan women.

A critical issue is the conflation of Financial Literacy and Digital Finance. Financial literacy encompasses general knowledge of budgeting, interest, and inflation, while digital finance relates specifically to digital security, mobile PIN management, and safe transaction processes. Many studies either combine these two concepts or use inadequate proxies for digital competence, such as simple mobile phone ownership. Consequently, the specific mechanism through which digital finance, operating independently of general financial literacy, mediates or moderates the decision to actively and safely use a mobile wallet over a physical bank account in rural Kenya remains weakly understood.

Furthermore, empirical studies have yet to rigorously quantify the conditional effects within the Kenyan context. While Rahman and Khatun (2024) successfully quantified the amplified magnitude of DFS benefits for literate women in Bangladesh (finding a

30–40% increase in inclusion gains), a similar rigorous quantification of this conditional effect, specifically distinguishing between the impact of financial literacy and digital finance, is urgently needed for rural Kenya. Addressing this gap will provide policymakers with clear targets for training interventions, ensuring resources are directed toward the most influential form of literacy required for beneficial digital finance adoption.

2.3.4 Theoretical Gaps

The theoretical landscape surrounding financial inclusion suffers from a critical fragmentation, often examining Financial Literacy and Digital finnace as isolated variables influencing inclusion (e.g., Salvatore, 2018; Ozili, 2018). While this approach establishes basic correlations, the theoretical gap lies in the absence of a comprehensive, integrated model that accounts for the complex interplay between capability, technology, and cultural context.

The existing frameworks, such as the basic Technology Acceptance Model (TAM), fail to explain how a woman's knowledge actually translates technical access into behavioral change within a restrictive social environment. Empirical evidence from South Africa (Adegbite & Machethe, 2020) and qualitative syntheses (Djurfeldt et al., 2018) consistently show that socio-cultural constraints like patriarchal control over assets and limited female mobility are the most significant non-financial barriers. Current theoretical models treat these norms as exogenous control variables, thereby failing to explore how they endogenously interact with Digital Financial Literacy (DFL) and DFS adoption.

Consequently, the core theoretical gap is the absence of an Integrated Socio-Technical-Capability Model tailored to the rural Kenyan context. This research needs to move beyond simple correlation and explicitly theorize the synergistic effect: how an increase in a woman's DFL allows her to negotiate, mitigate, or circumvent existing patriarchal control structures. For example, securing a private mobile PIN to maintain control over private savings or remittances (as demonstrated in the Bangladesh RCT by Barboni & Field, 2021) is a socio-technical outcome. By focusing on this mechanism, the thesis will provide a more robust theoretical foundation for future research, effectively translating technological access and capability into sustained behavioral change and measurable autonomy within the household.

2.3.4 Empirical Gaps

Empirically, the literature exhibits a critical gap in providing causal evidence regarding the dual influence of Financial Literacy and Digital finance on financial inclusion and empowerment outcomes, particularly within the target population of rural Kenyan women. While cross-sectional studies in Kenya have established strong correlations between mobile money usage, SHG participation, and formal account adoption (Gikunda & Gitau, 2021; Jack & Suri, 2022), they are inherently limited in demonstrating a causal link.

The empirical rigor observed in studies from other contexts, such as Ghana and Bangladesh, which have utilized sophisticated techniques like Instrumental Variables (IV) (Koomson et al., 2020; Rahman & Khatun, 2024) and Randomized Controlled Trials (RCTs) (Barboni & Field, 2021), is largely absent in the recent Kenyan-focused literature. Specifically, there is a distinct lack of recent RCTs in Kenya that target DFL

training and measure its causal impact on DFS usage, risk management (like digital credit default rates), and subsequent formal inclusion among a broad rural cohort.

Therefore, the existing empirical data on rural Kenyan women are largely descriptive or correlational. This study is mandated to address this empirical vacuum by employing a robust methodological design capable of providing concrete, causal evidence that will clearly demonstrate *how* and *to what extent* the synergistic effect of financial literacy and digital finance operates in the specific context of rural Kenya, thus forming a strong evidence base for effective policy formulation.

2.3.5 Methodological Gaps

A significant methodological gap characterizes the existing literature on financial inclusion in rural Kenya. The majority of studies rely on singular, quantitative approaches, primarily employing cross-sectional surveys analyzed via techniques such as multivariate logistic regression or Partial Least Squares Structural Equation Modeling (PLS-SEM). While these methods are effective for establishing prediction and correlation, they are inherently limited in their capacity to demonstrate causality or to capture the complex nuances of the adoption and usage process.

Specifically, the current methodological focus often fails to account for the crucial interplay and synergistic effect between financial literacy and digital finance in a holistic manner. To address the theoretical and empirical complexity of this subject especially the interaction of individual capability with socio-cultural barriers and high-risk digital credit products the thesis utilizes both the PLS-SEM and Chi-Square test of independence to confirm the relationship that exists among the variables.

2.4 Conceptual Framework

This study examines the influence of financial literacy aspects like financial knowledge, financial behavior, and financial awareness as well as digital finance aspects like digital payment systems and the use of digital financial services on financial inclusion of rural women in Kenya. The dependent variable in this study is financial inclusion while the independent variables are financial literacy and digital finance.

The study adopted and modified the conception framework from Bire et al. (2019) study that examined the effect of financial literacy towards financial inclusion through financial training. The relationship among the variables is as shown in Figure 2.1

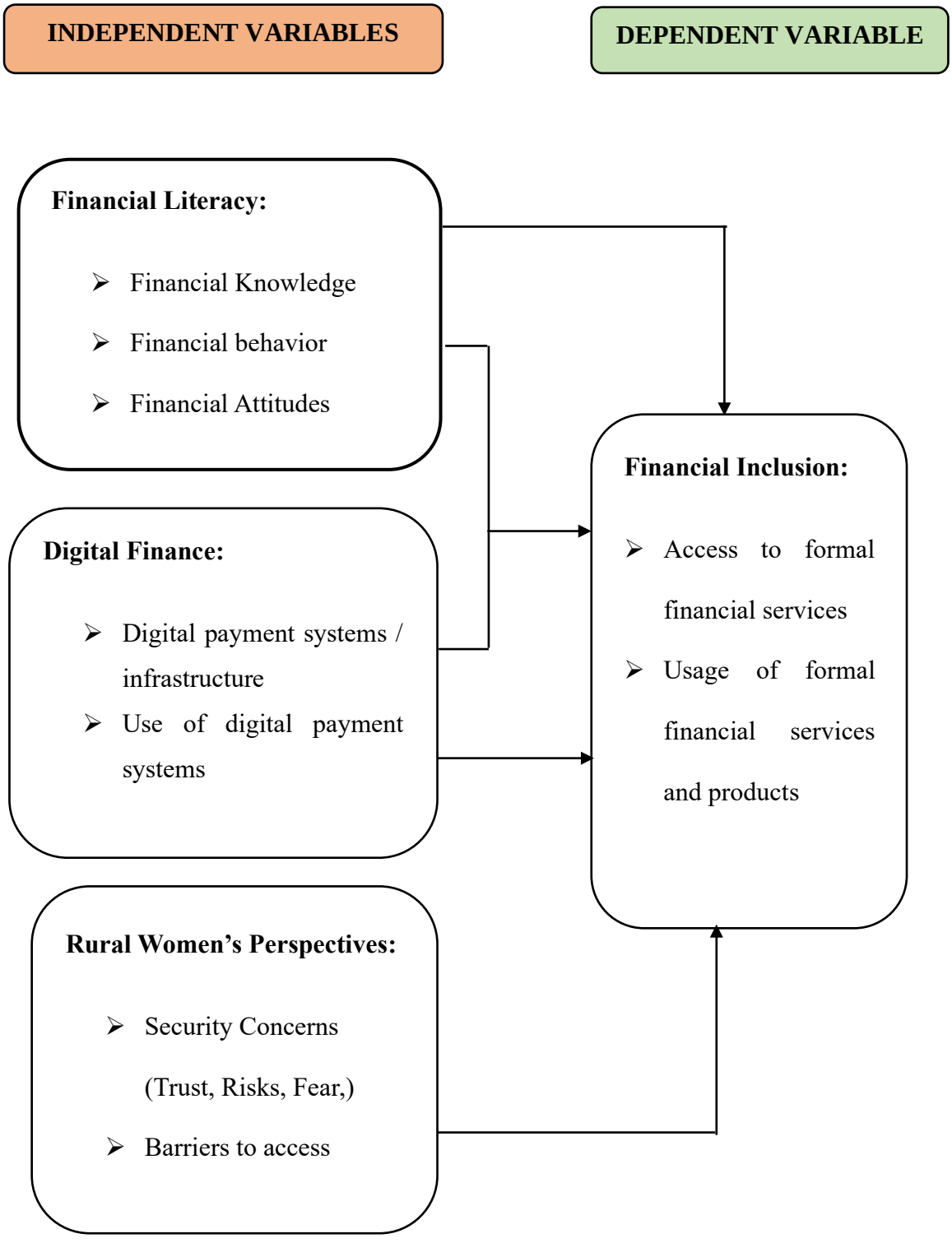


Figure 2.1 Conceptual Framework

From the conceptual framework (Figure 2.1), financial literacy which is measured through financial knowledge, financial behavior and financial attitudes serves as a

driver of financial inclusion. It equips individuals with the knowledge and skills necessary to understand and effectively use formal financial products and services. Therefore, a higher level of financial literacy is expected to directly contribute to increased access and usage of formal financial services. Rural women who understand financial products and services are more likely to seek them out, utilize them effectively, and make informed financial decisions.

Additionally, digital finance which is measured by digital payment systems, and the use of digital systems acts as a facilitator of financial inclusion. The availability and use of digital payment systems and infrastructure are crucial for expanding access to and usage of formal financial services in rural areas promoting financial inclusion among rural women. Digital finance reduces barriers to distance, time and cost making financial services more accessible for rural women.

When combined, financial literacy and digital finance address the structural and knowledge-based barriers to financial inclusion. Financial literacy equips rural women with the knowledge and skills necessary to understand and effectively use financial products and services. Digital finance on the other hand builds on financial literacy by providing the tools and that enable rural women to access and use financial services. Without adequate financial literacy, individuals may struggle to navigate or trust digital finance systems. Therefore, financial literacy is a prerequisite for engaging with digital finance and eventually achieving financial inclusion.

Financial Inclusion as measured by access to and usage of formal financial services is the ultimate goal of the conceptual framework. It represents the extent to which rural

women, can access and use formal financial services. Financial literacy and digital finance are critical enablers of financial inclusion.

Finally, rural women's perspectives as a robust test highlights specific challenges like security concerns (trust, fear of fraud) associated with financial and digital services and barriers to access like low financial literacy that limit rural women’s ability to engage with financial and digital services.

In conclusion, the conceptual framework illustrates a pathway where financial literacy and digital finance act as enablers of financial inclusion, while rural women's perspectives provide critical insights into the barriers and challenges that must be addressed to achieve equitable financial inclusion. The conceptual framework shows how financial literacy, digital finance, and rural women's perspectives interact to influence financial inclusion: Therefore, a holistic approach is needed to improve financial inclusion among rural women. It's not enough to simply provide financial literacy or digital finance, it's also essential to understand and address the specific barriers and concerns faced by rural women.

2.5 Summary of the Study

This chapter is dedicated to establishing the conceptual and empirical foundation for the thesis. It commences by delineating the theoretical bedrock of the study, specifically exploring how financial literacy theory, diffusion of innovation theory, social learning theory, and the vulnerable group theory inform the relationships between the dependent and independent variables. Following this, the chapter systematically conceptualizes the core constructs financial literacy, digital finance, and financial inclusion paying particular attention to integrating the perspectives of rural women. An extensive

empirical review is subsequently conducted on studies focused on rural women's financial inclusion in Kenya, with a focus on synthesizing the established measurements, methodologies, and documented findings. Crucially, this comprehensive synthesis is leveraged to precisely define the unaddressed research gap: the moderating or mediating role of the interaction between financial literacy and digital finance on the financial inclusion outcomes for rural women in Kenya, thereby articulating the study's unique contribution to the existing body of knowledge.

2.6 Definition and Measurement of Study Variables

The study variables are operationalized based on literature. Table 2.2 outlines the variables, the relevant measures and their corresponding operational indicators.

Table 2.1: Definition and Measurement of Variables

Variable	Nature	Indicator	Measure	Theory	Question
Financial Literacy	Independent Variable	• Financial knowledge of financial concepts (Interests, inflation, risk diversification, saving) • Awareness of financial products (Insurance, credit) • Financial behavior (Budgeting, Saving, financial planning)	• Financial literacy was measured by computing an aggregate score on financial knowledge (7 questions), financial behavior (9 questions) and financial attitude (5 statements). • Financial literacy score will be computed with values between 0 – 21.	Financial Literacy Theory	PART B
Digital Finance	Independent Variable	• Digital payment systems (Mobile money, ATM, Internet) • Use of digital services (Credit, saving, insurance)	• Measured by computing a digital finance score on Digital payment systems (5 Questions) and Usage of digital payment services (7 questions). • Digital finance score will be computed with values between 0 - 12	Diffusion of Innovation Theory	PART C
Financial Inclusion	Dependent Variable	• Access to financial services (Formal identification, account ownership) • Usage of financial services and products (mobile money transfers, deposits, withdrawal, remittances, duration & regularity of use)	• Financial inclusion was measured by computing a financial inclusion level index where rural women were categorized as displaying either of the 3 levels (0-3 low; 4-6 medium and 7-10 high).	Financial Literacy Theory, Social Learning Theory & Diffusion of Innovation Theory	PART D
Rural Women Perspectives	Independent Variable	• Barriers to access (low financial Literacy) • Security Concerns (fear, fraud)	• Rural women perspectives were measured by computing an average score of responses to 6 questions on barriers to access, and security concerns.	Vulnerable Group Theory & Socia Learning Theory	PART E

CHAPTER THREE
METHODOLOGY

3.0 Introduction

This chapter describes the methodology that was employed to achieve the objectives stated in chapter one. The chapter is organized in different sections covering the research philosophy, research design, sampling, data collection procedures, research instruments, reliability and validity of instruments, data analysis and ethical considerations

3.1 Research Philosophy

Research philosophy refers to the approach used in data collection, analysis, interpretation and use of information to solve an identified research problem (Easter – Smith *et al.,* 2013). According to Galliers (1991), two research philosophies exists; positivism and interpretivism. Positivists believe that in reality, every phenomenon can be observed and described objectively while interpretivists believe that most phenomena are interpreted subjectively depending on the situation.

The study adopted a positivist research philosophy because it aimed to empirically establish the relationships between specific, measurable variables: financial literacy, digital finance, and financial inclusion. This approach aligns with positivism's core tenets, which emphasize objective observation, quantitative data, and the search for cause-and-effect relationships.

The choice of a positivist research philosophy for this study is grounded in its central objective: to systematically investigate and empirically validate the relationships between financial literacy, digital finance, and financial inclusion. Positivism, as a philosophical stance, posits that knowledge is derived from sensory experience and can

be empirically verified through scientific methods (Creswell & Creswell, 2018). This approach is inherently linked to quantitative research, where phenomena are measured, and statistical analysis is used to test hypotheses and establish generalizable laws or relationships.

As Galliers (1991) notes, a key characteristic of positivism is its focus on generating findings that are objective and can be replicated by other researchers. In this study, the variables—financial literacy, digital finance, and financial inclusion—are defined and operationalized in a way that allows for their measurement. Financial literacy, for example, is assessed through a series of questions that gauge knowledge, skills, and attitudes, while digital finance can be measured by the frequency and type of digital financial services used. Financial inclusion is similarly quantifiable through metrics like access to and usage of formal financial products. By converting these complex social concepts into measurable variables, the study adheres to the scientific method central to positivism.

3.2 Research Design

The study examined the relationship between financial literacy, digital finance and financial inclusion among rural women in Kenya using the descriptive cross sectional research design. The cross-sectional nature of the study aimed at finding out the relationship between the variables in the year 2024.

The descriptive cross-sectional research design is highly appropriate for this study since it is particularly well-suited for collecting data on multiple variables at a single point in time, providing a snapshot of the current state of affairs (Saunders et al., 2019). Additionally, the study adopted the descriptive cross-sectional design because it allows

for the simultaneous collection of data on financial literacy levels, the use of digital finance tools, and the state of financial inclusion providing a practical and cost-effective way to capture the current landscape of financial behaviors and outcomes among rural women (Creswell & Creswell, 2018).

This design allows for the determination of the prevalence of certain characteristics among rural women. For instance, it helped determine what percentage of rural women in Kenya possess a high level of financial literacy, what proportion actively use mobile money services, and what percentage have access to formal banking products. Zheng et al. (2020) on financial inclusion in China used a cross-sectional design to assess the current state of financial inclusion and its determinants. The study collected data from a large, diverse sample at one point in time to analyze the relationships between digital financial services and financial inclusion.

3.3 Target Population

According to the National Gender and Equality Commission (NGEC, 2021), a majority of women, approximately 13.1 million live in rural areas. The target population for this study is 13.1 million rural women of Kenya. Agbo and Isa (2017) define a rural woman as one who is within the productive age, is living and has settled in the rural area, and has developed a livelihood in the village. Rural women are active agents of economic and social change though they are constrained and limited in terms of access to education, job opportunities, health care and credit access (World Bank Group, 2021). However, despite the challenges, rural women play a crucial role in supporting their households and communities at large to generate income, achieve security and improve their overall wellbeing.

3.4 Sampling

3.4.1 Sampling Technique

The sampling frame for the study was developed by demarcating Kenya into 8 regions following the previous provincial administrative system so as to capture inclusivity. These regions included; Western, Nairobi, Nyanza, Eastern, Central, Coastal, North Eastern and Rift Valley. Seven (7) of these regions excluding Nairobi that is purely urban were considered for the study since they displayed high degrees of rural representation. A total of seven counties one from each of the 7 regions namely Migori, Bungoma, Meru, Nyandarua, Narok, Kwale and Garissa Counties were purposively sampled given that they displayed high degree of financial exclusivity among women (FinAccess, 2022).

Accordingly, approximately, 10% of the population in these selected counties live in the urban areas while 90% live in the rural areas (Census, 2019). Figure 3.1 and Table 3.1 show the sample frame.

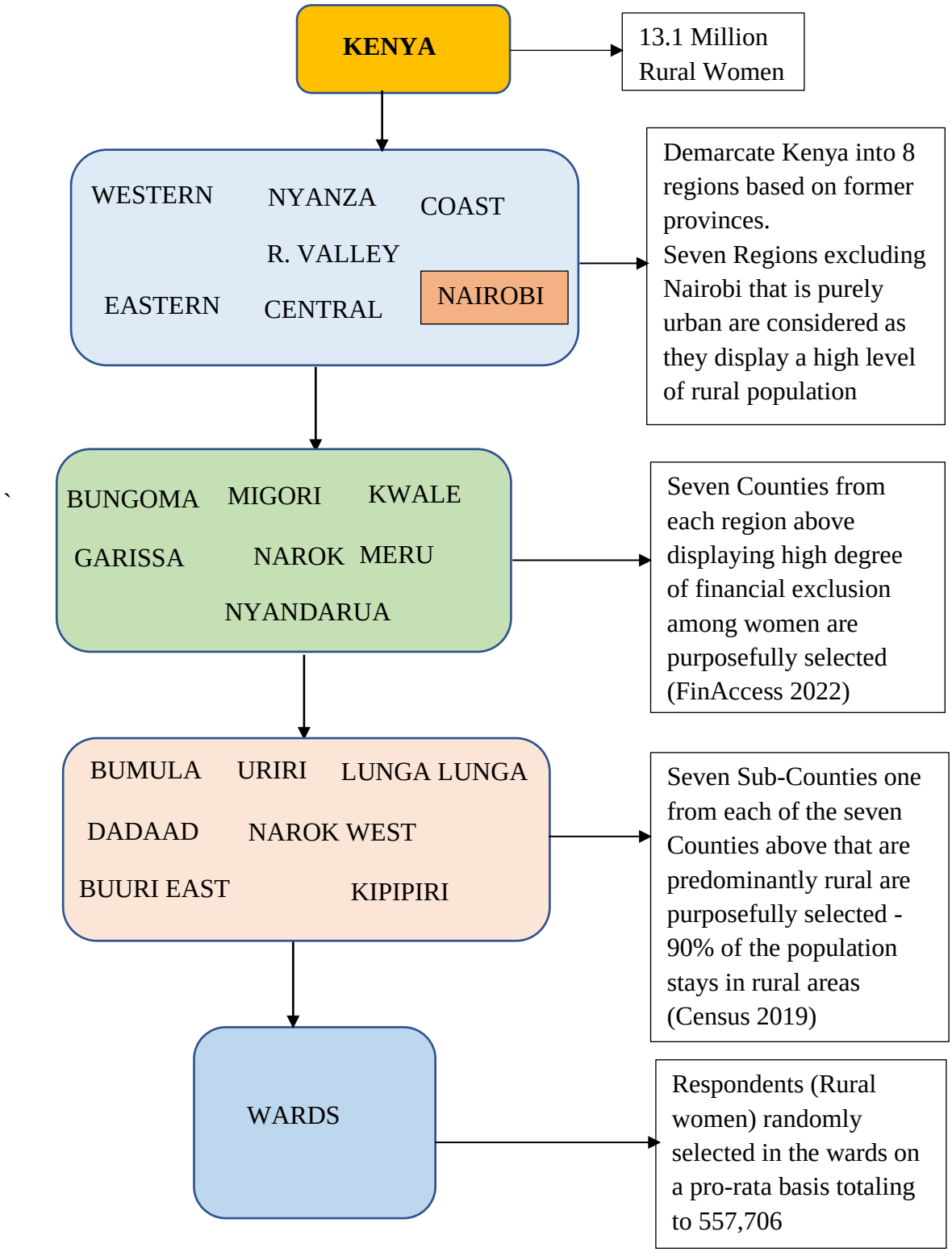


Figure 3.1 Sampling Procedure

Table 3.1: Sampling Frame

Region	Total Population	Female Population	Sub County	Female Population
Nyanza/Migori	1,116,436	580,214	Uriri	73,318
Western/Bungoma	1,670,570	858,570	Bumula	112,523
Eastern/Meru	1,545,714	777,975	Buuri	38,497
Central/Nyandarua	638,289	323,247	Kipipiri	47,740
Rift Valley/Narok	1,157,873	578,805	Narok West	98,198
Coastal/Kwale	866,820	441,681	Lunga Lunga	101,245
North Eastern/Garissa	841,353	382,344	Dadaab	86,185

Source: Survey Data (2024)

Based on the sample frame, one subcounty that is purely rural in each of these counties was purposively selected as it provided rich information that contributed positively to this study. Rural women were then randomly selected from the wards in each of the selected sub counties. Wards in town or urban centers were not part of the study.

3.4.2 Sampling Size Determination

To get a sample size that is a good representation of rural women in Kenya, the OECD/INFE toolkit for measuring financial literacy and financial inclusion suggest that a minimum sample size of 1,000 adult respondents is sufficient (OECD/INFE, 2022). Additionally, various related studies on financial literacy and financial inclusion including studies by Askar et al. (2020); Salvatore et al. (2018); Breitbach and Walstand (2022) and Koomson et al. (2012) used samples of over 1000 respondents. This therefore informed the 1000 sample size for this study which was distributed across the selected regions in proportion to the population as shown in Table 3.2.

Probability proportionate to population size was adopted to allocate the sample across the selected regions as shown in Table 3.2. Rural women were then randomly selected from the wards in the sampled sub counties.

Table 3.2: Sample Size

Region	Sub County	Sample Space (Female Population)	Sample Size
Nyanza	Uriri	73,318	13% = 130
Western	Bumula	112,523	20% = 200
Eastern	Buuri	38,497	7% = 70
Central	Kipipiri	47,740	9% = 90
Rift Valley	Narok West	98,198	18% = 180
Coastal	Lunga Lunga	101,245	18% = 180
North Eastern	Dadaab	86,185	15% = 150
		557,706	1000

3.5 Data Collection Instruments

The data for this study was collected using structured questionnaires adopted from the OECD/INFE Survey Toolkit (2022), Global Findex database (2021) and the FinAccess Household Survey Report (2022) questionnaires that were developed and modified to capture relevant information on financial literacy, digital finance and financial inclusion of the respondents. The questionnaire was then fed into the data collection software known as the KoboToolbox that would make reading out the questionnaire to the randomly selected rural women easy while at the same time giving instant feedback (Adebayo et al., 2022).

KoBoToolbox was selected as the primary data collection tool for this study due to its demonstrated effectiveness in similar Kenyan contexts. For instance, the Siaya County Spatial Planning Project reported that more than 95% of its socio-economic data was successfully collected within two weeks using enumerators' own mobile devices in a

fully paperless and offline-capable workflow (Research and Innovation Centre [RIC], 2017). Likewise, Nuru Kenya employed KoBoToolbox in its 2022 dairy program impact assessment, highlighting its advantages in enabling real-time monitoring and facilitating ease of use by local enumerators (Nuru Kenya, 2022). These examples illustrate that KoBoToolbox is not only adaptable to rural settings but also mitigates common logistical challenges such as unreliable internet connectivity, delays in data entry, and inefficiencies associated with paper-based surveys. Its proven capacity for efficient, reliable, and scalable data collection in rural Kenya provides strong justification for its adoption in the present study.

3.6 Data Collection Procedure

In preparation for data collection, the researcher sent out an advertisement seeking to recruit enumerators / research assistants for the study. The criteria for research assistants were; have a smart phone, be from the study area, speaks English, Kiswahili and the local language. This criterion was important as it helped to address language barrier problem as translation of questions into the local language was required.

After the interviews, fourteen (14) enumerators and two (2) supervisors were selected and thoroughly trained on data collection procedures that included reviewing the questionnaire, the criteria for sampling the rural woman and the administration of the questionnaire using the KoboToolbox software to collect primary data.

The study used KoboToolbox for data collection because it is a powerful, free, and open-source tool for data collection and analysis, making it particularly well-suited for this research. Additionally, the tool has the ability to collect data offline which was a significant advantage since the study required data from rural areas where internet

connectivity is unreliable or nonexistent. Therefore, it was easy for the enumerators to complete forms on their mobile devices without requiring live connection, the data is stored and later synched when they have internet connectivity.

KoboToolbox was also appropriate for the study because of its user-friendly interface that simplified the creation of complex questionnaires. The tool offers a platform that supports different allowing for capturing a wide range of information. The platform also provides skip logic, cascading questions, and validation rules ensuring the quality of data at the point of collection which reduces post collection cleaning.

Finally, because of its ability to collect for real-time data, instant monitoring and management, the tool was appropriate for this study as it required information from across the country. Through the tool, data is submitted and is available on the server allowing for closer monitoring while at the same time identifying any issues. Adebayo et al. (2022) employed KoboToolbox to collect household data, citing its efficiency and offline functionality as critical to the study's success.

To ascertain whether the required regions were actually visited, the supervisors monitored the data collection exercise on a daily basis and at the same time the software recorded the actual GPS co-ordinates of location as the data was submitted. The questionnaires were read out aloud by the enumerators and the respondents responses filled in the KoboToolbox software that automatically submitted at the end of the interviews.

3.7 Data Processing and Analysis

The data collected from the field, was cleaned and coded. Normality, autocorrelation and heteroscedasticity tests were carried out to detect existence of any econometric

problem. The researcher then carried out descriptive statistics to summarize the data collected and describe the relationships that existed between financial literacy, digital finance and financial inclusion.

The study employed the Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS 4 software for analyzing the data.

To confirm the results, the study further carried out Chi – Square test of independence on all the objectives to examine whether the study variables had statically significant associations. All statistical tests were conducted at a significance level α=0.05 and α=0.01.

3.7.1 PLS – SEM Model

Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to analyze data for this study. The selection of PLS-SEM is justified due to its resilience against different statistical assumptions like normality and its ability to handle complex models (Sarstedt et al., 2022) like the relationship between financial literacy, digital finance, and financial inclusion with multiple interconnected constructs. The PLS-SEM effectively manages multiple dependent and independent variables simultaneously, capturing both direct and indirect effects.

Additionally, the PLS-SEM is appropriate as it performs efficiently with both large and relatively small sample sizes (Sarstedt et al., 2022). Additionally, PLS-SEM was chosen for this study over other statistical methods is because it is a variance-based approach, meaning its main goal is to maximize the explained variance (R2) of the dependent variable(s) (Hair et al., 2017). This is particularly relevant for this study, which seeks to predict and explain the factors influencing financial inclusion among

rural women. PLS-SEM is also very predictive in nature which makes it suitable for this study that aimed at understanding the extent to which financial literacy and digital finance can predict and explain the level of financial inclusion. PLS-SEM's robustness to non-normal data makes it a reliable choice for this research.

PLS-SEM is well-suited for models that involve formative constructs or higher-order constructs (Hair et al., 2019). It can handle complex models with multiple latent variables and their indicators more effectively, making it a powerful tool for a study with constructs like financial literacy and financial inclusion, which are often measured by multiple items. The method's ability to simultaneously estimate the measurement and structural models provides a comprehensive and efficient way to analyze the hypothesized relationships.

The use of the PLS-SEM model for this study was informed by Mohsin et al. (2024) study that effectively used the structural equation model to analyze the relationship among financial literacy, digital financial services and economic empowerment among women as well as Shen et al. (2018) study that utilized the Partial Least Square method to estimate a formative model that analyzed the effect of financial literacy, digital financial product usage, internet usage on financial inclusion in China.

Amnas et al. (2024) also used the Partial least Squares Structural Equation Modeling (PLS – SEM) for exploring the potential of FinTech to promote Financial Inclusion. Zheng et al. (2020) also used PLS-SEM to examine the role of digital financial inclusion in promoting financial inclusion in China, citing its suitability for analyzing complex relationships and its predictive capabilities. The study's findings highlighted the significant mediating role of digital literacy in the relationship between FinTech and

financial inclusion, a finding that was made possible through PLS-SEM's ability to handle mediating effects.

This study therefore, made use of the partial least squares structural equation modelling technique as proposed by Wold (1982), using the suggested equations for analysis. According to Wold (1982) PLS-SEM analysis and interpretation is effectively carried out using both the structural and measurement models as per the following steps.

1. Develop the Structural / Inner model Equation

$$\xi = B\,\xi + \Gamma\,\eta + \zeta \qquad (1)$$

where;

ξ = is the endogenous latent variable (Dependent).

η = is the exogenous latent variables (Independent).

B = is path coefficients among endogenous latent

Γ is path coefficients from the exogenous to the endogenous latent

ζ is a vector of structural disturbances (residuals).

2. Develop the Measurement / Outer Model Equation

$$LV\_j = \Sigma\_k\, w\_\{jk\}\backslash,x\_\{jk\} + \delta\_j \qquad (2)$$

Where;

$LV_{(j)}$ – the j-th latent variable (construct)

x_{jk} – the k-th observed indicator that helps “form” that latent.

w_{jk} – the weight (regression coefficient) attached to indicator k within latent j.

Σ_k – "add up the weighted indicators".

3. Construct the PLS weights
4. Feed the weights into the structural model and interpret.

Based on this understanding, the study then developed the following equation for analyzing the influence of financial literacy, digital finance and financial inclusion of rural women in Kenya. The interpretation was based on structural and measurement models.

1. The structural (inner) model equation;

$$FI = \beta_1 \cdot FL + \beta_2 \cdot DF + \zeta \quad (1)$$

Where;

FI = Dependent variable (Financial Inclusion)

FL and DF = Independent Variables (Financial literacy and Digital Finance)

β_1 and β_2 are the path coefficients

ζ is the structural residual

2. For the measurement (Outer Model) the following equations were used

Financial Literacy

$$x_1 = \lambda_1 \cdot FL + \varepsilon_1$$

$$x_2 = \lambda_2 \cdot FL + \varepsilon_2$$

$$x_3 = \lambda_3 \cdot FL + \varepsilon_3 \quad (2a)$$

Digital Finance

$$x_4 = \lambda_4 \cdot DF + \varepsilon_4$$

$$x_5 = \lambda_5 \cdot DF + \varepsilon_5 \quad (2b)$$

Financial Inclusion

$$x_6 = \lambda_6 \cdot FI + \varepsilon_6$$

$$x_7 = \lambda_7 \cdot FI + \varepsilon_7 \quad (2c)$$

where;

$x_1 \ldots x_7$ are the observed data items.

λ's are weights indicating how strong an indicator reflects its constructs

ε's are the measurement errors.

3. Latent variable Score Construction (PLS weights)

$$\hat{FL} = w_1x_1 + w_2x_2 + w_3x_3$$

$$\hat{DF} = w_4x_4 + w_5x_5$$

$$\hat{FI} = w_6x_6 + w_7x_7 \quad (3)$$

The weights were then fed into the structural model for interpretation.

3.7.2 Chi-Square Test of Independence

To confirm the results and as robust test, the study used Chi-Square to determine whether there was a statistical significance among the variables. The study conducted Chi-Square test of independence on objectives one to three. The study applied the following steps.

1. Formulated a hypothesis based on developed categorical variables for each of the three objectives thus;

   H01: Financial literacy has no statistically significant influence on financial inclusion among rural women in Kenya.

   H02: Digital finance has no statistically significant influence on financial inclusion among rural women in Kenya.

H03: Digital financial literacy has no statistically significant influence on financial inclusion among rural women in Kenya.

2. Computed the expected counts using the formula;

   Expected Count = (Row Total * Column Total) / Grand Total

3. Determined the degrees of Freedom using the formula;

   $$df = (R - 1) * (C - 1)$$

4. Computed the Chi- square statistic using the formula

   $$\chi^2 = \sum (\text{Observed value} - \text{Expected value})^2/\text{Expected value}$$

5. Used SPSS software to analyze data to allow a decision to be made on whether the chi – square value was statistically significant.
6. Determined the critical value from the Chi-Square critical value table.
7. Interpreted the results by comparing the calculated Chi-square to the critical value

3.8 Logistical and Ethical Considerations

3.8.1 Logistical Considerations

Since the study involved rural women based in remote areas, there was communication with the local authorities to ensure that any potential logistical challenges and safety of the researchers was well taken care of. Additionally, the researchers were strictly requested to collect data between 8:00am to 5:00pm to ensure they were safe as they traversed from one ward to the other. Data collection was temporarily stopped during some specific days occasioned by the Genz demonstrations in Kenya that happened in the month of June 2024 at the time of data collection

A logistical budget was also factored in considering that getting the data required travelling as well as incentives for the research assistants.

3.8.2 Ethical Considerations

To effectively collect data using the acceptable standards, an introductory letter from the Machakos University Graduate School was used to apply for a license from the National Commission for Science, Technology and Innovation (NACOSTI). This license allowed for collection of primary data from rural women in Kenya in the specified counties.

Additionally, a clear explanation about the purpose of the study was communicated to the rural women to seek informed consent form each respondent prior to conducting the interviews.

The respondents were assured of confidentiality and the fact that the collected data was to be used purely for academic purposes

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CHAPTER FOUR
RESEARCH FINDINGS AND DISCUSSION

4.0 Introduction

The chapter presents the research findings of the study after data analysis and interpretation of the results in relation to the influence of financial literacy and digital finance on financial inclusion of rural women in Kenya. It is divided into seven sections covering: response rate, reliability and validity test results, demographic characteristics, descriptive analysis of variables, pre-test of variables, Partial Least Squares Structural Modeling (PLS-SEM) technique and Chi-square test of independence analysis.

4.1 Response Rate

A preliminary analysis performed revealed that from a sample of 1000, data was collected from 961 rural women across the seven regions in which Kenya was demarcated representing 96.1% response rate. There were 39 questionnaires that were not responded to as expected due to the demonstrations that were heated in the coastal and other regions in June 2024. The response rate of 96.1% is within the prescribed significant response rate for statistical analysis according to Richardson (2005) who suggests that a response rate of above 60% is fairly good and above 70% is very good. Based on this, the response rate for this study was deemed excellent as it surpassed the 70% threshold. The response rate is presented in Table 4.1.

Table 4.1: Response Rate

Response Category	Questionnaires Read	Questionnaires Answered	Response Rate %
Nyanza	130	130	100
Eastern	70	70	100
Western	200	195	97.5
Central	90	90	100
Rift Valley	180	177	98.33
Coastal	180	149	82.78
North Eastern	150	150	100
	1000	961	96.1

Nyanza, Eastern, Central and North Eastern regions had all the questionnaires answered by the respondents. Rift valley and Western region had 98.33% and 97.5% of the questionnaires responded to. Coastal region had the lowest response rate at 82.78 which was attributed to the June 2024 demonstrations that hindered data collection on some of the days.

4.2 Reliability and Validity Test Results

4.2.1 Validity of Research Instruments

To establish content validity, the research instrument was constructed by drawing and adapting items from internationally and nationally recognized surveys, including the OECD/INFE Survey Toolkit (2022), the Global Findex database (2021), and the Fin Access Household Survey (2022). This approach ensured that the questionnaire's content was comprehensive and representative of the constructs being measured, while necessary modifications were implemented to suit the unique demographic of rural women in Kenya.

4.2.2 Reliability of Research Instruments

Reliability of the questionnaire was evaluated using the Cronbach's Alpha Reliability coefficient that measures how well the variables measure a single dimensional latent construct. Taber (2018) notes that a Cronbach's Alpha (α) score greater than 0.7 is a suitable measure of an instrument's internal consistency. From the study findings, Cronbach's Alpha scores generated from the objectives were found to be above 0.70 as presented in Table 4.2 making the questionnaire satisfactory to continue with further analysis as it confirms a strong internal consistency among the variables.

Table 4.2: Reliability Results

Variable	Cronbach's Alpha	Conclusion
Financial Literacy	0.777	Reliable
Digital Finance	0.780	Reliable
Digital Financial Literacy	0.930	Reliable
Financial Inclusion	0.771	Reliable

4.3 Demographic Characteristics of the Respondents

This section presents the general characteristics of the respondents that the study deemed necessary. They include, marital status, level of education, employment status and monthly income levels of rural women in Kenya.

4.3.1 Marital Status

The study sought to know the marital status of the respondents as it aimed at testing who makes the financial decisions in the households. The respondent's marital status results are presented in Table 4.3.

Table 4.3: Respondents Marital Status (%)

Region	Married	Single	Widowed	Separated	Divorced
Western	65.6%	11.3%	13.3%	8.7%	1%
Eastern	65.7%	10.6%	12.9%	8%	2.9%
North Eastern	74.8%	9.3%	10.9%	3%	2%
Central	55%	25%	11%	8%	1%
Coast	60.1%	24.6%	6.5%	8%	0.7%
Rift Valley	64.4%	18.1%	4.5%	5.6%	7.3%
Nyanza	60%	8.5%	22.3%	4.6%	4.6%
Overall Marital Status	**64.2%**	**15.7%**	**11.4%**	**5.4%**	**3.2%**

All the regions had the highest number of married women. The overall results of the study indicated that 64.2% of the respondents were married, 15.7% were single, 11.4% were widowed, 5.4% had separated and 3.2% were divorced. This implied that some of the financial decisions were influenced by their partners.

4.3.2 Level of Education

Inquiry on the level of education of the respondents was valuable as it was aimed at establishing the respondent's literacy levels to understand the study objectives and the questionnaire. The results are presented in Table 4.4.

Table 4.4: Respondents Level of Education (%)

Region	University	College	Secondary	Primary	None
Western	8.7%	23.1%	25.1%	33.3%	9.7%
Eastern	1.9%	7.3%	24.3%	64.3%	2.3%
North Eastern	2%	0.7%	2.6%	4%	90.7%
Central	1%	8%	39%	46%	6%
Coast	3.6%	15.9%	38.4%	32.6%	9.4%
Rift Valley	4.5%	16.4%	50.8%	19.2%	8.5%
Nyanza	4.6%	10%	30.8%	51.5%	3.1%
Overall Level of Education	**4.47%**	**12.9%**	**30.4%**	**32.0%**	**20.2%**

Rift Valley region had the highest number of rural women who had attained secondary education and above (71.7%), followed by Western (56.9%) and Coast (52). On the overall front, approximately 47.77% of the rural women had attained secondary education and above. These findings indicate that the majority of the respondents were well educated and capable of responding to the questionnaires with understanding. The study also revealed that approximately 20% of the rural women had not attained any form of education.

4.3.3 Employment Status of Rural Women in Kenya

The researcher sought to find out the employment status of the rural women and the findings are presented in Table 4.5.

Table 4.5: Respondents Employment Status (%)

Region	Employed Public	Employed Private	Self-Employed (Business)	Self Employed (Farming)	None
Western	10.8%	9.7%	17.4%	28.2%	33.8%
Eastern	5.7%	2.9%	24.3%	44.3%	22.9%
North Eastern	0.7%	1.3%	44.4%	1%	52.6%
Central	4%	5%	29%	51%	8%
Coast	6.5%	25.4%	17.4%	11.6%	29%
Rift Valley	18.1%	9.6%	28.2%	33.3%	10.7%
Nyanza	2.3%	3.8%	34.6%	49.2%	10%
Overall Employment Status	**7.3%**	**9.3%**	**27.7%**	**28.7%**	**25.3%**

From the research findings, a majority of the respondents were self-employed either farming (28.7%) or business (27.7%). A quarter of the respondents (25.3%) were not employed while 9.3% and 7.3% were employed in private and public employment. These results imply that financial inclusion for these rural women is largely tied to their entrepreneurial activity, not formal salaries. Therefore, interventions must be integrated. For instance, digital finance platforms must be accompanied by targeted financial literacy training that teaches practical skills for managing a small, often informal business and farming income to effectively move them from basic digital transactions to deep financial inclusion where they can easily access credit, insurance, and formal savings.

4.3.4 Monthly Income of Rural Women in Kenya

Information on the rural women's monthly income was valuable in determining their financial standing. The findings are presented in Table 4.6.

Table 4.6: Respondents Monthly Income Levels (%)

Region	Ksh. 50,000 and Above (%)	Ksh. 31,000 to Ksh. 50,000 (%)	Ksh. 11,000 to Ksh. 30,000 (%)	Ksh. 1,000 to Ksh.10,000 (%)	No Income (%)
Bungoma	3.1	6.2	19.5	34.4	36.9
Eastern	1.4	6.0	44.0	45.7	2.9
North Eastern	0.7	0.7	0.7	49.0	49.0
Central	1.0	5.0	20.0	71.0	3.0
Coast	2.2	8.7	37.0	23.2	29.0
Rift Valley	0.6	6.8	40.7	44.1	7.9
Nyanza	0.2	0.6	6.0	69.2	24.0
Overall Monthly Income	**1.12**	**4.7**	**23.1**	**46.5**	**24.5**

A regional analysis on the level of income of rural women indicate that approximately 90% of the regions had a majority of rural women earning between Ksh. 1,000 to 10,000 with an average score of 46.5%. approximately 24.5% of all rural women in Kenya had no income.

In summary, the findings suggest that low income is the single greatest barrier to meaningful financial inclusion. Digital finance and financial literacy are necessary but

insufficient without a corresponding increase in disposable income that makes using financial services worthwhile and safe for these rural women.

4.4 Descriptive Analysis

Descriptive statistical analysis was used to provide the characteristics of the data set giving a summary of the main variables of the study and the measures as used in the study.

4.4.1 Financial Literacy Descriptive Statistics

Financial literacy is defined as the combination of awareness, knowledge, skills, attitudes and behavior necessary to make sound financial decisions and ultimately achieve individual financial wellbeing (OECD, 2020). Financial literacy was measured using three indicators; financial knowledge, financial behavior and financial attitudes. Following OECD (2020), the overall financial literacy score was computed as the sum of the scores on financial knowledge, financial behavior and financial attitudes. The overall financial literacy score was scaled to range between 0 and 21

For financial knowledge the score was computed based on number of correct responses to 7 financial knowledge questions ranging from 0 to 7. The financial knowledge score was created by attributing one point for each correct answer. A higher score indicates higher levels of financial knowledge. The minimum score for a financially knowledgeable person was considered by the minimum target of financial knowledge score which was defined as answering at least 5 out of the 7 financial knowledge questions correctly. The financial behavior score of the rural women was determined using 9 questions that were scored between 0-9. The minimum score for financial behavior was defined as answering at least 6 out of the 9 financially behaviors questions. Higher scores reflect higher levels of financial behavior. Financial attitudes were based on 5 statements giving 5 points. The financial attitude score was computed

as the average response across the 5 attitude questions. Correct answers to at least 2 out of the 5 attitudes gave the minimum financial attitudes score.

The study analyzed the scores of the indicators of financial literacy among rural women in Kenya using some specific questions. For instance, on the understanding of the concept of interest rate a key measure of financial knowledge, the respondents were asked questions on borrowing (loan) and how much they needed to repay. The results are presented in Table 4.7.

Table 4.7: Response on Interest Rate Concept (%)

Region	What I borrowed plus interest (%)	Total amount that I borrowed (%)	I have not yet returned (%)	I don't Know (%)
Western	20.0	50.0	10.6	17.4
Eastern	36.7	42.2	16.8	4.3
North Eastern	1.3	52.5	15.5	30.7
Central	24.0	46.4	18.6	11.0
Coastal	40.0	25.6	10.0	24.4
Rift Valley	45.0	22.6	26.4	6.0
Nyanza	48.0	22.0	11.4	18.6
Overall	**30.7**	**36.12**	**17.4**	**16.05**

North Eastern region had the least percentage (1.3%) of rural women who indicated that if they borrowed money, they would return it with interest. This shows that only a small portion of the rural women in North Eastern had an understanding of the concept of interest rate. In Nyanza region 48% of rural women demonstrated an understanding of the concept of interest rate as they indicated that if they borrowed, they would need to return with an interest. This disparity is attributed to the fact that in North Eastern region, only 5.3% of the rural women had acquired secondary education up to university

level while 45.4% of the rural women in Nyanza had acquired secondary education up to university levels an indication that they were endowed with sufficient financial knowledge that gave them a clear understanding of financial concepts including interest rate.

The overall findings from Table 4.7 shows that on average only 30.7% of the rural women indicated that if they borrowed, they would return what they borrowed plus interest, 36.12% would return only what they borrowed, 17.4% stated that they had not returned what they borrowed and 16.05% did not how much they needed to return after borrowing.

The results reveal a severe deficit in financial literacy among rural Kenyan women, manifested by a lack of basic comprehension of interest as seen by only 30.7% who acknowledge interest, and 36.12% that think they only return the principal and a lack of awareness of their actual debt obligations where16.05% did not know the amount, and 17.4% failed to repay. This implies that the potential of digital finance to provide accessible, formal credit is undermined, as rural women are more likely to misuse loans, fall into debt traps due to misunderstanding high-interest digital products, and demonstrate poor repayment behavior, ultimately hindering their economic empowerment and the sustainability of rural digital lending initiatives.

With respect to budgeting which was another key indicator of financial behavior, the respondents were asked whether they make a monthly budget and the findings are shown in Table 4.8.

Table 4.8: Response on Monthly Budgeting Activity (%)

Region	Yes (%)	No (%)	I don't Know (%)
Western	54.9	33.8	11.3
Eastern	35.7	61.4	2.9
North Eastern	4.0	4.6	91.4
Central	31.0	44.0	25.0
Coastal	50.7	48.6	0.7
Rift Valley	28.2	44.1	27.7
Nyanza	15.4	52.3	32.3
Overall	**31.41**	**41.25**	**27.32**

Regionally, it is revealed that a majority of rural women from Eastern, Nyanza and Coastal regions did not make a budget (61%, 52.3% and 48.6%). North Eastern, Nyanza, Rift Valley and Central regions also had a considerable number of rural women who did not understand the concept of budgeting as represented by 91.4%,32.3%, 27.7% and 25% respectively.

On the overall front, the results show that on average only 31.41% of the rural women make a budget, 41.25% did not budget and 27.32% did not have an idea about budgeting. These findings point to a profound gap in fundamental financial literacy which translates directly into shallow financial inclusion where the absence of basic money management skills prevents rural women from effectively utilizing available financial services for productive purposes like saving or investing. Without a budget, the benefits of digital finance like mobile money or digital loans are reduced to simple, reactive transactional tools, often leading to poor financial decision-making, high consumption spending, and an inability to build a financial cushion, thereby perpetuating their financial vulnerability and exclusion from formal economic growth.

Cumulatively from the indicators of financial literacy, the overall scores of the indicators were analyzed and presented in Table 4.9.

Table 4.9: Financial Literacy Indicators Scores

Indicators of Financial Literacy	No.	"Maximum" Score	Literacy "Threshold" Score	Actual Literacy Score (Mean Statistic)
Financial Knowledge Score	961	7	5	4.5
Financial Behavior Score	961	9	6	3.8
Financial Attitude Score	961	5	2	2.7

Note: Maximum score - refers to the highest possible score that could be attained in each of the indicators.
Threshold - means a set value that is used to determine literacy level.

Rural women in Kenya have a financial knowledge score of 4.5, financial behavior score of 3.8 and a financial attitude score of 2.7. These scores are out of a set threshold of 5, 6 and 2 for financial knowledge, financial behavior and financial attitude respectively (OECD, 2020). The results reveal low scores across all three dimensions signify a crisis in financial literacy, which impacts financial inclusion by creating a barrier to the meaningful usage of financial services: For instance, rural women may access digital finance like mobile money due to high accessibility in Kenya, but their poor behavior (low score) limits them to simple transactions. Rural women's negative attitude may lead them into viewing credit, savings, and insurance with skepticism or distrust, undermining the potential for Digital Finance.

According to World Bank Group (2021), financial knowledge is essential as it enables individuals to navigate the increasingly complex financial landscape allowing them to

make better choices with regards to saving, investing and insurance. With regards to financial behavior, the results imply that on average rural women exhibit moderate financial behavior (3.8/6) which limit their active participation in financial activities thus considered as having low levels of financial literacy. Huston (2020) noted that financial behavior is a very important component of financial literacy as it demonstrates an individual's ability to manage personal finances effectively including the ability to save, budget and allocate financial resources effectively improving their wellbeing.

Financial Literacy is a combination of financial knowledge, financial behavior and financial attitudes. Therefore, the study determined the financial literacy score of rural women in Kenya regionally and in general. The results are presented in Table 4.10

Table 4.10: Regional Scores for Financial Literacy

Region	Number of Women	Maximum Score	Literacy Threshold	Actual Financial Literacy Score	Literacy Level %
Western	195	21	13(62%)	12.96	✓
North Eastern	150	21	13(62%)	7.97	×
Coast	149	21	13(62%)	11.28	×
Eastern	70	21	13(62%)	12.96	✓
Nyanza	130	21	13(62%)	10.24	×
Rift Valley	177	21	13(62%)	12.65	✓
Central	90	21	13(62%)	10.19	×

Note: Column 4 indicates the threshold for financial literacy cumulative scores for financial knowledge, behavior and attitude as per the OECD (2020) which are then converted into percentages
✓-denotes that the region meets the financial literacy threshold and therefore are declared financially literate. ×-denotes that the region does not meet the threshold and are declared financially illiterate.

Given the benchmark score of 13 out of 21 (OECD/INFE, 2020) which is 62%, any region meeting the threshold is represented by a tick (✓) and any region not meeting the threshold is represented by a cross (✕) symbol.

For instance, North Eastern region (7.97), Nyanza (10.24), Coast (11.28) and Central (10.19) regions did not meet the threshold thus considered not literate. Western (12.96), Eastern (12.96) and Rift Valley (12.65) regions were closer to the set threshold and therefore considered literate. These results indicate that a majority of rural women in Kenya represented by 4 regions out of the 7 are not financially literate. The low levels of financial literacy among rural women in the specific regions can be attributed to the low levels of education in the same regions as shown in Table 4.4.

Accordingly, the overall financial literacy score of the 961 respondents is as shown in Table 4.11.

Table 4.11: Overall Financial Literacy Score

Descriptive Statistics					
	Total Number of Women	**Maximum Score**	**Threshold**	**Actual Score**	**Literacy Level (%)**
Financial Literacy Score	961	21	13 (62%)	11.152	✕

Note: ✕-denotes that rural women in Kenya do not meet the financial literacy threshold.

The results reveal an actual score of 11.152. This score denotes that a majority of rural women in Kenya do not meet the financial literacy threshold of 62%. They display low levels of financial literacy which locks them out of the financial literacy bracket. Higher literacy scores indicate higher levels of financial literacy while lower literacy scores

indicate low financial literacy levels among the women (OECD/INFE, 2022). This therefore signifies that the majority of the rural women in Kenya are effectively "locked out" of the financial literacy bracket because they lack the foundational understanding necessary to evaluate complex financial product terms, calculate risk, or make informed decisions limiting their utility to basic transactional functions and inhibiting substantive economic empowerment and eventual financial inclusion. The results compare with those from other studies by Fanta and Mutsonziwa (2021) and World Bank (2020) that reported relatively low financial literacy levels in Kenya, particularly among vulnerable populations like rural women.

On the other hand, Gang and Singh (2018) demonstrated that those with greater financial literacy are well able to handle their money, stay out of debt and easily accumulate wealth as compared to those with limited financial literacy. This therefore suggest that for rural women to be to participate actively in financial activities that will improve their financial wellbeing, they need to have high level of financial literacy which is currently limited. This observation strongly supports the core premise of Financial Literacy Theory (FLT), which posits that formal education is a critical conduit for acquiring the financial knowledge necessary to understand complex financial concepts, such as interest rates. The low educational baseline in the North Eastern region leaves women financially fragile and less equipped to engage with formal or digital lending products.

4.4.2 Digital Finance Descriptive Statistics

Digital finance is defined as a financial service delivered through mobile phones, the internet or cards linked to reliable digital payment services (Durai & Stella 2019). It is seen as a set of financial products and services that enable rural women to access

payments, savings, and credit facilities online without having to visit a bank or deal directly with a financial service provider (Lakhouil & Segdali 2024). Digital finance was perceived as a potential route to achieving and enhancing financial inclusion, offering opportunities for extended access to financial services for rural women in Kenya.

Digital finance was operationalized using a modified Alliance for Financial Inclusion (AFI) 2016 measure. It was measured using two key indicators; access or ownership of digital payment systems and usage of the digital payment systems. Rural women were asked a total of twelve (12) questions; 5 questions addressing the ownership of digital payment systems and 7 questions on the usage of the digital payment systems. An Average Digital Finance (ADF) score was then computed as the sum of digital payment systems (5) and the usage of digital payment systems (7) components.

Each component was given equal weighting. This measure was informed by Ozili (2018) and Widarwati et al. (2022) who used the ADF score in determining the impact of digital finance on financial inclusion. The average digital finance score therefore ranged from 0 to 12 where higher scores indicated greater confidence in using digital financial services that contributes to a positive attitude towards formal financial services (Lyons & Kass-Hanna 2021). Accordingly, the study set a minimum target score on digital finance and defined it as scoring at least 8 out of 12 points according to OECD/INFE (2020).

To get a better understanding of the measures of digital finance among rural women in Kenya, rural women were asked specific questions relating ownership and usage of

digital payment systems. The results on the ownership of digital payment systems are presented in Table 4.12.

Table 4.12: Ownership of Digital Payment Systems

Digital Payment Systems	Western %	Eastern %	North Eastern %	Central %	Coastal %	Rift Valley %	Nyanza %	Overall Ownership Status %
Mobile-Device-	72.3	72.9	24.5	93.0	84.1	77.4	67.7	**70.27**
Mobile-Money-Account	71.3	72.9	24.5	92.0	82.6	52.0	67.7	**66.14**
Account in a Formal Institution	41.3	51.4	2.0	35.0	21.7	48.0	16.2	**30.21**
ATM Card	31.8	20.0	2.0	9.0	21.7	19.2	16.2	**17.12**

North Eastern region stands out among the 7 regions with the lowest ownership percentage across all categories, particularly in ownership of accounts in formal institution (2%) and ownership of ATM cards (2%). This implies that rural women in this region have very limited access to digital payment systems which could be attributed to significant barriers to digital payment adoption. Additionally, the low ownership status in the region could also be as a result of the large percentage (49%) of rural women in the region who do not have an income as seen in Table 4.6.

Central region on the other hand, shows the highest percentage of rural women with ownership of mobile devices (93%) and mobile money accounts (92%), indicating strong adoption of digital payment systems. The other regions, Western, Eastern, Coastal, Rift-Valley, and Nyanza generally show moderate to high ownership rates for mobile devices and mobile money accounts, with varying levels of ownership of accounts in formal institution and as well as ATM card ownership.

When it comes to the overall mean of the regions, a significant (70.27%) of rural women in Kenya own a mobile device, indicating a strong foundation for digital payment adoption. A large majority (66.14%) of rural women have mobile money accounts, which highlights the widespread use of mobile money in the region. On the other hand, account ownership in formal financial institutions is lower (30.21%), suggesting a potential preference or greater accessibility for mobile money solutions. Additionally, ATM card ownership is the lowest (17.12%), which could be linked to the lower formal institution account ownership and the prevalence of mobile money suggesting a potential gap in access to traditional banking services. The high mobile device ownership as well as the mobile money account ownership from the results underscores its importance as an enabler for digital payment adoption which enhances financial inclusion among rural women in Kenya.

The study therefore found out that among the rural women in Kenya, ownership of a mobile phone and a mobile money account go hand in hand as seen Table 4.12. This is an indication that most of the rural women who had a mobile phone also had mobile money. Mobile money is a dominant form of digital payment system which is likely due to its accessibility and convenience. These findings concur with UN women (2021) report that stated that 50.2% of women in rural areas in Kenya owned mobile phones, most of which have mobile money accounts. This information is very important as it provides insights into access to technology and financial service which are crucial for financial inclusion of rural women.

Subsequently rural women answered specific questions on the usage of digital payment systems, another determinant of digital finance and the results are presented in Table 4.13.

Table 4.13: Usage of Digital Payment Systems

Digital Payment Systems	Western %	Eastern %	North Eastern %	Central %	Coastal %	Rift Valley %	Nyanza %	Overall Mean
Mobile money	62.9	68.6	25.5	67.0	72.5	61.5	56.2	59.17
Bank Account	35.4	15.7	2.0	22.0	16.6	43.5	5.4	20.09
ATM Card	30.3	20.0	2.0	7.0	13.0	17.5	3.8	13.36

The findings reveal how rural women in the different regions use digital payment systems. For instance, the North Eastern region consistently shows the lowest usage rates across all the three categories. Notably, only 2.0% of the rural women in this region use bank accounts and ATM cards for transactions, and only 25.5% use mobile money. This basically imply that ownership of digital payment systems is closely related to usage of the same. For example, North Eastern recorded the least percentage of rural women who owned digital payment systems, the same region has also recorded the least percentage in the usage of digital systems. Coastal region shows the highest usage of mobile money (72.5.0%) and relatively lower usage of bank accounts and ATM cards (16.6% and 13.0%) to transact. The other regions like Western, Eastern, Central, Rift-Valley, and Nyanza show moderate to high usage of mobile money, with varying levels of usage for bank accounts and ATM cards.

On average regionally, more than half (59.17%) of the rural women used mobile money accounts to transact which highlights the widespread adoption of mobile money as a primary transaction method as compared to bank accounts. Additionally, the results reveal that only 20.09% of rural women in Kenya use bank accounts for transactions, indicating a preference for or greater accessibility of mobile money. There is also a very low usage of ATM Cards at 13.36%, that further emphasizes the reliance on mobile money over traditional banking methods.

Conclusively, this study results imply that mobile money is the primary driver of digital transactions among rural women in Kenya which is attributed to its accessibility, convenience, and lower barriers to entry compared to traditional banking. There also exist significant regional disparities particularly in North-Eastern, highlighting the need for targeted interventions to promote digital financial inclusion. More so, the low usage of bank accounts by rural women in Kenya points to potential challenges the women could be facing related to access, affordability, or trust in formal banking institutions which also leads to their being excluded financially.

These findings imply that adoption and usage of mobile money accounts to transact among the rural women in Kenya is higher as compared to the uptake of the other digital financial systems. These results concur with the study by Tiony (2023) on adoption of digital financial services which revealed that adoption of digital financial services especially mobile money platforms like Mpesa had grown substantially increasing access to banking services, formal savings and credit facilities. Additionally, the Financial Sector Deepening Kenya, (2024) noted that M-PESA provided access to financial services to over 70 percent of the Kenyan adult population by enabling over 15 million Kenyans to have access to a formal financial system.

The regional digital finance adoption score among rural women was determined and the results are presented in Table 4.14.

Table 4.14: Regional Scores for Digital Finance Adoption

Region	Number of Women	Maximum Digital Finance Score	Digital Finance Threshold	Actual Digital Finance Score	Level of Fintech Adoption %
Western	195	12	8 (67%)	7.54	✓
North Eastern	150	12	8 (67%)	5.21	✕
Coastal	149	12	8 (67%)	7.50	✓
Eastern	70	12	8 (67%)	7.17	✕
Nyanza	130	12	8 (67%)	6.22	✕
Rift Valley	177	12	8 (67%)	5.35	✕
Central	90	12	8 (67%)	7.50	✓

Note: Column 4 indicates the threshold for digital finance (cumulative for ownership and usage) as per the OECD (2020) which are then converted into percentages. ✓-denotes that the region meets the digital finance threshold and therefore are declared having adopted Fintech while. ✕- denotes that the region does not meet the threshold and are declared as not having adopted Fintech.

With a threshold of 8 out of 12 for digital finance which is 67%, any region meeting the threshold is represented by a tick (✓) and any region not meeting the threshold is represented by a cross (✕) symbol. The results reveal that only 3 regions (Western (7.54), Coastal (7.50) and Central (7.50), were considered as having adopted fintech. This suggests that women in these regions have better access, understanding, or usage of digital financial services which could be as a result of their educational levels that are fairly better than the other regions. On the other hand, North-Eastern, Eastern, Nyanza, and Rift-Valley regions show limited level of adoption of fintech. Their average scores (5.21, 7.17, 6.22, and 5.35 respectively) are below the threshold of 8. This highlights a need for targeted interventions to improve digital financial inclusion in these regions.

Worth noting is the fact that there are significant regional disparities in the adoption of digital finance among rural women in Kenya. For instance, the average adoption rate of digital finance in Western (7.54) is different from that of Rift Valley (5.35)

suggesting that access to digital payment systems and usage of digital payment services vary significantly across different regions. This is also reflected in the percentage of rural women who have adopted fintech. The results reveal that 63% of rural women in the Coastal region and 45% of rural women from the Rift Valley region have adopted fintech. A majority of the women who have not adopted to Fintech come from the North eastern region at 57%. This region has posted the lowest number of rural women who have education, have an income and are employed.

The regional adoption trend in Table 4.14 is reflected in the overall digital finance score of the 961 respondents as presented in Table 4.15

Table 4.15: Overall Score for Digital Finance Adoption

Descriptive Statistics					
	Number of Women	**Maximum Score**	**Threshold**	**Actual Score**	**Adoption Level (%)**
Digital Finance Score	961	12	8 (67%)	6.609	×

×-denotes that the rural women do not meet the digital finance threshold and therefore are declared having not adopted Fintech

The results show that average digital finance score of rural women in Kenya was 6.609. This score is below the threshold of 8. This low score suggests that even amidst Kenya's globally recognized digital payment landscape, the intended usage and adoption of DF tools remain critically stunted among rural women in Kenya. The low levels of adoption and usage of digital finance could be as a result of the low financial literacy levels experienced in most regions. As noted earlier low literacy levels among rural women is heavily affected by their poor financial behavior that limit their ability to access and use digital payment systems.

The low DF score fundamentally confirms a gap between financial access and sustained, meaningful usage (Verixiv, 2024). While the introduction of mobile money has undeniably expanded the reach of financial services across Sub-Saharan Africa (SSA), the sub-threshold score reveals that the complexity of operating or the perceived safety of digital tools may be preventing effective integration. These results support Shen et al. (2018) study that noted that there is low uptake of digital financial services among many people and hence the need to popularize the same if the goal of advancing financial inclusion is to be achieved. The study therefore, posits that digital finance enhances financial inclusion and when the digital finance score is low, then it impacts financial inclusion negatively. This is in agreement with Al-Smadi (2022) study that investigated the association between digital finance and financial inclusion and revealed that digital finance enhances access to, availability of and use of financial services thus enabling financial inclusion.

According to the diffusion of innovation theory, the rate of adoption of an innovation is heavily influenced by the adopter's perception of its Complexity and Compatibility (Rogers, 2003). The low DF score strongly suggests that digital financial services are perceived as either too difficult to understand or incompatible with the existing realities of rural women. This aligns with findings by Shen et al. (2018), who noted that the low uptake of digital financial services is often due to a lack of popularization, which can be interpreted as a failure to effectively reduce the perceived cognitive load associated with the innovation.

Furthermore, the low score highlights profound issues with Compatibility. Digital finance, while designed for efficiency, often fails to align with crucial socio-cultural norms and safety calculi. For rural women, restrictions on mobility, time poverty, and

the persistent threat of gender-based violence associated with mobile phone ownership violate the innovation's compatibility with their established way of life, diminishing its appeal (UN Women, 2019; Verixiv, 2024). When the innovation introduces greater personal risk or friction like the need to travel long distances to find connectivity, its perceived relative advantage is nullified (Rogers, 2003). The finding of a low usage score thus confirms a fundamental gap between initial financial access and sustained, meaningful usage, which is key to successful diffusion.

4.4.3 Financial Inclusion Descriptive Statistics

This study considers financial inclusion as the access and usage of formal financial services by rural women in Kenya. Financial Inclusion in this study was measured by calculating a Financial Inclusion Level Index (Njenga & Irungu, 2024) whereby financial inclusion was seen as being low, medium or high. Rural women's financial inclusion index score was obtained by summing the scores of each of the financial inclusion indicators.

The financial inclusion indicators in this study were access to formal financial services and usage of formal financial services since they provide valuable insights, highlighting a wider gender gap (Financial Sector Deepening Kenya, 2024). Access to formal financial services was determined using 3 questions and usage of formal financial services was determined using 7 questions. A total of 10 questions were asked giving a total score of 10. The financial inclusion level of the rural women was then obtained as shown in Table 4.16.

Table 4.16: Financial Inclusion Level Index

Financial Inclusion Score	Financial Inclusion level
0-3	Low Level
4-6	Medium Level
7-10	High

Any score falling in the category of 0-3 would be considered low, 4-6 would be medium and 7-10 would be considered high.

To begin with, the study analyzed the indicators of financial inclusion among rural women by asking the women whether they had access to formal financial services and were using the services. The results are presented in Table 4.17.

Table 4.17: Financial Inclusion Levels for the Indicators per Region

Indicators (financial Inclusion)	Western	Eastern	North Eastern	Central	Coastal	Rift Valley	Nyanza	Financial Inclusion Level
Access to	5.1	3.9	2.9	3.8	4.3	3.7	3.6	3.9
Usage of	4.8	3.9	2.7	3.7	4.1	3.7	3.5	3.8

It is clear from Table 4.17 that Western region has the highest number of rural women with medium access to formal financial services at 5.1, followed by Coastal (4.3), Eastern (3.9), Central (3.8), Rift Valley (3.7) and Nyanza (3.6) respectively. North Eastern region has the lowest number of rural women with access to formal financial services at 2.9. With regard to usage of formal financial services, the results also reveal that rural women in Western region, Coastal, Eastern, Central, Rift Valley and Nyanza displayed medium kevel of usage to formal financial services. North Eastern region

recorded the lowest score (2.7) indicating that rural women in this region do not use formal financial services.

Additionally, the results reveal that the overall score of rural women in Kenya who use formal financial services (3.8) is slightly lower than those who have access to formal financial services (3.9). This suggests that not every rural woman who has access is actively using the financial services. It is noted from the results that a larger proportion (6.2) of the rural women in Kenya do not actually use formal financial services. The study findings reveal significant differences between rural women who have access to formal financial services and those who do not have access suggesting a major challenge when it comes to access as a component of financial inclusion.

The study also notes clear regional disparities in both access and usage of formal financial services with Western and Coastal region appearing to be doing relatively better as compared to other regions that displayed moderate levels of financial inclusion. The North Eastern region is significantly lagging behind. The regional disparities and the slight difference between access and usage of formal financial services could be an indication that regardless of financial services being available, there might be other factors like affordability, trust, awareness, and financial literacy that could be hindering rural women from using the formal financial services.

The study further sought to find out the actual financial inclusion score of rural women in Kenya. The results are presented in Table 4.18.

Table 4.18: Regional Score for Financial Inclusion

Region	Number of Women	Maximum Statistics	Actual Financial Inclusion Index	Financially Inclusion level
Western	195	10	5.14 (51%)	Medium
North Eastern	150	10	2.94 (29%)	Low
Coastal	149	10	4.31 (43%)	Medium
Eastern	70	10	3.86 (39%)	Medium
Nyanza	130	10	3.28 (33%)	Low
Rift Valley	177	10	3.56 (36%)	Low
Central	90	10	3.58 (36%)	Low

Table 4.18 shows financial inclusion index of rural women in Kenya as well as the financial inclusion levels across the regions. From a percentage point of view, a computation of the financial inclusion index level of rural women was done based on the set threshold (Njenga & Irungu, 2024) where any score of between 7 to 10 indicates higher levels of financial inclusion, 4 to 6 medium levels and 0 to 3 shows low levels of financial inclusion. Therefore, the actual scores were converted into percentages whereby a score equal to and above 70% was deemed to indicate the region was highly included. Regions with a percentage score of equal to or above 40% was deemed to have medium levels of inclusion while regions of 30% and below were seen as having very low levels of inclusion.

The results reveal that Western region exhibits the medium levels of financial inclusion (51%) among all regions suggesting that rural women in Western region can access and use of formal financial services as compared to rural women in other regions in this study. Coastal region with a financial inclusion index of 43% comes in second after Western region followed by Eastern region (39%). Other regions like Central (36%),

Rift valley (36%), Nyanza (33%) and North Eastern (29%) shows low levels of financial inclusion an indication that rural women in these regions have least access to and usage of formal financial services. The differences in the financial inclusion indexes could be attributed to the educational levels of rural women in these regions. For instance, the results indicated that most of the rural women in Western were more educated than rural women in other regions like the North Eastern region.

Conclusively, the overall financial inclusion level among rural women stands at 3.85 approximately (40%) as shown in Table 4.19.

Table 4.19: Overall Score for Financial Inclusion

	Number of women	Maximum Score	Actual Score	Financial Inclusion Level
Financial Inclusion score	961	12.000000	3.851	Medium

These results indicate that rural women in Kenya display medium levels of financial inclusion. Approximately 40% of rural women in Kenya are financially included while 60% of rural women are locked out of the financial inclusion bracket. This is true as a majority of rural women lack access to basic financial services like bank accounts, credit, insurance, and savings which are key to financial inclusion (World Bank, 2020). In addition to that, these results are consistent with the Financial Sector Deepening Kenya (2024) that noted that individuals living in rural areas are less likely to be financially included since financial institutions are not widely spread and at the same time the uptake of financial products among the rural community is low which is attributed to lack of adequate understanding of their benefits

The FinAccess (2024) report also notes that, in as much as the overall financial inclusion in Kenya stands at 84.7% women remain both unserved and underserved as compared to men because of the widespread lack of awareness. This qualifies this study results that has revealed that approximately 40% of rural women in Kenya are included. A percentage that is lower than the threshold basically because, the study was purely on women who live and have a livelihood in the rural areas unlike the household survey that was general in nature.

4.5 Statistical Analysis

The objectives of this study were analyzed using Partial Least Squares Structural Equation Modeling (PLS - SEM) technique and Chi-Square test of Independence.

The Partial Least Squares Structural Equation Modeling (PLS - SEM) technique was used to analyze the structural relationships that exists between the variables in the study objectives. The study interpreted the results based on measurement model and structural model according to Hair et al. (2022) and Wold (1982).

The measurement model according to Hair et al. (2022) focuses on the relationships between the observed indicators and their underlying latent constructs, thereby establishing the reliability of the constructs used in the study. It ensures that each construct is accurately represented by its indicators through assessments factor loadings. In contrast, the structural model examines the hypothesized causal relationships between the latent constructs themselves. It tests the strength, direction, and significance of the paths connecting constructs, as well as the explanatory power of the model (R^2 values) and effect sizes (f^2). In essence, the measurement model addresses the question of how well the constructs are measured, while the structural

model addresses how the constructs are related to each other within the theoretical framework.

The path coefficients were standardized to range from -1 to +1. Path coefficients of 0.0 to 0.1 indicate a very weak effect, 0.1 to 0.3 indicate weak effect, 0.3 to 0.5 indicate moderate effect and 0.5 to 1.0 indicate strong effect (Cohen, 1988). The study adopted R-squared value interpretation according to Hair et al. (2022) where 0.75 (substantial); 0.50 (moderate) and 0.25 (weak).

To confirm whether the variables in the study were related and had a statistically significant relationship, a robust test of the study objectives was carried out using Chi–Square test of independence. The test was used to establish whether there was an association between the categorical independent variables (financially literate /financially illiterate, adopted fintech / not adopted fintech, digitally financially literate / digitally financially illiterate) and the dependent variable (financially included or financially excluded). The study compares the calculated chi-square statistic to the critical value. If the chi-square calculated value is greater than the chi-square critical value, then the null hypothesis is rejected. If the chi-square calculated value is less than the chi-square critical value, then you "fail to reject" the null hypothesis. The hypothesis will be developed based on each Chi-Square objective under investigation.

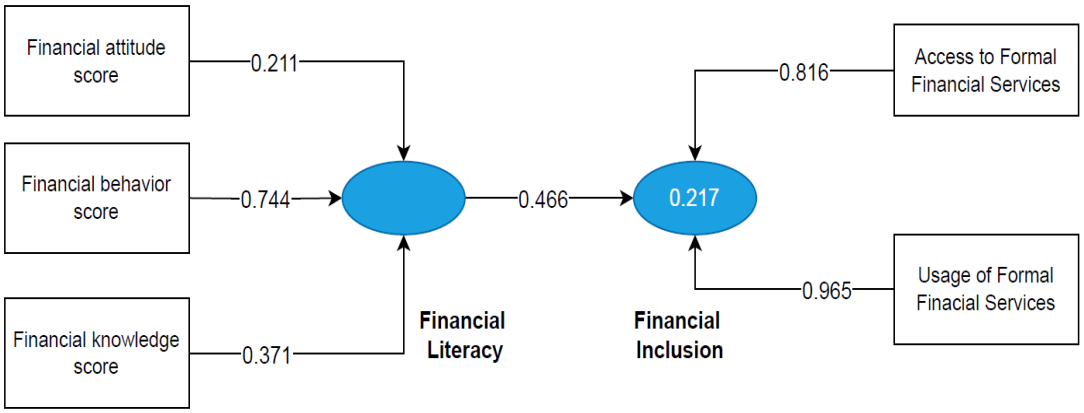
4.5.1 Financial Literacy and Financial Inclusion

4.5.1.1 PLS–SEM Analysis of Financial Literacy and Financial Inclusion

In addressing objective one on the influence of financial literacy on financial inclusion among rural women in Kenya, the study used the Partial Least Squares Structural Equation Modeling (PLS - SEM) technique to analyze the structural relationship

between financial literacy and financial inclusion of rural women in Kenya the study used

The measure of financial inclusion as the dependent variable was access to formal financial services and usage of formal financial services while the measure of the independent variable financial literacy was financial attitude, financial behavior and financial knowledge. To show the relationship between financial literacy and financial inclusion, PLS-SEM analytical methodology was used. The analysis was based on path coefficients standardized to range from -1 to +1 and R-squared. The results are presented in figure 4:1.



Note: Blue circles represent the variables while the rectangles represent the indicators of the variable.
The number inside the blue circle represents the R-Squared. The arrows represent the path coefficients.

Figure 4.1 Financial Literacy and Financial Inclusion

4.5.1.2 Measurement Model (Outer) Interpretation

4.5.1.2.1 Financial Literacy

From figure 4.2, Financial Literacy is measured by three indicators: financial attitude, financial behavior, and financial knowledge. The outer loadings of these indicators are 0.211, 0.744, and 0.371 respectively. In PLS-SEM, outer loadings indicate how

strongly each observed indicator reflects its underlying latent construct. Values closer to 1 suggest stronger relationships.

Among the three indicators, financial behavior shows the highest loading (0.744), indicating that it is the most important contributor to financial literacy. This suggests that the day-to-day financial practices and habits of rural women in Kenya play the most significant role in shaping their financial literacy. Women who actively engage in positive financial practices such as budgeting, saving, and disciplined spending are more likely to exhibit higher financial literacy than those who only possess financial knowledge or positive attitudes but do not translate them into behavior. However, the study also found that rural women generally scored low on financial behavior, which negatively influenced their overall financial literacy and, in turn, their level of financial inclusion.

Financial knowledge shows a moderate loading of 0.371, implying that it contributes meaningfully, though less strongly, to financial literacy. Rural women who understand financial concepts, products, and decision-making processes are likely to demonstrate higher literacy, which could eventually ease their integration into the formal financial system.

Financial attitude, with a loading of 0.211, is the weakest indicator of financial literacy in this context. Although positive financial attitudes like valuing savings, or preferring long-term security over short-term consumption are beneficial, they do not translate as strongly into overall financial literacy for rural women compared to behavior and knowledge.

Overall, the analysis highlights that financial behavior is the most critical component of financial literacy, followed by financial knowledge and, lastly, financial attitudes. This suggests that interventions aimed at improving financial literacy should focus primarily on cultivating sound financial behaviors, supported by the dissemination of financial knowledge. This finding is consistent with Robb (2011), who argued that financial behavior shaped by knowledge and attitudes contributes substantially to overall financial literacy, and with Shim et al. (2010), who emphasized the role of financial knowledge in developing literacy among young adults. Similarly, Xiao and Porto (2017) stressed the interconnectedness of financial knowledge, attitudes, and behaviors in shaping an individual's financial literacy and overall well-being.

4.5.1.2.2 Financial Inclusion

Figure 4.2, shows that Financial Inclusion is measured by two indicators: access to formal financial services and usage of formal financial services. Their respective outer loadings are 0.816 and 0.965, both of which are very high, indicating strong reliability of these measures.

Access to formal financial services has a loading of 0.816, which demonstrates that access is a strong contributor to financial inclusion. This implies that rural women's ability to open and maintain accounts, interact with banks, and access mobile or digital financial platforms forms an essential foundation for their inclusion in the formal financial system.

Usage of formal financial services shows an even stronger loading of 0.965, which is close to 1, making it the most dominant indicator of financial inclusion. This means that financial inclusion among rural women is most clearly reflected in their actual uptake

and utilization of services such as savings accounts, credit, insurance, and mobile money transfers. Usage, rather than mere access, is therefore the best signal of whether financial inclusion is taking root.

The difference between the two loadings highlights that while access is a necessary first step, it does not automatically translate into inclusion unless it is accompanied by active use of financial services. Once barriers to access such as distance, cost, and documentation are reduced, greater emphasis should be placed on encouraging usage. This ensures that access translates into meaningful participation in the financial system.

These findings are in line with Ozili (2018), who argued that true financial inclusion is achieved not just by providing access but by ensuring that individuals actively use formal financial services. In the context of rural women in Kenya, this suggests that interventions to improve financial inclusion should not only expand access channels but also build trust, awareness, and incentives to promote regular usage.

4.5.1.2.3 Structural Model Interpretation

The structural (inner) model interpretation was analyzed by considering path coefficients, R-squared, Cronbach's alpha, VIF and f2. The structural model is presented in Table 4.20.

Table 4.20: Financial Literacy and Financial Inclusion Structural Model Assessment

Relationship	β	Cronbach's Alpha (α)	VIF	f2	R2
Financial Literacy and Financial Inclusion	0.466	0.777	1.000	0.278	0.217

Note: β = denotes path coefficients; f2 = effect size; R2 = Coefficient of determination; VIF = Variance Inflation Factor

4.5.1.2.3.1 Path Coefficients (β)

The results of the structural model indicate that financial literacy, as an independent variable, exerts a positive effect on financial inclusion, with a path coefficient of $\beta = 0.466$. Based on Cohen's (1988) guidelines, this coefficient falls within the moderate effect range ($0.30 \leq \beta \leq 0.50$). This implies that a one-unit increase in financial literacy among rural women is associated with an increase of 0.466 units in financial inclusion. In other words, women who demonstrate higher levels of financial literacy are more likely to access and actively use formal financial services.

These findings corroborate earlier studies. For instance, Grohmann et al. (2018) established a positive relationship between financial literacy and financial inclusion across different contexts. This evidence reinforces the argument that targeted interventions to enhance financial literacy such as the provision of financial education programs can empower rural women with the knowledge and skills necessary for informed financial decision-making, ultimately leading to greater financial inclusion.

4.5.1.2.3.2 R-Squared (R^2) Interpretation

The coefficient of determination (R^2) for financial inclusion was found to be 0.217, indicating that approximately 21.7% of the variance in financial inclusion is explained by financial literacy in this model. The remaining 78.3% of the variance is attributable to other factors not captured in the present analysis, such as income levels, institutional barriers, cultural norms, and availability of financial infrastructure.

While the R^2 value highlights the importance of financial literacy, it also suggests that financial literacy alone is insufficient to fully explain financial inclusion outcomes. Reliance on financial education as the sole policy tool is therefore likely to yield limited impact. Complementary interventions such as regulatory reforms, product innovation,

reduction of access barriers, and attention to structural and psychological factors are equally critical in achieving comprehensive financial inclusion.

This interpretation is consistent with Willis (2011), who presented a critical perspective on the limitations of financial literacy programs, arguing that structural and regulatory mechanisms play a central role in shaping financial inclusion. Similarly, Huston (2020) highlighted that psychological and behavioral factors extend beyond knowledge and attitudes and can significantly influence financial decision-making.

4.5.1.2.3.3 Cronbach's Alpha (α)

The internal consistency of the scale measuring financial literacy was evaluated using Cronbach's alpha. The obtained value of $\alpha = 0.777$ exceeds the commonly accepted threshold of 0.70 (Taber, 2018), demonstrating that the items used in this study are reliable and internally consistent. This finding provides confidence that the data collected is robust and suitable for further analysis.

4.5.1.2.3.4 VIF (Variance Inflation Factor)

The analysis produced a VIF value of 1.000 for financial literacy. Since VIF values are used to assess multicollinearity among independent variables, this result indicates an absence of multicollinearity in the model. A VIF of 1.0 suggests that financial literacy is not correlated with other predictors. Given that VIF values exceeding 5 (or, more conservatively, 10) are typically regarded as problematic, the current result provides further assurance that multicollinearity does not undermine the validity of this model.

4.5.1.2.3.5 Cohen's f2 (Effect Size)

The effect size (f^2) of financial literacy on financial inclusion was calculated as 0.278. According to Cohen (1988), values of $f^2 = 0.02$, 0.15, and 0.35 represent small, medium,

and large effects respectively. Thus, the observed effect size of 0.278 falls between medium and large, signifying that financial literacy has a meaningful and substantial influence on financial inclusion in this context.

In summary, the structural model demonstrates a statistically significant and positive relationship between financial literacy and financial inclusion. The findings reveal that financial literacy explains 21.7% of the variance in financial inclusion ($R^2 = 0.217$), with a moderate path coefficient ($\beta = 0.466$) and a medium-to-large effect size ($f^2 = 0.278$). Furthermore, the measurement scale exhibited strong internal reliability ($\alpha = 0.777$), and no issues of multicollinearity were detected (VIF = 1.000).

These results provide robust support for the suggestion that improving financial literacy enhances financial inclusion among rural women in Kenya. Nevertheless, the relatively modest explanatory power of the model underscores the importance of addressing additional structural, institutional, and psychological determinants of financial inclusion alongside financial literacy interventions.

4.5.1.2 Chi-Square Analysis of Financial Literacy and Financial Inclusion

The study carried out a further examination of the influence of financial literacy on financial inclusion of rural women in Kenya to establish whether there was an association between rural women's financial literacy and their financial inclusion. To show whether there was an association, the study carried out Chi-square test of independence to compare the categorical variables. Financial literacy was measured by a combination of women's financial knowledge, financial behavior and financial attitude. The data was then converted into categorical variables of rural women being

financially literate or financially illiterate by converting the literacy scores into the actual number of women as shown in Table 4.21.

Table 4.21: Categorical Variables for Financial Literacy

Region	Total Population	Maximum	Financial Literacy Score	Financially Literate	Financially Illiterate
Western	195	21	12.96	121	74
North Eastern	150	21	7.97	57	93
Coast	149	21	11.28	80	69
Eastern	70	21	12.96	43	27
Nyanza	130	21	10.24	63	67
Rift Valley	177	21	12.65	107	70
Central	90	21	10.19	44	46
Total	**961**			**515**	**446**

From table 4.21, it is observed that the total population of rural women under consideration is 961. Out of these 515 rural women are financially literate while 446 are illiterate. Western, Rift Valley and Coastal regions had the highest number of women who were financially literate. North Eastern region has only 57 out of 150 rural women who are financially literate.

Financial inclusion on the other hand was measured by a combination of rural women's ability to access and use formal financial services. In developing a categorical variable to be used for Chi-square analysis, the study adopted the financial inclusion level index as used by Njenga and Irungu (2024) as seen in Table 4.16 that declared 3 levels of financial inclusion (low 0-3, medium 4-6 and high 7-10) and modelled financial inclusion in 2 classifications (financially included and financially excluded).

The study took the medium level (4-6) and split it into two (lower and upper part). The lower part was added to the low levels and denoted exclusion while the upper part was added to the high level to reflect inclusion. This then led to a new classification of financial inclusion as financially included and financially excluded where any rural woman who scored between 0-5 would be considered financially excluded while those who scored between 6-10 would be considered financially included.

With this new classification, the financial inclusion data was converted into categorical variables of rural women being financially included or financially excluded by converting the financial inclusion index into actual number of rural women. The results are presented in Table 4.22.

Table 4.22: Categorical Variables for Financial Inclusion

Region	Total Population	Maximum Statistics	Financial Inclusion Index	Financially Included	Financially Excluded %
Western	195	10	5.14	100	95
North Eastern	150	10	2.94	44	106
Coastal	149	10	4.31	64	85
Eastern	70	10	3.86	27	43
Nyanza	130	10	3.28	43	87
Rift Valley	177	10	3.56	63	114
Central	90	10	3.58	32	58
Total	**961**			**373**	**588**

It can be observed from Table 4.22 that 373 of the rural women are financially included while 588 are financially excluded. North Eastern and Rift valley regions recorded the highest number of rural women who were financially excluded (103 and 113 respectively).

To determine whether the association between rural women's financial literacy and financial inclusion is statistically significant, the study used the Chi-square test using the following steps;

Step 1: The study formulated a hypothesis for the first objective;

H0: There is no significant association between rural women's financial literacy and their financial inclusion.

Ha: There is a significant association between rural women's financial literacy and their financial inclusion.

Step 2: The study compared the overall observed counts from data with the expected counts as represented in tables 4.23 and 4.24 respectively.

Table 4.23: Overall Observed Count for Financial Literacy and Financial Inclusion

	Financial Inclusion		**Total**
Financial Literacy	Financially Included	Financially Excluded	Total
Financially Literate	334	181	515
Financially Illiterate	39	407	446
Total	**373**	**558**	**961**

From Table 4.23, the observed count reveal that 334 rural women were financially literate and financially included. 181 rural women were financially literate but were financially excluded. 39 rural women who were financially illiterate were financially included while 407 of the rural women who were financially illiterate were financially excluded.

The expected values of each of the cells was computed using the formula;

Expected Count = (Row Total * Column Total) / Grand Total

The study used SPSS to compute the expected count using a cross tabulation of financial literacy and financial inclusion and the results are presented in Table 4.24.

Table 4.24: Financial Literacy and Financial Inclusion Crosstabulation

Financial literacy * Financial Inclusion Crosstabulation

			Financial Inclusion		
			Financially Included	**Financially Excluded**	**Total**
Financial literacy	Financially Literate	Count	334	181	515
		Expected Count	200	315	515
		% of Total	34.8%	18.8%	53.6%
	Financially Illiterate	Count	39	407	446
		Expected Count	173	273	446.0
		% of Total	4.1%	42.4%	46.4%
Total		Count	373	588	961
		Expected Count	373	588	961
		% of Total	38.8%	61.2%	100.0%

The expected count of financially literate women who are financially included was approximately 200 while that of financially literate women who are financially excluded is 315. More so, the table reveals that the observed count of financially literate women who are financially included is substantially higher (334) than the expected count. Conversely, the observed count of financially literate women who are financially excluded is considerably lower (181) than the expected count.

Additionally, it is observed that the expected count of financially illiterate rural women who are financially included is 173 while the expected count for the financially illiterate

rural women who are financially excluded is 273. In comparison with the observed counts, financially illiterate women who are financially included is much lower (39) than the expected count. On the other hand, the observed count of financially illiterate women who are financially excluded is much higher (407) than the expected count. This then suggests a strong negative association in the sense that financial illiteracy is linked with financial exclusion.

Therefore, the study notes that the observed frequencies consistently deviate from the expected frequencies, demonstrating that financially literate women are significantly more likely to be financially included, while financially illiterate women are significantly more likely to be financially excluded.

Therefore, the results strongly implies that financial literacy is associated with financial inclusion and financial illiteracy is also associated with financial exclusion.

Step 3: The study determined the degrees of Freedom

df = (R - 1) * (C - 1) In this case, df = (2 - 1) * (2 - 1) = 1.

Step 4: The study then computed the Chi- square statistic using this formula;

$\chi^2 = \sum$ (Observed value – Expected value)^2/Expected value

$\chi^2 = (334 - 200)^2/200 + (181 - 315)^2/315 + (39 - 173)^2/173 + (407 - 273)^2/273$

$\chi^2 = 89.78 + 57.00 + 103.79 + 65.77$

$\chi^2 = 316.34$

Step 5: The study used SPSS software to compute statistics for making a decision on whether the chi – square value was statistically significant. The results are presented in Table 4.25

Table 4.25: Chi-Square Test Results for Financial Literacy and Financial Inclusion

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	316.854[a]	1	.000		
Continuity Correction[b]	314.496	1	.000		
Likelihood Ratio	351.372	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	316.524	1	.000		
N of Valid Cases	961				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 173.11.

b. Computed only for a 2x2 table

The results in Table 4.25 reveal a Pearson Chi-Square value (T-Statistic) of $\chi 2=316.854$ with a p-value of .000.

Step 6: Determine the critical value from the Chi-Square critical value table.

Table 4.26: Chi-Square Critical Value Table

Critical values of the Chi-square distribution with *d* degrees of freedom

	Probability of exceeding the critical value						
d	0.05	0.01	0.001	*d*	0.05	0.01	0.001
1	3.841	6.635	10.828	11	19.675	24.725	31.264
2	5.991	9.210	13.816	12	21.026	26.217	32.910
3	7.815	11.345	16.266	13	22.362	27.688	34.528
4	9.488	13.277	18.467	14	23.685	29.141	36.123
5	11.070	15.086	20.515	15	24.996	30.578	37.697
6	12.592	16.812	22.458	16	26.296	32.000	39.252
7	14.067	18.475	24.322	17	27.587	33.409	40.790
8	15.507	20.090	26.125	18	28.869	34.805	42.312
9	16.919	21.666	27.877	19	30.144	36.191	43.820
10	18.307	23.209	29.588	20	31.410	37.566	45.315

The Critical Value at alpha level 0.05 and 0.01 at 1 degree of freedom:

$\alpha = 0.05$; df = 1 Chi Square = 3.841

$\alpha = 0.01$; df = 1 Chi Square = 6.635

Step 7: Interpretation

The Chi-square value of 316.854 is much larger than the critical value of 3.841 and 6.635 at $\alpha = 0.05$ and $\alpha = 0.01$ df = 1. Since the $\chi 2$=361.854 >3.84, $\chi 2$=361.854 >6.635, we reject the null hypothesis and accept the alternative hypothesis that there is a statistically significant association between rural women financial literacy and their financial inclusion. The results confirm that rural women who are financially literate are likely to be financially included since they have the knowledge and awareness to engage in positive financial behavior like saving that will allow then to access formal

financial services enabling financial inclusion which is not the case with financially illiterate women.

This finding strongly supports the premise that financial literacy plays a role in facilitating or hindering financial inclusion for rural women in Kenya. These results underscore the importance of promoting financial literacy as a key strategy to enhance financial inclusion among rural women.

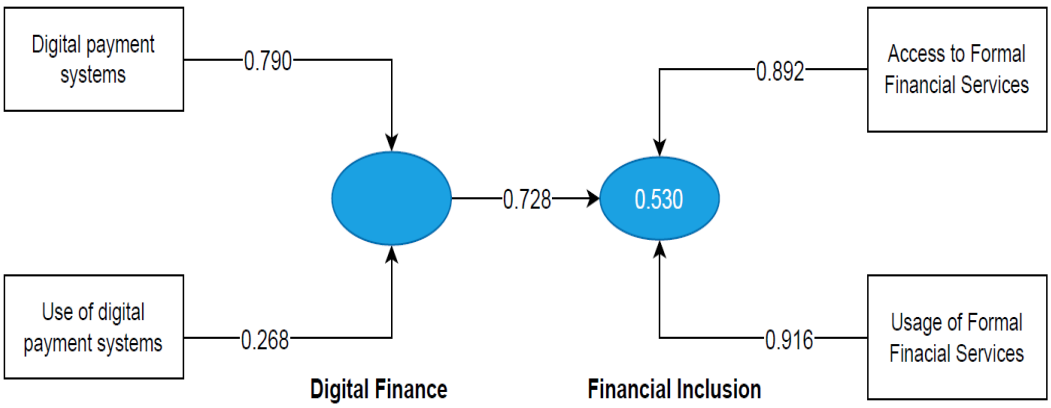
In conclusion, both the PLS–SEM and Chi-square test results, on the influence financial literacy and financial inclusion of rural women in Kenya, show a positive relationship between financial literacy and financial inclusion. The Chi- square test shows a strong statistical association between financial literacy and financial inclusion while the PLS model quantifies the relationship and shows that financial literacy is an important predictor of financial inclusion with a positive path coefficient of 0.466. The Chi–square test results ($\chi 2=361.854 > 6.635$) therefore helps confirm the PLS model results that financial literacy matters for financial inclusion.

The magnitude and direction of this relationship align with most studies that consistently affirm that financially literate individuals exhibit a higher propensity to participate in formal financial markets and effectively utilize the services offered by financial institutions (Falak et al., 2022). For instance, Thomas (2020) and Akande et al. (2023) argued that financial literacy had a positive impact on financial inclusion and that financial literacy was essential as it enhanced access to financial resources thus financial inclusion which agrees with the findings of this study. Koomson et al. (2020) observed that participation in financial literacy training programs increases the probability of financial inclusion for women by approximately **7%**.

4.5.2 Digital Finance and Financial Inclusion

4.5.2.1 PLS-SEM Analysis of Digital Finance and Financial Inclusion

Objective two focused on assessing the influence of digital finance on financial inclusion of rural women in Kenya. The study sought to establish the influence of digital finance on financial inclusion of rural women in Kenya using the PLS (Partial Least Squares Structural Equation Modeling) technique. Digital finance was measured using digital payment services and use of digital payment services. The measure of financial inclusion as the dependent variable was access to formal financial services and usage of formal financial services. To show the relationship between digital finance and financial inclusion, PLS-SEM analytical methodology was used. The analysis was based on path coefficients standardized to range from -1 to +1 and R-squared. The findings are represented in Figure 4.2.



Note: Blue circles represent the variables while the rectangles represent the indicators of the variable.
The number inside the blue circle represents the R-Squared. The arrows represent the path coefficients.

Figure 4.2 Digital Finance and Financial Inclusion

The results in figure 4.2 were interpreted based on measurement (outer) model and structural (inner) model according to Hair et al. (2022) and Wold (1982).

4.5.2.2 Measurement Model (Outer)Interpretation

4.5.2.1.1 Digital finance (Measurement Model)

The measurement model results indicate that the latent construct digital finance is reflected by two observed indicators: digital payment systems and use of digital payment systems.

The coefficient for digital payment systems is 0.790, demonstrating a strong positive loading on digital finance. This suggests that the presence and availability of digital payment systems are a dominant indicator of the digital finance construct among rural women in Kenya. In other words, the infrastructure and accessibility of digital payment platforms such as mobile money and other electronic payment channels strongly determine the overall level of digital finance.

By contrast, the indicator use of digital payment systems has a weaker but positive loading of 0.268. Although usage contributes positively to the measurement of digital finance, its relatively lower coefficient indicates that the actual uptake and application of these systems among rural women is less widespread compared to their availability. This gap between availability and usage may be attributed to barriers such as limited financial literacy, low trust in digital platforms, or cultural and infrastructural challenges. The findings therefore highlight that while access to digital payment systems is well established, greater emphasis must be placed on promoting awareness, trust, and practical usage to strengthen the digital finance construct.

These results are consistent with evidence from Demirgüç-Kunt et al. (2018) and the World Bank (2017), who argue that digital payments constitute the main entry point to digital finance, especially in developing economies. Furthermore, the World Bank

Group (2021), referencing M-Pesa in Kenya, emphasizes that both access to and usage of mobile money services have been instrumental in improving women's financial resilience, addressing geographic barriers to banking, and enhancing security by reducing cash dependence.

4.5.2.1.2 Financial Inclusion

The construct financial inclusion is reflected by two indicators: access to formal financial services and usage of formal financial services.

The loading for access to formal financial services is 0.892, signifying a very strong and positive relationship with financial inclusion. This suggests that the ability to reach and open formal financial service channels is a major component of inclusion for rural women.

The loading for usage of formal financial services is even higher, at 0.916, and is nearly a perfect indicator of financial inclusion. This implies that financial inclusion among rural women in Kenya is most strongly realized not merely through access, but through the active utilization of available services. Put differently, genuine inclusion is achieved when women not only gain access to financial products but also make sustained use of them to meet their financial needs.

The higher coefficient for usage compared to access underscores that while removing access barriers is necessary, it is insufficient on its own. Meaningful financial inclusion requires active engagement with financial products, which calls for efforts to build trust, reduce transaction costs, and design products that are relevant to rural women's needs. These findings align with Ozili (2018), who observed that expanded financial inclusion

through digital channels enhances both access to and usage of formal financial services, thereby generating positive welfare effects.

4.5.2.1.3 Structural Model Interpretation

The structural (inner) model interpretation was analyzed by considering path coefficients, R-squared, Cronbach's alpha, VIF and f2. The structural model is presented in Table 4.27

Table 4.27: Digital Finance and Financial Inclusion Structural Model Assessment

Relationship	β	Cronbach's Alpha (α)	VIF	f2	R2
Digital Finance and Financial Inclusion	0.728	0.780	1.000	1.129	0.530

Note: β = denotes path coefficients; f2 = effect size; R2 = Coefficient of determination; VIF = Variance Inflation Factor

4.5.2.1.3.1 Path Coefficients (β)

The structural model results indicate that digital finance has a significant and positive effect on financial inclusion, with a path coefficient (β) of 0.728. This implies that a one-unit increase in digital finance is associated with a 0.728 increase in financial inclusion, suggesting a strong and substantive relationship. In practical terms, higher adoption and integration of digital financial services among rural women in Kenya substantially enhance their levels of financial inclusion.

These finding positions digital finance as a critical enabler of inclusion, confirming that the availability and use of digital platforms such as mobile money, electronic transfers, and other fintech innovations reduce barriers to financial participation. By lowering transaction costs, increasing speed and efficiency, and extending service reach to underserved populations, digital finance effectively bridges the gap between financial

exclusion and formal financial engagement. These results are consistent with Ozili (2018), who highlighted the transformative role of fintech in driving financial access and usage, and with Banga (2019), who emphasized the efficiency gains and expanded outreach resulting from digital financial ecosystems.

4.5.2.1.3.2 R-Squared (R^2) Interpretation

The model yields an R^2 value of 0.530 for financial inclusion. This indicates that digital finance explains approximately 53% of the variance in financial inclusion, representing a substantial explanatory power in the context of social science research. This suggests that digital finance is a central driver of inclusion outcomes for rural women and can serve as a primary pathway to broaden their participation in the formal financial system.

Nevertheless, the remaining 47% of unexplained variance points to the influence of other factors structural, cultural, institutional, and psychological that also determine financial inclusion. This reinforces the argument made by Grohmann et al. (2018) and Couture et al. (2019) that financial inclusion is a multidimensional outcome shaped by a convergence of enablers, and not attributable to a single determinant. Therefore, while digital finance is critical, it must be complemented by parallel strategies such as consumer protection, regulatory frameworks, and tailored financial education.

4.5.2.1.3.3 Reliability of Constructs (Cronbach's Alpha, α)

The measurement reliability of the constructs is supported by a Cronbach's alpha of 0.780, which exceeds the conventional threshold of 0.70 (Taber, 2018). This indicates that the items used to measure digital finance and financial inclusion exhibit good internal consistency and are reliable for structural model analysis.

4.5.2.1.3.4 VIF (Variance Inflation Factor)

The Variance Inflation Factor (VIF) value of 1.000 confirms the absence of multicollinearity in the model. This indicates that digital finance operates as an independent explanatory variable without overlap with other latent constructs, ensuring the robustness of the structural path estimates

4.5.2.1.3.5 Effect Size (f^2)

The effect size (Cohen's f^2) for the relationship between digital finance and financial inclusion is 1.129. According to Cohen (1988), an f^2 value of 0.02 represents a small effect, 0.15 a medium effect, and 0.35 a large effect. The observed value far exceeds the threshold for a large effect, providing evidence of an exceptionally strong substantive impact of digital finance on financial inclusion. This finding underscores not only the statistical significance but also the practical importance of digital finance in shaping financial outcomes for rural women.

In summary, the structural model demonstrates a robust and highly significant relationship between digital finance and financial inclusion. The path coefficient ($\beta = 0.728$) confirms that digital finance is a strong predictor, while the R^2 value (0.530) shows that it explains more than half of the variance in financial inclusion. The exceptionally large effect size ($f^2 = 1.129$) further validates its substantive importance. Additionally, the constructs display strong reliability ($\alpha = 0.780$), and the absence of multicollinearity (VIF = 1.000) enhances the validity of the results.

These findings provide compelling empirical evidence that expanding digital finance infrastructure and fostering its effective usage among rural women in Kenya is a highly effective strategy for advancing financial inclusion. At the same time, they point to the

need for complementary interventions addressing the other determinants of inclusion to achieve holistic and sustainable outcomes.

4.5.2.2 Chi-Square Analysis of Digital Finance and Financial Inclusion

A further examination of objective two using Chi-Square on influence of digital finance on financial inclusion of rural women in Kenya was carried out to establish whether there was an association between rural women's digital finance levels and their financial inclusion. To show whether there was an association, the study carried out Chi-square test of independence to compare the categorical variables. Digital finance was measured by a combination of rural women's ownership of digital payment systems and their usage of digital payments systems. The data was later converted to categorical variables of rural women having adopted fintech or having not adopted fintech. The results are presented in Table 4.28.

Table 4.28: Categorical Variables for Digital Finance

Region	Total Population	Maximum Statistic	Digital Finance Score	Adopted Fintech	Not adopted Fintech
Western	195	12	7.54	123	72
North Eastern	150	12	5.21	65	85
Coastal	149	12	7.50	94	55
Eastern	70	12	7.17	42	28
Nyanza	130	12	6.22	68	62
Rift Valley	177	12	5.35	80	97
Central	90	12	7.50	57	33
Total	**961**			**529**	**432**

From table 4.28, it is observed that the total population of rural women under consideration is 961. Out of these 529 rural women had adopted Fintech while 432 had not adopted FinTech. Rift Valley region had the highest number of rural women who had not adopted Fintech.

Financial inclusion on the other hand was measured by a combination of rural women's access to formal financial services and usage of formal financial services. The data was also earlier converted to categorical variables representing rural women as being financially included or financially excluded. The results were presented in Table 4.29.

Table 4.29: Categorical Variables for Financial Inclusion

Region	**Total Population**	**Maximum Statistics**	**Financial Inclusion Index**	**Financially Included**	**Financially Excluded %**
Western	195	10	5.14	100	95
North Eastern	150	10	2.94	44	106
Coastal	149	10	4.31	64	85
Eastern	70	10	3.86	27	43
Nyanza	130	10	3.28	43	87
Rift Valley	177	10	3.56	63	114
Central	90	10	3.58	32	58
Total	**961**			**373**	**588**

It is also observed that 373 of the rural women are financially included while 588 are financially excluded with a majority of the excluded coming from North eastern and rift Valley regions.

To determine whether the association between digital finance among rural women and their financial inclusion is statistically significant, the study used the Chi-square test using the following steps;

Step 1: The study formulated a hypothesis for the first objective;

H0: There is no significant association between digital finance among rural and their financial inclusion.

Ha: There is a significant association between digital finance among rural women and their financial inclusion.

Step 2: The study compared the overall observed counts from data with the expected counts as represented in tables 4.30 and 4.31 respectively

Table 4.30: Overall Observation Count for Digital Finance and Financial Inclusion

	Financial Inclusion		**Total**
Digital Finance	Financially Included	Financially Excluded	
Adopted FinTech	300	229	529
Not Adopted FinTech	73	359	432
Total	**373**	**558**	**961**

From table 4.30, it is observed that 300 rural women had adopted Fintech and were financially included while 229 of the rural women who had adopted fintech were not financially included. Additionally, 73 rural women who had not adopted fintech were found to be included while 359 who had not adopted fintech were financially exclude.

To compute the expected values from table 4.30 an expected count formula can be used.

Expected Count = (Row Total * Column Total) / Grand Total

However, the study computed a cross tabulation of digital finance and financial inclusion using SPPS, the results are presented in Table 4.31.

Table 4. 31: Digital Finance and Financial Inclusion Crosstabulation

Digital Finance * Financial Inclusion Crosstabulation

			Financial Inclusion		
			Financially Included	**Financially Excluded**	**Total**
Digital Finance	Adopted Fintech	Count	300	229	529
		Expected Count	205	324	529
		% of Total	31.2%	23.8%	55.0%
	Not adopted Fintech	Count	73	359	432
		Expected Count	168	264	432.0
		% of Total	7.6%	37.4%	45.0%
Total		Count	373	588	961
		Expected Count	373	588	961.0
		% of Total	38.8%	61.2%	100.0%

The crosstabulation as shown in table 4.31 reveal both the observed and the expected counts of rural women in regards to digital finance and financial inclusion. The table reveals that the expected count of rural women who have adopted fintech and are financially included is 205 while those financially excluded yet they have adopted fintech is 324. For those that have not adopted fintech yet are financially included are 168 while those that have not adopted fintech and are financially excluded, the expected count is 264.

Therefore, the study notes that the observed frequencies consistently deviate from the expected frequencies, strongly suggesting that digital finance adoption and financial inclusion are not independent. It shows that there is an association between adoption of digital finance among rural women in Kenya and their financial inclusion.

Step 3: The study determined the degrees of Freedom

df = (R - 1) * (C - 1) In this case, df = (2 - 1) * (2 - 1) = 1.

Step 4: The study then computed the Chi- square statistic using this formula;

$\chi^2 = \sum$ (Observed value – Expected value)^2/Expected value

$\chi^2 = (300 - 205)^2/205 + (229 - 324)^2/324 + (73 - 168)^2/168 + (359 - 264)^2/264$

$\chi^2 = 44.02 + 27.85 + 53.72 + 34.18$

$\chi^2 = 159.77$

Step 5: The study used SPSS software to compute statistics for making a decision on whether the chi – square value was statistically significant. The results are presented in Table 4.32.

Table 4.32: Chi-Square Test Results for Digital Finance and Financial Inclusion

Chi-Square Tests

	Value	**df**	**Asymptotic Significance (2-sided)**	**Exact Sig. (2-sided)**	**Exact Sig. (1-sided)**
Pearson Chi-Square	158.715[a]	1	.000		
Continuity Correction[b]	157.043	1	.000		
Likelihood Ratio	167.440	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	158.550	1	.000		
N of Valid Cases	961				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 167.68.

b. Computed only for a 2x2 table

The results in Table 4.32 reveal a Pearson Chi-Square value (T-Statistic) of $\chi 2$=158.715 with a p-value of .000.

Step 6: Determine the critical value from the Chi – Square Critical value table.

The Critical Value at alpha level 0.05 and 0.01 at 1 degree of freedom:

$\alpha = 0.05$; df = 1 Chi Square = 3.841

$\alpha = 0.01$; df = 1 Chi Square = 6.635

Step 7: Interpretation

The Chi-square value of 158.715 is much larger than the critical value of 3.841 and 6.635 at $\alpha = 0.05$ and $\alpha = 0.01$ df = 1. Since the $\chi 2 = 158.715 > 3.84$, $\chi 2 = 158.715 > 6.635$, we reject the null hypothesis and accept the alternative hypothesis that there is a statistically significant association between digital finance among rural women and their financial inclusion. This basically implies that digital finance enhances financial. Therefore, the results confirms that rural women who have adopted and use digital finance are likely to access formal financial services thus financially included as opposed to those who have not adopted digital finance.

The statistical significance of these results supports the notion that there is a meaningful relationship between digital finance and financial inclusion among rural women in Kenya. These results agree with those of Durai and Stella (2019) who noted that financial inclusion is achieved through the adoption of digital finance as digital finance has the potential of providing affordable, and convenient financial services. These findings correspond with Widarwati et al. (2022), who opined that digital finance impacts financial inclusion through digital financial services that facilitate access to financial services thus financial inclusion.

It is therefore evident from the PLS-SEM results (R-squared value 0.530) as well as the Chi-Square test of independence ($\chi 2=158.715 > 6.635$) confirm that digital finance is crucial for financial inclusion. This strong association between digital finance and financial inclusion is consistent with the global shift toward digital-led inclusion, particularly in Sub-Saharan Africa (SSA), where mobile money has become the primary financial access point. The confirmation that digital finance is "crucial for financial inclusion" aligns with the basic premise that digital services lower transaction costs, mitigate time poverty, and expand reach beyond traditional banking (UN Women, 2019).

However, integrating this finding with other empirical evidence reveals a vital access versus usage dichotomy. While the statistical model confirms the potential influence of digital finance, the literature warns that this influence is often conditional and sometimes counterproductive in the absence of necessary enabling factors. For instance, other research utilizing the 2021 Kenya FinAccess Household Survey data found that FinTech adoption had a negative but statistically significant effect on women's economic empowerment ($\beta=-0.1664$, $p<0.05$). This highlights that while DF may provide access (as the R-squared suggests), it is insufficient alone to drive substantive empowerment due to barriers such as low digital literacy and gendered financial constraints.

The high statistical significance and R-squared value (0.530) directly support the diffusion of innovation theory’s attribute of relative advantage. The findings validate that digital finance is indeed recognized as advantageous in terms of efficiency, risk management, and providing greater control over personal finances (Kipchumba & Sulaiman, 2021).

The study's robust PLS-SEM and Chi-Square results therefore, confirm the essential role of digital finance, aligning with the diffusion of innovation theory's attribute of relative advantage and supporting empirical literature that shows that digital finance increases access and empowerment potential. However, diffusion of innovation theory and external empirical studies emphasize that to move beyond the current 53% explanatory power and achieve full inclusion, future interventions must address the structural barriers of complexity and incompatibility, particularly through integrated financial literacy training.

4.5.3 Financial Literacy and Digital Finance (Digital Financial Literacy) on Financial Inclusion

The third objective sought to establish the joint effect of financial literacy and digital finance on financial inclusion among rural women in Kenya. The study computed a new variable called digital financial literacy by multiplying the indicators of financial literacy (financial Knowledge, financial behavior and financial attitude) by digital finance indicators (digital payment services and usage of digital payment services). This was informed by the study of Lyons and Kass-Hanna (2021a) that defined digital financial literacy as a combination of digital finance and financial literacy.

Digital financial literacy therefore implies being "financially literate on digital platforms and being able to effectively use the available digital financial services". The study thus measured DFL by multiplying the metrics of both financial literacy and digital finance to get the digital financial literacy score. The actual scores were converted into percentages to represent the level of digital financial literacy in the regions. According to Ravikumar et al. (2022) there is no consensus on metrics of DFL,

therefore, the study defined a digitally financially literate women as one who scored a digital financial literacy score of at least 50%. The results are presented in Table 4.33.

Table 4.33: Regional Scores for Digital Financial Literacy

Region	Number of Women	Maximum Digital Literacy Score	Actual Digital Financial Literacy Score (%)	Digitally Financially Literate
Western	195	44	23.34 (53%)	✓
North Eastern	150	44	13.41 (30%)	×
Coastal	149	44	19.50 (44%)	×
Eastern	70	44	22.95 (52%)	✓
Nyanza	130	44	15.30 (35%)	×
Rift Valley	177	44	18.37(42%)	×
Central	90	44	21.80 (50%)	✓
Overall Digital Literacy	961	44	19.12 (43%)	×

✓-denotes that the regions scored at least 50% and above and are therefore considered digitally and financially literate.
×-denotes that the regions did not score at least 50% thus are not considered digitally and financially literate.

Regionally, Western region has the highest percentage (53%) of rural women who are digitally and financially literate followed by Eastern region with 52% and Central region with 50%. These fairly high scores are attributed to the reported regions high level of education and employment status that enable them to adopt and use digital finance easily as compared to other regions. Rift Valley, Nyanza and North Eastern regions with average digital financial literacy scores of 42%, 35% and 30% respectively are considered as having low digital financial literacy.

The regional statistics build up to the overall digital financial literacy score for rural women as shown in Table 4.33. The results reveal that rural women in Kenya have a

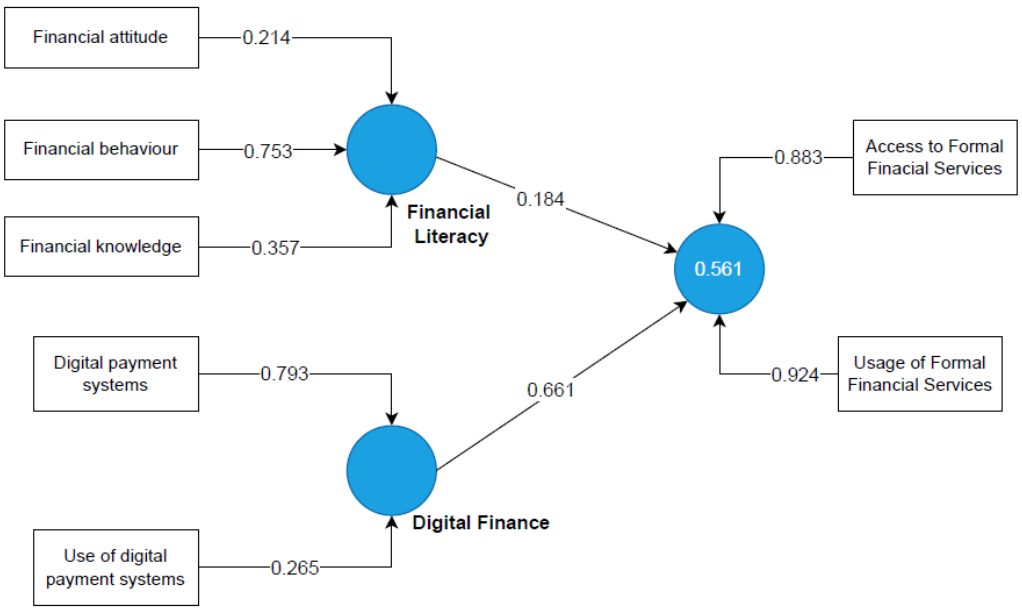
digital financial literacy score of 19.12 signifying that only 43% of the rural women are digitally and financially literate. This could be attributed to limited access to digital finance, low levels of financial literacy, lack of exposure to digital finance services and training programs and socio-economic conditions among rural women in Kenya as demonstrated in the demographic statistics.

The study suggests that the level of digital financial literacy among rural women is crucial for the adoption and usage of digital financial services which is key for financial inclusion. This agrees with Ravikumar et al. (2022) who noted that DFL is a key requirement for the effective usage of digital financial services. Accordingly, rural women with moderate to low digital financial literacy may face challenges in accessing and benefiting from formal financial services. There is therefore a need for targeted intervention and programs that focus on basic digital skills training, financial awareness campaigns about digital financial services and improving access to technology which will ultimately improve digital literacy among rural women particularly in North Eastern and Rift Valley regions of Kenya. This aligns with Morgan et al. (2020) who opined that DFL is a very crucial component in education in this digital age.

4.5.3.1 PLS–SEM Analysis of Digital Financial Literacy and Financial Inclusion

Using the Partial Least Squares Structural Equation Modeling (PLS-SEM) technique, the study sought to find out the structural relationship between digital financial literacy and financial inclusion of rural women in Kenya. Digital Financial Literacy was measured by multiplying the metrics of both financial literacy and digital finance to get the digital literacy score (Table 4.35). The actual scores were converted into percentages to represent the level of digital financial literacy in the regions. Financial inclusion on

the other hand was measured by the access and usage of formal financial services. To show the relationship between digital financial literacy and financial inclusion, PLS-SEM analytical methodology was used. The analysis was based on path coefficients standardized to range from -1 to +1 and R-squared that was interpreted according to Hair et al. (2022) The results are represented in Figure 4.3.



Note: Blue circles represent the variables while the rectangles represent the indicators of the variable. The number inside the blue circle represents the R-Squared. The arrows represent the path coefficients.

Figure 4.3 Digital Financial Literacy and Financial Inclusion

4.5.3.2 Measurement Model (Outer)Interpretation

4.5.3.2.1 Financial Literacy

The results presented in Figure 4.3 show that financial literacy is a latent construct measured by three indicators: financial behaviour, financial knowledge, and financial attitude. Among these, financial behaviour exhibits the strongest loading (β = 0.753), suggesting that the financial practices, decision-making, and day-to-day money management of rural women are the most significant reflections of their overall

financial literacy. This highlights that literacy in practice is most strongly expressed through behavioral patterns rather than just knowledge or attitudes.

Financial knowledge also shows a positive loading (β = 0.357), representing a moderate contribution to the measurement of financial literacy. This implies that while knowledge is an important enabler, its contribution to financial literacy is secondary to actual financial behaviour. Nevertheless, women who possess higher financial knowledge tend to demonstrate greater overall literacy, making it a meaningful though not dominant indicator.

Financial attitude, with a loading of (β = 0.214), contributes the least to the construct. This indicates a relatively weak but still positive relationship, suggesting that while favorable attitudes toward financial management are a component of literacy, they do not alone provide a strong reflection of the construct. Thus, the measurement model establishes that financial literacy is primarily behaviour-driven, with knowledge and attitudes playing supportive roles.

4.5.3.2.2 Digital Finance

The construct of digital finance is measured by digital payment systems and the usage of these systems. The availability of digital payment systems demonstrates a strong loading (β = 0.793), indicating that the existence and accessibility of digital financial platforms form the most significant aspect of digital finance among rural women.

On the other hand, the usage of digital payment systems shows a weaker loading (β = 0.265). Although usage contributes positively to the construct, its relatively lower weight suggests that while digital platforms are increasingly available, their actual adoption and utilization remain limited among rural women. This reflects a gap between

access and active engagement, highlighting the need for interventions that move beyond availability to foster meaningful usage.

4.5.3.2.3 Financial Inclusion

The construct of financial inclusion is measured by access to and usage of formal financial services. Access to formal financial services has a very strong loading (β = 0.883), indicating that enhanced access is a dominant reflection of inclusion. This underscores the importance of financial institutions providing physical, digital, and institutional access points to reach underserved populations.

Even stronger, however, is the loading of usage of formal financial services (β = 0.924). This coefficient, being very close to 1, positions usage as the most critical and dominant indicator of financial inclusion. This suggests that true financial inclusion extends beyond access to actual and consistent use of available services. Thus, while access opens the door to financial participation, usage demonstrates its realization and impact.

4.5.3.2.4 Structural (Inner) Model

The structural (inner) model interpretation was analyzed by considering path coefficients, R-squared, Cronbach's alpha, VIF and f2. The structural model is presented in Table 4.34

Table 4.34: Digital Financial Literacy and Financial Inclusion Structural Model Assessment

Relationship	β	Cronbach's Alpha (α)	VIF	f2	R2
Digital Financial Literacy and Financial Inclusion	0.661 0.184	0.930	1.161	0.857 0.066	0.560

Note: β = denotes path coefficients; f2 = effect size; R2 = Coefficient of determination; VIF = Variance Inflation Factor

4.5.3.2.4.1 Path Coefficients (β) Interpretation

The structural model results indicate that financial literacy has a positive but weak effect on financial inclusion with a path coefficient (β = 0.184). This suggests that, holding digital finance constant, a one-unit increase in financial literacy is associated with only a 0.184 increase in financial inclusion. While the relationship is positive, its relatively small magnitude implies that financial literacy alone does not directly translate into substantial inclusion outcomes. Instead, it is likely that financial literacy exerts a more meaningful influence on financial inclusion when complemented by other factors such as digital financial infrastructure and enabling institutional environments.

In contrast, the relationship between digital finance and financial inclusion is much stronger, with a path coefficient (β = 0.661). This demonstrates that, controlling for financial literacy, a one-unit increase in digital finance leads to a 0.661 increase in financial inclusion. This indicates that digital finance serves as a powerful driver of inclusion, reinforcing the centrality of digital payment systems and related technologies in enhancing financial participation among rural women. The strong coefficient highlights the transformative role of digital finance in bridging access and usage gaps in formal financial services.

4.5.3.2.4.2 R-Squared (R^2) Interpretation

The model reports an R^2 value of 0.561 for financial inclusion, meaning that 56.1% of the variance in financial inclusion is explained jointly by financial literacy and digital finance. This reflects substantial explanatory power, suggesting that the two constructs are important predictors of financial inclusion among rural women. However, the remaining 43.9% of unexplained variance points to the influence of other structural, economic, and socio-cultural factors that were not accounted for in this model.

These findings are consistent with Mohsin et al. (2024), who argue that combining financial literacy enhancement with improved access to digital finance is essential for empowering women and increasing their participation in economic activities. Similarly, Ozili (2018) emphasizes that digital platforms, when paired with financial literacy, enable individuals to effectively use financial services, thereby driving greater inclusion. This suggests that financial literacy on its own may be insufficient, but when combined with digital finance, it significantly increases the likelihood of rural women engaging with the formal financial system.

4.5.3.2.4.3 Reliability (Cronbach's Alpha, α)

The constructs in the model demonstrate excellent internal consistency, with a Cronbach's alpha of 0.930, well above the conventional threshold of 0.70. This indicates that the items used to measure financial literacy, digital finance, and financial inclusion are highly reliable and suitable for structural model analysis.

4.5.3.2.4.4 Multicollinearity (VIF)

The Variance Inflation Factor (VIF) value of 1.161 indicates that multicollinearity is not a concern in this model. Since this value is far below the accepted threshold of 5 (and even 10), the predictors operate independently, ensuring robust and unbiased path estimates.

4.5.3.2.4.5 Cohen's f2 (Effect Size)

The effect size results show that digital finance has a very large impact on financial inclusion, with a Cohen's f^2 value of 0.857. According to Cohen's (1988) guidelines, this far exceeds the threshold for a large effect (0.35), providing compelling evidence of the substantive significance of digital finance. This means that, beyond statistical

significance, digital finance is practically one of the most influential predictors of inclusion outcomes in this model.

Overall, the structural model demonstrates a strong and significant influence of digital finance ($\beta = 0.661$) on financial inclusion, compared to a weaker direct effect of financial literacy ($\beta = 0.184$). Together, these constructs explain 56.1% of the variance in financial inclusion ($R^2 = 0.561$), underscoring their combined relevance. The model is robust, with high construct reliability ($\alpha = 0.930$), no multicollinearity issues (VIF = 1.161), and an exceptionally large effect size for digital finance ($f^2 = 0.857$).

These findings suggest that digital finance is the most critical pathway to promoting financial inclusion among rural women, while financial literacy—though important—may require integration with digital tools to yield stronger outcomes. Thus, both constructs work in tandem, serving as prerequisites for meaningful access to and usage of formal financial services.

4.5.3.2.4.6 Conceptual Interpretation of the Structural Model

The structural model results provide an important lens through which the pathways to financial inclusion among rural women can be understood. The relatively weak direct effect of financial literacy on financial inclusion ($\beta = 0.184$) suggests that financial literacy, while necessary, does not automatically translate into inclusion. This indicates that simply knowing about financial concepts or having positive financial attitudes may not be sufficient to drive meaningful engagement with formal financial services. Instead, financial literacy appears to act as an enabling factor that prepares individuals to take advantage of other resources, particularly digital finance.

By contrast, digital finance demonstrates a very strong influence on financial inclusion ($\beta = 0.661$), confirming its central role as the primary driver of inclusion outcomes. Digital finance not only reduces barriers to access by providing low-cost, convenient, and geographically accessible services, but also amplifies the effect of financial literacy by offering platforms through which knowledge and behaviors can be applied. Thus, the interaction between financial literacy and digital finance is synergistic: literacy without digital tools has limited reach, while digital tools without literacy may lead to underutilization or misuse.

The R^2 value of 0.561 further demonstrates that more than half of the variance in financial inclusion is explained by the combined effects of these two constructs. This underscores the importance of viewing financial literacy and digital finance not as independent silos, but as interconnected elements of a broader inclusion ecosystem. Financial literacy builds the cognitive foundation equipping rural women with the skills, knowledge, and confidence to engage while digital finance provides the functional infrastructure through which engagement becomes possible.

This mechanism suggests a two-stage pathway: financial literacy equips individuals with the capability, while digital finance supplies the opportunity. Together, they create the conditions for sustainable financial inclusion. The findings therefore make a theoretical contribution by shifting the discourse away from literacy alone as a panacea, toward a complementary model where literacy and digital access must be jointly cultivated to achieve transformative inclusion outcomes

4.5.3.3 Chi–Square Analysis of Digital Literacy and Financial Inclusion of Rural Women in Kenya

The study carried out a further examination of objective three to establish whether there was an association between rural women's digital financial literacy levels and their financial inclusion. Towards this end, the study carried out Chi-square test of independence to compare the categorical variables. Digital financial literacy was computed by multiplying the elements of financial literacy and digital finance. The data for the computed variable was later converted into categorical variables of rural women being digitally financially literate or digitally financially illiterate. The results are presented in Table 4.35.

Table 4.35: Categorical Variables for Digital Financial Literacy

Region	Number of Women	Maximum Digital Literacy Score	Actual Digital Literacy Score	Digitally Financially Literate	Digitally Financially Illiterate
Western	195	44	23.34	103	92
North Eastern	150	44	13.41	46	104
Coastal	149	44	19.50	66	83
Eastern	70	44	22.95	36	34
Nyanza	130	44	15.30	45	85
Rift Valley	177	44	18.37	74	103
Central	90	44	20.80	42	48
Total				**412**	**549**

From table 4.35, it is observed that the total population of rural women under consideration is 961. Out of these 412 rural women were digitally and financially literate while 549 were digitally and financially illiterate.

Simultaneously, financial inclusion was measured by a combination of rural women's access to formal financial services and their usage of formal financial services. The data was converted into categorical variables indicating rural women as being financially included or financially excluded. The results are presented in Table 4.36.

Table 4.36: Categorical Variables for Financial Inclusion

Region	Total Population	Maximum Statistics	Financial Inclusion Index	Financially Included	Financially Excluded %
Western	195	10	5.14	100	95
North Eastern	150	10	2.94	44	106
Coastal	149	10	4.31	64	85
Eastern	70	10	3.86	27	43
Nyanza	130	10	3.28	43	87
Rift Valley	177	10	3.56	63	114
Central	90	10	3.58	32	58
Total	**961**			**373**	**588**

It is also observed that 373 of the rural women are financially included while 588 were financially excluded.

To determine whether the association between digital financial literacy among rural women and their financial inclusion is statistically significant, the study used the Chi-square test using the following steps;

Step 1: The study formulated a hypothesis for the first objective;

H0: There is no significant association between digital financial literacy among rural women and their financial inclusion.

Ha: There is a significant association between digital literacy among rural women and their financial inclusion.

Step 2: The study compared the overall observed counts from data with the expected counts as represented in tables 4.37 and 4.38 respectively.

Table 4.37: Observed Count for Digital Financial Literacy and Financial Inclusion

	Financial Inclusion		**Total**
Digital Financial Literacy	Financially Included	Financially Excluded	
Digitally Financially Literate	309	103	412
Digitally Financially Illiterate	64	485	432
Total	**373**	**558**	**961**

From table 4.37, it is observed that 309 rural women who were digitally and financially literate were financially included while 103 of the rural women who were digitally and financially literate were not financially included. Additionally, 64 rural women who were digitally and financially illiterate were found to be included while 485 rural women who were digitally and financially illiterate were financially excluded.

To compute the expected values from table 4.37 an expected count formula can be used.

Expected Count = (Row Total * Column Total) / Grand Total

However, the study computed a cross tabulation of digital financial literacy and financial inclusion using SPPS, the results are presented in Table 4.38.

Table 4.38: Digital Financial Literacy and Financial Inclusion Crosstabulation

Digital Financial Literacy * Financial Inclusion Crosstabulation

			Financial Inclusion		
			Financially Included	**Financially Excluded**	**Total**
Digital Financial Literacy	Digitally Financially Literate	Count	309	103	412
		Expected Count	160	252	412.0
		% of Total	32.2%	10.7%	42.9%
	Digitally Financially Illiterate	Count	64	485	549
		Expected Count	213	336	549.0
		% of Total	6.7%	50.5%	57.1%
Total		Count	373	588	961
		Expected Count	373	588	961.0
		% of Total	38.8%	61.2%	100.0%

The crosstabulation as shown in table 4.38 reveal both the observed and the expected counts of rural women in regards to digital financial literacy and financial inclusion. The table reveals that the expected count of rural women who were digitally and financially literate and were financially included was 160 while those financially excluded yet they were digitally and financially literate were 252. For those rural women that were digitally and financially illiterate yet are financially included were 213 while those that were digitally and financially illiterate and are financially excluded, the expected count is 336.

Therefore, the study notes that the observed frequencies consistently deviate from the expected frequencies, strongly suggesting that digital financial literacy and financial inclusion are not independent. It shows that there is an association between digital literacy among rural women in Kenya and their financial inclusion.

Step 3: The study determined the degrees of Freedom

df = (R - 1) * (C - 1) In this case, df = (2 - 1) * (2 - 1) = 1.

Step 4: The study then computed the Chi- square statistic using this formula;

$\chi^2 = \sum$ (Observed value – Expected value)^2/Expected value

$\chi^2 = (309 - 160)^2/160 + (103 - 252)^2/252 + (64 - 213)^2/213 + (485 - 336)^2/336$

$\chi^2 = 138.75 + 88.09 + 104.23 + 66.07$

$\chi^2 = 397.14$

Step 5: The study used SPSS software to compute statistics for making a decision on whether the chi – square value was statistically significant. The results are presented in Table 4.39.

Table 4.39: Chi-Square Test for Digital Financial Literacy and Financial Inclusion

Chi-Square Tests

	Value	**df**	**Asymptotic Significance (2-sided)**	**Exact Sig. (2-sided)**	**Exact Sig. (1-sided)**
Pearson Chi-Square	397.646[a]	1	.000		
Continuity Correction[b]	394.983	1	.000		
Likelihood Ratio	425.024	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	397.232	1	.000		
N of Valid Cases	961				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 159.91.

b. Computed only for a 2x2 table

The results in Table 4.39 reveal a Pearson Chi-Square value (T-Statistic) of $\chi 2$=397.64 with a p-value of .000.

Step 6: Determine the critical value from the Chi – Square Critical value table.

The Critical Value at alpha level 0.05 and 0.01 at 1 degree of freedom:

$\alpha = 0.05$; df = 1 Chi Square = 3.841

$\alpha = 0.01$; df = 1 Chi Square = 6.635

Step 7: Interpretation

The Chi-square value of 397.64 is much larger than the critical value of 3.841 and 6.635 at $\alpha = 0.05$ and $\alpha = 0.01$ df = 1. Since the $\chi 2 = 397.64 > 3.84$, $\chi 2 = 397.64 > 6.635$, we reject the null hypothesis and accept the alternative hypothesis that there is a statistically significant association between digital financial literacy among rural women and their financial inclusion. The results imply that rural women who are financially literate and have adopted digital finance are digitally and financially literate making it easier for them to access and use formal financial services thus become financially included. This finding strongly supports the premise that digital financial literacy enhances financial inclusion for rural women in Kenya.

From the analysis, the study found out that digital financial literacy (both financial literacy and digital finance) work in tandem to shape the financial inclusion landscape among rural women in Kenya. Using the Partial Least Squares Structural Equation Modelling Technique, it was revealed that the joint effect of financial literacy and digital finance explains 54.4% of the variations in financial inclusion of rural women in Kenya. The Pearson Chi-Square value (T-Statistic) for digital financial literacy and financial inclusion was $\chi 2 = 397.64 > 6.635$ with a p-value of .000 at $\alpha = 0.01$ indicating a statistically significant association between digital financial literacy and financial inclusion.

This result provides definitive quantitative evidence that financial literacy and digital finance work in tandem, confirming the necessity of integrated, synergistic interventions to shape the financial landscape for rural women in Kenya. This suggests that digital financial literacy positively influences financial inclusion by promoting the adoption and usage of digital financial services among services. These findings are in agreement with the findings of Ozili (2018), who posits that individuals with higher levels of financial literacy are more likely to adopt and effectively use digital finance tools, leading to increased financial inclusion. Additionally, the findings agree with the study by Mohsin et al. (2024), who noted that the combination of financial literacy and digital finance can be a powerful driver of financial inclusion since digital platforms paired with some financial literacy training can easily help rural women manage their finances better enabling them to actively participate in the economy.

It is important to note that the success of the joint effect is strongly illuminated by Diffusion of Innovation (DOI) Theory (Rogers, 2003). While digital finance possesses the inherent relative advantage that is necessary to spur adoption, offering efficiency and cost reduction (UN Women, 2019), its eventual diffusion often stalls due to the barriers of Complexity and Compatibility. The high R-squared value of 0.544 suggests that financial literacy acts as the necessary catalyst to overcome the complexity barrier. By enhancing cognitive skills, financial literacy reduces the perceived difficulty of adopting and using digital finance, thereby making the innovation more accessible and reducing the risk of rejection. Conversely, where financial literacy is absent, the innovation's potential advantage is nullified by its perceived complexity. The joint effect confirms that maximizing the influence of digital finance on inclusion depends on first successfully diffusing the underlying financial knowledge needed to use it.

4.5.4: Rural Women perspectives on Financial Inclusion

In Kenya, despite significant strides in recent years, rural women continue to face numerous barriers to accessing and utilizing formal financial services. The study sought to conduct further robust tests to prove the results in objectives 1-3. The tests were addressed in objective 4 on the rural women perspectives on financial inclusion, where the study sought to find out the different perspectives that the rural women held regarding Financial Inclusion in an attempt to explore their experiences, challenges, and aspirations.

Rural women perspectives in this study are analyzed using 6 questions revolving around financial training, their access to digital finance and their security when using digital financial services. Each question is allocated one point. A higher score indicates a more positive view of financial inclusion. The results are presented in Table 4.40.

Table 4.40: Rural Women Perspectives on Financial Inclusion

Region	N	Maximum Statistics	Perception on Financial Inclusion (Mean Statistics)
Western	191	6	4.98
North Eastern	150	6	1.71
Coastal	138	6	4.75
Eastern	70	6	4.89
Nyanza	130	6	3.92
Rift Valley	177	6	3.68
Central	90	6	4.78
Overall	961	6	4.173

Regionally from Table 4.40, rural women in Western region have a more positive view (4.98) of financial inclusion followed by Eastern region (4.89) Central (4.78) and

Coastal region (4.75). Nyanza and Rift Valley regions are slightly below the average perception. These regional results reveal mixed perceptions among rural women suggesting that in as much as they appreciate potential advantages of financial inclusion, there are concerns like security of digital finance that influence their overall perception. According to (Ozili, 2020) in as much as financial inclusion is meant to liberate, access to microcredit and other financial services with hidden charges always make individuals insecure hindering their adoption.

The study also reveals that the perception in North Eastern displays a significantly lower average perception score of 1.71 as compared to other regions suggesting a less positive view of financial inclusion that is attributed to challenges associated with financial inclusion like access to formal financial services, understandability and ability to use financial services, gender roles and trust and security concerns.

Generally, on average rural women in Kenya have a moderately positive perception of financial inclusion as shown by a score of 4.173. This suggests that rural women view having access to and using formal financial services like savings accounts, credit, insurance, and digital payments as a means of improving their lives.

Specifically, rural women from the different regions gave their perceptions on certain questions that reveled their perceptions and the results are presented in Table 4.41.

Table 4.41: Regional Perspectives on Financial Inclusion

Perspectives	Western %	Eastern %	North Eastern %	Central %	Coastal %	Rift Valley %	Nyanza %
Received formal or informal training on saving, budgeting or credit	32.5	25	7.3	33.2	12	20	30
Access to digital finance would be beneficial.	95.4	90	96.8	88	97.4	96.8	97.7
Safe using Digital Financial Services?	20	14.8	1.6	15.2	11	10	9

The results from Table 4.41 reveal that an overwhelming high percentage of rural women across all the seven regions believe that access to digital finance would be beneficial. This strong consensus across all regions indicates a high level of awareness and potential demand for digital financial services among rural women. It implies that rural women recognize the potential benefits of digital finance in terms of convenience, security, and access to a wider range of financial tools.

Additionally, the results reveal very low formal or informal training rural women across the regions highlighting a crucial gap that must be addressed to empower rural women to effectively utilize financial resources. The lack of or limited training suggests that many rural women may lack the foundational financial literacy skills needed to make informed decisions about saving, borrowing, and managing their finances, regardless of the availability of financial services. On the safety of digital finance, most rural

women across the regions indicated that they did not feel safe which could be the reason for the low uptake of digital financial services inhibiting eventual financial inclusion.

Collectively, Table 4.42 presents the overall responses from rural women in Kenya regarding financial inclusion.

Table 4.42: Specific Questions Relating to Rural Women Perspectives

Rural Women Perspectives	Status	Number	Percentage
Received formal or informal training on saving, budgeting or credit.	Yes	217	23%
Access to digital finance is beneficial	Yes	906	94%
Safe using Digital Financial Services	Yes	111	12%

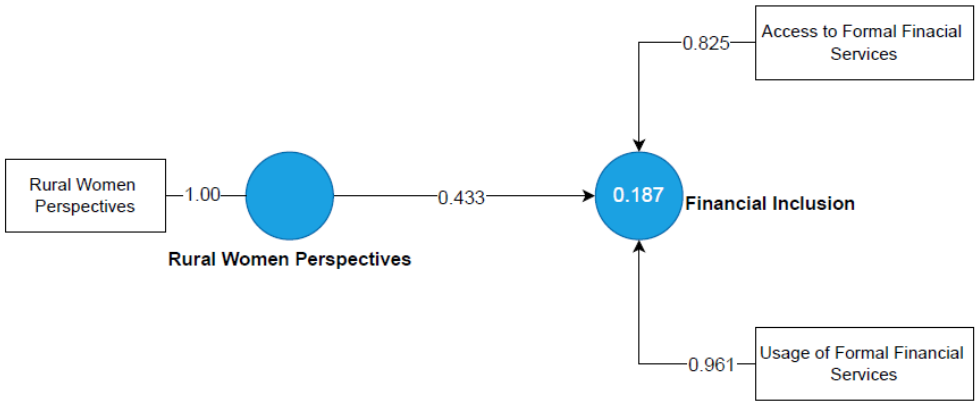
The results from Table 4.42 indicate that a significant majority (77%) of rural women in Kenya have not received any formal or informal training on saving, budgeting or credit as shown in row 2. This finding highlights a substantial gap in financial literacy among rural women that limits their economic empowerment acting as a hindrance to adoption and utilization of formal financial services thus remaining financially excluded. This could be a justification as to why rural women displayed low levels of financial behavior leading to low levels of financial literacy.

Additionally, as shown an overwhelming majority (94%) of rural women think that access to digital finance will be beneficial. This indicates that rural women recognize the advantages that digital finance offers when adopted enhancing financial inclusion. On their safety while using digital financial services, 88% of the rural women reported that they did not feel safe using digital financial services suggesting that safety and

security concerns are a major barrier to the adoption and usage of digital financial services among rural women in Kenya.

4.5.4.1 PLS-SEM Analysis of Rural Women Perspectives on Financial Inclusion

For objective 4 which is a robust test to prove objectives 1-3, the study sought to find out the rural women perspectives on financial inclusion using the PLS (Partial Least Squares Structural Equation Modeling) technique. The findings are represented in Figure 4.4.



Note: Blue circles represent the variables while the rectangles represent the indicators of the variable.
The number inside the blue circle represents the R-Squared; The arrows represent the path coefficients.

Figure 4.4 Rural Women Perspectives on Financial Inclusion

The PLS results revealed that rural women perspectives are directly measured by direct representation of the observed variable rural women perspectives giving a path coefficient of 1.000.

4.5.4.1.1 Structural (Inner) Model

The structural model results show that rural women's perspectives have a positive and statistically meaningful influence on financial inclusion, with a path coefficient of 0.433. This indicates that a one-unit improvement in rural women's perspectives

towards financial services is associated with a 0.433 increase in financial inclusion, holding other factors constant. The finding underscores that the way rural women perceive formal financial systems whether in terms of trust, relevance, or accessibility plays an important role in shaping their level of financial inclusion. In this sense, addressing women's attitudes, beliefs, and lived experiences emerges as a critical pathway to improving access to and usage of formal financial services.

4.5.4.1.1.1 R-Squared Interpretation

The model reveals that rural women's perspectives explain 18.7% ($R^2 = 0.187$) of the variation in financial inclusion. While modest, this explanatory power is meaningful in highlighting that what rural women think and feel about financial services directly affects whether they adopt or reject such services. Negative perceptions such as distrust of financial institutions, fear of complexity, or concerns over the safety of digital platforms can reinforce self-exclusion and keep women within the margins of the financially excluded population. Conversely, positive perspectives are associated with greater willingness to access and use financial products, thereby enhancing inclusion.

This result resonates with the Vulnerable Group Theory (VGT), which argues that marginalized populations are disproportionately excluded from mainstream financial systems and remain most vulnerable during economic shocks (Ozili, 2025). Rural Kenyan women, often disadvantaged by limited asset ownership, insecure income sources, and entrenched structural inequalities (Verixiv, 2024), exemplify this vulnerability. From a VGT lens, improving financial inclusion for such groups requires interventions that are not only accessible but also tailored to their perceptions and needs.

The explanatory power (18.7%) further demonstrates that self-exclusion, driven by perceptions, is an important dimension of financial exclusion. Even when financial services are available, negative perceptions can deter adoption. As UN Women (2019) noted, perceived risks and mistrust of digital financial services often prevent rural women from fully engaging with financial innovations. Thus, shifting perceptions through gender-sensitive financial literacy initiatives, trust-building strategies, and context-specific training materials (FAO, 2024) is essential. A positive shift in perceptions becomes a precursor to the behavioral change required for rural women to overcome structural barriers and achieve meaningful financial inclusion, in line with the tenets of VGT.

4.5.4.1.2 Theoretical Contribution

This study makes a notable contribution to the financial inclusion literature by highlighting the critical role of rural women's perspectives as an intangible yet powerful determinant of inclusion outcomes. While most prior studies have focused on measurable enablers such as financial literacy, income, or access to digital finance, this study demonstrates that perceptions, attitudes, and lived experiences are equally important in shaping financial behavior. The path coefficient ($\beta = 0.433$) and explanatory power ($R^2 = 0.187$) provide empirical evidence that positive perspectives significantly enhance access to and usage of formal financial services, while negative perceptions reinforce self-exclusion.

By situating these findings within the Vulnerable Group Theory (VGT), the study advances theoretical understanding by showing that financial exclusion is not only the product of structural inequalities but also of self-exclusion rooted in perceptions and trust deficits. In this sense, rural women's perspectives operate as both a barrier and a

gateway to inclusion. A negative perspective can lock women into the "vulnerability bracket," whereas a positive perspective can catalyze adoption, usage, and ultimately resilience through financial inclusion.

Therefore, this research broadens the conceptualization of financial inclusion by positioning perceptions as a mediating dimension bridging the gap between structural access (availability of services) and actual behavioral adoption (usage of services). This extends the application of VGT to financial inclusion by introducing the notion that addressing psychological and perceptual barriers is just as critical as dismantling structural barriers

CHAPTER FIVE
SUMMARY CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter highlights a summary of findings from the analyzed data, gives a conclusion and offers recommendations for policy based on the findings.

5.1 Summary of Findings

This research project has successfully assessed the influence of financial literacy and digital finance on financial inclusion of rural women in Kenya. It therefore presents the findings of the study.

5.1.1 Influence of Financial Literacy on Financial Inclusion

With regards to financial literacy and financial inclusion the research revealed that financial literacy a combination of awareness, knowledge, skills, attitude and behavior is necessary to make financial decisions that positively influence financial inclusion of rural women in Kenya. From the collected data as shown in Table 4.11, it is clear that rural women in most of the regions have low levels of financial literacy with a mean of 11.15 falling short of the established financial literacy threshold of 13 out of 21 points. Rural women evidently lacked essential knowledge, skills and attitudes that are needed to make informed financial decisions contributing to the low financial literacy scores.

Furthermore, it is noted from Table 4.9 that the average scores for financial knowledge (4.5 out of 7), financial behavior (3.8 out of 9) and financial attitude (2.7 out of 5) confirm the low financial literacy levels among rural women. Undoubtedly, only a few rural women had a clear understanding of the concept of interest rate which is a key component of financial knowledge as shown in Table 4.7.

Budgeting is an important concept that helps determine an individual's financial behavior that contribute to their level of financial literacy. However, from the data, close to 60% of the rural women indicated that they did not budget an indication that the concept has also not been embraced by many women as shown in Table 4.10 leading to low literacy levels.

Regionally, North Eastern had the majority of rural women who displayed low levels of financial literacy as represented by a mean of 7.9. Only 1.3% of the rural women in this region understood the concept of interest rate, 4.0% understood budgeting, and about 80.1% did not have an idea about saving or investments.

Furthermore, it emerged that financial literacy has a positive impact on financial inclusion, with financial knowledge, financial behavior, and financial attitude all contributing to improved financial literacy which enhances financial inclusion. The findings suggest that rural women with higher financial literacy are more likely to be financially included, while those with lower financial literacy are more likely to be financially excluded.

Additionally, the study highlighted compelling evidence of significant challenges facing rural women in Kenya regarding financial literacy and financial inclusion.

For instance, the financial literacy score of rural women in Kenya falls below the established threshold required for effective financial decision making and actual participation in the formal financial sector

The study also noted that a significant majority of rural women lack understanding of fundamental concepts such as interest rates having profound implications on their ability to make informed financial decisions and participate effectively in formal

financial systems. Regionally, there were disparities with financial literacy scores with North Eastern region posting the lowest financial literacy score pointing to geographical inequalities when it comes to financial inclusion. This highlights the need for targeted financial education programs to empower rural women in different regions with the aim of improving their financial decision-making capabilities

More so other than the financial knowledge gap, the research findings indicated that there is a deeper attitudinal and behavioral pattern among the rural women that may be influenced by cultural norms, immediate economic pressures, or a lack of access to formal financial services that makes them prefer spending their money other than investing or saving. It is evident therefore that rural women the financial knowledge gap, deeper attitudinal and behavioral patterns among the rural women influence their participation in the formal financial institutions impacting financial inclusion.

The Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis revealed a positive path coefficient of 0.466 between financial literacy and financial inclusion, confirming a strong, significant predictive relationship. This finding is further cemented by the highly robust Chi-Square test result ($\chi 2=316.854>3.84$). However, the analysis also demonstrated that financial literacy explains only an approximate 21.7% of the variance in financial inclusion ($R2=0.217$). This outcome is profoundly significant: while it validates that financial literacy is an indispensable factor, the remaining 78.3% of unexplained variance signals that other critical barriers ranging from digital access to profound socio-cultural constraints must be concurrently addressed to achieve substantive financial inclusion for rural women in Kenya.

In conclusion, the study validates financial literacy as a statistically significant predictor of financial inclusion. However, the high residual variance provides a clear mandate for a holistic policy approach that integrates financial literacy training with digital finance provision and simultaneously confronts the deeply embedded structural and socio-cultural barriers facing rural Kenyan women.

5.1.2 Influence of Digital Finance on Financial Inclusion of Rural Women in Kenya

On the influence of digital finance and financial inclusion of rural women, the study revealed that digital finance is a potential route to achieving and enhancing financial inclusion, offering opportunities for extended access and usage of financial services for rural women in Kenya. Even so, from the data collected, it is evident that rural women displayed low levels of adoption and usage of digital finance. This was well represented by a mean of 6.6 falling short of the digital finance threshold of 8 out of 12. North Eastern, Nyanza and Rift Valley regions registered the lowest means at 5.23, 6.92 and 5.35 respectively. On the ownership of digital payment systems, the study findings demonstrated that more than 60% of the rural women owned a mobile device and had a mobile money account. Contrary to this, only 30.21% owned an account in a formal financial institution and 17.12% had an ATM card an indication of the low uptake of digital financial services among the rural women in Kenya.

Over and above that, the study demonstrated that more than half (59.2%) of the rural women used mobile money accounts to transact as compared to 20.1% who used bank accounts and only 13.4% who transacted using the ATM cards. On the regional front, the findings revealed that North Eastern had a bigger percentage than the overall percentage with 75.5% of its rural women not being able to use their mobile money

account, 98% could not operate their bank accounts as well as use their ATM cards. The results reveal that digital finance has the potential to enhance financial inclusion by offering increased access and usage of financial services for rural women in Kenya. It suggests that the availability, adoption and usage of digital payment systems and services impact the overall digital finance levels positively promoting financial inclusion among the rural women

The structural modeling analysis yielded a robust and highly significant finding: digital finance (DF) is a key driver of financial inclusion (FI) among rural women in Kenya. The Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis revealed a positive path coefficient of 0.728 and an R-Square value of 53.0%, demonstrating that digital finance explains over half of the variation in financial inclusion. This strong predictive power is unequivocally confirmed by the highly significant Chi-Square test ($\chi 2=158.715>6.635$). The substantial path coefficient of 0.728 validates that digital finance is perceived by rural women as significantly better than the traditional cash-based system it supersedes. This is because digital finance offers crucial benefits like efficiency, lower transaction costs, and mitigation of time poverty associated with travel and waiting (UN Women, 2019). This confirmed advantage is the primary catalyst for the adoption and subsequent statistical association observed in the model

However, the data also indicates that rural women in Kenya display relatively low levels of adoption and usage of digital finance particularly pronounced in the North Eastern, Nyanza, and Rift Valley regions. The study also revealed significant disparity between the adoption of mobile money services and the uptake of other digital financial services among rural women in Kenya. More rural women owned a mobile devise and had a mobile money account but very few owned an account in a formal financial

institution limiting their ability to be financially included. This aligns with the diffusion of innovation theory that highlights that despite this confirmed advantage, adoption success is conditional on the perception of complexity. This suggests that while digital finance holds great potential, its diffusion is hindered by the complexity barrier. This emphasizes that the 53.0% explanatory power is dependent on successful strategies (like integrated training) that address the digital and cognitive difficulty of the innovation.

5.1.3 Influence of Financial Literacy and Digital Finance (Digital Financial Literacy) on financial Inclusion of Rural Women in Kenya

The findings revealed a complex interplay between financial literacy and digital finance in influencing financial inclusion. The results reveal that rural women in Kenya have a digital financial literacy mean score of 19.12 signifying that only 43% of the rural women are digitally literate as compared to 57% who are digitally illiterate. This could be attributed to access to digital finance, low levels of financial literacy, exposure to digital finance services and training programs and socio-economic conditions among rural women in Kenya

The statistical analysis established a relationship of profound significance: the joint effect of financial literacy (FL) and digital finance (DF) termed Digital Financial Literacy (DFL) explains 56.1% of the variation in financial inclusion (FI) among rural women in Kenya. This finding, quantified by the high R-squared value and confirmed by the highly significant Chi-Square statistic ($\chi 2=397.64>6.635$), confirms that digital financial literacy is the decisive factor shaping the financial landscape for rural women in Kenya.

The R-squared of 0.561 suggests that financial literacy serves as the essential mitigating factor for the complexity barrier. By increasing comprehension and reducing perceived risk, financial literacy makes the digital finance innovation understandable and usable, thereby accelerating its adoption rate. Furthermore, the joint effect increases the innovation's compatibility with rural women's lives. Digital finance offers greater control over personal finances (Kipchumba & Sulaiman, 2021), directly aligning the innovation with women's needs for autonomy and efficiency, which are highly valued in the social system.

Additionally, the successful realization of digital financial literacy in early adopters creates visible models within the community. When peers observe that women who are financially literate and using digital tools gain greater control over household finances, they are motivated to imitate both the cognitive skills (FL) and the behavior (DF adoption). The high Chi-Square statistic confirming a significant association between digital financial literacy and financial inclusion suggests that this social modeling and peer reinforcement mechanism is actively contributing to the widespread adoption required to account for over half the variance in financial inclusion

In conclusion, the finding that digital financial literacy accounts for 56.1% of the variation in financial inclusion is the most powerful result of the study. It confirms the necessity of integrated strategies, is robustly supported by financial literacy theory, diffusion of innovation, and social learning theories, and provides a clear mandate for policymakers to focus on enhancing the skills and competence of rural women to utilize digital financial services effectively.

5.1.4 Rural Women Perspectives on Financial Inclusion in Kenya

The findings from the study revealed that few rural women in Kenya approximately 22.58% had received any formal training on basic financial concepts like savings, budgeting and credit which are crucial to financial inclusion.

On whether access to digital finance would be beneficial to rural women, the findings revealed that a whopping 94.3% of the respondents felt that this would be very beneficial while only 5.7% had contrary thoughts showing the need for financial awareness and training among the rural women in Kenya.

Additionally, the results revealed that 88.45% of the respondents felt insecure when it comes to usage of digital financial services while 11.55% felt comfortable and safe to use digital financial services. This brings out the need for educating the rural women on safety and security measures to put in place while using digital financial services thus boosting their confidence.

The study further revealed that there is a significant association between rural women's perspectives and financial inclusion. It was noted that higher overall financial inclusion among women was as a result of rural women's positive perspectives that led to increased access to and usage of formal financial services. This finding therefore highlights the importance of understanding and addressing the unique needs, challenges and preferences of rural women to enhance their financial inclusion.

The finding of a significant association between positive perspectives and higher overall financial inclusion provides strong empirical support for the Vulnerable Group Theory (VGT) (Ozili, 2025). The theory argues that vulnerable groups, such as rural women facing structural economic disadvantage, are often left behind and are at high

risk of active self-exclusion (Ozili, 2025). The fact that positive perspectives lead to increased access and usage confirms that psychological and emotional barriers are key drivers of exclusion. If a woman harbors distrust or feels fear, she will consciously reject participation, irrespective of economic opportunity. The study's result highlights that successful financial inclusion strategies must be gender-sensitive (FAO, 2024), focusing on building confidence, addressing unique needs, and transforming the underlying perspectives that keep women locked in the vulnerability bracket (Ozili, 2025).

In essence, these descriptive findings collectively underscore that effective financial inclusion among rural women in Kenya requires a multi-pronged approach that simultaneously addresses the lack of financial education, mitigates the physical and emotional risks associated with digital technology, and deliberately cultivates the positive perceptions necessary to enable voluntary and sustained use of formal financial services.

5.2 Conclusion

This study set out to examine the influence of financial literacy and digital finance on financial inclusion among rural women in Kenya. The findings provide robust evidence that each of these factors contributes in different but interconnected ways to the financial inclusion outcomes of rural women.

Objective One sought to determine the influence of financial literacy on financial inclusion The structural model revealed that financial literacy has a positive and statistically significant effect on financial inclusion among rural women ($\beta = 0.466$). The explanatory power of the model, reflected in the R^2 value of 0.217, suggests that

financial literacy accounts for approximately 21.7% of the variance in financial inclusion among rural women in Kenya. This indicates that while financial literacy is an important driver of inclusion, a substantial portion of the variance is explained by other factors.

Rural women's overall financial literacy scores fell below the benchmark levels established by OECD (2022), with notable regional disparities. In particular, women in North Eastern Kenya recorded the lowest literacy levels, underscoring structural inequities in access to education and exposure to financial information. The findings therefore confirm that rural women with stronger financial knowledge, more disciplined financial behavior, and positive financial attitudes are more likely to access and utilize formal financial services. Conversely, women with limited literacy are more prone to financial exclusion, often relying on informal savings groups or remaining outside the financial system altogether.

Overall, Objective One was achieved by establishing that financial literacy exerts a meaningful but modest influence on financial inclusion. This highlights the need for complementary interventions such as digital financial literacy, gender-sensitive financial education programs, and supportive policy frameworks to maximize the transformative potential of financial literacy for rural women's financial empowerment.

Objective two examined the effect of digital finance on financial inclusion. The structural model results showed that digital finance had the strongest positive and statistically significant path coefficient ($\beta = 0.728$), making it the most influential single predictor of financial inclusion in the model. The explanatory power of the model, reflected in an R^2 value of 0.530, indicates that digital finance accounts for 53.0% of

the variance in financial inclusion. This substantial explanatory power demonstrates that access to and adoption of digital financial services, particularly mobile money platforms like M-Pesa, are pivotal in bridging financial gaps among rural women.

While mobile money services are widely adopted, formal banking tools such as ATM cards and savings accounts remain underutilized, particularly in marginalized regions where infrastructure and trust in institutions are weak. This suggests that digital finance enhances inclusion most effectively when barriers such as connectivity, affordability, and user confidence are overcome. The results confirm that for rural women, digital finance is not only an enabler of access but also a vehicle for daily financial management and economic participation. Objective Two has therefore been satisfactorily addressed

Objective three focused on the joint effect of financial literacy and digital finance termed digital financial literacy on financial inclusion. The model results established that digital financial literacy is the most powerful determinant of financial inclusion, with an R^2 value of 0.561, meaning that 56.1% of the variance in financial inclusion among rural women is explained by the combined effect of financial literacy and digital finance.

This high explanatory power underscores the importance of merging financial education with access to digital platforms. For rural women, financial literacy reduces the complexity and perceived risks of digital systems, enabling more confident and sustained adoption of services such as mobile savings, mobile credit, and mobile insurance. Without financial knowledge, digital access alone may not translate into effective usage, but when the two are combined, rural women are empowered to

manage financial resources more productively and securely. The findings therefore validate the theoretical assumptions of diffusion of innovation theory and financial capability frameworks, showing that literacy mitigates barriers to digital adoption. In practical terms, this means that digital platforms accompanied by tailored training programs provide rural women with the tools not only to access but also to effectively utilize formal financial services. Objective Three has therefore been fully achieved.

Objective four sought to assess the perspectives of rural women on financial inclusion. The structural model results revealed a positive and statistically significant association between rural women's perspectives and financial inclusion ($\beta = 0.433$). The explanatory power of the model, reflected in an R^2 value of 0.187, suggests that women's perspectives account for 18.7% of the variance in financial inclusion. Although this explanatory power is lower than digital finance and digital financial literacy, it demonstrates that attitudes and perceptions are meaningful drivers of inclusion outcomes.

The findings highlight that women with positive perceptions of formal and digital finance are more likely to adopt and consistently use such services. Conversely, negative perceptions rooted in distrust, fear of fraud, or perceived insecurity contribute to deliberate self-exclusion, even where access is available. This confirms the central argument of the Vulnerable Group Theory (VGT), which posits that psychological and attitudinal barriers exacerbate structural disadvantages, thereby reinforcing financial exclusion. In the rural Kenyan context, shifting women's perspectives through gender-sensitive financial literacy programs, trust-building mechanisms, and consumer protection is therefore a prerequisite for sustained inclusion. Objective Four has thus

been achieved, confirming that addressing women's perspectives is critical to ensuring equitable and lasting financial participation.

In conclusion, this study confirms that financial literacy, digital finance, and rural women's perspectives collectively shape financial inclusion outcomes in Kenya. Each objective has been systematically addressed and validated with empirical evidence. The most decisive finding is that digital financial literacy explains the largest proportion of variation in financial inclusion, thereby providing a clear policy mandate of empowering rural women with both financial and digital competencies, while simultaneously addressing their perceptions and regional disparities, is critical to achieving inclusive financial systems.

5.3 Recommendations

5.3.1 The Influence of Financial Literacy on Financial Inclusion

The study established that the majority of rural women in Kenya possess low levels of financial literacy, as evidenced by a fundamental lack of understanding of concepts such as interest rates, budgeting, and savings. This knowledge deficit significantly inhibits their ability to be financially included in the formal financial system. The pronounced regional disparity, particularly between the North Eastern and Nyanza regions, highlights the strong correlation between formal education and financial knowledge.

This finding strongly validates the core tenets of Financial Literacy Theory (FLT), which asserts that financial knowledge is a prerequisite for effective financial decision-making and participation. The study's empirical evidence of a direct link between educational attainment and the comprehension of financial concepts extends FLT by

demonstrating a critical pathway through which formal education can enhance financial capability, particularly among a vulnerable population. The findings suggest that financial literacy is not merely about access to information but about the foundational capacity to process and apply it.

The study therefore recommends that financial institutions, community-based organizations, and local government agencies should collaborate to develop and implement localized financial literacy curricula. These programs should move beyond general concepts to emphasize practical financial management, including budgeting, saving, and debt management, using simplified, culturally relevant language. The financial literacy curricula should be delivered through accessible channels such as women's savings groups and community centers, focusing on a hands-on approach to build practical financial management skills.

5.3.2 The Influence of Digital Finance on Financial Inclusion

The study confirms that digital finance is a significant enabler of financial inclusion for rural women in Kenya. However, it also revealed that rural women display low levels of adoption and effective usage of digital financial services, despite their potential benefits. This finding directly relates to Diffusion of Innovation Theory (DOI), which explains the adoption patterns of new technologies. The slow adoption of digital finance is attributed to perceived barriers within the innovation itself, such as complexity and a lack of compatibility with existing practices. The study extends DOI by empirically identifying these specific barriers in a new context, including inadequate digital infrastructure, non-user-friendly platforms, and products that are not tailored to the unique financial behaviors and needs of rural women.

The study thus recommends that Mobile Network Operators (MNOs) and FinTech companies should enhance digital infrastructure and network accessibility in rural areas to reduce transaction friction. FinTech companies should develop and market digital financial products tailored to rural women's needs, emphasizing user-friendly platforms and intuitive interfaces to simplify access and usage of formal financial services.

5.3.3 The Interaction Effect of Financial Literacy and Digital Finance

The study established that digital financial literacy plays a crucial role in shaping the financial inclusion landscape of rural women. It found that financial literacy is not just a direct driver of financial inclusion but also a necessary precondition for the effective adoption and usage of digital financial services. This finding highlights a synergistic relationship that extends both Financial Literacy Theory and Diffusion of Innovation Theory. While financial literacy theory posits that financial knowledge improves outcomes, and diffusion of innovation theory explains adoption, this study demonstrates that financial literacy acts as a critical moderator for the diffusion process. Without a baseline level of financial literacy, rural women are unable to fully understand the benefits and risks of digital financial products, thereby slowing their adoption and preventing them from achieving deeper financial inclusion. The study's findings thus extend the combined application of these two theories, demonstrating that the presence of an innovation (digital finance) and a vulnerable user group require a mediating factor (financial literacy) for successful integration.

The study therefore recommends that financial institutions should collaborate with educational and community organizations to develop strategies that create awareness among rural women about formal financial products, services, and the benefits of their adoption and usage. Awareness campaigns should be designed to highlight the practical

value and security of digital finance, connecting its use to tangible improvements in their lives, such as saving for a specific goal or managing business cash flow.

5.3.4 Rural Women's Perspectives on Financial Inclusion

The study established that having access to formal financial services does not guarantee active usage. A significant finding was that rural women felt insecure about using digital financial services, leading to a trust deficit that keeps them outside the financial inclusion bracket. These findings are explained by Vulnerable Group Theory (VGT) and Social Learning Theory (SLT). The Vulnerable Group Theory posits that individuals in vulnerable social positions, such as rural women, face unique barriers like lack of trust and fear of fraud that prevent them from engaging with formal systems. The study extends the Vulnerable Group Theory by providing specific empirical evidence of this vulnerability within the context of digital finance. Furthermore, the spread of insecurity and distrust can be explained by social learning theory, where negative experiences or anecdotes shared within a community can lead to the widespread adoption of risk-averse behavior.

The study therefore recommends that financial service providers should conduct local needs assessments to understand region-specific barriers, cultural norms, and economic conditions, allowing for the tailoring of intervention strategies. To build confidence and trust, financial institutions should implement targeted interventions and awareness campaigns. These initiatives should not only educate rural women on security measures but also provide clear, transparent information on how digital platforms protect their funds and personal data.

5.4 Suggested Areas for Further Research

Based on the research findings of this study, several avenues for future inquiry can be explored to deepen the understanding of financial inclusion among rural women in Kenya.

5.4.1 Longitudinal Studies on Financial Capability

The current study utilized a cross-sectional research design. Future research should employ a longitudinal approach to track a cohort of rural women over time. This would provide valuable insights into the long-term impact of financial literacy interventions on financial behavior and inclusion outcomes. It would also allow researchers to better understand the temporal dynamics of how digital finance adoption evolves and how different life stages or economic shocks influence financial decisions.

5.4.2 Comparative and Context-Specific Research

This study considered rural women in Kenya as a single demographic. Further research should conduct comparative studies on financial inclusion across different regions and sub-demographics. A comparative analysis of regions with varying levels of formal education and digital infrastructure, such as a focused study comparing Nyanza and North Eastern regions, could illuminate the specific drivers of financial behavior and expose region-specific barriers to financial inclusion. Such studies would also be crucial for understanding cross-cultural financial behavior patterns among rural women.

5.4.3 Inclusion of Urban Women in Financial Inclusion Indices

The study's focus on rural women, while providing a concentrated analysis, limits the ability to draw a complete picture of female financial inclusion in Kenya. Future research should incorporate a sample that includes both urban and rural women to

establish a comprehensive financial inclusion index for the entire female population. A comparative study between urban and rural women would highlight key differences in access, usage, and financial capability, providing a more accurate representation of the country's progress toward gender-inclusive financial systems.

5.4.4 Qualitative Exploration of Trust and Social Barriers

The finding that many rural women feel insecure about digital finance and are influenced by shared anecdotes of distrust suggests a need for deeper qualitative research. Future studies could utilize qualitative methods such as focus groups, in-depth interviews, or ethnographic observation. The aim would be to qualitatively explore the social and psychological factors that shape perceptions of trust in formal financial institutions and digital platforms. This research could reveal the specific sources of distrust, the role of community leaders and social networks in shaping financial behavior, and the most effective communication strategies for building confidence.

5.4.5 Analysis of Informal Financial Systems

The study's focus on formal and digital finance could be expanded by incorporating a detailed analysis of informal financial mechanisms (e.g., rotating savings and credit associations or "chamas"). A study could investigate how the informal financial practices of rural women influence their willingness to adopt formal and digital financial services. This would provide a more holistic view of their financial ecosystem and help to design interventions that leverage existing trust networks to bridge the gap between informal and formal financial systems.

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APPENDICES

Appendix I: Questionnaire

Part A: Introduction

This questionnaire is intended to facilitate the collection of data and information with respect to the study: Financial Literacy, Access to Digital Finance and Financial Inclusion among Rural Women in Kenya.

You are kindly requested to answer the questions as honestly as possible. These questions will be read out aloud by the interviewer thus there is no requirement for the respondent to be able to read and write.

Background Information

I would like to ask you a few questions about yourself and your household.

1. **Which of these age categories do you belong to?**
    1) 18 - 28years [ ]
    2) 29-39 years [ ]
    3) 40-50 [ ]
    4) 51-60 [ ]
    5) 60 and above [ ]
2. **What is the highest level of education that you have completed?**
    a) None [ ]
    b) Primary School [ ]
    c) Secondary School [ ]
    d) College [ ]
    e) University [ ]

3. **Which of this best describes your current work situation**:

   a) Unemployed [ ]

   b) Self-employed (Business / Farming [ ]

   c) Employed (Public / Private) [ ]

4. **Which of these categories best describe your household income.**

   a) Ksh 1,000 to Ksh. 10,000 a month [ ]

   b) Ksh. 10,000 to Ksh. 30,000 a month; [ ]

   c) Ksh. 30,000 to Ksh. 50000 a month [ ]

   d) Above Ksh. 50,000 [ ]

   e) I don't have an income [ ]

5. **Which subcounty and ward do you live in?**

6. **Who do you usually live with in your household?**

   a) I live alone [ ]
   b) 1 to 3 people [ ]
   c) 4 to 6 people [ ]
   d) 7 to 10 people [ ]
   e) Above 10 people [ ]

7. **What is your Marital Status?**

   a) Married [ ]
   b) Single [ ]
   c) Divorced [ ]
   d) Separated [ ]
   e) Widowed [ ]

8. **Do you have access to electricity / power connection?**

   a) Yes [ ]

   b) No [ ]

Part B: Financial Literacy

Financial Knowledge

9. **In case you need to borrow Ksh. 1,000 from a friend, chama or bank. How much will you payback?**

   1.Ksh. 1,000 plus interest [ ]

   2.Ksh. 1,000 [ ]

   3.Others [ ]

10. **Assuming you had Ksh. 10,000 in a savings account, the chama or the bank adds Ksh. 1000 every year to the account. How much money would you have in the account after one year if you did not remove any money from the account?**

    1. More than Ksh. 10,000; [ ]
    2. Exactly Ksh. 10,000 [ ]
    3. Others [ ]

11. **Suppose over the next 3 years the price of sugar which has been 200 per kilo becomes 400 per kilo. If your income of Ksh. 10,000 also becomes Ksh. 20,000, which of the following will apply?**

    1) Buy the same as you can buy today? [ ]
    2) Buy less than you can buy today? [ ]
    3) Buy more than you can buy today? [ ]
    4) I don't know [ ]

12. **Supposing you have some money and you would like to make an investment. Which is the safest way to go about it?**

    i. Put my money into several businesses [ ]
    ii. Put my money into one business [ ]

iii. Save in the chama [ ]

iv. Others [ ]

13. How do you rate your overall knowledge about financial matters compared with other rural women in your village?

a) Very high [ ]

b) High [ ]

c) Fair [ ]

d) low [ ]

e) Very low [ ]

14. Have you ever heard about any of these financial terms?

1) Insurance

a) Yes [ ]

b) No [ ]

2) Budgeting

a) Yes [ ]

b) No [ ]

3) Investment

a) Yes [ ]

b) No [ ]

4) Savings

a) Yes [ ]

b) No [ ]

5) Credit / Loan

a) Yes [ ]

b) No [ ]

15. Please indicate to what degree you agree or disagree with the following statements?

Statement	**5 Strongly Disagree**	**4 Disagree**	**3 Not sure**	**2 Agree**	**1 Strongly Agree**
Having insurance protects you when you have a problem					
Insurance is a way of saving on long term basis					
Insurance is a government tax					
Insurance is for the rich people					
I have never heard of the statements before					

Financial Behavior

16. Who is responsible for making day-to-day decisions about money in your household?

1. I make these decisions by myself [ ]
2. I make these decisions with the household head [ ]
3. Someone else makes these decisions [ ]

17. Do you usually make a budget every month?

1. Yes [ ]
2. No [ ]

18. Who makes the budget?

a) I make the budget [ ]

b) The household head makes the budget [ ]

c) Someone else makes the budget [ ]

19. Why do you make the budget?

a) To check on my expenditure [ ]

b) To make sure I use money well [ ]

c) To buy the most important things first [ ]

d) Other [ ]

20. Please indicate how often you do any of the following for your household?

Statement	**5 Not at all**	**4 Sometimes**	**3 Not sure**	**2 Most of the time**	**1 Always**
Make a plan to manage your income and expenses					
Record your spending					
Keep money separate for monthly use from day-to-day spending money					

21. In the past 12 months, where have you been saving your money?

1) Saving money on my phone [ ]

2) Saving money into a savings/deposit account [ ]

3) Saving cash at home or in your wallet [ ]

4) Giving money to family to save on your behalf [ ]

5) Save money in chama / table banking [ ]

6) I haven't saved any money [ ]

7) Others [ ]

22. If you, personally, had an emergency today, which of the following describes how you would settle it.

1) Withdraw money from savings [ ]

2) Sell some of my property [ ]

3) Borrow from the chama [ ]

4) Borrow from the phone (Mshwari, Hustler fund) [ ]

5) Borrow from family and friends [ ]

Financial Attitudes

23. The following statements are on money management, please tell me whether you agree with any of the statements.

Statement	**5 Strongly Disagree**	**4 Disagree**	**3 Not sure**	**2 Agree**	**1 Strongly Agree**
I find it more satisfying to spend money than to save it for the long term					
I prefer to buy things on credit than save					
I believe that money in a bank will be lost if the bank collapses					
I have too much debt right now					
If I borrow money, I don't have a responsibility of paying it back					

Part C: Digital Finance

Digital payment services

24. Do you have a mobile phone?

a) Yes [ ]

b) No [ ]

25. Do you have a Mobile Money (Mpesa, Airtel, Telkom) account on your mobile phone?

a) Yes [ ]

b) No [ ]

30 Do you have an ATM card from your bank?

a) Yes [ ]

b) No [ ]

31 How do you use your ATM card?

a) To withdraw money [ ]

b) To pay for purchases [ ]

c) Others [ ]

32 Do you have an credit card from your bank?

a) Yes [ ]

b) No [ ]

Use of digital payment services

33. Can you use your Mobile money account to transact by yourself without the help of another person or mobile money agent?

a) Yes [ ]

b) No [ ]

34. Do you usually keep money in your Mobile money account?

a) Yes [ ]

b) No [ ]

35. What are some of the factors that prevent you from having money in your Mpesa account?

a) I will spend without planning [ ]

b) I don't have extra money to keep [ ]

c) I fear I might loose the money [ ]

d) Others [ ]

36. **Have you used your mobile money to make payments, send or receive money in the past 3 month?**

a) Yes [ ]

b) No [ ]

37. In the past 3 months, have you borrowed money from your Mobile money (Mpesa, Airtel, Telcom) account?

a) Yes [ ]

b) No [ ]

38. Have you ever used any USSD (*144#) code on your mobile phone?

a) Yes [ ]

b) No [ ]

39. For which of the following transactions did you use the USSD code (*144)?

a) Bill payments [ ]

b) Saving [ ]

c) Checking Account balance [ ]

d) Taking loan [ ]

e) Withdrawing money from a bank accoun [ ]

f) Others [ ]

Part D: Financial Inclusion

Access to Formal Financial Services

38.Do you have an account with a formal institution like a bank, sacco?

a) Yes [ ]

b) No [ ]

44.Do you have an ATM card from your bank?

a) Yes [ ]

b) No [ ]

59.Which of the following financial products and services do you have access to?

a) Insurance [ ]

b) Bank account [ ]

c) Savings [ ]

d) Credit / Loan [ ]

Usage of Formal financial Services

41. Are you able to operate the account by yourself?

i. Yes [ ]

ii. No [ ]

42. Do you make deposits to your bank account?

i. Yes [ ]

ii. No [ ]

43. Have you withdrawn any money from the bank account in the past 3 months?

i. Yes [ ]

ii. No [ ]

45.How do you use your ATM card?

a) To withdraw money [ ]

b) To pay for purchases [ ]

c) Others [ ]

33 Have you used your own ATM card directly in the past 6 months to make transactions?

a) Yes [ ]

b) No [ ]

48.In the past 6 months, how have you used the internet in your financial decisions?

a) To check account balance [ ]

b) To buy something online [ ]

c) To make a bill payment [ ]

d) To send money [ ]

60. Have you used or are currenting using the following financial products and services?

a) Insurance

i. Yes [ ]

ii. No [ ]

b) Credit / Loan

i. Yes [ ]

ii. No [ ]

c) Savings

i. Yes [ ]

ii. No [ ]

Part E: Rural Women's Perspectives about Financial Literacy and Access to Digital Finance

26. Have you at any time received any formal or informal financial training on saving, budgeting or even credit / loan?

a) Yes [ ]

b) No [ ]

if yes, where did you receive the training from?

a) Women Group [ ]

b) Financial Institution [ ]

c) Financial literacy experts [ ]

d) Other [ ]

How did you find the training?

a) Educative [ ]

b) We needed more [ ]

c) Taught what I already knew [ ]

d) Other [ ]

27. Do you think financial literacy is important for rural women?

a) Yes [ ]

b) No [ ]

28. Would you be interested in participating in financial literacy training or workshops?

a) Yes [ ]

b) No [ ]

If yes, which of these financial literacy topics would you be interested in?

a) Budgeting [ ]

b) Saving [ ]

c) Investing [ ]

d) Insurance [ ]

e) Others [ ]

29. Do you feel safe using digital financial services as compared to the traditional methods?

a) Yes [ ]

b) No [ ]

Why don't you feel safe?

a) I do not know how to use digital services [ ]

b) I feel they are not secure [ ]

c) I don't like giving out my personal information [ ]

d) Other [ ]

30. As a rural woman, do you think access to digital finance would be helpful for other rural women in your community?

a) Yes [ ]

b) No [ ]

31. What are some of the barriers for your using digital financial services?

a) Financial Illiteracy [ ]

b) Internet connectivity [ ]

c) Fear of losing money [ ]

d) Fraud [ ]

e) Others [ ]

32. Are you aware of rural women in your community who have benefited from using digital financial services?

a) Yes [ ]

b) No [ ]

In which way have they benefited?

a) They are more informed [ ]

b) Their lives are organized [ ]

c) They have invested [ ]

d) They plan their money well [ ]

Appendix II: Wards in the Seven Counties

Item	County	Sub County	Wards
1.	Migori	Uriri	Kamagambo Central, Kamagambo East, Kamagambo North, Kamagambo South, Kamagambo West
2.	Meru	Buuri East	Kiirua Naari, Timau, Kisima, Kibirichia, Ruiri, Rwarera
3.	Bungoma	Bumula	Bumula, Khasoko, Kabula, Kimaeti, South Bukusu, Saboti
4.	Narok	Narok West	Ilmotiok, Mara, Siena, Naikoria
5.	Nyandarua	Kipipiri	Wanjohi, Kipipiri, Geta, Githiora
6.	Kwale	Lungalunga	Vanga, Mwereni, Dzombo, Pungwe, Kikokeni
7.	Garissa	Dadaab	Dadaab, Dertu, Labasigale, Damajale, Liboi, Abakaile

Appendix III Financial Inclusion Index (FII) Matrix

The level of financial inclusion is typically measured by aggregating data across the following three main dimensions, using both demand-side (household/individual survey data) and supply-side (financial institution data) indicators.

Dimension 1: Access (The Availability and Reach of Financial Services)

This dimension measures the physical and digital infrastructure that makes financial services available to the population.

Dimension 2: Usage (The Extent to Which Financial Services are Used)

This dimension measures the actual uptake and frequency of use of financial products by individuals and businesses.

Dimension 3: Quality / Financial Health (Affordability, Stability, and Welfare)

This dimension moves beyond mere access and usage to assess how services meet user needs, considering factors that influence sustainable use.

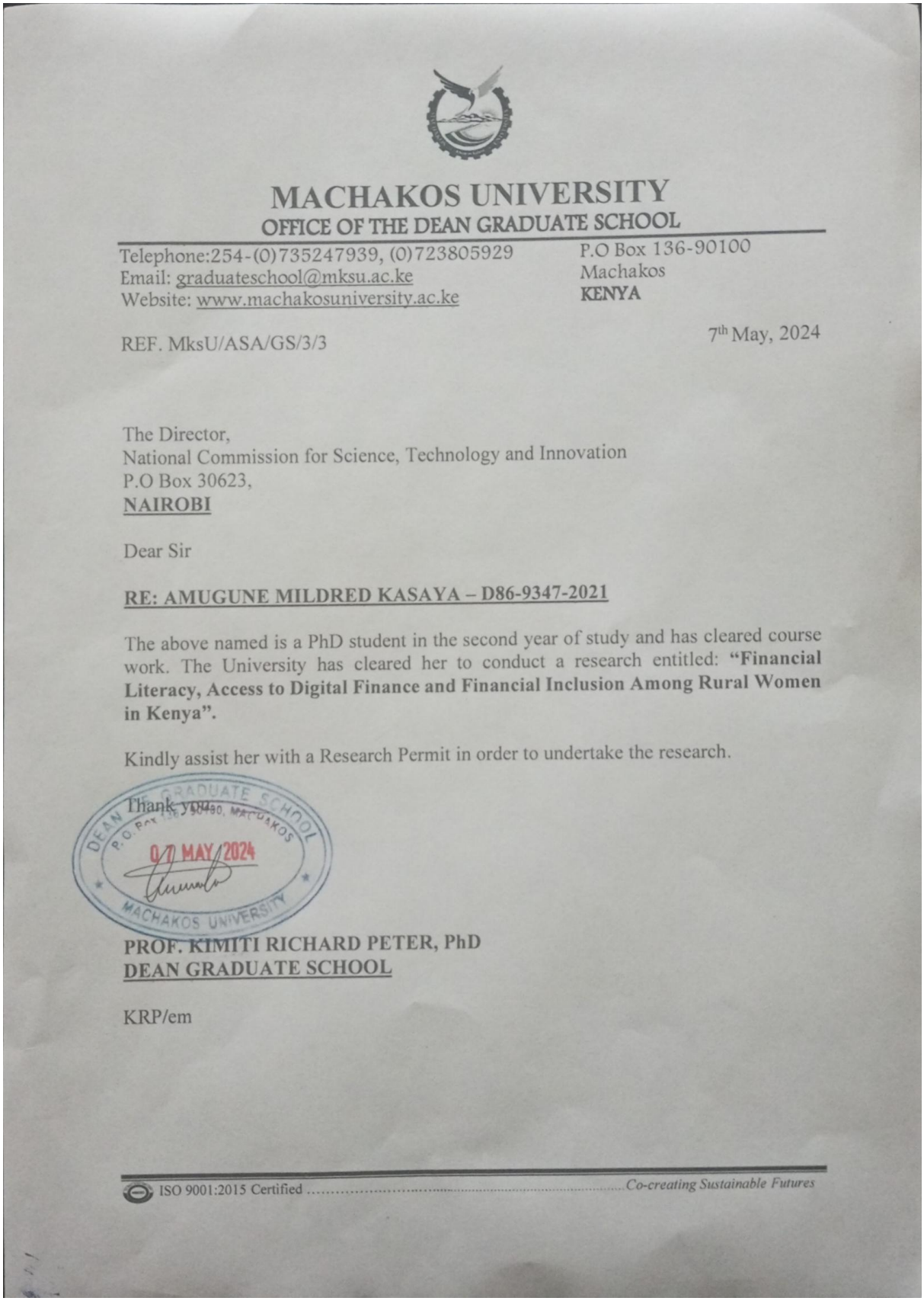
Construction of the Index

A composite Financial Inclusion Index (FII) combines these dimensions and their corresponding indicators into a single score (usually between 0 and 1) through statistical methods like Principal Component Analysis (PCA) or simple weighted averages.

FII=w1(Index Access) +w2(Index Usage) +w3(Index Quality)

- wi represents the weight assigned to each dimension, which can be equal or determined empirically by the analysis method.
- Each sub-index (Index Access, Index Usage, etc.) is also an aggregation of its respective indicators.

Appendix III: University Authorization Research Letter



MACHAKOS UNIVERSITY
OFFICE OF THE DEAN GRADUATE SCHOOL

Telephone:254-(0)735247939, (0)723805929
Email: graduateschool@mksu.ac.ke
Website: www.machakosuniversity.ac.ke

P.O Box 136-90100
Machakos
KENYA

REF. MksU/ASA/GS/3/3

7th May, 2024

The Director,
National Commission for Science, Technology and Innovation
P.O Box 30623,
NAIROBI

Dear Sir

RE: AMUGUNE MILDRED KASAYA – D86-9347-2021

The above named is a PhD student in the second year of study and has cleared course work. The University has cleared her to conduct a research entitled: **"Financial Literacy, Access to Digital Finance and Financial Inclusion Among Rural Women in Kenya".**

Kindly assist her with a Research Permit in order to undertake the research.

Thank you.

DEAN GRADUATE SCHOOL P.O. Box 136-90100, MACHAKOS MACHAKOS UNIVERSITY
07 MAY 2024

PROF. KIMITI RICHARD PETER, PhD
DEAN GRADUATE SCHOOL

KRP/em

Appendix IV: NACOSTI Permit

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