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Effect of digital financial services uptake on socio-economic status of households in Kibera.

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EFFECT OF DIGITAL FINANCIAL SERVICES UPTAKE ON SOCIO-ECONOMIC STATUS OF HOUSEHOLDS IN KIBERA.

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2024

DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the dissertation contains no material previously published or written by another person except where due reference is made in the proposal itself.

Teresia Ngandi

13th May 2024

Approval

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ABSTRACT

The current economic conditions characterized by a high cost of living, high interest rates on loans and unemployment, digital lending products and services have increasingly become an option for many. Borrowing appetite has often led to bad debts, shifting between lending institutions to evade the responsibility to repay loans and resulting to debt accumulation. This study sought to find out the influence of digital financial services on the socioeconomic status of Kibera households. Specifically, the research sought to find out: the effect of digital credit services on socioeconomic status of households; the effect of digital savings services on socioeconomic status of households; and the moderating effect of household characteristics on the relationship between digital financial services and socioeconomic status of households . Primary data collection through administering structured questionnaires to the target population of households in Kibera. The questionnaires were issued randomly but purposively to households that used digital credit and digital savings. Descriptive statistics entailed mean and standard deviation were used for analysis. Inferential statistics, particularly regression analysis was conducted. OLS regression model was used to establish the relationship between the independent variables and the dependent variable. Notably, digital credit, digital savings and household characteristics had a positive relationship with socioeconomic status. Digital savings had a positive effect while digital credit reported a negative effect on socioeconomic status. Only one element of household characteristics namely, household size had a moderating effect on the relationship between digital financial services and socioeconomic status. The findings of this study are important to policymakers, regulators and digital financial services providers. The findings will be significant to future researchers who might need to refer or build on it through further research. The study recommended that there was need for policy makers to look at how the negative effects of digital credit on socioeconomic status can be reversed and maximize on the positive impact of digital savings on socioeconomic status of households.

Key Words: **Digital Credit, Digital Savings, Socioeconomic status, Household characteristics**

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS AND ACRONYMS

ATM	Automated Teller Machine
BIS	Bank of International Settlement
CBK	Central Bank of Kenya
CRB	Credit Reference Bureau
DFS	Digital Financial Services
IFC	International Finance Corporation
KNBS	Kenya National Bureau of Statistics
MDG	Millenium Development Goals
MFI	Micro Finance Institutions
MNO	Mobile Network Operators
MPI	Multidimensional Poverty Index
NACOSTI	National Commission for Science, Technology and Innovation
NGO	Non-Governmental Organizations
OLS	Ordinary Least Squares
OPHDI	Oxford Poverty and Human Development Initiative
SDG	Sustainable Development Goals
SIDA	Swedish International Development Cooperation Agency
UN	United Nations
UNDP	United Nations Development Programme
USA	United States of America
PCA	Principal Component Analysis

DEFINITION OF TERMS

Jua Kali	Kenya's informal business sector that provides employment majorly on a casual basis
M-Kopa	M stands for Mobile, Kopa is Swahili for borrowing. Financial Platform that provides underbanked population with access to essential products such as solar power, smartphones through small digital payments
M-Pesa	M stands for mobile, Pesa is Swahili for money. It is a digital mobile money application that allows for savings and access to credit in addition to mobile money transfer services
M-Shwari	M stands for Mobile, Shwari is Swahili for calm. It is a Mpesa application that offers a savings platform
Fuliza	Swahili for continuously flowing. It is a digital overdraft service
Safaricom	Telecommunications service provider in Kenya. It provides applications such as Mpesa, Mshawari and Fuliza
Digital Credit	Financial overdraft (loans and credit)facility offered through technological platforms that are digital.
Digital savings	Platforms that allow opening, making and making transactions through channels such as phones instead of traditional physical banks.
Household Characteristics	Aspects such as number of people, age-group, employment status, gender, dependency ratio.
Socioeconomic status	Classification of people based on level of education, income, resources accumulation, access to healthcare, diet.

DEDICATION

I dedicate this work to my family for their immeasurable support throughout the study.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Globally, access to financial services is recognized as a key contributor to social and economic development as opined by (Sha'ban, Girardone and Sarkisyan, 2020). Through access to formal financial services, people can save, borrow, make payments and meet unexpected life emergencies. However, ability to enjoy these financial services has not been equally accessible for all people and hence financial exclusion. Lack of collateral, improper documentation to open an account, low and irregular earnings to maintain an active current or savings account, large family size reliant on a single wage earner, financial illiteracy and high transaction costs are some of the reasons for financial exclusion (Chakrabarty, 2016). There are also non-monetary transaction costs such as travelling to a financial centre to fill out paper-work and time spent travelling and securing collateral.

According to Suzman (2016) 80% of the world's poor are unable to access basic financial services provided by banks. For survival, the poor often turn to informal financial avenues such as money-lenders who are often high risk, and provide these services at high cost and also lack a variety of financial services and products which often leads to undersaving (Karlan, Ratan, and Zinman, 2014). In an urban set-up, majority of households with low socioeconomic status are concentrated in the slums which are often characterised by insecurity and hence posing a security threat for formal banking institutions to set up a branch (Kyung, 2020). Additionally, the households work in informal jobs, are self employed or get jobs on a casual basis (Desgroppes and Taupin, 2011). As a result of irregular nature of income earned, financial management is crucial for low income households to cover for unexpected life emergencies. Group savings are often adopted among the low income households to offer financial services. They are characterised by high transaction costs, need to wait for one's turn to access a loan and also the risk of losing money.

Financial inclusion which is defined as the ease in accessing and availability of formal financial services for all participants in an economy according to Beck and Kunt (2006) is among the mechanisms adopted by various economies in the world to promote socioeconomic development especially for the underpriviledged in the society (Immurana, Iddrisu, Boachie and Dalaba, 2021). It entails provision of formal financial services at an affordable costs in a responsible and sustainable way (Ozili, 2022; Mahendra 2006). For a country to achieve

sustainable economic development and growth, inclusivity while offering financial services is critical (IMF, 2014; World Bank, 2014; Demirguc, Beck, and Honohan, 2008). Financial inclusion has the potential to reduce poverty, inequality, promote establishment and boosting of business ventures Nsiah,Yusif, Tweneboah and Agyei, (2021); Bruhn and Love (2014) and hence contribute to bettering the livelihoods of people (Sakyi, Onyinah, Baidoo, and Ayesu, 2021).

Through digital revolution, the landscape for financial services is transforming at unprecedented pace (Lyons and Hanna, 2021). Financial services have experienced transformation over the last few decades, which as a result has led to disruptive innovation and hence introduction of new business models (Rana, Luthra, and Rao, 2020). These technological innovations have caused transformation in provision of financial services by spurring new products or modifying existing ones through digital technologies and hence FinTech. Through Fintech, new digital financial products and services which are referred to as Digital Financial Services (DFS) have been developed (Mora, Uttamchandani, Natarajan, Feyen, Saal, and Pazarbasioglu, 2020). Fintech has not just led to the development of DFS but also a wide range of digital services providers.

However, this is not to imply that the financial services sector has recently embraced technology in performing operations. Automated Teller Machines (ATM) were available in the 1960's, the introduction of internet followed in 1990s which introduced online banking services especially in the developed economies (Aner, Barberis, and Buckley, 2016). Developing countries such as China, India and Kenya are ahead of most economies in making use of DFS according to Kass, Lyons, and Liu (2021); Lyons, Kass and Fava (2021), through FinTech firms and Mobile Network Operators (MNO). China has experienced unprecedented growth in digital finance in the past decade with mobile money payments being used in various contexts such as online shopping, offline shopping and payment of utility bills (Meng and Xiao, 2022). By contrast, it is the banking sector that has led shift to digitization in the advanced economies (AFI, 2019). Following the 2008 global financial crisis, banks were focused on complying with the new regulatory requirements, FinTech start-ups were able to enter the financial services market through offering low costs and efficiently (IFC, 2017). To respond to the increasing competition, traditional banks acquired FinTech firms through alliances or by investing internally in FinTech innovations (Clavijo, Vera, Beltran, and Londoño, 2019).

Digital financial services promote boosting financial inclusion through innovations in digital payment infrastructures, increasing access to financial services among the underserved and

improving the levels of utilisation of financial services (Fernandes, Borges, and Caiado, 2021). Increased availability and affordability of digital technology combined with the challenging circumstances in many parts of the world created an environment for tropicalized financial solutions enabled by digital technology (Sharma and Andrade, 2023).

According to Jiang, Qiu, and Zhou (2022), digital finance began in the United States of America (USA) back in the 1970s with the creation of NASDAQ. It was also home to the first bank without any branch in the world, the Security First Network Bank (SFNB), where services were provided through the internet. The growing penetration of smartphones and internet further propelled the transformation of financial services (Santoso, Trinugroho, and Risfandy, 2019).

Simultaneously, mobile money services paved their way in Africa through the launch of M-pesa in Kenya in 2007. Mpesa services further extended to Kenya, Tanzania and Uganda. The service has 32 million users in ten countries. Mobile financial services have spread in all parts of the world especially where penetration of traditional financial services are low (GSM Association, 2021). As at the end of 2020, there were 310 mobile financial services in 96 countries (GSM Association, 2021).

According to GSMA (2016), there has been unprecedented growth in expansion of digital financial services innovations in Sub-Saharan Africa with Kenya leading Africa with 70% of the population using these services (GSMA, 2015). Mpesa is leading with 80% market share (Communication Authority (CA) of Kenya, 2018).

Formal and informal financial institutions aim at providing financial services to the public. However, unfortunately, most formal financial institutions are profit driven. This means that the poor who cannot afford collateral requirements are excluded due to their inability to afford the high interest rates that are otherwise offered to compensate for lack of collateral. Microfinance did the opposite. It offered loans to the poor, the vulnerable who were mostly women and instead of basing offering of loans based on the past, it focused on the future. This concept was introduced by Muhammad Yunus who later founded the Grameen bank in 1970 to fight rural poverty (Nogueira, Duarte and Gama, 2020). The introduction of microfinance which led to solving the problems of the poor people who were excluded from conventional banking system. Microfinance entails a range of services including microloans, microsavingsand microinsurance products targeting the low income population excluded from accessing formal financial systems (Errais and Miled, 2015).

Due to the great success of microfinance in driving social and economic development in Bangladesh, the concept spread rapidly to globally. Though most microfinance borrowers are located in rural South Asia, East Asia and the Pacific region, microfinance has spread to Latin America, Eastern Europe Central Asia and Sub-Saharan Africa. The expansion of microfinance also saw a shift in the original concept of group lending to individual lending (Lützenkirchen and Weistroffer, 2012). The share of group lending is highest in South Asia while individual lending is common in Eastern Europe and Latin America. Other forms of microfinance include individual credit, group lending, and village banking .

However, despite ease of access to formal financial services by the previously excluded, challenges such as overborrowing and being caught up in debt cycles, default in payment are being witnessed and hence affecting the welfare of the same people these financial services are supposed to alleviate from poverty. This challenges end up affecting the welfare of most households who borrow to supoort their businesses, take care of routine household needs or taking care of small needs of the family as they await for salary.(Microsave consulting, 2019).

1.1.1 Digital Financial Services

Digital Financial Services (DFS) are financial services which rely on digital technology for their delivery and use by customers (Mora, et al., 2020). DFS constitutes a wide range of services retrieved and delivered through digital channels such as insurance, savings, investments and mobile financial services (AFI, 2019). Through DFS, there has been expansion in channels for accelerating financial inclusion through reaching larger population segments which were previously disregarded by traditional financial institutions. Table 1.1 indicates how innovations have impacted on evolution of financial products through comparing traditional financial services and new digital financial services.

Table 1.1: Evolution of Financial products and services via digitization

Financial services	Traditional products and services	New digital products and services
Payments and transfers	▪ Cash/ATM ▪ Check ▪ Wire/MTO ▪ Debit/Credit cards	➢ Mobile payments, mobile money, mobile PoS ➢ Peer-to-peer (P2P) payments ➢ Business-to-business (B2B) transactions ➢ Digital wallets, e-wallets, mobile wallets ➢ Digital money, virtual currencies
Savings and investments	▪ Bank deposits ▪ Mutual funds ▪ Bonds ▪ Equities	➢ Mobile banking ➢ Micro-saving and micro-investing apps ➢ Mobile market funds ➢ Blockchain stocks and bonds ➢ Online brokers ➢ Mobile trading ➢ Crowdinvesting or equity crowdfunding ➢ Social trading
Borrowing and financing	▪ Bank loan ▪ Microcredit and microloans ▪ Bonds ▪ Mortgages ▪ Trade credit	➢ Crowdsourcing and alternative financing ➢ Crowdfunding (crowdlending, P2P lending, social lending) ➢ Online business lending ➢ Blockchain bonds ➢ Electronic or e-leasing ➢ Electronic or e-invoicing ➢ Electronic or e-factoring

Sources: Authors based on Gomber et al. (2017), IMF &World Bank (2019), and Thakor (2020)

Digital finance entails all electronic financial services and products, including financing, investment, payment, insurance, and financial information delivered through digital channels (Ozili,2018**)**. According to Ghosh and Chaudhury (2022) debit cards, credit cards, transactions using mobile internet, mobile account and online payment are indicators of digital financial services. Usage of DFS does not just improve efficiency in delivery of financial services but it also improves on speed, transparency and security in delivery of financial services (Misati, Osoro, Odongo, and Abdul, 2022).

The World Bank has supported digital finance as a means for promoting financial inclusion. This is because it improves access to finance for the financially vulnerable. Hess and Klapper (2016) argue formal financial services accessed through phones connect the poor to economic opportunities and hence contribute to poverty alleviation. Through access to a savings application, low-income earners can save little amounts which over time build up and can be channeled to investments that could earn them more income or meet future costs such as education. According to Klapper (2018), access to mobile money accounts cushions the poor and low-income earners from extreme shocks such as ability to receive remittances from relatives in the event of fundraising to offset medical bills.

Access to DFS for the world's poor is beyond convenience. It is transformative. It enables saving, the ability to meet daily needs, prepare for unexpected shocks such as drought, sickness

or job loss. Digital payment methods allow people to send and receive money over long distances without the hassle of travelling which entails costs and security threats while carrying the money. Owning a digital account facilitates receipt of government payments and subsidies conveniently and hence receiving economic relief when needed and not days or weeks later. Through DFS, school fees can also be paid. Transacting digitally can tell a story which offer insights to financial services providers. As a result, digital products and services that suit the borrowers' needs can be developed and rolled out.

1.1.2 Socioeconomic status

Socioeconomic status is defined as one's position in the society which is determined by family income, education, occupation type and level, family and social support, wealth, access to quality healthcare, proper nutrition, food security, and availability of quality housing, all which inform an individual's or group standing in the community. The deprivation of these dimension constitutes the universal definition of poverty (Wang, Zeng, and Luo, 2021).

There is no widely accepted definition of poverty and as such it is defined differently across countries and socio-economic backgrounds (Dartanto and Otsubo, 2015). However, there is consensus that the definition should include specific social, cultural, income contexts and well-being (Nyarko, Amoateng, and Aboagye, 2023). According to the World Bank, living below US$1.90 in a day is classified as extreme poverty and less than US$3.10 per day as moderate poverty. This takes an economic wellbeing approach where people are deprived of economic resources to meet basic survival needs including food, shelter and clothing (Akindola, 2009).

United Nations (2012) describes poverty in terms of connected mutually reinforcing deprivations and focusses on stigma, insecurity, social exclusion and discrimination. It views poverty as a condition characterized by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education, and information. United Nations Development Programme (UNDP) views poverty as multidimensional, thus, not just looking at income but the reality of living with less than life basics and hence the poor fail to realize their full potential. SIDA (2017) views poverty in four dimensions; (1) Resources, which looks at deprivation from material and/or non-material resources such as decent income, physical and human capital including being educated and good health (2) Opportunities and choice where one lacks resources to move out of poverty (3) Power and choice where one is deprived of expressing concerns, rights and needs from an informed perspective, participating in decision making at household, community or national level (4) Human security which looks as physical, sexual and psychological violence. These multidimensions of poverty are not linear

but are cyclical. For example, lack of income could trigger material deprivation, loss of social capital and loss of economic resources (Gweshengwe and Hassan, 2020). People engulfed in poverty are often characterized by low income and consumption levels, lack access to clean water and sanitation, live without healthy food, proper housing, quality medical and education access (Koomson, Villano and Hadley, 2020).

Although poverty is a multi-dimensional phenomenon, poverty levels are often measured using economic dimensions based on income and consumption (World Bank, 2015). The Global Multi-dimensional poverty index developed in 2010 by UNDP and Oxford Poverty and Human Development Initiative (OPHDI) considers 10 indicators, namely, nutrition, child mortality, years of schooling, school attendance, cooking fuel, sanitation, drinking water, electricity, housing, and assets. This study adopts this model for measurement of social-economic status. Household income and consumption expenditure are considered monetary dimensions to poverty while social indicators such as health, education and standards of living constitute non-monetary dimensions of poverty. Falling below certain thresholds of the above indicators would qualify individuals to be classified as poor.

Poverty is still among the world's greatest challenges and neither the industrialized nor resource rich countries have been able to eradicate it as poised by Fombad (2018), despite extreme poverty eradication being the first goal in the Millenium Development Goals (MDG) which ended in 2015 and the target was still unmet. The SDGs were adopted to finish what was started where poverty eradication is still the first goal out of the 17 SDG's. UNDP (2023) reports half of the multidimensionally poor people live in Sub-Saharan Africa and over a third in South Asia.

1.1.3 Household Characteristics, Digital financial services and household socioeconomic status

Hussen and Mohamed (2023) point out that certain aspect of a household such as who heads the household, education level and form of employment determines accesibility to financial services. Through use of financial inclusion, households are spared from adverse poverty effects (Koomson, Villano, and Hadley, 2020) . Through knowledge of digital financials services in the market, a household which does not have regular income can take up digital loan to take care of day to day needs such as purchase food, pay school fees and meet emergencies. The knowledge of how to operate these digital financial products is also crucial, otherwise, the existence poses no benefit if the target population do not know how to operate them. Additionally, the features of the digital products should be user friendly. Features such

as ease of accessibility, instant processing of loans, no need for collateral and no minimum savings requirements make the digital financial services achieve the intended purpose of accessibility to finance for all and hence poverty eradication.

Access to digital financial services by households is intended to tackle poverty and hence improve the socioeconomicstatus of these hosuseholds. However, access and usage these digital financial products is just not enough. Different households have different needs and hence characteristics such as financial literacy levels which determines the awareness of need for financial planning, interst rates offered by different financial services providers, when to borrow and need for saving. Dependancy level affects the use of digital financial services where a household which has high dependancy on one person to provide for the family and depending on the type of household needs, the level of income and type of employment, each household will use the digital financial services available differently due to the different household characteristics.

The available literature has not shown connection among the interaction between digital financial services , household characteristics and the household socioeconomic status which is what this study seeks to look at.

1.1.4 Digital Finance in Kenya

United Nations (2023) halfway the 2030 agenda, we are living more than half the world behind with progress on 50% of the SDG targets weak and 30% stalled. Poverty eradication is one of them. More than half of Kenyans live in poverty based on a measurement that goes beyond lack of money. The Kenya National Bureau of Statistics (KNBS) multidimensional poverty index in addition to income looks at access to water, education, food and electricity. UNDP (2023) highlights 37.5% of Kenyans as multidimensionally poor with an additional 35.8% vulnerable to multidimensional poverty as of 2021.

Through digital financial services, low-income households can access affordable and convenient tools that help them increase their economic activities through creation of low-cost business models and thus reducing unemployment, through small business models, new innovations and wider market reach through digital platforms is achieved and hence digital financial inclusion. Similarly, digital finance can be an equalizing tool through offering tools to increase income for low-income earners and households which improves their financial resilience and access to social opportunities. Through micro-loans enabled by digitization of payments, people living in informal settlements can afford to pay for clean and sustainable

electricity through facilities like M-Kopa, which promotes environmentally friendly investments. Access to digital savings, credit and insurance can help the poor mitigate climate related risks. Additionally, digital payments promote transparency of transactions which makes it easier for accountability. Low-income households can access digital financial services to save or take loans to pay for school fees and hence keep their children in school. Insurance cover payments can be made through digital platforms and saving for medical emergencies. Access to credit enables low-income earners supplement their irregular earnings and smooth consumption.

Kenya leads in use of mobile money in Sub- Saharan Africa according to Suri, Bharadwaj, and Jack (2021) with M-pesa, a Fin-Tech innovation which facilitates transfer of money electronically, and hence a DFS innovation was launched in 2007 by Safaricom. Mobile money form part of financial innovations products used to penetrate financial inclusion in developing and emerging economies (Chamboko and Guvuriro, 2021). Mobile money entails the use of mobile phones to extend the delivery of financial services such as bill payments and money transfers to businesses or individuals especially low-income individuals excluded from formal financial services (GSMA, 2016). Through increase in mobile money usage, the probability of saving, borrowing and receipt of funds increases as depicted by (Ajefu and Ogebe, 2019; Munyegera and Matsumoto, 2018; Lwanga and Adong, 2016). M-shwari, a mobile based microcredit formed through partnership between Safaricom and Commercial bank of Africa was launched in 2012 targeting both unbanked and banked to promote financial inclusion (Cook and McKay, 2015). It allows saving and access to credit. M-Shwari dominates the formal credit market as alluded by (Suri, Bharadwaj, and Jack, 2021). In January 2019, Fuliza, an overdraft facility, a product of Safaricom, was launched targeting the poor through offering digital credit (Kimani, 2020).

Apart from the digital credit provided by Safaricom, there are several other players in the Kenyan market such as Eazzy loans by Equity bank, Timiza by Absa bank and M-Co-op cash by Co-operative Bank of Kenya which are regulated by Central Bank of Kenya (CBK) (Blechman, 2016). Due to the increase in demand of digital credit, there was the entry of fintech players who provided DFS through mobile applications (Oguso and Ndung'u, 2021). This application based digital lenders in Kenya include Okash, Branch, Zidisha, Kiva, Zidisha, Saida, Haraka, Pesa Pata and Pesa na Pesa.

Izaguirre, Kaffenberger, and Mazer (2018) argued late payment and default on loan are due to lack of transparency and irresponsible lending from the lenders side. Most borrowers do not

know or understand the terms of their loans, incur unexpected fees or experience lenders unexpectedly withdrawing funds from their accounts. Lack of transparency contributes to borrowers not making good and informed choices at the time of borrowing and in turn affects their repayment ability. Additionally, the digital lender fail to measure the capacity of someone to repay. Failure to repay leads to blacklisting and hence inability to access formal financial services and hence financial inclusion.

Kibera, the largest informal settlement in Africa based in Nairobi County, Kenya and 6.6 km from the city centre. It is divided into 13 villages namely, Kianda, Olympic, Soweto West, Katwekera, Karanja, Kisumu Ndogo, Makina, Kambi Muru, Mashimoni, Lindi, Laini saba, Silanga and Soweto East. It has a high population density of approximately one million people (Taylor, Millington, Jacob, Mallamud, & Pelling, 2020). The area is characterized by increased crime, poor sanitation and water, informal housing and high unemployment levels. According to World Bank (2015), households live on less than USD$1.25 a day. Most of the people are in Kibera are in engaged in informal employment commonly known as 'Jua-Kali' which accounts for 82.7% of employment in Kenya according to (World Bank, 2016). The earnings are irregular and often very meagre to support daily needs. It is thus difficult to survive. However, through evolution of M-pesa, M-shwari, Fuliza and other digital financial services, households which were underserved and underbanked can receive, make payments, save, invest and access credit. Thus, through DFS, financial inclusion is promoted in Kibera.

Providing access to finance through the provision of credit is associated with poverty alleviation and economic development (Demirguc et al., 2008). At household level, access to credit enables the start of entrepreneurial activities, enables low-income households to provide education for their children (Ampah, Ambrose, Omagwa, and Frimpong, 2017). In line with the financial inclusion objective of accessibility, uptake and usage, through fintech, access to digital credit is a means of enabling low-income earners access financing like all other people and hence eradicate poverty. This aligns with SDG requirements of leave no one behind, and thus DFS accelerates financial inclusion (Bharadwaj and Suri, 2020).

There are different opinions on financial inclusion's effect on poverty reduction. Agwu (2021) and Asongu and Odhiambo (2019) argue that increased financial inclusion promotes reduction in poverty and inequality. However, Collins and Amolo (2018) posit increased financial inclusion does not have a direct impact on poverty. Though access to financial services has significantly improved in most sub-Saharan countries in the last few years, there has not been a similar match in improvement of life for the poor (Huang and Zhang, 2019). This could be

attributed to unequal access to infrastructure and technology which increases digital divide. For example, due to lack of access to basic telecommunication and financial infrastructures, affordable mobile devices and data-plans. On the other hand, due to convenience and ease in accessibility of digital credit, borrowers can accumulate multiple loans than they can afford to pay and hence over indebtedness which leads default and sinking the poor into further debts and hence financial distress (Yue, Korkmaz, Yin, and Zhou, 2022).

In Kenya, DFS have risen exponentially over the last decade according to Mora et al. (2020), with digital banking markets being among the most developed in Africa as depicted by Wandeda, Poulard, Kemboi, Ikiriinya, Lentimalei, Karanja and Ntutu (2023) and financial inclusion increasing by more than 300% within a decade. Due to high frequency in loan uptake, digital loans are the most sought loans accounting for 54% of the total observed market (FSD Kenya, 2019). However, despite increase in use of digital credit, there has been uproar due to pushing users into debt which has triggered further negative consequences including selling of assets, perpetual indebtedness through multiple loan products, credit blacklisting, gambling, and opacity in terms (Donovan and Park, 2019). For low-income earners, the immediate benefit of survival through digital credit outweighs the future ability to take another loan. In addition, due to uncertainty in wages/income earned, most low-income households must rely on these digital loans and the vicious cycle of borrowing and repayment makes them trapped in perpetual debts. As such, digital credit to an extent could be perceived as predatory and exploitative for daily wage earners (Donovan and Park, 2019).

1.2 Statement of the Problem

Access to financial services such as savings and borrowing facilities and other basic financial services has the potential to help many poor people in developing countries out of poverty. However, challenges such as lack of money to bank, improper documentation for account opening, cultural factors, involuntary barriers including lack of market access, distance to financial institutions and lack of trust in financial institutions, illiteracy, lack of collateral, credit history and lack of familiarity with technology often pose as barriers to access and uptake of financial services (Amari and Anis, 2021; Adegbite and Machethe, 2020 Fungáčová and Weill, 2015).

Most poor people are unemployed and often engage in casual jobs where the earnings are irregular and often meagre (FSD Kenya, 2019). Access to financial services is thus crucial to allow for saving in secure platforms which are flexible to accommodate small savings, which in turn can accumulate to substantial amounts that can be invested in education, business

ventures and healthcare needs for example (Aidoo, 2018). Additionally, during times of income shock, such savings can be drawn from to smooth consumption and hence avoid deprivation. However, where such savings instruments are high risk, high cost to maintain and limited functionality, saving is discouraged (Karlan, Ratan, and Zinman, 2014).

However, there are emerging challenges brought about by ease of access to credit and savings facilities. Rising cases of over indebtedness have been raising concerns due to the negative unintended consequences attributed to ease of access to these digital financial services (KIPPRA, 2023). Due to riskiness of borrowers, the digital loans are offered at high interest rates which the borrowers most of the time are not aware about, thus triggers repayment burden. Other borrowers end up also taking multiple loans than they can afford to pay and hence over indebtedness (Tetteh, 2023). Additionally, psychological stress from calls and threats of being blacklisted for default in payment, selling assets to pay off a loan, receiving funds through proxies' mobile line to circumvent debt repayment, taking another loan to pay another loan that is almost maturing and hence getting caught up in a vicious cycle of debt traps are some of the consequences that are emerging from taking up these digital loans (Yue, Korkmaz, Yin, and Zhou, 2022). In the end, are we achieving poverty reduction?

While several studies have been done on the effects of digital financial services in accelerating realization of financial inclusion through reaching the financially excluded population and hence achieving poverty reduction, less focus has been put on the effect of digital financial services on multidimensional poverty. Most studies look at the effect of these services on income poverty reduction. Studies conducted have looked at development of Fintech, its benefits, challenges and what needs to be addressed to allow rapid uptake of FinTech products in Sub-Sharan Africa, impact of digital payments, mobile money, robo-advising and crowdfunding on SME's and microfinance institutions. There are also studies that have explored unintended consequences such as gambling due to ease of access to mobile borrowing, ill-health, social relation ties being weakened and over indebtedness and need for regulation of digital financial services. There are also reports of non-performance of digital loans exceeding traditional loans threefold (Wamalwa, Rugiri, and Lauler, 2019). Socio-economic features of households including gender, age, education, occupation and income are determinants of financial inclusion and hence this study looks at how they affect the socio-economic status of households using digital financial services (Ali and Ghildiyal, 2023)

This study narrowed down to digital credit and digital savings services as they are the most sought digital financial services in Kenya and how they contribute to poverty reduction not just

from an income perspective but from a multidimensional angle. Further, the study seeked to look at how households' characteristics as a moderating variable affect the interaction between digital credit and digital savings (independent variable) and poverty reduction (dependent variable). Further, the study addressed a contextual gap by specifically looking at households in informal settlement in Kenya, which is a leader in financial inclusion in Sub-Saharan Africa (Jombo, 2021).

1.3 Research Objectives

1.3.1 General Objective

The study aimed to analyze the effect digital financial services on poverty eradication with focus on low-income earners in Kibera.

1.3.2 Specific Objectives

i. To determine the effect of digital credit services on socioeconomic status among Kibera households
ii. To evaluate the effect of digital savings services on socioeconomic status among Kibera households
iii. To find out the moderating effect of household characteristics on the relationship between digital finance and socioeconomic status among households in Kibera.

1.4 Research Questions

i. Does access to digital credit affect socioeconomic status among households in Kibera?
ii. Do digital savings influence socioeconomic status among households in Kibera?
iii. Do household characteristics moderate the relationship between digital financial services and socioeconomic status among households in Kibera?

1.5 Scope of the Study

The study adopted a cross-sectional analysis of households in Kibera using DFS. The study variables were digital financial services with specific focus on digital credit and digital savings services as the independent variables and socioeconomic status was the dependent variable. In relation to context, the study focused on understanding how household characteristics affect the outcome of use digital financial services and socioeconomic status.

1.6 Significance of the Study

1.6.1 Regulators

Based on the findings from the study, regulators in the financial sectors could get insights on ways to improve digital financial services for example through equipping the public with all

the relevant information for decision-making and also support entry of DFS players in the industry, which creates competition and a pool of market for consumers to choose from.

1.6.2 Policy makers

With a few years remaining until 2030 when the goal of poverty reduction in all its forms and dimensions is expected to be realized, findings from the study can be used to assess whether policies in place align towards realization of the goal.

1.6.3 Digital Financial Services Providers

The study will guide DFS providers on whether there is need to tailor make their products to suit the target population needs instead of a general product that is designed as one size fits all approach. Additionally, access to DFS should not turn to financial exclusion to users who are already facing huge financial burdens.

1.6.4 Academia

Previous studies have not looked at the joint connection among digital financial services, household characteristics and socioeconomic status of households. The study looks at how the introduction of a moderating variable, in this case, how household characteristics affect the outcome of achieving poverty eradication. It also informs the need to look at poverty from a multidimensional perspective rather than access to money.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The chapter focusses on the theory that supports digital credit and digital savings as captured in the research objectives. It also looks at empirical literature in line with the study objectives and research gaps addressed by the study.

2.2 Theoretical Review

Three theories have been discussed in relation to the study: Technology Acceptance Model (TAM) theory, Life cycle model and the Grameen model. The theories are relevant as they explain what triggers savings and consumption, adoption of new innovations in the market and how people's attitude determines achievement of intended objective and how financial services can address poverty reduction.

2.2.1 Technology Acceptance Model

Technology Acceptance Model (TAM) was developed by Davis in 1989 and is used to foretell use and acceptance of information systems and technology by individual users. The theory is used to examine the adoption of technologies such as mobile money services (Ekow and Palaniappan, 2022). It considers two variables: perceived usefulness and perceived ease of use as the two most important determinants influencing use of a product or service.

Perceived usefulness is the prospective user's subjective probability that using a specific application system will enhance his or her job or life performance. Perceived Ease of Use (EOU) is the degree to which the prospective user expects the target system to be free of effort. Perceived usefulness and ease of use are influenced by external factors, mainly social, cultural and political factors. Social factors include language, skills and facilitating conditions. Political factors are the impact of using technology in politics and political crisis. The attitude to use is concerned with the user's evaluation of the desirability of employing a particular information system application. Behavioral intention is the measure of the likelihood of a person employing the application. By measuring perceived usefulness and perceived ease of use, mobile money service providers should design better products and services that meet the needs of their users (Gefen, Karahanna, and Straub, 2003).

TAM fails to consider subjective norms in human behavior in response to accepting and using an innovative technology. It is also limited in that it uses only two factors; perceived ease of

use and perceived usefulness to explain human behavioral responses to accept and use a technological innovation. However, other factors such as perceived trust, perceived cost, perceived risk and social influence have been considered to advance the model (Namahoot and Laohavichien, 2018; Hansen, Saridakis, and Benson, 2018). Perceived trust in the providers of digital financial services improves the adoption of services offered as users of the digital services and products would be required to share data which entails personal information, which should be protected.

Serbeh, Adjei, and Forkuor (2022) conducted and found from a study conducted in Ghana that characteristics such as speed of transactions as a predictor in adoption of mobile money. Attitude, perceived usefulness, perceived ease of use, compatibility and price value were found to be important predictors of intention to use financial services as established by a study analyzing the various financial solutions (Neves, Oliveira, Santini and Gutman, 2023).

In relation to this study, the features of digital financial services influence their acceptance and adoption. Considering these, users are more likely to use digital financial services such as mobile and savings products if the cost of transactions is transparent and predictable according to Ozili, Okafor, and Kinyua (2019) and perceived cost of service is low (Falk, 2020). Other variables that are addressed by the theory that are taken into consideration for adoption are perceived usefulness, perceived ease of use, perceived risk, perceived behavioral control and perceived enjoyment contribute to continued use of products and/or services (Farah, Hasni, and Abbas, 2018).

2.2.2 Life-Cycle Theory

The theory was first developed by Brumberg and Modigliani in 1954 and further developed by Ando and Modigliani in 1963. It states that individuals seek to smooth consumption during their lifetime. According to the theory, households maximize the consumption benefit over their lifetime against expected lifetime income and initial wealth. This implies that rational individual's smooth consumption over their lifetime. During youthful age, individuals have negative savings but as years move, they earn income and savings increase, in retirement, the savings decline as individuals draw down saved earnings for consumption.

The amount of savings is determined by age and demographic structure of society rather than family income (Modigliani and Brumberg, 1954). By saving, one can spend in the future. However choices on how much to spend at each age are mainly limited by the resources available over one's lifetime. The theory assumes that people maximize utility over their life-

cycle consumption. Consumption is thus continuous, despite irregular income through one's lifetime, and that saving is meant to finance consumption during old age (Mori, 2019). The theory argues that individuals/households take loans when earnings fall below expectations . The loans are taken with the intention of optimizing consumption benefits of the individuals throughout their lifetime (Samad, Daud, and Dali, 2020).

According to life-cycle theory, poverty is higher for households headed by households headed by young and older households. This is driven mostly by low productivity at young age, it increases in middle age and decreases at old age. The theory also assumes that debt levels can be influenced by socio-economic factors such as household age and their expectations of future of future income and household size. Households thus borrow according to their future income expectations for purposes of smoothing their lifetime consumption. It thus explains high levels of debt among young people, which will start to decline as they age (Wong, Kusairi, and Halim, 2023).

Li, Wu and Xiao (2020) while studying the impacts of digital inclusive finance on household consumption found that households that were less financially literate, had lower incomes and few assets witnessed greater benefits from digital financial services than their elite counterparts. It was also established that these households significantly used digital finance to meet recurring household expenditure.

In line with the study variables, the theory addresses the moderating variable, household characteristics by looking at age of household and income level.

2.2.3 The Grameen Model

The model emerged from a local experiment in Bangladesh in the early 1970's by Muhammad Yunus. The model was developed by the Grameen Bank addressing the needs of the poor. This was triggered by the high poverty levels in Jobra, where Muhammad observed women took loans which were charged high interest rates from the shylocks. The rates were too high that the little gains the women made from their sales were wiped out by paying the loan plus interest. Failure to repay loans would lead to the shylocks taking away the woven baskets made for sale. Muhammad lent 856 taka (USD$27) to the forty-two women of Jobra village and told them to repay without interest.

The model entails setting up a village bank with a field officer and a few qualified bank workers. Prior to setting up the village bank, the field officer will have done some groundwork on prospective clients. A group of five people is formed, two of which will be eligible to get a

loan. The two borrowers are monitored for one month and the credibility of the group repayment is based on the performance of the two borrowers. If repayment is done within 50 weeks, the rest of the members can access a loan.

Following the successful implementation of the model in Bangladesh, it was replicated worldwide including in North America in the United States (US) and Europe Barua and Khaled (2023) and has been widely recognized as an approach to financial inclusion (Mia, Lee, Chandran, Rasiah, and Rahman, 2017). However, access to loans alone is not sufficient to lift the poor out of poverty (Joshee, 2008). Poverty is not just about income poverty. There are other forms of poverty such as poverty in education, social, health, sanitation. It is for these reasons that the Grameen model was further improved to and became more diversified to include savings, insurance, money transfer and marketing sectors (MicroSave, 2010).

In relation to the study variables, the model looks at poverty reduction through financial services (Credit and savings) and products tailored to address the need of the poor, in the model, the bank goes to look for the client instead of the clients approaching the bank and hence opening the door for the poor to access financial services. Loans are offered without collateral which allows the poor who cannot afford collateral or documentation to access loans. The model believes the poor are bankable and hence relies on credit history and repayment history and not on possessions acquired, it is managed by professionals who are experts in the field and the products offered target the marginalized.

2.3 Empirical Review

This section focuses on review of global and local literature on digital financial services in relation to eradicating poverty. Literature will review digital credit, digital savings and digital investments in line with poverty eradication. Additionally, literature on digital financial services, household characteristics and poverty reduction is provided. For each variable, literature is first reviewed and then gaps are finally highlighted.

Poverty has many manifestations though most of the time it is measured using unidimensional measures based on income or consumption expenditure. However, just one indicator cannot be used to capture the various poverty indicators (Mare, Gecho, and Mada, 2022). Poverty is manifested by various ill-being indicators such as poor health, nutrition, lack of clean water adequate sanitation social exclusion, bad housing conditions, low education, shame, violence and disempowerment as depicted by (Oyekale, Aboaba, Adewuyi, and Dada, 2019). Thus,

measuring poverty from an income and consumption perspective alone does not depict a true picture but rather masks the realities and dimensions of the exact nature and magnitude of poverty as opined by (Mare et.al., 2022). 9.2% or approximately 719 million global population live on less than USD$2.15 a day, however, from a multidimensional perspective which entails not only income but lack of health, education and living conditions, 1.2 billion people in 111 developing countries are poor according to (UNDP, 2023). To tackle poverty, it is crucial to address the root cause of poverty, which is lack of regular and reliable income.

The Millenium Development Goals (MDG's) signed up in 2000 had a primary goal of halving world's poverty by 2015, subsequently the SDG focused on ending poverty in all its forms. UN (2015) reports that apart from Sub-Saharan Africa, the rest of Africa and other parts of the world achieved the poverty reduction benchmark of MDG 1 of halving poverty. Hence poverty reductions is a key in the SDG (United Nations, 2016).

However, to tackle poverty, a consensus on who is poor, what defines their poverty and how to exit poverty (Lemanski, 2016). The World Bank conceptualizes development in terms economic growth as thus measures poverty in terms of financial income while UNDP measures poverty in terms of social welfare and freedom to make decisions. By the 1990's the concept of poverty being multidimensional was acknowledged in World Bank (2000), by combining basic needs approach with social and political poverty indicators including vulnerability and fear (related to violence) and powerlessness and voicelessness. By contrast, Sen (2001), argued, to determine if somebody is poor, consideration should be on what they can and cannot do. Sen viewed poverty as deprivation of capabilities. He was against income-based measurement of poverty since it failed to consider whether by use of income, capabilities could be achieved. In 1997, UNDP adopted Sen's approach to understand poverty through development of the Multidimensional Poverty Index (MPI). MPI views poverty as a denial of choices and opportunities required to live a long, healthy and creative livelihoods. It measures poverty against three dimensions; health (child mortality and nutrition), education (years of schooling and school enrolment) and living standards (access to water, sanitation, electricity, type of cooking fuel, type of housing floor and assets owned).

Chen, Leu, and Wang (2019) and Mei, Chao, Leu, and Mu (2019) conducted a study in Taiwan and found age of household, income, family size and marital status are related to multidimensional poverty. (Goli, Maurya, Hill, You, Alexander, Hou and Estabrooks, 2019) did a study in Nepal on regional differentials on multidimensional poverty and found standard of living as primary contributor to multidimensional poverty. Khan, Saboor, Rizwan, and

Ahmad (2020) did a study on multidimensional poverty using panel data and found that education and health are the major contributors to multidimensional poverty in Pakistan. Access to financial services empowers poor people to save and borrow, which enables the poor to acquire assets, invest in education and create businesses that enable them to improve their living standards as depicted by (Baidoo, Yusuf, and Aidoo, 2019).

Prior to digital finance, microfinancing was used to offer loans to low-income earners who could not get loans from formal financial institutions (Ozili, 2020). However, microfinancing came under criticism for its high interest rates. The Economist (2014) argued that the microfinance institutions put strong focus on credit over other financial services. Mader and Sabrow (2019) critiqued the microfinance institutions for lack of women empowerment. Fraser (2009) opined they triggered over indebtedness, Gue´rin, Labie, and Servet (2015) addressed their failure to educate borrowers on effects of loan default, high fixed costs with little left from the borrowed amount and lack of demonstration in poverty elimination (Duvendack, Jones, Copestake, Hooper, Loke, and Rao, 2011). As result of these criticisms, digital platforms were preferred as a preferred channel for offering micro-loans as they addressed high fixed costs and bureaucracy associated with microfinance loans. Most Micro-Finance Institutions (MFI) have adapted digital platforms to advance microloans to low-income earners (Ozili, 2020).

Financial inclusion has been adopted as a poverty reduction tool in Sub-Saharan Africa with mobile money accounting for 21% in promoting financial inclusivity according to (World Bank, 2018). Several studies have been conducted examining the link between financial inclusion and poverty reduction. In Nigeria, (Umaru and Chibuzo, 2018) found financial inclusion promotes poverty reduction. Similar findings were reported by (Churchill and Marisetty, 2020; Le, Ho, and Mai, 2019; Park and Mercado, 2015).

A time series study between October 2015 to February 2016 by Kyung (2020) across two low-income sites in Kibera, found that prior to mobile money, low-income earners were against or not able to use any form of financial instrument. In turn, they depended on relatives and friends. Moreover, the study also found that low-income earners lacked proper alternatives to mobile money unlike high income earners and middle-income earners who had commercial banks as an alternative. This thus indicates high dependency on mobile money by low-income earners.

Digital Financial Services have supported financial inclusion through reaching out to the unserved and underserved and has as a result increased income and reduced poverty (Cali,

Wollny, Minsat, and Martin, 2021). Expansion of DFS has been attributed with the recent financial gains in Africa. Sahay, Allmen, Lahreche, Khera, Ogawa, Bazarbash, and Beaton, (2020) depict that between 2014 and 2017, digital financial inclusion in Sub-Saharan Africa increased while financial inclusion through non-digital channels stalled. In 2017, an average of 42% of adult population owned an account at a financial institution or a mobile phone compared to 30% in 2014 (World Bank, 2017). As of 2020, Africa had 560 million registered phones which represents 65% of the total global mobile transactions (GSMA, 2021).

Sub-Saharan Africa leads is the world leader in mobile money accounts, with 53% active mobile money accounts and approximately two thirds of$70 billion worth of transactions executed in December 2020 (GSMA, 2021). Greater accessibility of mobile money compared to traditional financial services is partly attributable to the increase in usage of mobile money. Several studies have shown that financial inclusion and FinTech solution facilitate access to finance through increasing savings and access to credit (Kunt, Klapper, Singer, Ansar, and Hess, 2018; Koomson, et.al, 2020; Senyo, Osabutey, and Kan, 2020). Among the various Fintech solutions in the world, mobile money is one of the most popular and widely adopted across many developing countries (GSMA, 2019). Bateman, Duvendack, and Loubere (2019), claim that digital finance does not reduce poverty in Africa. They argue financial technologies such as Mpesa do not alleviate poverty in Kenya or Africa. However, Li, Wu, and Xiao (2020) argued that digital financial services increase economic output through financial intermediation.

According to Jack and Suri (2014), households lacking access to mobile money accounts suffered 7% drop in consumption in comparison to those who had mobile money. In Kenya, the presence of financial services through mobile money has significantly contributed to the growth of financial inclusion from 26.7% in 2006 to 82.9% in 2019 according to (Central Bank of Kenya et al., 2019). Unlike formal lenders, semi-informal lenders were previously not bound by interest rate regulations and could set high interest rates (Blechman, 2016). In addition, they were prohibited from reporting defaulters to Credit Reference Bureau (CBK, 2020). Failure to regulate interest rates would result to high interest rates charged to borrowers who would not be considered by the formal digital credit lenders (Brailovskaya, Dupas, and Robinson, 2021). Due to high interest rates, the rate of default is likely to increase Johnen and Mußhoff (2023) which results to questionable loan recovery practices by the lenders. However, there was an amendment in Central Bank Act in 2021 which brought the application -based lenders under the CBK Regulation (Ndung'u, 2022).

Though loans from informal lenders are convenient, the downside to it is, no credit score is built and the borrower's risk financial exclusion from failure to repay (Johnen and Mußhoff, 2023). Due to the high risk of default, small loans are offered (Shema, 2022). Several borrowers take digital loan products from several lenders because the prior loan offered was not enough to sustain their needs, others take a digital loan to pay another active loan that is about to mature, others sell off their assets to pay debt, reduce food consumption to pay off debt Putman, Mazer, and Blackmon (2021) while others have taken loans and cannot afford to repay. They therefore switch off their mobile phone lines and get new lines and others request for funds to be sent to a relative or friend's mobile phone line and they can withdraw.

Dalberg (2021) conducted a study on reliance and satisfaction in digital tools and services, reported that 84% of Kenyans used digital financial services, with only 22% using the platforms for basic financial transactions such as sending and receiving money and airtime top up. 94% used mobile money. Microsave consulting (2019) report between 2016 and 2019, 86% of loans taken by Kenyans were digital in nature. As such, digital credit has become a leading source of credit in Kenya according to (Totolo, 2018). Unlike microfinance, digital credit transaction costs are lower, loan approval process and disbursement can be instant or at least within 24 hours Johnen and Mußhoff (2023), borrowing limit depends on credit scoring Cheney (2017), rather than credit history Puri, Burg, Gombovic, and Berg (2018), households and individuals can conveniently access loans through mobile phones and using the same platform to make payments Chamboko and Guvuriro 2021; Gubbins and Totolo 2018) and there is no collateral required. Digital credit approval request is automated through algorithms used to determine the loan amount and hence no need for collateral as security. This makes it possible for low-income earners who might lack or have inadequate collateral be able to access financial services (Fletschner and Kenney, 2014). Low cost, ease of access and fast processing of digital loan requests are what promote the increased uptake (Kandie and Islam, 2022). Due to these characteristics (Microsave consulting, 2019) reported digital loans in Kenya had surpassed traditional loans at a ratio of 10:1 by 2018.

Central Bank of Kenya, KNBS, and FSD Kenya (2021) reported access to formal financial inclusion increased to 84% in 2021 from 83% in 2019 while adult population excluded from access to formal financial services increased to 11.6% in 2021 from 11% in 2019. In terms of usage, banking services including mobile banking services increased 44.1% in 2021 from 40.8% in 2019. This is attributed to the increased usage of mobile banking accounts, whose proportion rose to 34.4 % in 2021 from 25.3% in 2019. Users of physical bank branches

declined from 29.6 % in 2019 to 23.8% in 2021. Use of informal groups declined to 28.7% in 2021 from 30.1% in 2019, implying increasing formality in the financial sector. By contrast, financial health Central Kenya et al. (2021) reported declining financial health which is the ability of an individual to meet current and future financial needs and wants (KIPPRA, 2023). The report further explains that individuals use ineffectively the available financial tools such as savings and mobile money to plan other unexpected life emergencies. As a result, households are suffering from over indebtedness from multiple borrowing, defaulting in loans and hence living in financial distress.

Increased access to financial products and services leads to efficient resource allocation, thus providing better financial leverage to the underprivileged for poverty reduction. Lack of financial resources not only dampens economic growth but also income inequalities. This explains why there are large income inequalities in countries where the population is denied access to financial services. Beck, Demirguc, and Ross, (2004) concluded failure to meet demand of financial services by access to formal financial systems results to expensive informal financial systems which expose the poor to borrowing at high costs and reducing their income.

2.3.1 Digital credit services and poverty reduction

Björkegren and Grissen (2018) explain households in developing economies lack access to credit which makes them miss economic opportunities. Policymakers have tried to expand access to credit through duplicating institutions in developed countries or developing new ones such as microcredit institutions. However, the problem has not been solved as two billion people in the world lack bank accounts. Through financial inclusion, inclusivity is embraced by extending financial services to the underbanked and unbanked has gained tremendous attention because of its emphasis on equitable access to opportunities. Financial Inclusion leads to poverty eradication through increasing access to financial resources which can allow opportunities to pursue education, self-employment and human development and hence poverty alleviation (Zulfiqar, Chaudhary, and Aslam, 2016).

Sethi and Acharya (2018) argue provision of low-cost credit to low-income earners stimulates uptake of loans which are channeled to production activities and hence increases production and job opportunities. However, Totolo (2018) concluded the rise of access to digital credit, which was easily accessible prompted accumulation of loans and hence over indebtedness among low-income earners. CGAP conducted a survey and the findings were that digital loans are driving Kenyans into multiple debts. This is despite the organization which is popular for

its active promotion of financial inclusion, advocating for receding in use of digital credit to achieve growth in East Africa (Izaguirre et al., 2018). Donovan and Park (2022); Kusimba (2021) in a study looking at Kenya's M-Pesa story found subscribers were trapped in poverty through reliance on digital credit. They found that the small loan size failed to address poverty with borrowers using them for daily survival or temporary lack of money.

World Bank (2014) and Galor and Zeira (1993) argue as a result of high transaction costs and information asymmetry, the poor are unable to escape poverty as these challenges limit their access to formal financial services. Due to these imperfections of credit markets, poor households are unable to borrow and channel the funds to productive investments such as education or grow their small business ventures. Inadequate information about the financial situation of borrowers also presents challenges in the context of screening desirable borrowers (Baffour, Rahaman, and Mohammed, 2021). Akolgo (2023) questioned the amount of digital credit advanced in terms of effectiveness in starting up a small business operation. A study conducted in Ghana, the respondents questioned which business in Accra could yield enough profit within 30 days to pay back a loan including interest? As a result, borrowers end up debt juggling. In turn, it becomes a question of when and not if, debt crisis reaches its limits. In other situations, borrowers need to supplement their irregular income and so end up taking digital loans.

Naito, Ismailov, and Kimaro (2021) conducted a study on the effect of mobile money on savings and borrowings and found that mobile money increases the chances of borrowing while allowing households while allowing savings in a safe and liquid manner. Ouma, Misati, and Njoroge (2012) allude that through expansion of credit to the poor, who are extensively unbanked has the potential to increase their income and achieve poverty eradication.

Several studies have looked at the positive impact of digital finance through technological innovation hence promoting financial inclusion hence reaching the underbanked and unbanked Yang, Wu, and Huang (2020) and Bourreau and Valletti (2015) enabling reduction in transaction costs and information asymmetry between lenders and borrowers (Huang and Wang, 2017) and offering secure, affordable and convenient banking services to the poor in developing countries (Lyman and Lauer, 2015). However, there are also studies that have questioned the outcome of digital finance.

Gabor and Brook (2017); Loubere (2017) and Mader (2016) are against the push for digital financial inclusion while development institutions including World Bank, MasterCard, G20,

Bill and Melinda Gates Foundation are aggressively advocating for FinTech in all development interventions. Ozili (2020) questions the eagerness of big corporations and banks to deliver digital finance to the poor. Poor people have little money and the eagerness of fintech and banks to deal with the poor is worrisome.

Ndung'u (2022) explored the development of Fintech, its benefits, challenges and what needs to be addressed to allow rapid uptake of FinTech products in Sub-Sharan Africa. (Sumit & Chua, 2020) posit Fintech helps households' smooth consumption and facilitate borrowing. They specifically examine the impact of digital payments, mobile money, robo-advising and crowdfunding. FSD (2017) looks at speed and ease of access of digital credit leading to borrowers being heavily indebted. Melzer (2011) report indebtedness has a negative impact on health and mental wellness wellbeing impacts such as sleeping problems, conflicts with family and friends over economic issues (Hohnen, Gram, and Jakobsen, 2020).

Wamalwa et al (2019) investigate digital credit and its impact on household indebtedness. They posit digital borrowers are likely to have more loans than conventional borrowers and that through borrowing household income is reduced to an extent of not being able to engage in investments that can refinance the debt. The study was generalized and was not specific to a target population.

Chamboko and Guvuriro (2021) argue that though digital financial services have improved lives of Kenyans, there are negative impacts through ease of access to credit They look at gambling which is made easier through ease of access to credit through mobile phones. Due to betting using borrowed funds, it leads to distress towards credit repayment as there are no returns generated to pay off the loan. In the end, financial distress creeps in and affects the , welfare of the gamblers.

GSMA (2022) alludes the need for shared responsibility towards consumer financial health not only by mobile money providers but also by policy makers, donors' regulators and researchers in promoting financial literacy, measuring and reporting data related to financial health. (Panos & Wilson, 2020) explains that mobile loans are too accessible and should be complemented by training.

While digital credit has enabled many households to smooth their consumption in desperate times of need, provided access to credit, high rate of default and over indebtedness remains a concern as to the effectiveness of these services in eradicating poverty. Following the concerns highlighted in the literature review, the following hypothesis is formulated:

$H_0$1: Access to digital credit does not significantly affect poverty reduction among households in Kibera.

2.3.2 Digital savings and poverty reduction

According to Omwansa, Waema, Chen, and Sullivan (2013), about 40% of the global population survive on less than USD$2 within a day with 10% of these lacking access to formal savings products. Informal savings tools work for the poor but fail to match the households income and therefore make it a challenge to save for the long term (Collins, Morduch, Rutherford, and Ruthven, 2009). Due to unstable and little income of the poor, they need financial tools that accelerate their need to save in an automated way. Rutherford (2001) opined that in designing financial services that are beneficial to the poor, policymakers and digital financial service providers ought to have in mind the features that meet the needs of the various population segments instead of a one-size-fits-all approach. Reliability which is timely and accuracy in design of products and services and convenience in the sense of proximity, quick and private are some key features taken into consideration. Digital finance tools including mobile banking applications have features that address these requirements and in turn allow easy access to financial services from mobile phones, which leads to increased savings and improvement in well-being (Bank of International Settlement (BIS), 2020).

Kyung (2020) argued through mobile money savings services, low-income earners are able save little amounts of money securely and frequently, which can accumulate over time to meet needs that would have otherwise not been met were it not for the ability to save. Due to irregular earnings by low-income earners, they need flexible savings products to a greater extent more than benefits derived from savings such as interest (Karlan et al.,2014). While group savings, microfinance and informal institutions allow for small savings which lump up over time, unlike mobile money savings platform, they are not flexible in the sense they require defined savings contributions regularly. This creates pressure or responsibility for regular payment.

Studies indicate that poor households lose approximately 40% of their cash savings through informal channels such as putting savings in mattress or theft. This thus makes it very difficult to make any meaningful investments and reduce poverty which is the goal for saving. Through a study conducted by Kickstart, an International NGO which helps the poor by identifying profitable business opportunities, reported that the mobile money product created to encourage savings had three impacts; reduced the time to purchase a pump, though poor households could have still purchased the pump, it could have taken them longer and through mobile money, a

larger segment of the poor population was reached, and without which, they could not have purchased the pump (Omwansa et.al., 2013).

M-KOPA Holdings Ltd and International Finance Cooperation (IFC) have partnered to expand credit access to low social economic households in Kenya and Uganda through a flexible credit model that enables users have instant access to essential products by paying a small deposit and subsequently paying easy daily, weekly or monthly payments. Through these, one can access financial services without upfront collateral. These facilitates digital marketing through to smartphones, which an entrepreneur can use to promote their business and increase income, save on fuel cost by through substitution with solar energy and the savings can be channeled to generate more profitable investments.

Through mobile banking, the chances of formal savings increases by 2.4% while informal savings by 0.83%, and a greater significance on women's formal savings in West Africa (Loaba, 2022). In Burkina Faso, use of mobile money increased tendency to save for health emergencies (Ky and Sauviat, 2018). This corroborates a study conducted in India, Nandhi (2012), mobile money users increased their savings after using mobile money in contrast to keep cash in hand. Ouma, Odongo and Were (2017) conducted a study investigating if the universal use of mobile phones in delivering financial services offered a benefit in savings deployment in designated nations in select sub-Saharan countries. They found that households that used households that used mobile phones were more likely to save than households using manual methods to access financial services.

There was also a drop in the use of risky informal methods which were previously used because of lack of affordable and safe saving channels. GSMA (2015) posited, though mobile financial services were not meant to facilitate savings, through their accessibility, users are encouraged to use their electronic wallets for short and medium-term savings. In Ghana, Aker and Wilson (2013) in Uganda, Lwanga and Adong (2016) from Benin, Burkina Faso, Ivory Coast, Mali, Niger, Senegal and Togo Loaba (2021) all report similar findings on mobile money services creating a shift in savings practices due to perceived advantages of security, lower transaction costs and ease of use.

In Kenya, Suri and Jack (2016), found through M-pesa mobile money, there was increase in savings which led to lifting 194,000 households out of poverty. Additionally, most mobile money users were more likely to have savings products in formal institutions than non-users

as reported by (Skogqvist, 2019). In Ghana, use of mobile money for saving was more dominant in the rural areas than in an urban setting (Takyi, Sorkpor, and Asante, 2022).

A study conducted in Kibera by Plyler, Haas, and Ngarajan (2010), found crime incidents dropped due to adoption of mobile money savings platforms which were safer from a security perspective than keeping funds home. Personal Identification Number (PIN) feature ingrained in mobile applications to access savings encourages privacy over stored wealth which promotes further security (Tiwari, Shaub, and Sultana, 2019). However, in Uganda, Chile and Malawi, a safe space to keep funds only had a limited effect on the incentive and preference of people to commit to save and increase their savings practices (Dupas, Karlan, Robinson, and Ubfal, 2018).

Unlike high income earners who saved lumpsum funds for future spending, low-income earners used mobile money services for safe custody of their money and transferring services according to a study conducted in Nairobi by (Kyung, 2020). In terms of benefits derived from mobile money services by low-income earners, ability to save was ranked second after convenience in sending funds anytime according to the study. However, Batista and Vincente (2018) in a study found that in as much as savings smooth consumption in the event of shocks, mobile money availability created a disincentive to save and invest in agriculture among rural households in Mozambique. However, the study found Mozambican small smallholder farmers were open to save where there was guaranteed interest earning on the saved amounts.

Though most digital savings products are incorporated in the digital financial products and services, uptake of these services is not as popular as digital credit, though they encourage flexibility and allow for as little as sh.1 savings. There are also a few studies addressing how digital savings can be used to influence poverty reduction. To address these the study formulated the second hypothesis:

$H_0$2: Digital savings do not significantly influence poverty reduction among households in Kibera.

2.3.3 Digital finance, household characteristics and poverty reduction

Betti, D'Agostino and Neri (2002) studied factors influencing multidimensional poverty on UK households using time series data from 1991 to 1997. Multidimensional poverty was the dependent variable, independent variables included those representing household characteristics; gender, age, occupation, education, marital status of the household head, geographic region, and household size. The results show that except for unemployment, the

remaining variables all affect the multidimensional poverty index. Ningaye, Ndjanyou, and Saakou (2011) explores unidimensional and multidimensional poverty and determinants of multidimensional poverty in Cameroon. From the study, living area to a significant extent affects multidimensional poverty, while household size and gender do not. According to Tran, Alkire, and Klasen (2015) who studied determinants of income poverty and multidimensional poverty, they found multidimensional poverty rate decreases significantly when the education level of the household head increases. The study also shows that there is a difference in multidimensional poverty levels among different ethnic groups.

Development of digital finance reduces information asymmetry, enhances household ability to use financial services, which satisfies their growing demand for funds for investment in education, asset accumulation effectiveness in managing risks and thus increase in income levels as posited by (Bruhn and Love, 2014). Further, it promotes structural transformation in employment and helps bridge digital divide (Zhang, Wan, and Wu, 2021).

High financial literacy translated to better savings behavior in Vietman as depicted by (Morgan and Trinh, 2019). In Kenya, through BOMA, a US nonprofit and Kenyan NGO, identified 750 women from fourteen locations in Samburu and Marsabit counties and introduced mobile banking by providing mobile phones connected to M-Pesa. The connection was meant to facilitate savings to groups, contribution and withdrawal from personal and group based digital accounts. The study found preference to save in cash and traditional forms of securing value such as livestock among pastoralist communities which can be lost through drought or diseases. Illiteracy also prevented participants' ability in use of digital savings platform. M-Chama, the digital platform used to send contributions to the group, has a complex interface which proved unnavigable by a large population of the illiterate group and thus only 17% of participants were able to make transactions without assistance (Tiwari et.al, 2019).

Li, Wu, and Xiao (2020) found Chinese households used digital finance to support recurrent household expenditures such as food, clothing, education and house maintenance rather than non-recurring expenditures. Uzoma, Omankhanlen, Obindah, Arewa, and Okoye (2020) argued empowering of the poor through use digital finance will create jobs for themselves and provide employment for others, thus achieving hunger elimination, inequality reduction employment creation and poverty reduction. A study conducted in Tanzania on the effect of mobile money adoption by households on consumption smoothing and poverty found that households that used mobile money conveniently were shielded from sliding into extreme

poverty. Moreover, there was an increase in households surviving on below USD$1.25 a day where mobile money was not adopted (Koppensteiner and Olukorede, 2016).

A study conducted in Ghana by Bukari, Peprah, Ayifah, and Annim (2021) looked at the effect of four financial products, credit, savings, micro-insurance and life insurance along with other variables like age on household poverty and multidimensional poverty aspects. The findings were that these financial products improve household poverty at varying degrees, that is, households with access to credit witnessed improved consumption over those who did not have credit. The same observation applied to households who had savings, where consumption was high over those who lacked savings. Additionally, these households with savings were 15.8% less likely to be multidimensionally poor. Additionally, the effect of savings was highest among the poor compared to other quantiles. This supports a study conducted in Pokhara, Nepal's second largest city by Prina (2015) which concluded that it was better to promote a culture of savings more than advancing credit among the poor. Prina (2015) opined the poor often lacked access to formal financial services such as savings accounts which forces them to turn to costly means for savings. The study further concluded household size has the largest effect on poverty level.

While access to credit and savings products can help households tackle poverty, there are few studies looking into how household characteristics affects the use of digital financial services and the effect on poverty reduction. This led to the formulation of a hypothesis.

$H_0$3: Household characteristics use of digital financial services do not significantly influence poverty reduction among households in Kibera.

2.4 Summary of Literature and Gaps

From the literature reviewed, there were some gaps identified. Most of the literature looked at the overall effect of borrowing and savings with the introduction of mobile money among various groups including the high, middle and low income. Additionally, the studies concentrated on the unidimensional aspect of poverty, which is from the financial perspective. Poverty is a multidimensional aspect and therefore for financial inclusion to achieve poverty reduction, it is crucial to address poverty from the various dimensions as one aspect is intertwined to another. Through access to digital financial services, more so, access to financial services such as borrowings, savings and investments most unbanked and underbanked can now financial services just like any other person who has access to banking services.

This study further investigates how access to digital financial services addresses multidimensional poverty among low-income earners who access these digital financial services, in particular mobile money digital credit and savings products. Further, it seeks to understand if the household characteristics for users of digital credit and savings products have any nexus with poverty reduction.

Table 2.1: Summary of Literature Gaps

Author	Title	Findings	Research Gaps
Li et al. (2020)	The impact of digital finance on household consumption	Households used digital finance for recurrent household expenditure	The study did not use data for poor people and hence findings cannot be generalized to apply to the poor.
Bukari et.al. (2021)	Effects of Credit 'Plus' on Poverty Reduction in Ghana	Credit alone is not enough to break the poverty cycle and thus examines the effect of multiple financial products on poverty reduction in Ghana	Study took place in Ghana. It generalized all financial services and not specifically looking at digital financial services.
Tesfaye and Getachew (2018)	Determinants of Rural Households' Poverty with Selected Link Functions: The Case of Soro District, Hadiya Zone, SNNPR States, Ethiopia	Access to credit services has a negative and significant effect in reducing the probability of being poor.	The study considered rural households in Ethiopia. Poverty is viewed from a unidimensional perspective.
Kyung (2020)	The role of mobile money in improving the financial inclusion of Nairobi's urban poor	Savings through mobile money by low-income earners was high for security reasons and flexibility in amounts saved and hence promoting financial inclusion	The study focused on only one aspect of mobile money; savings among the low-income earners who often even lack income to meet daily needs, let alone save.

Author	Title	Findings	Research Gaps
Fernandes et al. (2021)	The contribution of digital financial services to financial inclusion in Mozambique: an ARDL model approach	Digital Financial Services play a crucial role in financial inclusion especially in improving access to and use of financial services by the underserved population.	The study fails to address issues such as effect of overborrowing due to ease of access of financial services on low-income earners. This study address overborrowing because of access to Digital financial services.
Takyi et al. (2022)	Mobile money for financial inclusion and saving practices: empirical evidence from Ghana	Mobile money increases savings and savings behavior among Ghanaians. The savings were mostly channeled to business start-ups, child education and emergencies	The study was based in Ghana. This study looks at Kenya, a leader in the adoption of FinTech in Africa, and focuses on an Urban informal settlement setting.
Omwansa, et al. (2013)	The Mobile Phone as the Tool to Redefine Savings for the Poor: Evidence from Kenya	Well-designed mobile money product can be effective in mobilizing savings for the poor. Mobile money promoted savings which led to women empowerment	The study does not address the effect of mobile saving products on poverty alleviation.
Ky and Sauviat, (2018)	Does mobile money affect savings behaviour? Evidence from developing countries	Mobile money increases the propensity of the disadvantaged population to save	The findings were generalized for all the developing countries which are different in terms of regulation and advancement in use of DFS.

Author	Title	Findings	Research Gaps
Sharma and Andrade (2023)	Digital financial services and human development: current landscape and research prospects	DFS enables people cope with life uncertainties, shape spending and saving behaviors and develop livelihood strategies	The study did not address how access to DFS affects poverty reduction.
Churchill and Marisetty (2020)	Financial inclusion and poverty: A tale of forty-five thousand households	There is a negative relationship between financial inclusion and poverty and hence financial inclusion reduces poverty.	The study was based in India and looked at financial inclusion but failed to look at digital financial tools which dominate the market as channels for promoting financial inclusion.
Suri and Jack (2016)	The long-run poverty and gender impacts of mobile money	Through M-Pesa female clients were able to move from subsistence agriculture into microenterprise which generates high incomes and consumption	The study did not consider survival rate of microenterprises established through M-pesa.

2.5 Conceptual Framework

Figure 2.1 indicates the conceptual framework which shows the relationship between the independent variables, moderating variable and the dependent variable.

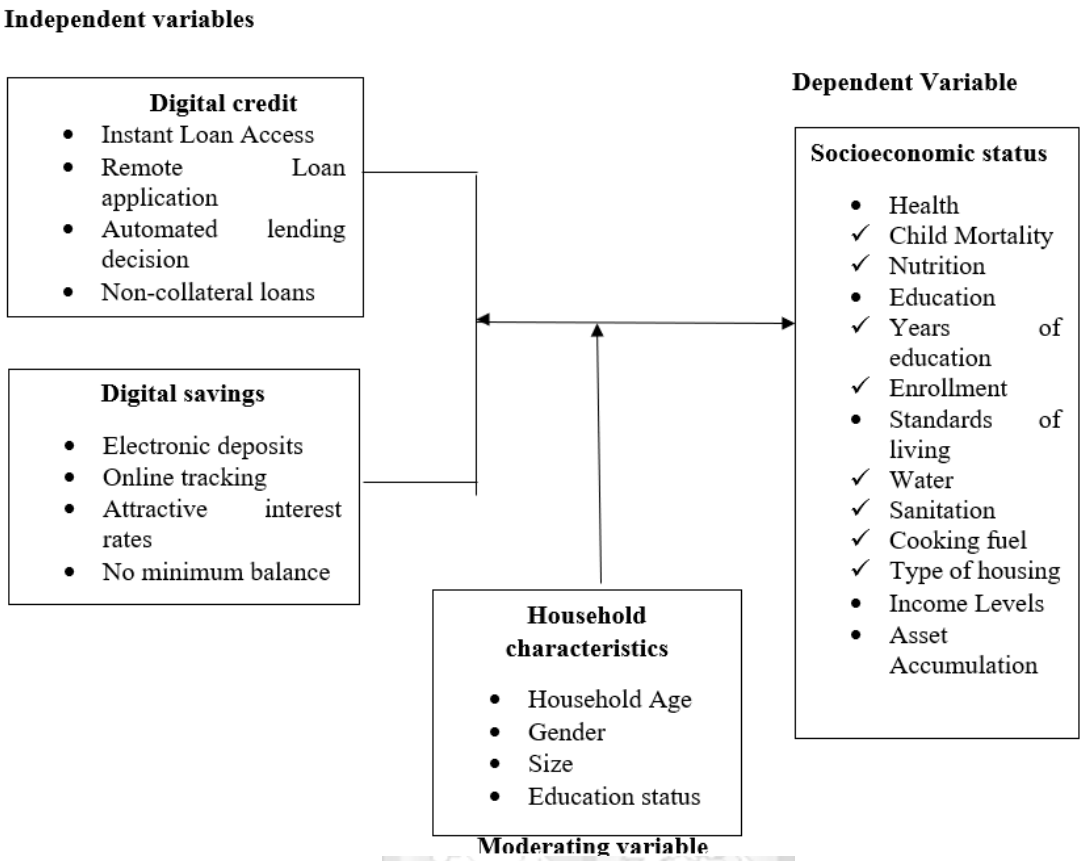


Figure 2. 1: Conceptual Framework

Source: Author (2024)

Socioeconomic status is the dependent variable, and its indicators are reflected by the multidimensional poverty indicators of access to education, standards of living and access to healthcare. Digital credit and digital savings are the independent variables. Indicators of digital credit are financial status of borrower, loan features and purpose of borrowing. Digital savings are indicated by purpose of savings, financial literacy of household, income levels and security. Household characteristics represent the moderating variable and they are indicated by household age, size, gender of breadwinner, and education status of the household.

The conceptual framework mirrors the objectives of this study. The first two objectives relate to digital financial services, which entail digital credit and digital savings. These represent the independent variables. Socioeconomic status is the dependent variable while household characteristics represent the moderating variable, which affects the relationship between independent and dependent variables.

2.5.1 Operationalization of study variables

Table 2.2 indicates how the study variables will be measured, measurement scale used and the supporting literature.

Table 2.2: Operationalization of study variables

Variable	Variable type	Indicators	Measurement	Item in questionnaire	Supporting Literature
Digital Financial Services	Independent	Digital Credit • Instant loan access • Remote loan application • Automated lending decision • Non-collateral loans	5-point Likert scale (Ordinal)	Question 6-9	Akolgo (2023), Baffour, Rahaman and Mohammed (2021), Chen, Leu, and Wang (2019) Mei, Chao, Leu, and Mu (2019)
	Independent	Digital savings • Electronic deposits • Online tracking • Attractive interest rates • No minimum balance	5-point Likert scale (Ordinal)	Question 10-15	Kyung (2020), Lusardi (2008), Aidoo (2018), West, Banerjee, Phipps, and Friedline, (2017) Murendo and Mutsonziwa, (2017) (Morgan and Trinh, 2019) Ouma, Odongo and Were (2017), Tamara, Darajat, Ermawati and Gunawan (2019)
Social Economic status	Dependent	• Health ✓ Child Mortality ✓ Nutrition • Education ✓ Years of education ✓ Enrollment • Standards of living	5-point Likert scale (Ordinal)	Question 16-19	Sen (1999), Halpern (2019), Alkire and Kanagaratnam (2018), Oyekale, Aboaba, Adewuyi, and Dada (2019), Goli, et al.

Variable	Variable type	Indicators	Measurement	Item in questionnaire	Supporting Literature
		✓ Water ✓ Sanitation ✓ Cooking fuel ✓ Type of housing • Income Levels • Asset Accumulation			(2019), Adeoaye, Seini, Sarpong and Amegashie (2019), Heeks (2017), Walsham (2017)
Household characteristics	Moderating	• Household head age • Sex • Dependency ratio • Education Status • Marital status	5-point Likert scale (Ordinal)	Question 20-26	Beyene and Muche (2010) Tesfaye and Getachew (2018) Bekele and Silshi (2020) Girma and Temesgen (2018) Milu, Jayne, and Burke, (2013) Mekonen, Degif, and Beyene, (2022) Li, Lv, and Han, (2022) Bukari, Peprah, Ayifah, and Annim (2021)

2.6 Chapter Summary

This chapter focused on theories that explain the adoption of digital financial services, household characteristics and their effect on consumption and saving and finally the relationship between access to financial services and poverty reduction. Empirical review that looks at what previous studies have found on digital credit, digital savings and household characteristics and address gaps found in these studies and how this study seeks to address them. A conceptual framework which is a graphical representation of the relationship between the study variables is included. Finally, operationalization of variables which is a representation of the elements of the study variables and how they are measured in the study is indicated.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter discussed research philosophy, research design, population of the study, sampling method, data collection methods, reliability and validity, data analysis and ethical considerations.

3.2 Research Philosophy

Research philosophy is a set of beliefs that guide the execution of a research study. Pragmatism, positivism, realism and interpretivism are the main research philosophies with positivism and interpretivism being the extreme knowledge paradigms. Positivism approach considers factual knowledge can be drawn from objective observation and measurement while interpretivism approach takes the approach that reality is socially constructed by the observer through their experience of it instead of being independent of the observer (Saunders, Lewis, and Thornhill, 2019).

The study took a positivism approach since it entails objectivity, generalization and replicability of findings. The study looked at the effect of digital financial services uptake on poverty reduction among low-income households in Kibera and hence attempted to study if there is a causal relationship between usage of digital financial services and socioeconomic status and to what extent. It entailed interviews and data collection was based on research questions guided by research objectives (Kothari, 2018).

3.3 Research Design

Research design entails how to go about answering the research questions, it specifies the source(s) for data collection, how to collect, measure and analyse data and is thus a conceptual structure within which research is conducted (Kothari, 2018).

The study embraces a descriptive correlation design because it describes the characteristics of digital credit and digital savings services and how they correlate with socioeconomic status. It also adopted a cross-sectional approach since the study collects and analyses data from a single point in time on the effect uptake of these digital financial services on poverty reduction among Kibera households (Bryman, 2014).

3.4 Population and Sampling

3.4.1 Target population

Zehnalova and Kubatova (2019) define target population as universe of units from which a sample is drawn from. Once the target population is determined, the sample size can then be established. The target population was households in Kibera. According to KNBS (2019) the total number of households in Kibera is 61,690. Though Kibera is divided into villages, the population is homogenous and is only heterogenous in terms of ethnicity, age and gender.

3.4.2 Sampling

A sample is a subset of individuals drawn from a population in a systematic way with the aim of generalizing about the population (Kothari, 2018). A mix of random sampling and purposive sampling was employed to select households that used digital financial services. Random sampling was employed on the population of 61,690 to purposively select 398 households who are beneficiaries of digital financial services.

To determine the sample size, Yamane formula was used. The formula is as follows;

$n = N/(1+N(e)2$

where n is sample size, N is the population of the study and e is the margin of error in the calculation (Yamane, 1967).

The total population (N) is 61,690 and the margin of error (e) is 5%. The sample size (n) is thus $61,690/ (1+61,690(0.05)^2=398$

3.5 Data Collection Methods

Primary data collection was employed by administering a five-point likert scale questionnaire to users of digital financial services. This is mainly because of non-availability of secondary data on the study topic. One questionnaire per household was administered to the household head. As the study looked at the relationship between digital financial services and socioeconomic status, structured questionnaires were considered ideal for purposes of collecting data in a structured way for easier data analysis. Questionnaires are easy to administer, appropriate for sampling a large population. The questions were related to indicators of digital credit, digital savings and how they link to poverty reduction.

3.6 Research Quality

Research quality refers to the degree to which a study is conducted with rigor, integrity and reliability. It encompasses validity and reliability of the research findings.

3.6.1. Research Validity

Saunders, Lewis and Thornhill (2019) define research validity as the extent to which data collection method(s) accurately measure what they were intended to measure. To ensure the questionnaire was relevant through adequate coverage of the investigating questions and could be understood by target respondents, a pilot test was conducted among ten households in Kangemi which is also a slum set-up like Kibera. After conducting the pilot test the questionnaire was found to be suitable for data collection.

3.6.2 Research Reliability

Reliability looks at consistency of findings at different times and at different conditions (Saunders, Lewis, and Thornhill, 2019). At times, respondents may give inconsistent responses due to misunderstanding or failure to read the instructions due to familiarity in answering questionnaires (Hardy and Ford, 2014). Cronbach alpha was used to test consistency in the responses to the likert scale questions using the pilot test data. In Cronbach, the alpha values range between 0 and 1, with values between 0.7 and above indicating consistency in measurement (Field, 2018).

Table 3.1: Cronbach Alpha Results

	Cronbach Alpha	**Number of Items**
Digital Credit	.858	4
Digital Savings	.740	6
Household Characteristics	.664	4
Social Economic status	.807	7

Source: Author computation (2024)

3.7 Data Analysis

Qualitative and quantitative techniques was used. Descriptive statistics was used to describe the data collected through employing measures of central tendency including mean and standard deviation and inferential statistics was applied to analyze and draw conclusions from the responses in the questionnaire. Correlation analysis was conducted to understand the strength of the relationship between the independent and dependent variable. Quantitative

analysis was employed in understanding the relationship between independent and dependent variables and hence inferential statistics by applying a regression model will be used. The study employed Ordinary Least Squares (OLS) regression due to ability to code and convert data into variables into continuous data. The regression model was stated as follows: -

$Y=\beta_{0+}\beta_1 DC_{+}\beta_2 DS_{+}\ \varepsilon$

Where:

Y= Socioeconomic status

$\beta_{0=}$ Intercept term

DC= Digital credit

DS= Digital Savings

β_1 and β_2 = Regression coefficients

ε =Error term

The regression coefficients were used to test the effect of each independent variable on the dependent variable. Due to hypothesis testing, t-test statistics was used at 5% significance level for purposes of testing whether the regression coefficient is significant.

The existence of a moderating variable affects the relationship between a dependent and independent variable. A hierarchical regression model was used to analyze how the effect of a moderating variable affects outcome of the multiple regression model through the addition of an interactive term which is a product of digital financial services and household characteristics. The hierarchical regression model for this study is:

$Y= \beta_0+\beta_1 DFS + \beta_2 Gender+ \beta_3 Age+ \beta_4 Education+ \beta_5 employment+ \beta_6 Size+ \beta_7[DFS*Gender] + \beta_8[DFS*Age] + \beta_9[DFS*Education] + \beta_{10}[DFS*employment] + \beta_{11}[DFS*size] + \varepsilon$

Where:

Y=Socioeconomic Status

$\beta_{0=}$ Intercept term

DFS = Digital financial services (A composite of digital credit and digital savings)

Gender, Age, Education, Employment, Size=Elements of Household Characteristics

β_2 β_3 β_4 β_5 β_6= Regression coefficients for the elements of Household characteristics

β_7 β_8 β_9 β_{10} β_{11}= Regression coefficients for the interactive terms.

ε =Error term

3.8 Diagnostic Tests

OLS regression model entails some assumptions which must be considered for the regression to be considered valid. Diagnostic test was conducted to ensure these assumptions have been met. Normality, multicollinearity and homoscedasticity tests were employed in the study.

3.8.1 Normality Test

The error term in a OLS regression model is assumed to be normally distributed (Gujarati, 2004). The error term is used to capture all other variable factors affecting the dependent variable but are not captured in the regression model. The excluded factors are believed to have only a small impact on the regression and are random.

Shapiro-Wilk test for normality was employed to measure for normality of residuals distribution.

3.8.2 Homoscedasticity Test

OLS regression assumes errors have a constant variance or rather homoscedastic. It refers to the extent to which the data values for the dependent and independent variables have constant variance for the residual error (Saunders, Lewis and Thornhill, 2019).

Scatter plot of residuals was used to test for the variance of the residuals.

3.8.3 Multicollinearity Test

It is assumed that there should not be a strong correlation between the independent variables. This is because if the independent variables are strongly correlated to each other, it becomes difficult to isolate the effect of each on the dependent variable.

Variance Inflation Factor (VIF) was used to test for this where a value of 10 and above indicates high collinearity (Saunders, Lewis, and Thornhill, 2019).

3.9 Ethical Issues in Research

The research participants will not be subjected to any harm. For dignity and respect of privacy, data collected will be treated with utmost confidentiality. Prior to going to the field, ethical approval letter was obtained from Strathmore University. The findings from the study were

used for research purposes, and as such, permission to conduct the study was obtained from National Commission for Science, Technology and Innovation (NACOSTI).

CHAPTER FOUR: DATA ANALYSIS AND PRESENTATION OF RESEARCH FINDINGS.

4.1 Introduction

The chapter presents findings of the study on effects of digital financial services on socio-economic status of households in Kibera. The specific objectives entailed finding out the effect of digital credit and digital savings on the social economic status of households in Kibera. In addition, determining the moderating effect of household characteristics on the relationship between digital finance and social economic status among households in Kibera. This chapter focuses on demographic information, descriptive analysis, factor analysis, correlation analysis and regression analysis.

4.2 Response rate

The study was conducted across all the villages in Kibera specifically targeting households using either digital credit and digital savings services. A total of 398 questionnaires were issued and out of which 366 were answered. This represented 92% response rate. This is considered sufficient because according to Sekaran and Bougie (2011), a response rate of 70% is excellent.

4.3 Respondents demographics

The study sought to gather information about gender, age, education level, employment status and household size.

4.3.1 Gender

The respondents were required to choose between female and male. From the results indicated in Table 4.1 male respondents were the majority at 51.4% while female were at 48.6% .

Table 4.1: Gender of respondents

Gender	**Frequency**	**Percent**
Male	188	51.4%
Female	178	48.6%
Total	**366**	**100%**

Source: Author computation (2024)

4.3.2 Age

The respondents were required to provide details of the age bracket they fell into. The findings are indicated in Table 4.2. where majority at 42.6% fall within the 18-30 years age bracket, followed by 29.2% falling within the 31-40 years age group, 19.4% in the 41-50 years category, 5.7% in the 51-60 years category, and 3% aged above 60 years. Use of digital financial services is therefore more popular within the youth population.

Table 4.2: Age of respondents

Age Bracket	**Frequency**	**Percent**
18-30 Years	156	42.6%
31-40 Years	107	29.2%
41-50 Years	71	19.4%
51-60 Years	21	5.7%
Above 60	11	3.0%
Total	**396**	**100%**

Source: Author computation (2024)

4.3.3 Education level

Respondents were asked to respond on the highest level of education attained at the time. Table 4.3 shows the results. The respondents' level of education varies, with the majority, comprising 50.3%, having completed secondary education. Following this, 21.6% have attended technical college, while 15.3% have completed primary education. A smaller proportion, 9.8%, have pursued undergraduate studies, 2.7% reported having no formal education and 0.3% with masters degree. From the results, at least 50% of the population using digital financial services are literate.

Table 4.3: Education attainment

Education background	**Frequency**	**Percent**
Secondary	184	50.3%
Technical Collage	79	21.6%
Primary	56	15.3%
Undergraduate	36	9.8%
None	10	2.7%

Masters Degree	1	0.3%
Grand Total	**366**	**100.0%**

Source: Author computation (2024)

4.3.4 Household Size

The study sought to investigate the number of people per household. Table 4.4 indicates majority at 37.9% of respondents reported a household size of 3-4 members, while 28.4% reported 1-2 members. Additionally, 24.4% reported a household size of 5-6 members, and 9.3% reported a household size above 6 members. The average household size among the surveyed population is approximately 4 members.

Table 4.4: Household size

Size range	**Frequency**	**Percent**
3-4	142	38.8%
1-2	106	29.0%
5-6	84	23.0%
Above 6	34	9.3%
Total	**366**	**100%**

Source: Author computation (2024)

4.3.5 Employment status

The study sought to get the employment status of the respondents. Table 4.5 indicates that a majority comprising 72.4%, are engaged in casual employment, indicating a significant portion of the population relies on irregular or temporary work arrangements. Meanwhile, 17.3% reported being in formal employment, suggesting a smaller but notable segment with stable, regular jobs. Additionally, 10.3% of respondents reported being unemployed. Due to the unreliability of income from casual employment, it is likely that for most users to use digital financial services to meet their needs.

Table 4.5: Employment status

Form of employment	**Frequency**	**Percent**
Casual Employment	277	75.7%

Formal Employment	54	14.8%
Not Employed	35	9.6%
Total	**366**	**100.0%**

Source: Author computation (2024)

4.4 Descriptive Analysis

The study carried out a descriptive analysis to summarize the responses from the respondents' which were presented in form of sum mean and standard deviation.

4.4.1 Digital credit features

Table 4.6 indicates the mean and standard deviation for the responses obtained under digital credit from the questionnaire.

Table 4.6: Descriptive results for digital credit features

The first independent variable was digital credit features and the results are as indicated below.

	N	Mean	Std. Deviation
I can access digital loan instantly	366	4.38	.818
It is possible to access a digital loan from anywhere	366	4.47	.643
I do not need to offer any guarantee for digital loan repayment	366	4.15	1.011
There is no loan officer to decide if I will get a loan	366	3.98	1.129
Valid N (listwise)	366		

Source: Author computation (2024)

The questions in the table 4.6 were meant to gauge the extent of digitalization of the credit services offered to the Kibera residents. The results were as discussed below.

The results indicate agreement in accessibility to digital loans from anywhere as indicated by a mean of 4.47 and a standard deviation of .643. The results further indicate agreement as depicted by a mean of 4.38 and a standard deviation of .818 that digital loans are processed fast and therefore during periods of emergency. Further, there is no collateral required to secure the digital loans as shown by a mean of 4.15. However, some respondents felt that though there was no loan officer to decide if one would get a loan, there were other criteria's employed

to determine the success in getting a loan which was automated. This therefore resulted to a fair agreement reported by a mean of 3.98 but with variation in responses at 1.129.

4.4.2 Digital savings features

The second independent variable was digital savings features and the results are indicated in Table 4.7.

Table 4.7: Descriptive results for digital savings features

	N	Mean	Std. Deviation
I can access digital savings instantly	366	4.38	.818
It is possible to access digital savings from anywhere	366	4.47	.643
My savings are secure	366	4.33	.676
Through savings I meet my target expectations	366	3.65	1.053
I can easily check how much savings I have	366	4.49	.562
There is no minimum saving amount	366	4.41	.668
Valid N (listwise)	366		

Source: Author computation (2024)

Findings indicate agreement that is was easy to check level of digital savings made with as reported by a mean of 4.49. The results also indicated agreement that it is possible to access digital savings from any location mean of 4.47. The study also found that there was agreement among respondents that there was no requirement to save above a certain limit. This was supported by a mean of 4.41. Similarly, there was agreement in the ability to access digital savings immediately at a mean of 4.38. The results also indicate the respondents found saving through digital platforms was safe at a mean of 4.33. The findings also indicate there was fair agreement that through savings, the respondents were able to use the savings for intended purposes as reported by a mean of 3.65.

4.4.3 Household Characteristics

Household characteristics was the moderating variable in determining how they change the relationship interaction between the digital financial services (independent variable) and socio-economic status (dependent variable). The results are indicated in Table 4.8.

Table 4.8: Descriptive results for household characteristics

	N	Mean	Std. Deviation
The younger the household, the more the use of digital credit and savings services	366	2.79	1.010
The smaller the household, the less the use of digital credit and savings services	366	2.79	1.010
A household headed by a man is likely to use digital credit and digital savings	366	2.92	1.013
The more educated, the more the use of digital credit and digital savings services	366	3.30	.958
Valid N (listwise)	366		

Source: Author computation (2024)

The results show fair agreement that the more educated a household is, the more the use of digital credit and digital savings services depicted by a mean of 3.30. The findings indicate disagreement that a household headed by a man is likely to use digital credit and digital savings by a mean of 2.92. There is disagreement in the younger the household the more the use of digital credit and savings services and the smaller the household, the less the less the less the use of digital credit and digital savings at a mean of 2.79.

4.4.4 Socioeconomic status

The dependent variable was the socioeconomic status in relation to use of digital financial services and the results are as indicated in Table 4.9.

Table 4.9: Descriptive results for socio-economic status

	N	Mean	Std. Deviation
My family can easily access medical care through use of digital credit and savings	366	3.52	1.000
My children can attend school without being sent away for lack of school fees	366	3.59	1.142
We have access to clean water and toilets	366	3.29	1.054

We can afford a balanced diet meal everyday	366	3.58	1.032
The house we live in is safe	366	3.19	1.036
My income has increased since I started using digital credit and savings services	366	3.55	.892
Assets in our house have increased because of using digital credit and savings services	366	3.65	1.053
Valid N (listwise)	366		

Source: Author computation (2024)

There results show that there was fair agreement in households' assets increasing due to use of digital credit and savings services at a mean of 3.65, however, there was a variation in responses at 1.053. The results show fair agreement in ability to afford to have a balanced diet meal everyday as reflected by a mean of 3.58. The results also indicate fair agreement that the respondents' children can attend school without being sent away from lack of fees at a mean of 3.59. The findings also indicate fair agreement that income has increased since starting to use digital credit and digital savings as depicted by a mean of 3.55. There was also fair agreement in ability to access medical care as shown by a mean of 3.52.

4.5 Factor Analysis

Factor analysis is used as a data reduction technique that takes on a large number of variables and summarizes it to represent the different factors or components. This is done by grouping variables based on intercorrelations (Kline, 2014). Kaiser-Meyer Olkin -KMO and Bartlett's test of Sphericity are done to check whether there is need for factor analysis. KMO was used to measure sampling adequacy which is expressed between a range of 0 to 1. The study considered KMO values of 0.5 and above are considered as appropriate for factor analysis (Bandari and Migiro, 2015). Bartlett's Test of Sphericity measures significance of the data. For this study, factor analysis is suitable where the significance level is $p<0.05$ (Brown, 2009).

4.5.1 Diagnostic checks for factor analysis

The study used Kaiser-Meyer Olkin and Bartlett's Test of Sphericity to test whether factor analysis was necessary.

Table 4.10: Bartlett's test of Sphericity and Kaiser -Meyer Olkin

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.543
Bartlett's Test of Sphericity	Approx. Chi-Square	474.448

	df	6
	Sig.	<.001

Source: Author computation (2024)

The results in Table 4.10 indicate KMO value of 0.543 which is above 0.5. This means there is sampling adequacy to proceed with factor analysis.

Bartlett's sphericity tests whether the correlation matrix is an identity matrix where the leading diagonal value is 1 and the off-diagonal values are 0. This means the variables are completely independent of each other and thus the factor model is not appropriate. Identity matrix can be ruled out if p value of the test is less than 0.05. The results in table 4.10 indicate Bartlett's sphericity test reported a significance value less than 0.001 which is less than 0.05 and hence correlation between variables. Therefore, from the two diagnostics tests results, factor analysis can be applied.

Table 4.11: Exploratory factor analysis.

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.299	37.852	37.852	5.299	37.852	37.852	4.478	31.987	31.987
2	2.280	16.288	54.140	2.280	16.288	54.140	2.244	16.029	48.016
3	1.198	8.554	62.695	1.198	8.554	62.695	1.946	13.899	61.915
4	1.082	7.726	70.421	1.082	7.726	70.421	1.191	8.506	70.421
5	.924	6.598	77.019						
6	.786	5.616	82.634						
7	.711	5.075	87.710						
8	.622	4.445	92.155						
9	.517	3.695	95.849						
10	.323	2.311	98.160						
11	.258	1.840	100.000						
12	3.980E-16	2.843E-15	100.000						

13	-2.046E-16	-1.461E-15	100.000						
14	-2.594E-16	-1.853E-15	100.000						

Extraction Method: Principal Component Analysis.
Source: Author computation (2024)

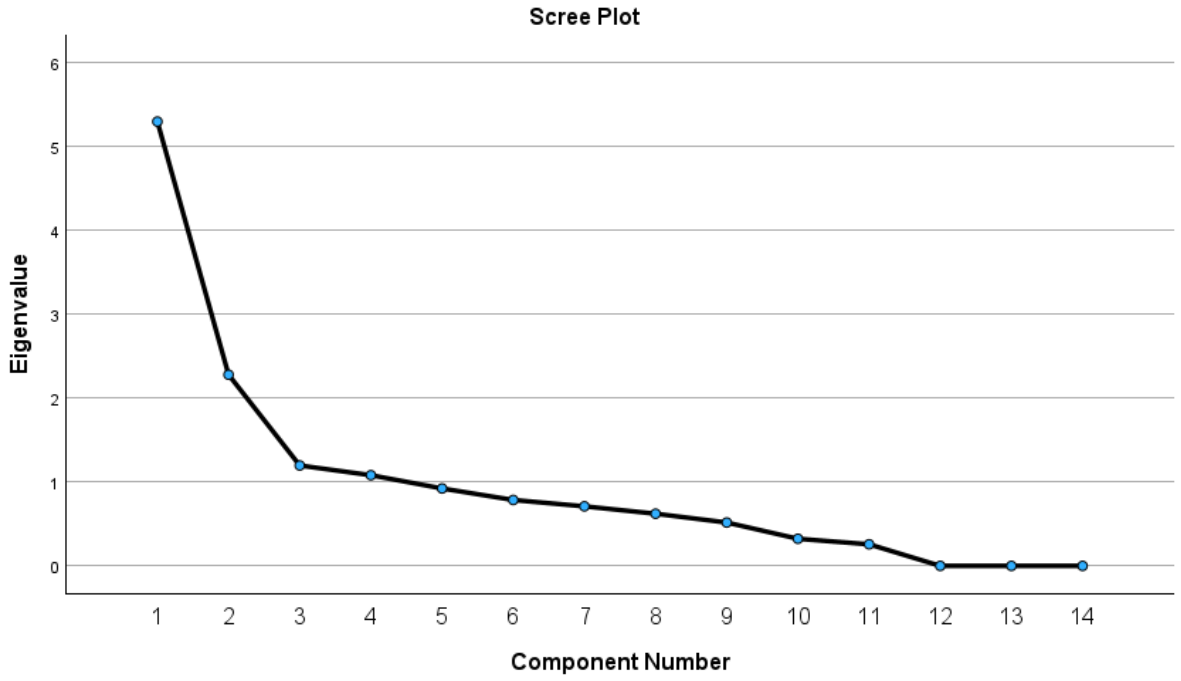


Figure 4. 2: Scree Plot of Eigenvalues

Source: Author computation (2024)

Eigenvalues rank the factors in terms of their contribution to the variance of the underlying data. Factors whose eigenvalues are more than 1 are considered to have reasonable contribution to the variance and hence we exclude the factors whose eigenvalue is less than 1. In our case, as illustrated in Table 4.11, only four important factors are selected. The loading cumulative percentage indicates the variance of the underlying data explained by the factors. In this case, 70.421% variance of the underlying data is explained by the four factors.

4.5.2 Factor Rotation

Rotated component matrix shows correlation between factors and the underlying questions. The goal is to identify factors that are different from one another. It shows which questions are

related to which factor. If the questions relating to the variables have a fairly good correlation of 0.5 and above, then the relevant variable relating to that question is considered important.

Table 4.11: Rotated Component Matrix

	Component			
	1	2	3	4
I can access digital savings instantly	.897			
I can access digital loan instantly	.897			
It is possible to access digital savings from anywhere	.806			
It is possible to access a digital loan from anywhere	.806			
I do not need to offer any guarantee for digital loan repayment	.735			
There is no loan officer to decide if I will get a loan	.727			
The younger the household, the more the use of digital credit and savings services		.960		
The smaller the household, the less the use of digital credit and savings services		.960		
A household headed by a man is likely to use digital credit and digital savings		.545		
I can easily check how much savings I have	.519		.686	
Through savings I meet my target expectations			.664	
My savings are secure			.604	
There is no minimum saving amount			.596	
The more educated, the more the use of digital credit and digital savings services				.840

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.
Source: Author computation (2024)

Based on the results in table 4.12, all the questions relating to independent variables were found to have a fairly good correlation of 0.5 and above with the four important factors and hence none should be dropped. The relevant variable relating to that question is considered important.

An interrogation of the factor loadings for the questions captured above shows that the four factors identified above are accommodated into the three variables pursued in this study namely credit, savings and household characteristics.

4.6 Correlation Analysis

Correlation measures the strength of association between two variables and the direction of the relationship. It is measured by coefficients that range from -1 to +1. A value of +1 means perfect association between the variables, 0 means no association between the variables and -1 means perfect negative association between the variables. The direction of the relationship is indicated by + or – sign. A + sign means a positive relationship between the variables while a – sign indicates negative relationship. Due to the use of categorical data, which is not continuous data, Spearman correlation was used for this study.

4.6.1 Overall correlation analysis

Correlations of all four study variables were computed. A composite measure of each variable was determined as an average of the relevant indicators. The results are presented in Table 4.14

Table 4.12: Correlation between Digital credit, Digital savings , Household characteristics and Socioeconomic status

			Digitalcredit	Digitalsavings	Household_Characteristics	Socioeconomic_Status
Spearman's rho	Digitalcredit	Correlation Coefficient	1.000	.754**	-.017	.429**
		Sig. (2-tailed)	.	<.001	.747	<.001
		N	366	366	366	366

	Digitalsavings	Correlation Coefficient	.754**	1.000	-.101	.612**
		Sig. (2-tailed)	<.001	.	.054	<.001
		N	366	366	366	366
	Household_Characteristics	Correlation Coefficient	-.017	-.101	1.000	.022
		Sig. (2-tailed)	.747	.054	.	.679
		N	366	366	366	366
	Socioeconomic_Status	Correlation Coefficient	.429**	.612**	.022	1.000
		Sig. (2-tailed)	<.001	<.001	.679	.
		N	366	366	366	366

**. Correlation is significant at the 0.01 level (2-tailed).
Source: Author computation (2024)

Based on the results on table 4.13, digital credit and digital savings had significant correlations with socioeconomic status as indicated by $p<0.05$. Household characteristics which were moderating variables were found not significantly related to socioeconomic status as depicted by $p>0.05$. Digital credit was found to be significantly correlated with digital savings ($R=0.754$, $p<0.05$). However, Digital credit and household characteristics were not significantly correlated as depicted by $R=-0.017$, $p>0.05$. Digital savings did not have a significant correlation with household characteristics as reported by ($R=-0.101$, $p<0.05$).

4.7 Regression Analysis

Regression analysis is a statistical method used to determine the structure of a relationship between two or more variables. This study used multiple regression analysis as there were more than two variables. It is used to determine the magnitude and structure of the relationship between variables and to forecast a variable based on its relationship with another variable.

4.7.1 Diagnostic tests

Certain assumptions should hold for regression analysis to be performed. These assumptions entail (1) the residuals being normally distributed (2) constant variance for the residual errors and (3) absence of strong collinearity among the independent variables.

4.7.2 Normality tests

The test examines whether the variables are approximately normally distributed. Shapiro-Wilk test is used to test for normality.

Table 4.13: Test for normality

	Shapiro-Wilk		
	Statistic	df	Sig.
Digitalcredit	.855	366	<.001
Digitalsavings	.914	366	<.001
Household_Characteristics	.942	366	<.001
Socioeconomic_Status	.977	366	<.001

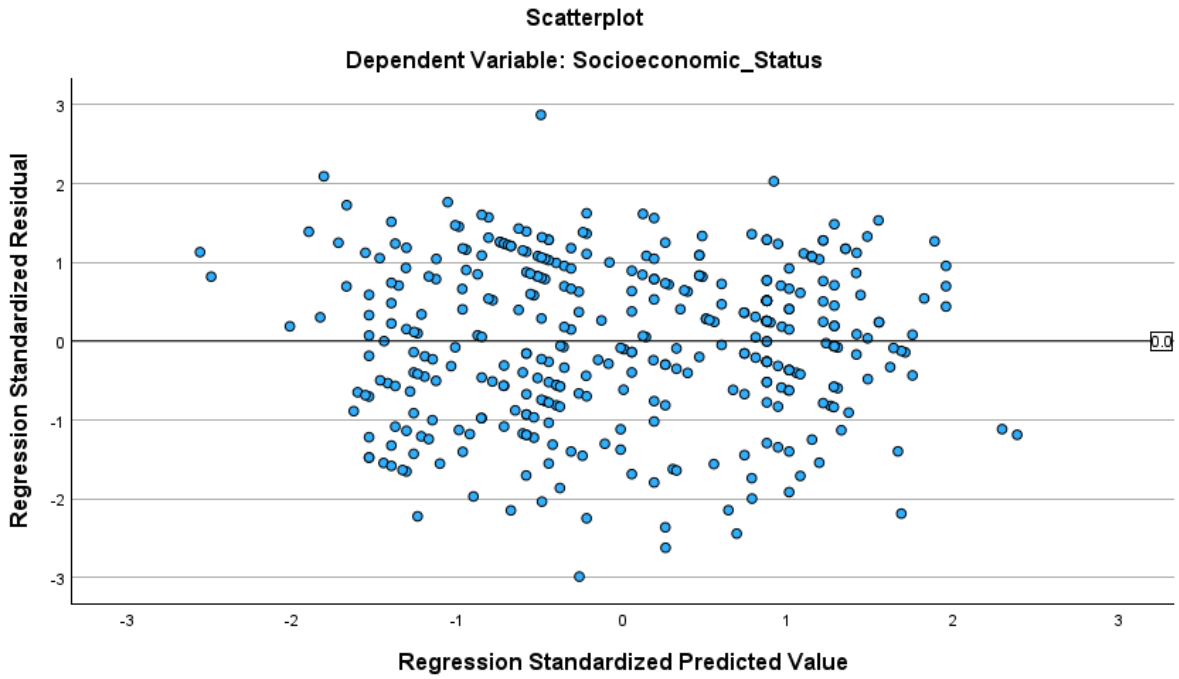
Source: Author computation (2024)

The null hypothesis under the normality test is that data is not normally distributed. Table 4.14 indicates the $p<0.05$ and hence data is normally distributed. This means that the null hypothesis is rejected.

4.7.3 Heteroscedasticity tests

Heteroscedasticity tests examines if residuals have constant variance. Scatter plot of residuals was used to test for variance of residuals from the scatter line.

Table 4.14: Scatter plot of residuals from multiple regression



Source: Author computation (2024)

The findings from Table 4.15 show that the vertical distance representing the variance from point -3 to 0 is uniform and equidistant from 0 to 3. Hence, it is concluded there is constant variance between the variables and hence the assumption of homoscedasticity is met.

4.7.4 Multicollinearity tests

Multicollinearity occurs when two or more independent variables in a regression model are highly correlated. Variance Inflation Factor was used to test multicollinearity.

Table 4.15: Variance Inflation Factor for predictor

Model	**VIF**
Digital Credit	2.285
Digital savings	2.287
Household Characteristics	1.006

Dependent Variable: Socioeconomic_Status

Source: Author computation (2024)

Table 4.16 indicates all three predictor variables had VIF coefficients ranging between 1.006 and 2.287. As a rule of thumb, VIF values exceeding 10 indicate collinearity (Saunders, Lewis, and Thornhill, 2019). Based on the results in table 4.16, there is no collinearity.

4.8 The Model explanatory power

The study sought to find out the effect of digital financial services on socio-economic status. To achieve the objective, digital credit and digital savings which are components of digital financial services were used as the predictors.

The results of the multiple regression analysis are as displayed in Table 4.17.

Table 4.16: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.606[a]	.367	.364	.55884

a. Predictors: (Constant), Digital savings, Digitalcredit

a. Dependent Variable: Socioeconomic_Status

Source: Author computation (2024)

The results above indicate that R Squared =0.367 or 36.7%. This implies that the two predictor variables namely digital credit and digital savings explain 36.7% variation of the dependent variable.

Table 4.17:Regression Coefficients

	Unstandardized coefficients		**Standard Coefficients**	**t**	**Sig**
	B	**Std.Error**	**Beta**		
(Constant)	-.202	.256		-.788	.431
Digital credit	-.184	.059	-.197	-3.134	.002
Digital savings	1.042	.089	.740	11.749	<.001

Dependent Variable: Socioeconomic_Status$_a$

The following regression equation is derived from the study

$Y=-0.202-0.184X_1+1.042X_2$

The first study objective was to examine the effect of digital credit services on social economic status among Kibera households.

$H_0$1: Access to digital credit does not significantly affect social economic status among households in Kibera.

The results obtained from the regression indicate that β_1= -0.184, t= -3.134 and p<.05. this implies that the null hypothesis is rejected.

The results imply that digital credit has a significant negative effect on socioeconomic status of Kibera households. More specifically for one unit increase in use of digital credit, the socioeconomic status of Kibera households decreases (deteriorates) by 0.184 units.

The second objective was to evaluate the effect of digital savings services on social economic status among Kibera households,

$H_0$2: Digital savings do not significantly influence socioeconomic status among households in Kibera.

The results obtained from the regression indicate that β2=1.042, t=11.749 and p<.05. Therefore the null hypothesis is rejected. The interpretation of this is that digital savings has a significant positive effect on socioeconomic status of households. For every unit increase in the use of digital savings it is expected that the socioeconomic status of households will increase by 1.042 units.

4.9 Moderating effect of household characteristics

The study sought to find out whether household characteristics play a moderating role in the relationship between digital financial services and socioeconomic status. The hypothesis tested was:

$H_0$3: Household characteristics use of digital financial services do not significantly influence social economic status among households in Kibera.

The moderating effect of household characteristics was tested using hierarchical regression analysis. Two sets of model were used. Model 1 did not have the interaction term while in model 2 the interaction term was introduced. The two models are specified as follows:

Model 1:

$$Y= \beta_0+\beta_1 DFS + \beta_2 Gender+ \beta_3 Age+ \beta_4 Education+ \beta_5 employment+ \beta_6 Size + \varepsilon$$

Model 2:

$$Y= \beta_0+\beta_1 DFS + \beta_2 Gender+ \beta_3 Age+ \beta_4 Education+ \beta_5 employment+ \beta_6 Size+ \beta_7[DFS*Gender] + \beta_8[DFS*Age] + \beta_9[DFS*Education] + \beta_{10}[DFS*employment] + \beta_{11}[DFS*size] + \varepsilon$$

The results for the two models are as presented in Table 4.19

Table 4.19: Household characteristics moderating effect

	Model 1	**Model 2**
Constant	.627	1.676
DFS	.554**	.280
Gender	.084	.294
Age	-.013	-.005
Education	-.027	-.507
Employment	-.025	.817
Size	.045	-.723**
DFS*Gender	.	-.048
DFS*Age		.000
DFS*Education		.114
DFS*Employment		-.193
DFS*Size		.183**
Adjusted R squared	.257	.297

Model 1: Predictors: (Constant), Size of Household, Gender, Employment, DFS, Level of Education, Age

Model 2: Predictors: (Constant), HouseholdDFS, Gender, Employment, EduDFS, DFS, Age, Size of Household, GenderDFS, Level of Education, EmploymentDFS, AgeDFS

** The Coefficient is significant at 5% significance level

The results show that only household size has a moderating effect on the relationship between digital financial services and socioeconomic status of the Kibera residents. This is as demonstrated by the significant interaction term coefficient ($p<.05$). Furthermore, the results indicate that the introduction of interaction term increases the model explanatory power by 4% (29.7% -25.7%) implying that household characteristics moderates the relationship between

digital financial services household socioeconomic and socioeconomic status. All the other elements of household characteristics were found not to have any moderating effect. Hence the null hypothesis is rejected because at least one element of household characteristics, namely the household size has a moderating effect. The negative coefficient for household size indicates that the bigger the household the poor the socioeconomic status and vice versa.

CHAPTER FIVE: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter looks at findings, discussions, conclusions and recommendations drawn from the study.

5.2 Discussion of the Findings

The study looked at the effect of digital financial services on socioeconomic status of households in Kibera. In particular, it looked at two aspects of digital financial services, namely, digital credit and digital savings. These were the independent variables. Additionally, it looked at how the introduction of household characteristics as a moderating variable affected the interaction between the independent variable and the dependent variable, which in this case was socioeconomic status. Socioeconomic status was measured by multidimensional poverty indicators which entail access to medical care, balanced diet, clean water and sanitation, education, type of housing and asset accumulation. The findings are discussed below in line with the specific objectives of the study.

5.2.1 Effect of Digital Credit on Socioeconomic Status of Households in Kibera

The study sought to determine the effect of digital credit on the socioeconomic status of households in Kibera. Based on the results obtained, there was a positive correlation between digital credit and socioeconomic status. However, the use of digital credit had a negative effect on the socioeconomic status of households in Kibera. The findings are in agreement with a study done by Donovan and Park (2022); Kusimba (2021) who in their studies reported that users of digital credit were trapped in poverty. Similarly, from a study that analysed the uptake of digital credit and its impact on indebtedness by Wamalwa, Rugiri, and Lauler (2019) reported that a household that used digital credit was more likely to sell household assets to repay a loan. This resonates with the findings of this study.

It was also found that digital credit financial services were used to supplement income derived from casual wages by the majority of the respondents who were casual employees. The uptake of digital credit was mainly for payment of school fees, daily household needs such as meeting transport costs and purchase food. The findings agree with what was reported by Kandie and Islam (2022) who found out that the features of digital credit such as low cost, ease of access and fast processing of digital loan requests are what promote the increased uptake with the purpose of meeting daily needs such as food, rent transport and other emergencies.

5.2.2 Effect of Digital savings on Socioeconomic Status of Households in Kibera

The second objective of the study was to evaluate the effect of digital savings services on socio economic status among Kibera households. The study found there was correlation between digital savings and socioeconomic status.

Additionally, the study found that digital savings have a positive effect on socioeconomic status of households. The findings are in agreement with Suri and Jack (2016) who found through use of M-pesa mobile money, savings increased and lifted 194,000 households from poverty. Of the two digital financial services studied, digital savings reported a higher effect on socioeconomic status. The finding is also supported by a similar study by Bukari et al.(2021) where it was concluded that savings have the greatest poverty reduction effect. This was in agreement with the findings by Kyung (2020) who argued through mobile money savings services, low-income earners are able save small amounts of money safely and frequently, which in turn build up and they can acquire what they previously could not afford if they did not have savings. This very much resonates with the study findings where most savings were channeled to growth of business, acquiring stock, pay school fees and acquiring assets.

5.2.3 Effect of household characteristics on Socioeconomic Status of Households in Kibera

The third objective of the study was to find out the moderating effect of household characteristics on the relationship between digital finance and socioeconomic status among households in Kibera. The study sought to understand if the introduction of household characteristics would affect the outcome of digital financial services on socioeconomic status.

The study findings indicates that household size has a moderating effect on the relationship between digital financial services and socioeconomic status. However, the other elements of household characteristics namely gender, age, education and employment status do not have any moderating effect.

These findings are corroborated by Rahman (2013) who found out that family size and dependency ratio had an impact on poverty from a multidimensional viewpoint. However, the current study findings differs with the foregoing research on the aspects of household age,education and gender which were found to have had an impact on socio-economic status.

5.3 Conclusions

The study found that the features of digital credit and in particular ease of access, instant loan processing, no need of collateral ability to access the loan remotely encouraged their uptake among Kibera households. The digital credit was mostly used for daily use scenarios such as purchase of food and also non-routine costs such as settlement of school fees. As a result, this was the basis for the significant relationship between digital credit and socioeconomic status. On the flip side however, there was negative effect of digital credit on socioeconomic status as illustrated by the regression equation findings. This can be attributed to the high-interest rates that come with digital credit. Since no collateral is offered, the lenders compensate by increasing the interest rates due to the likelihood of the borrowers defaulting in payment.

Digital savings reported a significant and positive relationship with socioeconomic status. From the study, the households were able to save little amounts made from their businesses, save to support their families, save for school fees and increase their business stock, there is clear evidence that savings contribute greatly in tackling multidimensional poverty. As such, savings should be more promoted as a tool for improving socio-economic of the poor in the society. This finding is similar to Prina (2015) who observed that savings accounts increased households monetary assets and total assets without crowding out other assets.

In the case of household characteristics only one element namely household size was found to have an effect on the relationship between digital financial services and socioeconomic status. From this, it can be deduced that the ability of a household to exploit the available digital financial services to improve on their socioeconomic status is determined by household size.

5.4 Contribution to Knowledge

Digital financial services have been used as a means of promoting financial inclusion and hence the underbanked and the most low-income earners who could not afford conventional banking services and were excluded can now access financial services . This exclusion meant they could not afford access to credit and savings services. However, the introduction of digital credit and digital savings which are products of digital financial services has led to access these formal financial services by all. As a result of these digital financial services being easily accessible, affordable, no need for collateral, no minimum savings amount and almost instant processing, it is anticipated that they could be a means to end poverty.

Previous studies have looked at how these digital financial services contribute to poverty reduction. However, there is a gap in how poverty is viewed. Poverty is viewed as lack of

access to income. However, poverty is a multidimensional phenomenon. The multidimensional aspect of poverty looks at deprivations from access to healthcare, education, clean water and sanitation, eating a well-balanced diet, accumulation of assets and proper housing. For instance, while access to digital credit requires no collateral and hence good for someone without capital, if the interest rate is high and the repayment period is short, the borrower might end up selling assets to pay off the loan. Similarly, due to ease of access to digital credit, a borrower could be caught up in debt traps, be listed as a defaulter and hence not be able to afford to buy food, pay rent or school fees. The study therefore looked at the effect of access to digital financial services on socioeconomic status which looks at poverty from a multidimensional angle.

Household characteristics were introduced to the study to understand if they played a role in affecting the outcome of the socioeconomic status of users of digital credit and digital savings. From the results of the study, household size plays a role in the outcome. This therefore means there are factors that affect the outcome of the intended objective of digital financial services which is poverty alleviation and household characteristics is just but one of these factors. These variables should be explored and how they affect the interaction between digital financial services and the intended goal of poverty alleviation.

5.5 Recommendations

5.5.1 Recommendations for Policy

The introduction of digital credit is intended to have a positive effect on the users of these facilities. However, from the findings of the study, digital credit has a negative effect on the socioeconomic status of the users. Some of the negative effects include being caught up in debt traps as a result of multiple borrowing and failure to pay in time. As a result, the borrowers end up being blacklisted and not able to access the money when they need it. This leads to financial distress. Other borrowers used the credit for non-beneficial activities such as gambling. Policymakers should thus look for ways in which the features of these digital loans do not work to the detriment of the same people they are meant to benefit by causing more harm than good.

For example, policy makers can consider analyzing the impact of each specific digital financial service product in the market for different categories of borrowers rather than generalizing the benefits of the various products on the entire population. From this study, digital savings have a positive effect on the socioeconomic status of Kibera residents unlike

digital credit whose effect is negative. Policymakers could thus look at ways in which use of digital credit could influence improvement of socioeconomic status in the long term.

5.5.2 Recommendations for Regulators

There are several providers of digital financial services in the market, which makes the competition high for search of borrowers. There is information asymmetry as one party, in this case the lender, knows the borrower is high risk and thus likely to default on payment. This is compensated by charging high interest rates to the borrower. However, the borrower is often not aware of the interest rates offered when borrowing. As such, the borrower runs a risk of not being able to afford to repay the loan within the time duration required by the lender. This results in borrowing from another source to settle a debt, default or even blacklisting.

Regulators could consider ensuring that the borrowers are made fully aware of the cost of the credit before borrowing. Additionally, they ought to be made aware of how the borrowed funds will be recovered rather than the lender deducting any funds received from the borrower without their knowledge or consent.

5.5.2 Recommendations for Digital Financial Service Providers

Providers for digital financial services could consider expanding the coverage of digital savings products. From the results, digital savings have a positive effect on socioeconomic status. Currently, there are not as many digital savings products in the market as there are for digital credit. More applications that encourage savings should be rolled out and also marketed for publicity of their existence to the target population.

5.5.3 Recommendations for Academia

Researchers in the academia field could look at other elements that affect the relationship between digital financial services and multidimensional poverty for different populations in different settings. From the findings, there could be collaboration with other stakeholders such as policymakers, regulators and digital financial service providers to chart the way forward.

5.6 Suggestions for Further Research

As there are other factors which affect socioeconomic status, future studies could be more comprehensive by introducing relevant control variables to test how these affect the interaction between digital financial services and socioeconomic status.

5.7 Limitations of the Research

The nature of the study is that is requires the respondents to discuss their well-being. However, some respondents may feel the data given might be used against them and thus fail to give a true reflection of their day-to day experiences using digital credit. This therefore required the research assistants to probe the respondents further so they could give an accurate rating on the likert scale. While the study explored all the villages in Kibera, there were some areas in Kibera which were not safe for data collection due to security challenges and so it was not quite secure to get inside the villages.

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APPENDIX 1 : ETHICAL CLEARANCE

Strathmore UNIVERSITY

20th November 2023

Ms Ngandi Teresia,
teresia.ngandi@strathmore.edu

Dear Ms Ngandi,

RE: Effect of Digital Financial Services Uptake on Socio-Economic Status of Households in Kibera

This is to inform you that SU-ISERC has reviewed and approved your above SU-masters research proposal. Your application reference number is SU-ISERC1928/23. The approval period is from 20th November 2023 to 19th November 2024.

This approval is subject to compliance with the following requirements:

i. Only approved documents including (informed consents, study instruments, MTA) will be used.
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by SU-ISERC.
iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to SU-ISERC within 72 hours of notification.
iv. Any changes anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to SU-ISERC within 72 hours.
v. Clearance for the export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to the expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days of completion of the study to SU-ISERC.

Before commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology, and Innovation (NACOSTI) https://research-portal.nacosti.go.ke/ and obtain other clearances needed.

Yours sincerely,

Mr Ambrose Rachier,
Chairperson; SU-ISERC

SCIENCE AND ETHICS REVIEW COMMITTEE
(SU-ISERC)
05-Dec-2023
P.O BOX 59857-00200
NAIROBI-KENYA

APPENDIX 2 : RESEARCH PERMIT

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 236353

Date of Issue: 15/December/2023

RESEARCH LICENSE

This is to Certify that Ms.. Tarsila Ngasili of Strathmore University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: Effect of Digital Financial Services Uptake on Socio-Economic Status of Households in Kilifi. for the period ending : 15/December/2024.

License No: NACOSTI/P/23/31498

236353

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

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See overleaf for conditions

APPENDIX 3: QUESTIONNAIRE

Dear Respondent.

I am Teresia Ngandi, a student of Masters in Development Finance in Strathmore Business School. I am undertaking a study on the Effect of Digital Financial Services on Poverty reduction among households in Kibera. This questionnaire is being used to obtain this information from users of digital financial services and you have been selected to participate in the survey. Please be assured that information collected will be treated with high confidentiality and the findings will be used for recommendations.

Thank you in advance for your valuable assistance in participating.

SECTION 1: DEMOGRAPHIC DATA

Please tick (✓) one option in the spaces provided.

1) **Gender**

Male ☐ Female ☐

2) **Age**

☐18-30 ☐31-40 ☐41-50 ☐51-60

☐Above 60

3) **Level of education**

☐Primary ☐Secondary ☐Technical ☐Undergraduate ☐Masters Degree

☐Doctorate degree

4) **Employment status**

☐Formal employment ☐Casual employment ☐Not employed

5) **Size of Household**

☐1-2 ☐3-4 ☐5-6 ☐Above 6

SECTION 2: DIGITAL CREDIT FEATURES

To what extent do you agree with the following statements (Tick in the appropriate box)

	Statement	**Strongly Agree**	**Agree**	**Fairly Agree**	**Disagree**	**Strongly Disagree**

6.	I can access digital loan instantly					
7)	It is possible to access a digital loan from anywhere					
8)	I do not need to offer any guarantee for digital loan repayment.					
9)	There is no loan officer to decide if I will get a loan					

SECTION 3: UPTAKE OF DIGITAL SAVINGS

To what extent do you agree with the following statements (Tick in the appropriate box)

	Statement	**Strongly Agree**	**Agree**	**Fairly Agree**	**Disagree**	**Strongly Disagree**
10)	I can access my digital savings instantly					
11)	It is possible to check my digital savings from anywhere					
12)	My savings are secure					
13)	Through digital savings I can meet my target expectations					
14)	I can easily check how much savings I have					
15)	There is no minimum saving amount					

SECTION 4: HOUSEHOLD CHARACTERISTICS

To what extent do you agree with the following statements (Tick in the appropriate box)

	Statement	Strongly Agree	Agree	Fairly Agree	Disagree	Strongly Disagree
16)	The younger the household, the more the use of digital credit and savings services					
17)	A household headed by a man is likely to use digital credit and digital savings					
18)	The smaller the household, the more the use of digital credit and savings services					
19)	The more educated, the more the use of digital credit and digital savings services					

SECTION 5: SOCIOECONOMIC STATUS

To what extent do you agree with the following statements (Tick in the appropriate box)

	Statement	Strongly Agree	Agree	Fairly Agree	Disagree	Strongly Disagree
20)	My family can easily access medical care					
21)	My children can attend school without being sent away for lack of school fees					
22)	We have access to clean water and toilets					
23)	We can afford a balanced diet meal everyday					
24)	The house we live in is safe					
25)	My income has increased since I started using digital credit and savings services					
26)	Assets in our house have increased because of using digital credit and savings services					

END