MOSHI CO-OPERATIVE UNIVERSITY

INNOVATIVE FINANCIAL TECHNOLOGIES AND LIVELIHOOD OUTCOMES: A CASE OF UCHUMI COMMERCIAL BANK AND CRDB BANK BRANCHES IN MOSHI MUNICIPALITY, TANZANIA

MOSHI CO-OPERATIVE UNIVERSITY

INNOVATIVE FINANCIAL TECHNOLOGIES AND LIVELIHOOD OUTCOMES: A CASE OF UCHUMI COMMERCIAL BANK AND CRDB BANK BRANCHES IN MOSHI MUNICIPALITY, TANZANIA

BY

JESCA J. MARINGO

A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF A MASTER OF BUSINESS MANAGEMENT OF MOSHI CO-OPERATIVE UNIVERSITY

NOVEMBER, 2023

DECLARATION AND COPYRIGHT

I, JESCA J. MARINGO, declare that this Dissertation is my original work and that it has not been presented and will not be presented to any other learning institution for a similar or any other academic award.

Signature_____Date_____

CERTIFICATION

ii

CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by Moshi Co-operative University a Dissertation titled ***"Innovative Financial Technologies And Livelihood Outcomes: A Case of Uchumi Commercial Bank and CRDB Bank Branches in Moshi Municipality, Tanzania"*** in partial fulfilment of the requirements for the award of Master of Business Management of Moshi Co-operative University.

Dr. P. Ummars

(Supervisor's name)

(Supervisor's signature)

Date 30/11/2023

DR. N. N. TOWO

(Supervisor's name)

(Supervisor's signature)

Date 30/11/2023

DEDICATION

I dedicate this dissertation to my family especially my husband, Evance Joseph Komu, my sons Giancarlo Evance Komu and Gavin Evance Komu whose unlimited love, and enduring strength have been my guiding light throughout this journey. Their sacrifices and encouragement have been a driving force behind my determination

ACKNOWLEDGEMENTS

I express my deeply grateful to the Almighty God for granting me the strength, knowledge, capacity, and the golden opportunity to embark on the enriching journey of the Master's program at Moshi Co-operative University (MoCU).

I extend my deepest thanks to my esteemed supervisors, Dr. Nathaniel Towo and Dr. Prosper Kimaro, whose invaluable guidance and generous commitment of time played an instrumental role in shaping the effectiveness of this dissertation. Without their support, this work would not have been realized.

In addition, I am immensely grateful to my beloved Husband, Mr. Evance Komu, for her consistent encouragement and support throughout this academic pursuit. To my cherished sons Giancarlo and Gavin, your patience and understanding have been a source of strength.

A heartfelt appreciation goes out to the entire community of Moshi Co-operative University for fostering a conducive environment for my academic endeavors.

I would also like to express my sincere thanks to my office Uchumi Commercial Bank authorities for the support and time provision for the accomplishment of my studies especially to Mr. G. Mlingi It is through their assistance that the completion of my studies became not only conceivable but achievable.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATION AND ACRONYMS

ATM	:	Automatic Teller Machine
BoT	:	Bank of Tanzania
CGAP	:	Consultative Group to Assist the Poor
Crdb	:	Cooperative and Rural Development Bank
DFID	:	Department for International Development
DRPS	:	Directorate of Research the Postgraduate Studies
Fintech	:	Financial Technology
GDP	:	Gross Domestic Product
IMF	:	International Monitory Fund
ME	:	Master of Engineering
MIT	:	Massachusetts Institute of Technology
NGOs	:	Non-Government Organisations
NMB	:	National Microfinance Bank
OECD	:	Organisation for Economic Cooperation And Development
PEOU	:	Perceived Ease of Use
PU	:	Perceived Usefulness
RAS	:	Regional Administrative Secretary
SDGs	:	Sustainable Development Goals
SIM	:	Subscriber Identity Module
SLA	:	Sustainable Livelihood Approach
SMEs	:	Small and Medium Enterprises
SMS	:	Short Message Service
TAM	:	Technology Acceptance Model
Ucb	:	Uchumi Commercial Bank
USD	:	United States Dollar
VIF	:	Variance Inflation Factor
WAP	:	Wireless Application Protocol

ABSTRACT

The aim of this study was to assess the penetration of FinTech on livelihood outcomes of CRDB bank and UCB clients in Moshi Municipality. A cross-sectional research design was used to collect data from 360 respondents. The questionnaire tool and interview guide were employed to collect primary data which was analysed through descriptive statistics and ordinal logistic regression data analysis techniques. The study found that, the most commonly used FinTech was agency banking as a way of and second most common was mobile banking while internet banking was the least commonly used FinTech, but with at least half of respondents having been accessing banks through this method. Moreover, the study found that time saving, transaction costs, security, investment opportunities and reliability were statistically significant influencing users' livelihood outcomes since the $p<0.05$. Furthermore, the study found that the clients in the study area generally hold positive attitudes toward using FinTech. Nonetheless, the study revealed that low network coverage, power breakdowns and insecurity of money were the major challenges facing FinTech. The study concludes that use of FinTech is significant to improve users' livelihood outcomes in the study area. The study recommends more efforts to improve the usefulness and trust by improving technology and infrastructures for internet banking. The study suggests further study to be made to compare the effects of Fintech on livelihood between commercial banks and community banks.

CHAPTER ONE

1.0. INTRODUCTION

1.1 Background to the Study

Access to digital financial technologies, in particular mobile phones, internet connectivity and biometric authentication, allows for a wider range of financial services, such as online banking, mobile phone banking, and digital credit for the unbanked (Haider, 2018). Digital financial services can be more convenient and affordable than traditional banking services, enabling low-income and poor people in developing countries to save and borrow in the formal financial system, earn a financial return and smoothen their consumption (Haider, 2018).

A financial digital system is the use of digital technologies, such as computers, mobile phones, and the internet, to conduct financial transactions and manage financial information. This includes activities such as online banking, mobile payments, digital wallets, and electronic trading (Van den Berg *et al.*, 2020). A financial digital system can provide a number of benefits, such as convenience, speed, and cost-effectiveness. For example, with digital banking services, customers can perform transactions from the comfort of their homes, and can access their account information and transaction history at any time. With mobile payments, customers can quickly and easily pay for goods and services using their mobile phones, without the need for cash or credit cards.

Currently, the financial system excludes two billion people from using financial products and services, whereby women, rural poor, small and medium-sized enterprises (SME's), and other hard-to-reach populations are overrepresented (Melnychenko, Svitlana *and* Yurii, 2020). This group of financially excluded people and companies has no access to useful and affordable financial products and services that meet their needs transactions, payments, savings, credit and insurance delivered in a responsible and sustainable way. The absence of access to these financial products and services is constraining companies and individuals in many day-to-day activities (Durai and Stella, 2019). Moreover, a large share of the financially excluded population has developed a deep mistrust and suspicion about the financial system, which makes them reluctant to put effort in getting access to financial products and

services. In order to remove this mistrust and include all people in the financial system, the entire system can be fundamentally redesigned (World Bank, 2017a).

Recent empirical research of Xu, (2020) shows that population density plays an important role in explaining low financial technology levels in many developing countries. Presumably, bank branch penetration figures remain low in sparsely populated, low-income areas, since there are difficulties in achieving minimum viable scale (Melnychenko *et al.,* 2020). Large physical distance to financial institutions is a major obstacle to gain access to financial products and services at affordable costs. Innovations in financial technologies (hereafter referred to as FinTech), such as internet banking, blockchain, P2P lending, and cloud computing are not subject to physical distance and could be accessed at lower cost (Ozili, 2018).

Inclusive digital financial systems enable poor people to save and borrow in the formal financial system, allowing them to build their account balances and assets, earn a financial return, smooth their consumption, and invest in entrepreneurial ventures (Ouma, Odongo and Were, 2017; Wyman, 2017). This can contribute to improvements in livelihoods, higher profits among micro-enterprises and greater ability to deal with shocks (Islam *et al.,* 2016). Also digital financial systems can boost the gross domestic product of digitalized economies by providing individuals and firms with convenient access to a range of financial instruments (including credit facilities), increasing the volume of financial transactions and aggregate expenditure (Ozili, 2018).

Mobile phones, internet and other tools that collect, store, analyse and share information digitally have spread rapidly across the globe. According to a 2017 Gallup World Poll, 79 % of adults in developing countries own mobile phones and 40% have access to both mobile phones and the internet (Demirgüç-Kunt *et al.,* 2017). Access to both technologies allows for a wider range of financial services, such as online banking, mobile phone banking, digital credit via mobile phones for the unbanked.

Mobile money services can be integrated with other digital technologies, such as smart cards, point-of-sale devices, ATMs and digital technology-based biometric identification cards (Demirgüç-Kunt *et al.,* 2017). Biometrics data can verify customer identity for account opening and payment authorisation, which can lower

barriers to account ownership (Wyman, 2017). Building upon mobile payments, mobile innovations can provide micro-insurance and facilitate social cash transfers (Leng *et al.,* 2018).

While in Europe and North America mobile money services are practically non-existent with less than 1 percent of the population having an active mobile money account, in sub-Saharan Africa there are now close to 25 mobile money accounts per 100 adults (Leng *et al.,* 2018). In early adopter countries, such as Kenya, as little as four years after the introduction of M-Pesa more than 75 percent of households had at least one active mobile money account and in June 2014, the monthly value of transactions was about US$2 billion, equivalent to 60 percent of average monthly GDP (Aron *et al.,* 2015). The dramatic expansion of mobile money in sub-Saharan Africa is likely driven by very limited existing traditional financial services. However, there has been a huge development in the financial sector where for instance in Tanzania there are 48 banks registered to operate and offer financial services with 957 agents acting on behalf of the banks (Were *et al.,* 2021). In Kenya, there are 957 bank branches with 301 100 agents across the country

Livelihood strategies are the activities and resources that people use to make a living and support themselves and their families (Ferguson *et al.,* 2019). These strategies can include a wide range of activities, such as agriculture, fishing, hunting, trade, crafts, and wage labour. People develop their livelihood strategies based on a variety of factors, including their skills and abilities, available resources, social networks, and cultural and environmental factors. In rural areas, for example, livelihood strategies may be heavily dependent on natural resources such as land, water, and forests. Financial technology is among livelihood strategies used by people to improve their capability to overcome stress and shocks in life.

In the East Africa region, financial technologies such as agency banking was firstly launched in Kenya that took effect in May 2010 where agents are increasingly utilised as important distribution channels for financial institutions (Agalla, 2014). Agency banking took effect in Tanzania in February 2013 after the publication of prudential guidelines by the bank of Tanzania (BoT) and firstly launched by Tanzania Postal bank in March 2013 followed by CRDB bank Plc in June 2013 (Kairuki, 2013).

Agency banking in Tanzania is mainly a common phenomenon in only 11 banks including CRDB bank Plc, Equity bank Limited, Kenya Commercial bank Limited, Access bank Limited, NMB bank Plc, Dar es Salaam Community bank Limited, Tanzania Postal bank Limited, Advance bank Limited, Amana bank Limited, Efatha bank Limited and Finca Microfinance bank Limited. The BoT (2014) Dissertation identifies 3,431 agency banks countrywide with CRDB bank's agency *banking* controlling slightly over 50% of the total available bank agents which are basically located in urban centres. According to the report, as of March 2016, most available bank agents (about 35%) are in Dar es Salaam followed by Arusha with market share of 8.5% and Mwanza with 8.39 % market share.

Tanzania, the country of interest in this research, has seen similar increases in the use of mobile money since its introduction in 2009. Mobile money led to a dramatic decrease of the transaction cost of transferring funds between users, in particular across large distances, allowing individuals to send and receive remittances much more cheaply than before the introduction of the service. According to the World Bank (2020), the population of Tanzania was projected at 61,498,437 or 61.498 million as of July 1, 2021. Likewise, the total population in Tanzania was projected at 59,734,218 or 59.734 million people for the year 2020. Tanzania ranks number 23rd in the world by population in the list of 235 countries/territories. GDP in Tanzania averaged 25.48 USD Billion from 1988 until 2021, reaching an all-time high of 67.78 USD Billion in 2021 and a record low of 4.26 USD Billion in 1990 (World Bank, 2022). The Tanzanian economy is still to a large extent based on agriculture production, with about 27 percent of GDP and about 80 percent of employment related to the agricultural sector. With its vast landmass, the country is sparsely populated and predominantly rural, creating additional challenges for economic activity, the provision of services, including telecommunication, and access to financial services, including banking.

Having access to financial products and services at affordable prices, is a first step for the unbanked population in Tanzania to take charge of their lives by means of financial planning and management. Improving financial technology is an important milestone on the road for many towards economic development. Research by the World Bank Group, the IMF, the OECD, and private sector studies show that billions can be added to global GDP by financially including the unbanked population (World

Bank, 2017d). With the introduction of FinTech, such as mobile banking, alternative credit scoring, and identification technologies it is easier for the financially excluded population to overcome the obstacles that withhold them from access to financial products and services. This emphasises the importance for a country of having a supportive FinTech climate that consists of country characteristics that facilitate the use of FinTech. For the purpose of this study, only two financial technologies (agency banking and mobile banking) will be examined on livelihood outcomes of the bank clients in the study area. Also, the study will assess the challenges on assessing innovative financial technologies and livelihood outcomes using CRDB bank and Uchumi Commercial Bank branches in Moshi Municipality.

1.2 Statement of the Problem

The widespread adoption of financial technologies (FinTech) has transformed the landscape of financial services, offering greater access, convenience, and efficiency for consumers (Chidzero and Tshitangano, 2018). While there is increasing evidence of the positive impact of FinTech on financial inclusion and economic development, there is limited understanding of the relationship between FinTech and livelihood outcomes. However, FinTech is widely spread among individuals but the users' livelihood is still poor (Kimaro and Nkundwe, 2021). Clients are still claiming low saving propensity as a result of higher financial transactions despite the usage of FinTech (Kosele, 2018). This calls for this study to find out the effects of FinTech on livelihood outcomes in the study area. Moreover, the study aims to address lack of empirical evidence on the impact of FinTech on livelihood outcomes, particularly in developing countries (Kwesigabo, 2021).

According to the World Bank Financial Index in Tanzania, only 17 percent of individuals of 15 years and older have a bank account, compared to over 65 per cent in developed nations for the same age group. In addition, on average there are 1.56 commercial bank branches and 2.22 ATMs per 100,000 populations between 2004 and 2018 in Tanzania (Haider, 2018). These contrast sharply with 26.4 and 123, respectively, in countries like the United Kingdom (Durai and Stella, 2019). These figures indicate the very weak provision of formal financial services in Tanzania, resulting in a financial inclusion gap, especially for the rural population who has the lowest livelihood capability levels (Simpson *et al.*, 2021). The innovative FinTech has improved the livelihood of those who are engaged in the business operations like

agents and mobile transfer operators. Furthermore, FinTechs have been said also to improve the livelihood of clients/users of the technologies differently in terms of livelihood capabilities. The study is therefore important to investigate how agency banking and mobile banking as part of the innovative financial technologies have touched lives in terms of livelihood outcomes taking an experience of the UCB and CRDB Bank.

1.3 Objectives of the Study

1.3.1 General objective

The main objective of the study was to assess the effects of innovative financial technologies on livelihood outcomes: A case of Uchumi commercial bank and CRDB bank branches in Moshi municipality, Tanzania.

1.3.2 Specific objectives

Specifically, the study intended to;

(i) Determine the current level of FinTech adoption among customers in study area,
(ii) Determine the effects of financial technologies on livelihood outcomes,
(iii) Examine the clients' attitudes toward the usefulness of financial technologies and
(iv) Determine the challenges faced by bank clients in the usage of financial technologies.

1.4 Research Questions

(i) What is the current level of FinTech adoption among customers in the study area?
(ii) Are there any effects of financial technologies on livelihood outcomes?
(iii) What are the clients' attitudes toward the usefulness of financial technologies?
(iv) What are the challenges faced by bank clients in the usage of financial technologies?

1.5 Significance of the Study

This study is significant to various stakeholders which include the government of Tanzania in their quest to reduce poverty. Commercial banks and other financial

institutions in Tanzania, NGOs that support livelihood and work in enhancing credit access to the unbanked population and finally to scholars and researchers in this field. Financial technologies are central to financial technology which is one important tool for poverty reduction to have a prosperous nation. It is one cornerstone which positively impacts the lives of people. Low financial technology on the other hand is part of the reasons for slow economic growth, reduced economic activities leading to reduced job opportunities. The government and other practitioners such as banks and academicians can use the study outcomes to help improve the population financial services usage quest through improving innovative financial technologies penetration. This can be achieved by formulating policies and necessary strategies to enhance the penetration of innovative financial technologies.

The study on financial technologies can also contribute to the achievement of several SDGs, including: SDG 1: No Poverty - by increasing access to financial services and reducing the cost of financial transactions, financial technologies can contribute to reducing poverty. SDG 8: Decent Work and Economic Growth - by improving financial efficiency and reducing transaction costs, financial technologies can contribute to economic growth and the creation of decent work. SDG 9: Industry, Innovation, and Infrastructure - Financial technologies are a form of innovation that can contribute to improving infrastructure and increasing access to financial services. SDG 10: Reduced Inequalities - by increasing access to financial services and reducing the cost of financial transactions, financial technologies can contribute to reducing inequalities. SDG 17: Partnerships for the Goals - Collaboration between public and private sectors, as well as between countries, is essential to promoting the adoption of financial technologies and achieving the SDGs.

Financial sector regulators can adopt this study finding to formulate policies to make it a must for commercial banks to take responsibility in ensuring their customers have access credit through innovative financial technologies. The study will further provide insights that the nation can adopt to ensure that poverty is eradicated in Tanzania and improve livelihood outcomes of the majority of households living in poverty.

Understanding livelihood outcomes is important for policymakers and development practitioners to assess the impacts of their interventions and identify areas for

improvement. By assessing the positive and negative outcomes of livelihood strategies, they can design and implement policies and programs that support sustainable livelihoods and promote wellbeing.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Definitions of the Key Terms

2.1.1 Financial technologies

According to Azarenkova *et al.* (2018) financial technology (commonly also known as Fintech) is used to describe new technologies that seek to improve and automate the delivery and use of financial services. Fintech is the use of digital technologies to provide financial services and improve financial transactions. Fintech encompasses a wide range of innovations, including mobile payments, online banking, digital currencies, robo-advising, crowdfunding and peer-to-peer lending.

Fintech has the potential to significantly transform the financial industry by making financial services more accessible, affordable, and efficient. For example, mobile payments allow users to send and receive money using their mobile phones, without the need for a traditional bank account. Online banking provides users with the ability to manage their finances online, including making transfers, checking account balances, and paying bills. Digital currencies, such as Bitcoin, allow users to make transactions without the need for a traditional bank, and can provide increased security and privacy.

Robo-advising platforms use algorithms to provide automated investment advice, while crowdfunding platforms allow individuals and businesses to raise funds from a large number of people. Peer-to-peer lending platforms connect borrowers and lenders directly, often at lower interest rates than traditional lenders. Overall, FinTech has the potential to democratise finance, increase financial inclusion and improve financial efficiency. As the use of digital technologies continues to grow, we can expect to see more innovations in Fintech and greater integration of technology into the financial industry. In this study, FinTech refers to the use of mobile banking and agency banking which are used by UCB and CRDB banks to offer financial services to their clients.

2.1.2 Livelihood outcomes

Livelihood outcomes are what household members achieve through their livelihood strategies, such as levels of food security, income security, health, well-being, asset

accumulation and high status in the community (Ngoma, 2018). Livelihood outcomes are the results of livelihood strategies adopted by individuals or households. These outcomes refer to the changes in their material and non-material well-being, which are influenced by their access to resources, capabilities, and opportunities. Livelihood outcomes can be positive or negative, and can vary depending on a range of factors such as social, economic, and environmental conditions.

There are several categories of livelihood outcomes that are commonly used in research and policy analysis, including: Economic outcomes: These refer to the changes in household income, expenditure, and asset ownership resulting from their livelihood strategies. Positive economic outcomes can include increased income, savings, and investment, while negative outcomes can include debt, asset loss, and reduced income.

Social outcomes: These refer to the changes in household social relationships, networks, and interactions resulting from their livelihood strategies. Positive social outcomes can include increased social capital, improved access to services, and greater participation in community activities, while negative outcomes can include social exclusion, discrimination, and conflicts. Human outcomes: These refer to the changes in household health, education, and skills resulting from their livelihood strategies. Positive human outcomes can include improved health status, higher education attainment, and greater skills and knowledge, while negative outcomes can include poor health, limited education, and skills mismatch.

Environmental outcomes: These refer to the changes in household natural resource use, management, and conservation resulting from their livelihood strategies. Positive environmental outcomes can include sustainable resource use, conservation of biodiversity, and reduced environmental degradation, while negative outcomes can include resource depletion, land degradation, and pollution. In this study, the definition by Ngoma (2018) is adopted for UCB and CRDB clients in the study area.

2.1.3 Bank

A bank is an institution that deals in money and its substitutes and provides other money-related services. In its role as a financial intermediary, a bank accepts deposits and makes loans (Carlini *et al.*, 2022). In this study, definition by Carlini *et al.* (2022) is adopted for UCB and CRDB banks in Moshi Municipality.

2.1.4 Bank client

Bank client means any person or corporate with respect to which bank issues private business products and services as part of a private label or co-branded programs between bank and such person or corporate as of the day to day transactions between them (Munkhdalai *et al.,* 2019). In this study, bank clients are defined as persons that transact with CRDB bank and UCB through agency banking and mobile banking in Moshi Municipality.

2.2 Theoretical Literature Review

In this study, two theories are used. The Technology Acceptance Model informs the study on the technological part of FinTechs while Sustainable Livelihood Approach (SLA) will be used to inform the study on the part of livelihood outcomes to the two bank clients. The two theories complement each other and each has an important weight in the study.

2.2.1 Technology Acceptance Model

The technology acceptance model (TAM) was proposed by Fred Davis (1985) in his Doctoral thesis at the MIT Sloan School of Management. He proposed that the system use is a response that can be explained or predicted by user motivation, which in turn is directly influences by an external stimulus consisting of the actual system's features and capabilities which are stimulus (system features and capabilities), organism (user's motivation to use the system) and response (actual use).

In his Dissertation , Davis (1985), suggested that the users' motivation can be explained by three factors: perceived ease of use, perceived usefulness and attitude towards using the system. He hypothesised that the attitude a user toward a technology was a major determinant whether the user will actually use or reject it. The attitude of the user in turn, was considered to be influenced by two major beliefs: perceived usefulness and perceived ease of use, with perceived ease of use having a direct influence on perceived usefulness. Finally both these beliefs were hypothesised to be directly influenced by the system design characteristics, represented by X_1, X_2 and X_3. These are the three variables explained earlier.

During later experimentation stages, Davis (1985) refined his model to include other variables and modify the relationships that he initially formulated. Similarly, other researchers would apply and propose several additions to the Technology Acceptance

Model (TAM), such that over time, TAM evolved into a leading model in explaining and predicting technology use. In fact, the literature explains that TAM has become so popular as it has been cited in most of the research that deals with user acceptance of technology (Lee et al., 2003).

Some researchers claim that TAM may have attracted more ease and quick research, such that less attention has been given to the real problem of technology acceptance (Lee et al., 2003). Today, research on technology acceptance is still ongoing, and thus an understanding of the assumptions, strength and limitations of the Technology Acceptance Model is essential for anyone willing to study user acceptance of technology. This explanation becomes relevant for this particular study as the e-filing system may be new to some taxpayers, and particularly with how the variables in the model may be operationalised.

However, TAM has been opposed on the ground that, a key purpose of TAM is to provide a basis for tracing the impact of external variables on internal beliefs, attitudes, and intentions, and it suggests that perceived ease of use (PEOU) and perceived usefulness (PU) are the two most important factors in explaining and predicting technology use (Davis et al., 1985). However, some scholars confirm that external variables are mediated by PEOU and PU and that any additional variable contributes little to the explanation of the variance in a technology system. Some scholars also say that the external variables provide a better understanding of what influences PU and PEOU, and their presence guides the actions required to influence greater use of technology systems.

2.2.2 The Sustainable Livelihood Approach (SLA)

The SLA was developed by DFID (2001); the theory advocates that there are three insights into poverty underpinning this approach. The first is the realisation that while economic growth may be essential for poverty reduction, there is no automatic relationship between the two since it all depends on the capabilities of the poor to take advantage of expanding economic opportunities as supported by Kunze *et al*. (2019). Secondly, there is the realisation that poverty as conceived by the poor themselves is not just a question of low income, but also includes other dimensions such as bad health, illiteracy, lack of social services, etc., as well as a state of vulnerability and feelings of powerlessness in general.

Finally, it is recognised that the poor themselves often know their situation and needs best and must therefore be involved in the design of policies and projects intended to better their livelihood. Therefore, in understanding clients' livelihood outcomes it is important to understand how users utilise the livelihood capabilities and assets to achieve the desired livelihood outcomes in terms of sustainable use of resources, increased household income, reduced vulnerability, empowerment and ownership of household assets as qualified by DFID (2001).

2.3 Empirical Literature Review

2.3.1 Agency banking and livelihood outcomes

Some scholarly works at different times have made attempts to analyse the relationship between agency banking and livelihood outcomes across countries. In this regard, Nnaeme *et al.* (2020) investigated the role of agency banking on how cash transfers enable agency through livelihoods in South Africa. The study used descriptive and inferential statistics and found that customers patronised agency banking services irrespective of the extra charges of agency banking. Furthermore, the study found that financial inclusion under agent banking is determined by the availability of liquidity, geographical coverage, investment opportunity, costs and the security of agency banking services.

A study by Cheston (2016) using a sample of 256 respondents and inferential statistics found that, in India agency banking is providing locational convenience banking services which have increased the usage and has reduced the cost of accessing and managing new clients by banks. Agents have immensely helped in accounts opening, offering of cash-in/cash-out services, acceptance of loan repayments, making payments and transfers, recharging of phones, helping in e-money usage; and are now beginning to facilitate financial capability interventions. Through these interventions, clients have acquired a good level of livelihood capabilities where some are starting to establish small businesses in their areas and helping a number of people in the households concerned.

Another study by Arhin *et al.* (2022) on displacements and livelihood resilience in Ghana's mining sector focusing on the moderating role of coping behaviour found that, the costs of agency banking, payments of bills by the agents and the creation of financial services awareness among the rural populace have positive relationship with

access to financial services and their livelihood outcomes. Using descriptive statistics and a concurrent research design the study found that respondents rated with a high mean score that agency banking has improved the livelihood of the bank clients in the study area. The study concluded that the advent of agency banking has increased financial awareness among the unbanked people. Further the study concluded that, increased awareness has redirected peoples' behaviour and embedded reflection of peoples' on the innovations of agency banking and community developments.

Makate and Makate (2019) investigated an interceding role of institutional extension services on the livelihood impacts of drought tolerant maize technology adoption in Zimbabwe. The study used descriptive and inferential statistical tools and found that agency banking has enhanced financial inclusion through the geographical coverage of agency banking, and the low cost associated with the delivery of financial services by the agents. Likewise, the study by the Bangladesh Institute of Bank Management (2017) on the effectiveness of agent banking in financial inclusion in Bangladesh found that agents are offering financial services such as; accepting deposits, foreign remittances and payment of utility bills which have promoted financial inclusion in the economy.

2.3.2 Effects of mobile banking on livelihood outcomes

A number of researchers in mobile banking acknowledge that there has been a huge development across the world in terms of improvements of how financial services are provided by banks (Kedir and Kouame, 2022; Kouame and Kedir, 2020; Hatayama, 2018). Demirgüç-Kunt *et al.* (2017) in their study on FinTech and financial inclusion, a research agenda for financial inclusion and microfinance using survey of 18 countries in the developing economies found that, mobile phones, the internet and other tools that collect, store, analyse and share information digitally have spread quickly in the financial markets and being used by banks to ease the financial service provision. Their findings indicated that 79 percent of adults in the developing economies for instance own mobile phones and 40 percent have access to both mobile phones and the internet. As a result, according to further findings by Demirgüç-Kunt *et al.* (2017) suggests that, access to both technologies have allowed a wider range of financial services, such as online banking, mobile phone banking, digital credit via mobile phones for the unbanked, WhatsApp fundraising, and money pooling and

circulation through M-Pesa, Airtel money, Tigo Pesa and many others mobile networks allowing users to easily deposit, withdraw or transfer money.

Likewise, in a study by Senyo *et al.* (2022) in their study on FinTech ecosystem practices shaping financial inclusion: the case of mobile money in Ghana; using a regression analysis noted that, weak infrastructure and under-developed banking sector makes it time consuming for poor people to physically visit banks, in terms of travel costs and waiting in line. Their study concluded that digital financial services can eliminate such transaction costs and provide affordable, convenient and secure banking services to poor individuals. The study further found that mobile phones enable the financially excluded and people in rural areas to access accounts where banking services are lacking. By doing so, they put control and decision-making in the hands of users, who are able to process, store and transmit personalised financial data, and to transfer funds and make payments at their convenience.

Furthermore, a study by Patnam and Yao (2020) using a descriptive statistic approach for 18 countries and mobile banking users on money transfers found that, in developing countries, 19 percent of adults (30 percent of account owners) reported making at least one direct payment using a mobile phone and/or the internet. Mobile phones are used primarily for cash transfer, cash withdrawals and deposits. The study concluded that mobile finance can be integrated with other digital technologies, such as smart cards, point-of-sale devices, ATMs and digital technology-based biometric identification cards to enhance usage thereby improving the livelihood of users through engaging in business or being clients. Their study further suggested that biometrics data can verify customer identity for account opening and payment authorization, which can lower barriers to account ownership. Building upon mobile payments, mobile innovations can provide micro-insurance and facilitate social cash transfers at communal and household levels.

A study by Ouma *et al.* (2017) on innovative digital financial systems in Kenya using a descriptive statistics found that, technologies has enabled poor people to save and borrow in the formal financial system, allowing them to build their account balances and assets, earn a financial return, smooth their consumption, and invest in entrepreneurial ventures. Further, the findings of this study indicated that digital financial services contribute to improvements in livelihoods, higher profits among micro-enterprises, and greater ability to deal with shocks. The study concluded that

digital financial systems can boost the gross domestic product of digitalized economies by providing individuals and firms with convenient access to a range of financial instruments (including credit facilities), increasing the volume of financial transactions and aggregate expenditure, hence positively affecting the household outcomes.

2.3.3 Challenges on using agency and mobile banking

The study reviewed various empirical studies in view of the challenges associated with the usage of agency banking and mobile banking conceptualization. Kim *et al.* (2018) observed that security over mobile financial transactions was the main challenge in Tanzania. Using a systematic review of academic literature, the study found the following challenges: on the handset operability it was found that there are a large number of different mobile phone devices and it is a big challenge for banks to offer mobile banking solutions on any type of device. Some of these devices support Java ME and others support SIM Application Toolkit, a WAP browser, or only SMS. The other challenge found in the study by Kim *et al.* (2018) was about security. It was found that security of financial transactions, being executed from some remote location and transmission of financial information over the air. It was also found that there was a challenge of mobile banking infrastructure to handle exponential growth of the customer base over time which complicates the load that their systems can handle.

Muthinja and Chipeta (2018) in their study on the drives of financial innovations in Kenya's commercial banks, an empirical study on firm and macro-level drivers of branchless banking using inferential statistics found that found that, the most critical factor for the customer was high cost and in trust due to insecurity. Thus, the study concluded that service should be affordable and trusted as trust was found to be significantly negatively correlated to perceived risk. Muthinja and Chipeta (2018) noted that despite the positive perception toward mobile banking services; customers do face challenges and security threats when utilising the service through their banks.

Rahman (2019) in his study on prospects and challenges of agency banking on financial inclusion in Bangladesh using descriptive statistics established that there is difficulty in enforcing appropriate oversight by the agent and customer interaction was inconsistent with the overall banking regulatory framework. The findings

revealed the need for regular training of agents on changes in operational processes and policies in order to eradicate occurrence of error and mistakes that obstruct penetration of agency banking to enhance banks' financial performance. Further findings indicated that distance was a non-factor to customers and their transactions.

2.4 Research Gap

From the foregoing literature review, it is obvious that FinTech have assisted bank clients to access financial services easily and enhance household livelihood (Muthinja and Chipeta, 2018; Rahman, 2019; Senyo *et al.*, 2022; Demirgüç-Kunt *et al.,* 2017; Suri and Jack, 2016; Patnam and Yao, 2020; Ouma *et al.*, (2017; Kedir and Kouame, 2022; Kouame and Kedir, 2020; Hatayama, 2018). In the literature reviewed, agency banking and mobile banking effects on livelihood outcomes were identified. Likewise, the challenges of using digital financial technologies have been presented. Livelihood outcomes are made possible by favourable but also available technologies to use which have positive effects to the users. All the studies that have been reviewed were done in other countries around the world while those done in Tanzania were not done in Moshi Municipality and specifically to Uchumi Commercial Bank or CRDB Bank clients. This study is intended to fill a gap on the two technologies discussed on livelihood outcomes taking UCB and CRDB bank branches as case studies in Moshi municipality, Tanzania.

2.5 Conceptual Framework

Figure 1 provides the causal relationship between the independent variables and the dependent variables explaining the innovative financial technologies in the banks under the study in Moshi Municipality, Tanzania. Independent variables include time saving, transaction costs, safety, investment opportunities and reliability which all together are expected to influence users' livelihood outcomes which is indicated by increase in incomes and asset possessions.

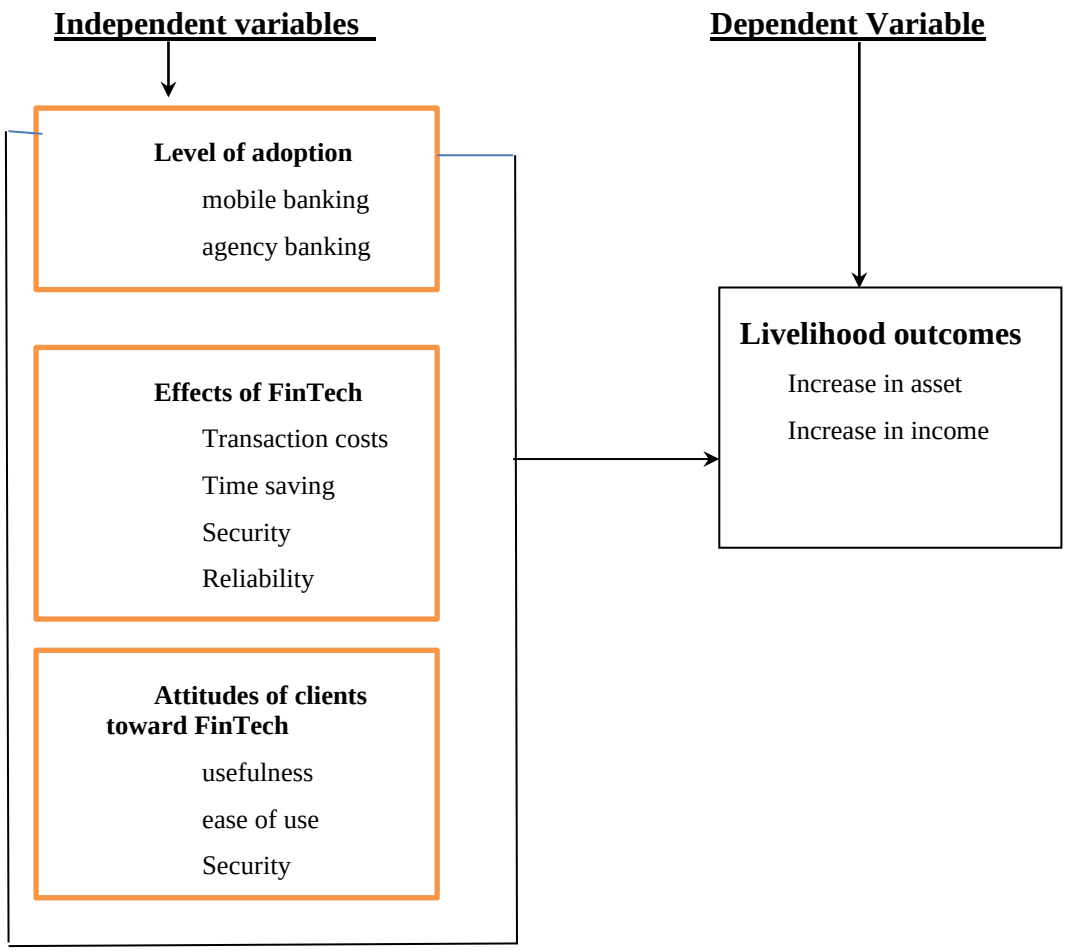

Figure 1 : Conceptual Framework

FinTech explained in terms of the innovations that support livelihood outcomes, establishing the effects of on livelihood outcomes and determining the challenges faced by the banks clients in the usage of innovative financial technologies. The three independent variables mentioned whenever they move to the positive direction, the resultant effects should be positive household livelihood and the reverse is true.

CHAPTER THREE

3.0. METHODOLOGY

3.1 Research Design

This study adopted a concurrent research design with a mixed research approach where qualitative and quantitative data were collected at the same time. Descriptive design provides accurate means of assessing information and helps in collecting uniform and comparable data that captures respondents' similarities and differences across the sampled organisations to enrich the study findings. This research design supports the study's desired objectivity as a large amount of data can be collected with ease from a variety of people (Cooper and Schindler, 2008). Also, the design supports the study's desired objectivity as a large amount of data can be collected with ease from a variety of people (Cooper and Schindler, 2008). Moreover, mixed research is chosen for this study since it gives a detailed description of the dynamics of tailoring business and livelihood of business owners in the study area. The mixed research approach allows other researchers to verify the relevance of findings obtained (Makombe, 2017).

3.2 Geographical Coverage

The study is conducted in Moshi Municipality in two banks i.e. Uchumi Commercial Bank (UCB) and CRDB Bank. Mosh municipality was appropriate in this study since the UCB bank is mostly found in Moshi municipality compared to any other areas with fewer number of its customers. The choice of the two banks is based on the sense that, one is a Community Bank (UCB) while the other one is a commercial bank (CRDB). The two banks give a good combination of clients in terms of the household outcomes.

3.3 Population

The unit of analysis of this study were all bank clients in selected banks. The population of the study was unknown since the clients who were using FinTech in the study area were not determined.

3.4 Sample Size and Sampling Procedures

3.4.1 Sample size

The sample size was 384 determined using the formula of Fisher *et al*. (1991) for an unknown population.

$$n = \frac{Z^2pq}{d^2}$$

Where;

n = the desired sample size.

Z = the standard normal deviation, set at 1.96, which corresponds to 95 percent confidence level.

p = Skewness level estimated at 50 per cent.

q =1.0 – p.

d = the degree of accuracy desired, here set at 0.05 corresponding to the 1.96.

In substitution, n = 0.052

$$\frac{1.962 \times 0.5 \times (1 - 0.5)}{0.052}$$

= 384 clients

3.4.2 Sampling procedures

The clients that participated in the study were obtained conveniently at the bank and outlets of the agents in Moshi Municipality to those customers who were using FinTech. The convenience sampling technique was appropriate in order to select the appropriate respondents who use FinTech such as agency banking, internet and mobile banking. Moreover, convenience suits this study since it is cheap, efficient, and simple to implement and it is easy to interpret data collected using this method. Thus, it makes an accurate method of collecting data.

3.5 Data Collection Methods

3.5.1 Survey

Under the survey method of data collection, a questionnaire data collection tool was used to collect primary data. Both closed-ended and open-ended questions were used

in this study to enhance the study to reside on both qualitative and quantitative data (Kothari, 2004). The type of questionnaire was also opted because it was easy to fill and does not put pressure on respondents. The questionnaire for the survey was administered by the researcher and research assistants to 384 respondents in the study area.

3.5.2 Key informant interview

Under the interview data collection method, interview guides were employed to collect data from key informant interviews to two (2) bank officials in each of the banks studied to include the heads of bank operations, one from each bank. A key informant interview guide was used to collect opinions of the interviews and record their opinion with regards to the research questions to be answered by the study, especially the data that could not be captured by questionnaire. This enabled study to gather more information and feelings that can't be collected through questionnaires.

3.6 Validity and Reliability

3.6.1 Validity

In this study a content validity which refers to the extent to which the items on a test are fairly representative of the entire domain the test seeks to measure was used. To verify content validity, the questionnaire was discussed with financial specialists and the supervisors at the university. The proposed changes were evaluated and considered in adjusting the questionnaire to enhance its validity.

3.6.2 Reliability

In this study, the questionnaire was tested by 5% of the target population to ensure that it was relevant and effective. Reliability was tested using a duly completed questionnaire by fifteen (15) randomly selected respondents tested by using a Cronbach Alpha Coefficient (Cronbach, 1951). A study found Alpha Coefficient greater than 0.7 which indicates a strong validity for the study to proceed as it is considered to be enough especially in social sciences (Cronbach, 1951).

Table 1 : Reliability of the items assessed

Category of items	Number of items	Total number of respondents	Cronbach alpha coefficient
Time saving	15	360	0.707
Transaction Costs	15	360	0.870
Safety	15	360	0.729
Investment opportunities	15	360	0.846
Reliability	15	360	0.851

3.7 Data Analysis

The qualitative data were analysed through content data analysis technique where data were summarised to find the themes intended by respondents in relation to study objectives. Quantitative data were analysed objective wise where each objective had a different data analysis technique. The first objective, which is to determine the current level of FinTech adoption among individuals in the study area, was analysed through descriptive statistics where frequencies and percentages were computed and compared. The second objective on the effects of financial technologies on livelihood outcomes were analysed through multiple ordinal logistic regression to ascertain the unique contribution of FinTech on livelihood outcomes. Ordinal logistic regression was appropriate in this study since the dependent variable is the categorical variable (livelihood outcomes) measured into three levels i.e. low extent, 2 = moderate extent and 3 = high extent.

Ordinal logistic regression equation;

Where; $Logit[p(x)] = log\ log\ \left[\frac{p(x)}{1-p(x)}\right] = \propto + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots\ldots \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$

Logistic regression involves fitting an equation of the following form to the data:

Logit (pt) $= \propto + \beta_1 X_{1,t} , + \beta_2 X_{2,t} + \beta_3 X_{3,t} \ldots\ldots \beta_P X_{P,t} + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$

Whereby; Logit (P_i) = Y; represents the probability of livelihood outcome, coded as 1= Low extent, 2 = Moderate extent, 3 = High extent

$$\propto = Intercept$$

$$\beta 1 - \beta p = Regression\ coefficients$$

$X_{1,i}$ - $X_{p,i}$ = Independent variables or predictor variables

e = Error term,

Table 2 : Variables and unit of measurements

Variables		Variables' definition and unit of measurements
Dependent variable		
Livelihood outcomes		1 = Low extent , 2 = Moderate extent, 3=High extent
Independent variables		
$\mathbf{X_1}$	Time saving	1 = low extent, 2 = moderate extent, 3 = high extent
$\mathbf{X_2}$	Transaction Costs	1 = low extent, 2 = moderate extent, 3 = high extent
$\mathbf{X_3}$	Safety	1 = low extent, 2 = moderate extent, 3 = high extent
$\mathbf{X_4}$	Investment opportunities	1 = low extent, 2 = moderate extent, 3 = high extent
$\mathbf{X_5}$	Reliability	1 = low extent, 2 = moderate extent, 3 = high extent

Third objective on the clients' attitudes toward the usefulness of financial technologies was analysed descriptively where five Likert scales 1= strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree were given to different questions to get the level of attitudes. Items that scored mean 3 and above were regarded as positive attitudes and less than 3 were regarded as negative attitudes. Lastly, the fourth objective about the challenges faced by bank clients in the usage of financial technologies were analysed through multiple responses in which respondents were allowed to give more than one response (challenge) on a single question. Multiple responses enabled the study to determine the main challenges facing use of FinTech in the study area.

3.8 Ethical Consideration

Following ethics for research, all the necessary approvals were obtained from the University through the Directorate of Research the Postgraduate Studies (DRPS) and the Regional Administrative Secretary (RAS) of the Kilimanjaro Region before looking for information from the respondents; participants were under their own to participate or withdraw from the study and; confidentiality assurance was granted. Additionally, the objectives of the study were well clarified to respondents and that data to be collected only is used for academic purposes.

3.9 Testing for Normality and Multicollinearity

3.9.1 Testing for normality

Kurtosis and Skewness Tests were conducted to detect whether the samples drawn from the population were normally distributed. Skewness measures the deviation of distribution from symmetry while Kurtosis measures peakness of the distribution. For perfectly symmetrical data, the value of Skewness and Kurtosis is 0. If the value of

Skewness and Kurtosis is significantly different from 0, then data are obviously non-normal. However, since it is quite unlikely to be perfectly symmetrical, the values of Skewness and Kurtosis approximately range between -1 and +1. A descriptive analysis revealed approximate normal distribution of the data related to all five variables under this study.

3.9.2 Test for multicollinearity

Variance inflation factor (VIF) analysis was also conducted (Table 2) to test for Multicollinearity in the regression model. Multicollinearity refers to the degree of correlation between predictor variables. The general rule of thumb under a regression model is that the predictor variables are not highly correlated with each other. Multicollinearity in the data occurs when the independent variables are too highly correlated with each other. When VIFs = 1 indicates no or little Multicollinearity; VIFs > 1 indicates moderate Multicollinearity; VIFs between 5 – 10 indicate high correlation and when VIFs > 10 assumes that coefficients are poorly estimated and that Multicollinearity in the regression model is a problem that should be handled accordingly.

Table 3 : Multicollinearity Statistics

Variables	Tolerance	VIF
Time saving	0.875	1.560
Transaction Costs	0.892	1.478
Safety	0.904	1.364
Investment opportunities	0.907	1.621
Reliability	0.955	1.530

The analysis (Table 2) revealed that the VIFs for all predictor variables were found to be equivalent to 1 (VIFs = 1), indicating that Multicollinearity is not a problem among the predictor variables.

CHAPTER FOUR

4.0 FINDINGS AND DISCUSSION

This chapter presents demographic profiles of respondents and findings based on study objectives. The chapter also discusses the findings and justifies from other related studies.

4.1 Demographic Characteristics of the Respondents

Overall, demographic factors can play an important role in shaping how FinTech affects users' livelihood outcomes. Therefore, it is essential to consider the intersection of these factors with the use and effects of FinTech when designing policies and interventions aimed at promoting financial inclusion and improving livelihoods.

Table 4 : Demographic characteristics of respondents (N = 360)

Categories	Frequency (n)	Percentage (%)
Sex of respondent		
Male	212	58.9
Female	148	41.1
Age group (Years)		
< 19 years	25	06.9
19-30	100	27.7
31-40	110	30.5
41-50	92	25.5
51 and above	34	09.4
Education level (Years)		
Primary education	36	10.0
Secondary education	80	22.2
Certificate/diploma	116	32.2
First Degree and above	128	35.6
Marital status		
Married	198	55.0
Otherwise	162	45.0
Type of occupation		
Employed	108	30
Business	187	51.9
Agriculture	65	18.1

The study analysed the demographic characteristics of respondents in terms of their sex or gender, age group, education level, marital status, and type of occupation. Based on the data, there were 360 respondents who participated in the study, with 212 (58.9%) identifying as male and 148 (41.1%) identifying as female. Gender has also been identified as a key demographic factor that influences FinTech adoption and

usage. Some studies have found that men are more likely to adopt and use FinTech services compared to women (Karjaluoto *et al*., 2017; Statista, 2020). However, other studies have found no significant gender differences in FinTech adoption and usage.

In terms of age group, the study found that 25 (6.9%) respondents were under 19 years old, 100 (27.7%) were between 19-30 years old, 110 (30.5%) were between 31-40 years old, 92 (25.5%) were between 41-50 years old, and 34 (9.4%) were 51 years old and above. Age has been identified as a key demographic factor that impacts FinTech adoption and usage. Several studies have found that younger individuals are more likely to adopt and use FinTech services compared to older individuals (Zhu *et al*., 2019; Statista, 2020). Additionally, older individuals may face barriers to FinTech adoption and usage, such as lack of digital literacy and concerns about data security and privacy (Lim *et al*., 2018).

Regarding education level, 36 (10.0%) respondents had primary education, 80 (22.2%) had secondary education, 116 (32.2%) had certificate/diploma, and 128 (35.6%) had first degree and above. This means that, the majority of respondents were holders of first degree and above who were able to understand questions to meet the study objective. Education level has also been found to be associated with FinTech adoption and usage. Studies have shown that individuals with higher levels of education are more likely to adopt and use FinTech services compared to those with lower levels of education (Karjaluoto *et al*., 2017). This may be due to higher levels of financial literacy and a greater understanding of the potential benefits of FinTech.

Regarding marital status, 198 (55.0%) respondents were married, while 162 (45.0%) were not. This means that more than half of the respondents were married people and the rest were either single, widowed/widower and divorced or separated. This may imply that the study obtained information with dependents who might affect their livelihood outcomes.

Regarding the type of occupation, 108 (30%) respondents were employed, 187 (51.9%) were in business, and 65 (18.1%) were in agriculture. This means that most of the respondents were business people who owned different business entities in the study area. The findings agree with other studies that have shown that self-employed individuals and entrepreneurs are more likely to adopt and use FinTech services

compared to those who are employed by others (PwC, 2017). Additionally, those working in industries that require frequent financial transactions, such as retail and hospitality may also be more likely to adopt and use FinTech services (Zhu *et al*., 2019).

4.2 Level of Customers' Adoption of Electronic Banking

The study was interested to ascertain the extent to which FinTech is adopted in the study area. In order to achieve this, the study inquired about the different information from respondents. The following are findings on the level of FinTech adoption in the study area.

4.2.1 Internet usage

The study was interested to know whether the clients in the study area use the internet when accessing bank services. The findings in Figure 2 indicates that, vast majority of people (91.3%) use the internet for banking services while only a small percentage (8.7%) do not. This suggests that online banking has become increasingly popular, with more people using digital channels to manage their finances. The rise of mobile devices and the internet has made it easier for people to access banking services from the comfort of their own homes or on the go.

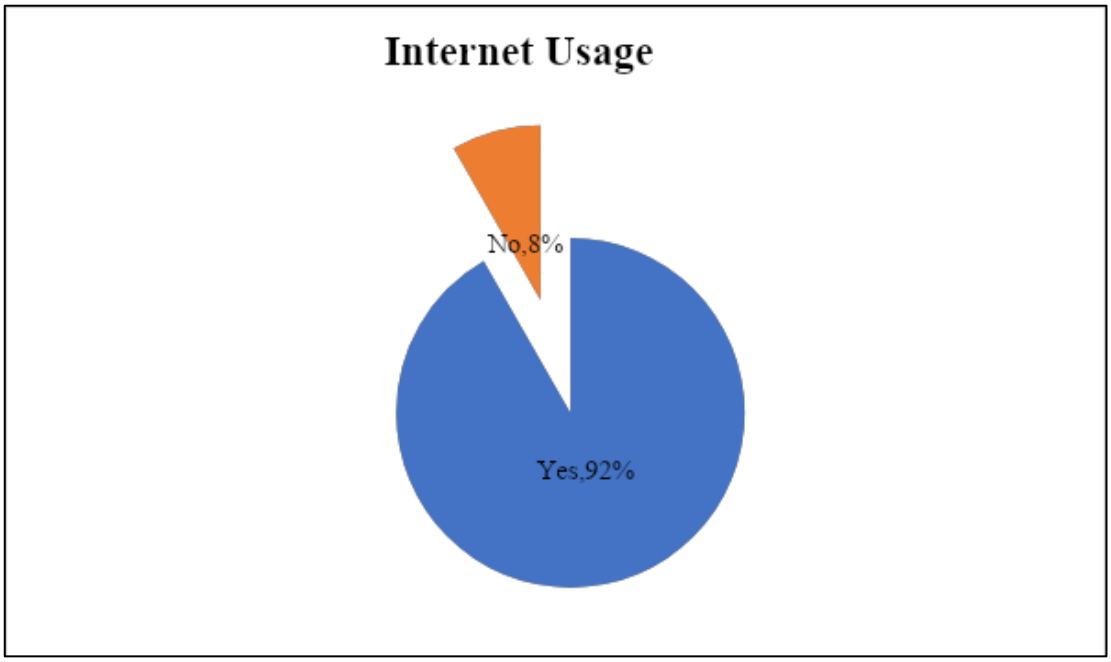

Figure 2 : Internet Usage

The trend towards online banking is likely to continue, as banks and financial institutions continue to invest in digital technology to provide customers with more convenient and secure ways to manage their money. It's also worth noting that the COVID-19 pandemic has accelerated the shift towards digital banking, as more people avoid physical branches and opt for contactless transactions. Overall, the high percentage of people using internet banking services reflects the growing importance of digital technology in the banking sector, and highlights the need for financial institutions to continue to invest in online banking capabilities to meet the changing needs of their customers. The findings are in line with Mishra and Mishra (2020) who found that over 80% of bank customers used digital channels for banking services, with mobile banking being the most popular digital channel. Similarly, a study in India found that internet banking adoption had increased significantly over the past decade, with 45% of consumers using internet banking services in 2020, compared to just 10% in 2010.

4.2.2 Usage duration

The study also was interested to know for how long clients have been using internet banking. The findings presented in Table 4 indicate the duration of time that users have been using internet banking services. The majority of the respondents, about 62.8%, have been using online banking services for 3 to 5 years, followed by 20% of respondents using online banking for 1-3 years. A small percentage of respondents, 5%, have been using internet banking for less than a year, while 12.2% of respondents have been using it for over 5 years.

Table 5 : Usage Duration

Durations	Frequencies (n)	Percentages (%)
Less than 1 year	18	05
1-3 years	72	20
3-5 years	226	62.8
Over 5 years	44	12.2
Total	**360**	**100.0**

This data implies that the majority of online banking users have been using the service for a significant period, indicating a growing trend towards long-term adoption of online banking. This could be attributed to the growing awareness and adoption of digital technologies by individuals and businesses, as well as the

convenience and ease of access offered by online banking services. However, the relatively small percentage of respondents who have been using online banking for less than a year suggests that there may be some resistance to adopting this technology or a lack of awareness about its benefits. This highlights the need for financial institutions to continue to educate their customers about the benefits of online banking services and address any concerns or misconceptions they may have.

The findings agree with the Dissertation by Oladapo and Falohun (2017) in Nigeria who found that online banking adoption had increased significantly over the past few years, with over 60% of respondents reporting using online banking services regularly. Furthermore, the study found that over 80% of online banking users had been using the service for more than two years. Another study conducted in Bangladesh by Ahmed (2018) found that online banking usage had increased significantly over the past few years, with over 50% of respondents reporting using online banking services regularly. The study also found that the majority of online banking users had been using the service for more than three years.

4.2.3 Types of bank account used

The study was interested to know the type of bank accounts used by clients in the study area. The findings in Table 5 indicate that the majority of clients use saving accounts, with a usage rate of 87.8%. Current accounts are the second most popular type of bank account used by clients, with a usage rate of 10%. Fixed accounts are the least popular type of bank account, with a usage rate of 2.2%.

Table 6 : Types of Bank Account Used

Types of bank accounts	Frequencies (n)	Percentage (%)
Saving accounts	316	87.8
Current accounts	36	10
Fixed accounts	08	2.2
Total	**360**	**100%**

The popularity of saving accounts can be attributed to their flexibility, accessibility, and low risk. Saving accounts typically come with low minimum balance requirements and are often easy to open and maintain. Current accounts are typically used by clients to deposit their regular income and to make day-to-day transactions which are mostly owned by business owners. Current accounts often come with

overdraft facilities, which can be useful for clients who need to borrow money for a short period. Fixed accounts are typically used by clients to earn higher interest rates on their deposits. Fixed accounts often require clients to deposit a specific amount of money for a fixed period, which can range from a few months to several years. The findings suggest that clients prefer saving accounts over other types of bank accounts, highlighting the importance of savings and the need for financial security among clients. The popularity of saving accounts also underscores the importance of banks in providing financial services that meet the needs of their clients which improves users' livelihood outcomes.

The findings are similar to findings by Devi and Patro (2018) on the usage of bank accounts in India and found that saving accounts were the most common type of bank account used by clients, with a usage rate of 79%. The study attributed the popularity of saving accounts to their accessibility, low maintenance requirements, and the ability to earn interest on deposits. Similarly, a study by Huang and Chen (2019) on the usage of bank accounts in China found that saving accounts were the most commonly used type of bank account, with a usage rate of 82%. The study attributed the popularity of saving accounts to the convenience and flexibility they offer, as well as the ability to earn interest on deposits.

Another study by Yahya and Al-Tamimi (2018) on the usage of bank accounts in Saudi Arabia found that saving accounts were the most popular type of bank account used by clients, with a usage rate of 64%. The study attributed the popularity of saving accounts to the low risk, accessibility, and the ability to earn interest on deposits. These studies suggest that saving accounts are the most popular type of bank account used by clients in developing countries, highlighting the importance of savings and financial security among clients. The popularity of saving accounts also underscores the importance of banks in providing financial services that meet the needs of their clients, particularly those in low-income and rural areas which in turn improve their livelihood outcomes.

4.2.4 Ways of accessing bank services

The given data provides information on the ways people access bank services through multiple response options. The most commonly used method was agency banking, with 324 respondents (90.0%) selecting it as a way of accessing bank services. The

second most common method was physical visits to bank branches, with 295 respondents (81.9%) indicating that they accessed bank services through this method. Mobile banking was the third most commonly used method, with 252 respondents (70.0%) selecting it. Internet banking was the least commonly used method, with 180 respondents (50.0%) indicating that they accessed bank services through this method. The percentage values next to each response option indicate the proportion of respondents who chose that option.

Table 7 : Ways of Accessing Bank Services

Ways of Accessing Bank Services	Responses		Percent of Cases (%)
	N	Percent (%)	
Agency banking	324	30.8	90.0
Physical visiting bank holes	295	28.1	81.9
Mobile banking	252	24.0	70.0
Internet banking	180	17.1	50.0
Total	**1051**	**100.0**	**291.9**

The findings show that, it is clear that agency banking was the most preferred method of accessing bank services. Physical visits to bank branches were also popular, indicating that some customers still prefer to interact with bank personnel in person. Mobile banking was another commonly used method, which indicates that more people are becoming comfortable with using their mobile devices for banking transactions. Lastly, internet banking was the least commonly used method, indicating that customers may not yet be fully confident in using online banking services. Generally these findings suggest that banks should offer multiple channels for accessing their services to cater to the diverse preferences of their customers. It is also important for banks to continually improve and simplify their mobile and online banking services to encourage more customers to use them.

A study by Muturi and Gachanja (2021) in Kenya found that physical visits to bank branches were the most commonly used method of accessing bank services, followed by mobile banking. Similarly, a study by Kamau and Chege (2020) in Kenya found that physical visits to bank branches were the most popular method for accessing financial services. The study also found that mobile banking was the second most commonly used method.

In Tanzania, a study by Komba and Katundu (2019) found that agency banking was the most preferred method for accessing financial services, particularly in rural areas where access to traditional banking services is limited. Similarly, a study by Mkwizu, Mwemezi and Kibonde (2018) in Tanzania found that agency banking was becoming increasingly popular, particularly in remote areas where traditional banking services are not available.

These studies suggest that physical visits to bank branches and mobile banking are commonly used methods for accessing bank services, while agency banking is becoming increasingly popular in areas with limited access to traditional banking services. The findings are consistent with the original question's data that agency banking, physical visits to bank branches and mobile banking are popular ways of accessing bank services. One possible reason for the popularity of physical visits to bank branches and mobile banking in East Africa is the relatively low levels of digital literacy in some areas, which may make it challenging for people to use internet banking. Additionally, limited access to internet and mobile connectivity in some regions may also make it difficult for people to use digital banking services.

4.2.5 Rate of customers' use of FinTech

Based on the findings in Table 6 about the rate of use of FinTech for mobile banking, it can be inferred that a significant proportion of the population does use mobile banking, with 38.9% of respondents reporting that they often, usually or always use mobile banking. However, the majority of respondents (56.9%) reported that they rarely use mobile banking, which may suggest that there is still a significant segment of the population that is hesitant to use digital banking services, or that may not have access to mobile banking technology. It is also interesting to note that a very small percentage (2.0%) of respondents reported not using mobile banking at all. This suggests that mobile banking is becoming increasingly prevalent and widely adopted, and that there are few individuals who are completely resistant to using it.

Based on the findings about the rate of use of FinTech for agency banking, it can be inferred that a significant proportion of the population does use agency banking, with 88.1% of respondents reporting that they often, usually, or always use agency banking. Only 11.9% of respondents reported that they rarely or never use agency banking, which suggests that it is becoming a more common and widely adopted

technology for financial transactions. It is interesting to note that a relatively small percentage of respondents reported using agency banking always (3.1%) or never (0%), which suggests that agency banking may have a more consistent user base compared to mobile banking, for which a larger percentage of respondents reported rarely using it.

The findings in Table 6 about the rate of use of FinTech for internet banking, it appears that a significant proportion of the population is not using this service, with 71.9% of respondents reporting that they either rarely or never use internet banking. Only a small percentage of respondents (28.1%) reported using internet banking often, usually, or always. This suggests that internet banking may not be as widely adopted as other FinTech services, such as agency banking or mobile banking. The relatively high percentage of respondents who reported not using internet banking at all (20%) may suggest that there are barriers to adoption, such as concerns about security or a lack of familiarity with the technology.

Table 8 : Rate of Use of FinTech

Type of FinTech	Rate of use	Frequency (n)	Percent (%)
Mobile banking	Not at all	07	2.0
	Rarely	205	56.9
	Often	122	33.9
	Usually	18	5.0
	Always	08	2.2
	Total	**360**	**100.0**
Agency banking	Not at all	0	0.0
	Rarely	43	11.9
	Often	198	55.0
	Usually	108	30.0
	Always	11	03.1
	Total	**360**	**100.0**
Internet banking	Not at all	72	20
	Rarely	187	51.9
	Often	54	15
	Usually	36	10
	Always	10	2.8
	Total	**360**	**100.0**

Overall, these findings indicate that while mobile banking is becoming more popular, there is still room for growth and further adoption among certain segments of the population. It may be necessary for FinTech companies and financial institutions to

continue promoting the benefits and convenience of mobile banking in order to encourage more widespread adoption. This can be linked with the users' livelihood outcomes such as saving time and cost reduction. Nonetheless, the findings suggest that agency banking is a relatively popular and widely used FinTech service among the respondents. This could be due to its convenience, accessibility, and availability in areas with limited banking infrastructure. However, there may still be room for growth in its adoption, particularly among those who reported using it rarely or not at all.

Furthermore, the findings indicate that while internet banking is available and used by some individuals, there may be a need for further education and promotion of the benefits of this service in order to encourage wider adoption. Financial institutions and FinTech companies may need to address concerns around security and usability to increase user confidence and drive adoption which in turn will improve their livelihood outcomes.

The findings about the rate of use of FinTech in developing countries are consistent with several studies that have examined the adoption and usage of digital financial services in these regions. A study by the World Bank (2019) found that while mobile money usage has grown rapidly in developing countries, the adoption of other digital financial services, such as internet banking, has been slower. This is in line with the finding that a relatively low percentage of respondents reported using internet banking often, usually, or always.

However, a study by Tandon and Madhur (2017) also highlighted barriers to adoption of digital financial services, including low levels of financial literacy, lack of trust in technology, and inadequate infrastructure. These barriers could be contributing to the high percentage of respondents who reported not using internet banking at all.

In contrast, a study by Agarwal and Chomsisengphet (2018) showed the relatively high adoption rates for agency banking and mobile banking identified in the findings align with other studies that have shown the popularity and convenience of these services, particularly in areas with limited banking infrastructure. Finally, the findings suggest that while digital financial services are becoming more prevalent in developing countries, there is still a need to address barriers to adoption and promote

the benefits of these services to drive wider usage in order to improve users' livelihood outcomes. This is possible through financial service reliability, time saving and cost reduction which can help them to save their income for other livelihood outcomes like asset possessions.

4.3 Effects of Fintech on Livelihood Outcomes

The study was interested in examining the effects of financial technologies on livelihood outcomes. The effects of fintech such as time saving, transaction costs, safety, investment opportunities and reliability were tested through ordinal logistic regression to ascertain the unique contribution of variables on users' livelihood outcomes. The effects of FinTech tested through an ordinal regression model were rated by respondents with five levels of effects i.e. 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. The study established the fitness of models used where a Chi-square statistic established the difference between the explanatory variables in the -2log likelihood against the model used. This was done to determine whether the model improves the study ability to predict the outcome at a selected probability level. The model was compared against the dependent variable to see whether it significantly fit the data (Table 7). Independent variables were qualified as significant predictors of the dependent variable provided that the p-value in the Chi-Square statistics was less than < 0.05).

The result of the ordinal logistic analysis indicates that the significant p-value in the model used was statistically significant. This is because the probability ($p = 0.001$) at 95% confidence level was less than 0.05 which is the cutoff point. The effects were time saving, transaction costs, security, investment opportunities and reliability do explain the variation on users' livelihood outcomes. On top of this, Goodness of Fit was conducted to test whether the observed data were consistent with the fitted model. The assumption was that, when the significant p-value was higher than the critical value, then it could be concluded that the data and the model predictions were similar and therefore we had a good model. Likewise, if $p < 0.05$, then the model used could not fit the data well. Table 7 contains Pearson's Chi-square statistic for the model and Chi – square statistic based on the deviance. The results for the analysis revealed that the model significantly fit very well ($P = 0.675$) as presented in Table 7.

The three approximations for ordinal regression model (Pseudo R–square, Cox and Snell, and Nagelkerke are produced to replace R^2. Therefore, the pseudo R^2 values (Nagelkerke) explains how dependent variables (livelihood outcomes) vary with variation in independent variables (time saving, transaction costs, safety, investment opportunities and reliability). Nagelkerke was found to be 0.452 meaning that the five predictor variables enhance livelihood outcomes by almost 45.2% at 95% confidence level, leaving only 54.8% for other unaccounted factors that affect users' livelihood outcomes. Therefore, it is sufficient to argue that FinTechs are essential tools for enhancing users' livelihood outcomes.

Table 7 presents Wald statistics, parameters estimates (β) and contribution of each independent variable on users' livelihood outcomes at 95% confidence level. It was revealed that all five predictors variables were statistically significant since $p<0.05$. This means that the FinTech effects i.e. time saving, transaction costs, safety, investment opportunities and reliability were significant variables that significantly improves clients' livelihood outcomes. The findings presented in the ordinal logistic regression model suggest that FinTech can have a significant impact on livelihood outcomes in developing countries. Specifically, the results indicate that reducing transaction costs and increasing the reliability and time-saving benefits of financial services can improve livelihood outcomes, particularly for low-income populations.

These findings are supported by previous studies on the effects of FinTech on livelihood outcomes in developing countries. The negative effect of transaction costs on livelihood outcomes is consistent with previous research indicating that high transaction costs can discourage the use of financial services among low-income populations. Similarly, the positive effects of time-saving and reliability on livelihood outcomes are consistent with previous research highlighting the importance of these factors for improving economic security and business growth in developing countries. Generally, the findings suggest that FinTech can play an important role in promoting financial inclusion and poverty reduction in developing countries, but that efforts must be made to reduce transaction costs and ensure the reliability and time-saving benefits of financial services for all populations, particularly those living in poverty.

Table 9 : Parameter Estimates

FinTech Effects	Estimate	SE	Wald	df	Sig.
Transaction costs	-2.759	0.211	12.645	1	0.000
Time saving	2.884	0.586	11.483	1	0.001
Security	1.657	0.195	8.293	1	0.011
Reliability	1.702	0.736	8.179	1	0.036
Investment opportunities	1.595	0.582	6.826	1	0.000

Model Fitting Information (Chi-square = 32.85; sig. = 0.001); Goodness of Fit (Chi-square 28.35; Sig = 0.675), Pseudo R-Square (Cox and Snell R Square = 0.452; Nagelkerke = 0.698)

The findings suggest that transaction costs is the main FinTech effect that is statistically significant negative effect on livelihood outcomes, as indicated by the negative beta coefficient of -2.759 and the significant Wald value of 12.645 with a p-value of 0.000. This means that, the more banks' use FinTech, the more the transaction costs, diseases and likelihood of having better livelihood outcomes. In other words, users who incur higher transaction costs when using FinTech may be less likely to experience positive changes in their livelihoods as a result of using these technologies. This result implies that, the clients who uses FinTech, are likely experiencing better livelihood outcomes like asset possession and higher disposable income.

The findings agree with the study by Demirguc-Kunt, Klapper, and Singer (2017) who found that there is a negative effect of transaction cost on livelihood outcomes. The study further noted that high transaction costs for financial services negatively affect the use of these services, particularly among low-income populations in developing countries. This is consistent with the negative beta coefficient found in the model, suggesting that higher transaction costs lead to worse livelihood outcomes.

The findings in Table 7 Time saving was among of main FinTech effects that was statistically significant positive effect on livelihood outcomes, as indicated by the positive beta coefficient of 2.884 and the significant Wald value of 11.483 with a p-value of 0.001. This means that, the more banks' clients use FinTech, the more they enjoy time saving and likelihood of having better livelihood outcomes. This result is in line with the general expectation that time savings would lead to more positive livelihood outcomes, as it can free up time and resources for other productive activities. This implies that users with better livelihood outcomes may be more likely to experience time savings as a result of using FinTech.

Similarly, the study by Jack and Suri (2014) found positive effects of time-saving and reliability on livelihood outcomes in developing countries. The study noted that the introduction of mobile money services in Kenya resulted in significant time savings for households, which in turn had positive effects on consumption, income, and economic security. This supports the positive effect of time-saving found in the model. Additionally, a study by Klapper, Love, and Randall (2014) found that access to reliable financial services, particularly among women entrepreneurs, was positively associated with business growth and income in developing countries. This supports the positive effect of reliability found in the model.

Furthermore, security was among of strong statistically significant positive effect on livelihood outcomes, as indicated by the positive beta coefficient of 1.657 and the significant Wald value of 8.293 with a p-value of 0.011. This means that, the more the use of FinTech, the more users are secured financially and likelihood of having better livelihood outcomes. This result is in line with the general expectation that greater security in financial transactions and activities would lead to more positive livelihood outcomes, as it can help protect against fraud, theft, and other risks. This implies that users with better livelihood outcomes may be more likely to prioritise and invest in security measures when using FinTech.

Moreover, the findings in Table 7 suggest that there is a statistically significant positive effect of reliability on livelihood outcomes, as indicated by the positive beta coefficient of 1.702 and the significant Wald value of 8.179 with a p-value of 0.036. This means that, the more the use of FinTech, the more the reliability increases and likelihood of having better livelihood outcomes. This result is in line with the general expectation that reliable financial services would lead to more positive livelihood outcomes, as it can help users to plan and manage their finances more effectively. This implies that users who use FinTech are more likely to experience better livelihood outcomes and may be influenced to use and benefit from reliable FinTech services.

Finally, the findings suggest that there is a statistically significant positive effect of investment opportunities on livelihood outcomes, as indicated by the positive beta coefficient of 1.595 and the significant Wald value of 6.826 with a p-value of 0.000. This means that, the more the use of FinTech, the more users' find investment

opportunities and the likelihood of having better livelihood outcomes. This result is in line with the general expectation that access to investment opportunities and financial services can help users to build wealth and improve their financial well-being over time. This implies that, it is possible that users with better livelihood outcomes may be more likely to seek out and take advantage of investment opportunities.

The findings agree with Kabir *et al*. (2020) who highlighted the positive impact of FinTech on livelihood outcomes, particularly in terms of increasing access to financial services and promoting financial inclusion. The study noted that the use of mobile financial services led to increased financial security, better household management, and improved livelihood outcomes among users. Similarly, the findings are in line with a study by Adedokun *et al*., (2019) in Nigeria who found that the use of mobile banking services had a positive impact on household income and financial well-being, particularly for low-income households. Investment opportunities have also been identified as an important factor in promoting financial inclusion and improving livelihood outcomes in developing countries. For example, a study conducted in Kenya found that the availability of investment opportunities through mobile financial services led to increased savings and asset accumulation among users, particularly those in rural areas (Suri and Jack, 2016).

4.4 The Clients' Attitudes toward the Usefulness of Financial Technologies

The findings presented in Table 8 indicate that the majority of respondents had a positive attitude towards the usefulness of financial technologies in managing finances more efficiently. Specifically, 51% of the respondents agreed that using financial technologies could lead to better financial outcomes such as increased savings and investment opportunities, while 24% strongly agreed with this statement. The mean score of 3.97 is above 3.0 as cutoff point which suggests that, on average, respondents had a positive attitude towards the usefulness of financial technologies for managing finances more efficiently. However, it is worth noting that a significant proportion of respondents (23%) had a neutral attitude towards the statement. This could be due to various reasons such as lack of awareness about financial technologies, lack of trust in digital financial services, or simply not having tried these services before. This was confirmed by one of respondent who said that;

> …"FinTech *has been useful for use since we make transactions easily without travelling to bank branches for banking; it is very useful in saving time and cost as well as bill clearance*... (12nd April, 2023).

Overall, the findings suggest that there is a general positive attitude towards the usefulness of financial technologies for managing finances more efficiently, which could have a positive impact on users' livelihoods. However, efforts need to be made to raise awareness about these technologies and address any concerns or barriers that users may have in order to fully realise their potential benefits.

Table 10 : The Clients' Attitudes toward the Usefulness of Financial Technologies

	1		2		3		4		5		Mean score
	f	%	f	%	f	%	f	%	f	%	
Using financial technologies to manage finances more efficiently could potentially lead to better financial outcomes, such as increased savings and investment opportunities, which could positively impact users' livelihoods.	0	0	6	2	84	23	182	51	88	24	**3.97**
Improved financial decision-making abilities through the use of financial technologies could potentially lead to more informed and effective financial choices, which could also have a positive impact on users' livelihoods.	0	0	11	3	36	10	223	62	90	25	**4.09**
Greater control over financial situations through the use of financial technologies could potentially reduce financial stress and uncertainty, which could positively impact users' overall well-being and livelihoods.	0	0	11 3		43	12	234	65	72	20	**3.82**
Positive recommendations of financial technologies to others could potentially increase the use of these tools in society, which could lead to greater financial literacy and access to financial services, potentially benefiting users' livelihoods and those of others.	0	0	18	5	180	50	108	30	54	15	**3.55**
Saving time and effort in managing finances through financial technologies could potentially free up time and resources for users to focus on other areas of their lives, such as work or personal development, which could also have a positive impact on their livelihood outcomes.	0	0	11	3	36	10	198	55	115	32	**4.16**
Using financial technologies to manage finances more efficiently could potentially lead to better financial outcomes, such as increased savings and investment opportunities, which could positively impact users' livelihoods.	0	0	29	8	43	12	162	45	126	35	**4.07**
Total mean score											**23.66**
Grand mean score											**03.94**

Furthermore, the findings presented in table 8 indicate that a majority of the respondents had a positive attitude towards the usefulness of financial technologies in improving their financial decision-making abilities. Specifically, 62% of the respondents agreed that using financial technologies could potentially lead to more informed and effective financial choices, while 25% strongly agreed with this statement. Moreover, the mean score of 4.09 is above the minimum cutoff point for positive attitudes. Therefore, it implies that, on average, respondents had a relatively

strong positive attitude towards the usefulness of financial technologies in improving their financial decision-making abilities. However, it is worth noting that a small proportion of respondents (3%) disagreed or strongly disagreed with the statement, indicating that some users may not find financial technologies helpful in making financial decisions.

The findings suggest that there is a general positive attitude towards the usefulness of financial technologies in improving financial decision-making abilities, which could have a positive impact on users' livelihoods. However, it is important to address any concerns or barriers that users may have in order to fully realise the potential benefits of financial technologies. Efforts should be made to increase awareness and education around the effective use of these technologies in improving financial decision-making abilities.

Moreover, the findings suggest that a majority of the respondents agreed with the statement that using financial technologies could potentially lead to greater control over financial situations, which in turn could reduce financial stress and uncertainty, and positively impact users' overall well-being and livelihoods. Specifically, 65% of the respondents agreed with the statement, while 20% strongly agreed with it. The mean score of 3.82 is above 3 minimum score which implies that, on average, respondents had a positive attitude towards the potential benefits of financial technologies in providing greater control over financial situations and reducing financial stress and uncertainty. However, it is worth noting that a small proportion of respondents (3%) disagreed or strongly disagreed with the statement, indicating that some users may not believe that financial technologies can provide greater control over their financial situations or reduce their financial stress and uncertainty.

Overall, the findings suggest that there is a general positive attitude towards the potential benefits of financial technologies in providing greater control over financial situations and reducing financial stress and uncertainty, which could have a positive impact on users' overall well-being and livelihoods. However, it is important to address any concerns or barriers that users may have in order to fully realise the potential benefits of financial technologies. Efforts should be made to increase awareness and education around the effective use of these technologies in providing greater financial control and reducing financial stress and uncertainty.

Based on the findings, the majority of the respondents (50%) held a neutral attitude towards recommending financial technologies to others. Only 30% of the respondents agreed that they would recommend these tools to others. Meanwhile, 5% disagreed and 15% strongly disagreed. The mean score of this statement was 3.55 greater than 3 minimum score which implies a slightly positive attitude towards recommending financial technologies to others. However, the fact that half of the respondents were neutral suggests that there is still a need for more education and awareness-raising about the benefits of financial technologies. Encouraging satisfied users to share their positive experiences with others could help increase the adoption of these tools in society, potentially benefiting users' livelihoods and those of others.

Nonetheless, the statement that suggests that using financial technologies to manage finances could save time and effort, which could positively impact users' livelihood outcomes, majority of respondents (87%) either agreed or strongly agreed with the statement, with a mean score of 4.16. This suggests that the respondents perceive the use of financial technologies as a useful tool for saving time and effort in managing finances, which could potentially free up time and resources for other areas of their lives. This is consistent with previous research that has highlighted the time-saving benefits of financial technologies, such as mobile banking apps and online budgeting tools (Kabir *et al*., 2020; Adedokun *et al*., 2019; Suri and Jack, 2016). Therefore, it is recommended that financial service providers continue to develop and promote user-friendly financial technologies that offer time-saving benefits to enhance the user experience and improve their livelihood outcomes.

Finally, the findings in Table 8, clients generally have a positive attitude towards the usefulness of financial technologies for managing their finances. The mean score of 4.07 is above minimum score of 3 which implies that, on average, respondents agree that using financial technologies could lead to better financial outcomes, such as increased savings and investment opportunities, which could positively impact their livelihoods. It is worth noting that a relatively small percentage of respondents strongly disagreed (1%) or disagreed (8%) with this statement, while the majority either agreed (45%) or strongly agreed (35%). A minority of respondents were neutral (12%) about the statement.

Generally, these findings suggest that clients are generally receptive to the idea of using financial technologies to manage their finances and believe that doing so could have positive outcomes. However, it is important to note that attitudes towards financial technologies may vary depending on factors such as age, income level, and prior experience with financial technologies. The findings are similar to a survey conducted by the Central Bank of Kenya that found that mobile money services have become increasingly popular in the country, with over 60% of adults using mobile money for financial transactions. The study found that the majority of users reported positive outcomes, such as improved financial management and increased access to financial services. Similarly, a study by the Consultative Group to Assist the Poor (CGAP) found that low-income households in Tanzania who used mobile money reported improvements in their financial lives, such as increased savings and better access to credit.

4.5 The Challenges Faced by Bank Clients in the Usage of FinTech

The study was interested in determining the challenges facing bank clients' usage of FinTech. The study identified the challenges such as low network/ breakdown, insecurity of money, power breakdown, inaccessibility of services, inconvenience in using, lack of insurance (ban insurance), poor services from service providers, personal relationship/link and I don't know how to use/operate. The study analysed the findings using multiple response data analysis techniques and the findings are presented in Table 11.

Table 11 : FinTech challenges

FinTech challenges	Responses		Percent of Cases (%)
	N	Percent (%)	
Low network/ breakdown	360	29.5	100.0
Insecurity of money	330	27.0	91.7
Power breakdown	288	23.6	80.0
Inaccessibility of services	108	08.8	30.0
Inconvenience in using	64	05.2	17.8
Lack of insurance (ban insurance)	57	04.7	15.8
Poor services from service providers	08	0.01	02.2
Personal relationship/link	04	0.0	01.1
I don't know how to use/operate	02	0.0	0.60
Total	**1221**	**100.0**	**345.2**

The most commonly reported challenge is low network/breakdown, which was cited by 29.5% of respondents. This suggests that issues with network connectivity or reliability are a major concern for users of FinTech. The findings are consistent with the findings by Oyebisi and Rufai (2020) in Nigeria that found network connectivity issues were a major challenge for users of FinTech services, particularly in rural areas where internet access is limited. Insecurity of money is also a commonly cited challenge in developing countries, particularly in areas where financial fraud and cybercrime are prevalent. One of the responded replied that;

> …"*the main challenge facing the4 use of FinTech in our country is low/poor network and insecurity issues. Sometimes you can log in a particular page of the payment system but fail to complete the transaction on time. We are afraid to lose our credits and money since we fill our bank details in these platforms*"…. (12nd April, 2023).

Insecurity of money is the second most frequently reported challenge, with 27.0% of respondents reporting this issue. This highlights the importance of security measures in FinTech services, such as encryption and fraud detection. The findings are similar to the study by Owusu (2018) who conducted in Ghana found that concerns about security and privacy were a major factor influencing the adoption of mobile money services.

Power breakdown is the third most frequently reported challenge, with 23.6% of respondents citing this issue. This suggests that power outages or disruptions may be a significant concern for users of FinTech, particularly in areas with unreliable power grids. The findings agree with the findings by Suri and Jack (2016) in India who found that power outages were a significant barrier to the adoption of digital financial services, particularly among low-income households.

Inaccessibility of services, inconvenience in using, lack of insurance (ban insurance), poor services from service providers, personal relationship/link, and not knowing how to use/operate are reported less frequently, with percentages ranging from 0.0% to 8.8%. Lack of awareness or understanding of how to use FinTech services is another commonly cited challenge, particularly among low-income or less-educated populations. A study conducted in Kenya found that many users of mobile money services were not fully aware of the features and benefits of these services, which

limited their adoption and use (Ssewanyana *et al*., 2020). Overall, these studies support the findings presented earlier regarding the challenges associated with the use of FinTech in developing countries. The challenges identified in these studies are similar to those reported in the earlier findings, highlighting the need for targeted interventions to address these challenges and promote the adoption and use of FinTech services in developing countries.

CHAPTER FIVE

5.0. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The aim of this study was to assess the penetration of FinTech on livelihood outcomes of CRDB bank and UCB clients in Moshi Municipality. Specifically, the study intends to determine the current level of FinTech adoption among customers in the study area, determine the effects of financial technologies on livelihood outcomes, examine the clients' attitudes toward the usefulness of financial technologies and determine the challenges faced by bank clients in the usage of financial technologies. This chapter therefore summarised the findings of the study as analysed and presented in chapter four basing on these study objective(s). This chapter also provides conclusions and clear recommendations to decision and policy makers on how FinTech can better affect clients' livelihood outcomes.

5.2 Summary of the Study

5.2.1 Level of customers' adoption of electronic banking

The study was interested to ascertain the extent to which FinTech is adopted in the study area. In order to achieve this, the study inquired about the different information from respondents. The following are findings on the level of FinTech adoption in the study area. The study determined whether the clients in the study area use the internet when accessing bank services. It was revealed that, vast majority of people use the internet for banking services while only a small percentage do not. The study also found that the majority of online banking users have been using the service for a significant period, indicating a growing trend towards long-term adoption of online banking. This could be attributed to the growing awareness and adoption of digital technologies by individuals and businesses, as well as the convenience and ease of access offered by online banking services.

Furthermore, the study revealed that, the most commonly used method was agency banking as a way of accessing bank services. The second most common method was physical visits to bank branches while mobile banking was the third most commonly used method of accessing bank services. Internet banking was the least commonly

used method, but at least half of respondents have been accessing banks through this method.

Nonetheless, the findings revealed that, while mobile banking is becoming more popular, there is still room for growth and further adoption among certain segments of the population. It may be necessary for FinTech companies and financial institutions to continue promoting the benefits and convenience of mobile banking in order to encourage more widespread adoption. This can be linked with the users' livelihood outcomes such as saving time and cost reduction. Nonetheless, the findings suggest that agency banking is a relatively popular and widely used FinTech service among the respondents. This could be due to its convenience, accessibility, and availability in areas with limited banking infrastructure. However, there may still be room for growth in its adoption, particularly among those who reported using it rarely or not at all.

Moreover, the findings indicate that while internet banking is available and used by some individuals, there may be a need for further education and promotion of the benefits of this service in order to encourage wider adoption. Financial institutions and FinTech companies may need to address concerns around security and usability to increase user confidence and drive adoption which in turn will improve their livelihood outcomes.

5.1.2 Effects of fintech on livelihood outcomes

The study was interested in examining the effects of financial technologies on livelihood outcomes. The livelihood outcomes such as time saving, transaction costs, safety, investment opportunities and reliability were tested through ordinal logistic regression to ascertain the unique contribution of variables on users' livelihood outcomes. The effects of FinTech tested through ordinal regression models. The result of the ordinal logistic analysis indicates that the significant p-value in the model used was statistically significant. This is because the probability ($p = 0.001$) at 95% confidence level was less than 0.05 which is the cutoff point. The findings in Table 7 revealed that time saving, transaction costs, security, investment opportunities and reliability were statistically significant influencing users' livelihood outcomes since the $p<0.05$. This implies that FinTech can have a significant impact on livelihood outcomes in developing countries. Specifically, the results indicate that

reducing transaction costs and increasing the reliability and time-saving benefits of financial services can improve livelihood outcomes, particularly for low-income populations.

These findings are supported by previous studies on the effects of FinTech on livelihood outcomes in developing countries. The negative effect of transaction costs on livelihood outcomes is consistent with previous research indicating that high transaction costs can discourage the use of financial services among low-income populations. Similarly, the positive effects of time-saving and reliability on livelihood outcomes are consistent with previous research highlighting the importance of these factors for improving economic security and business growth in developing countries. Generally, the findings suggest that FinTech can play an important role in promoting financial inclusion and poverty reduction in developing countries, but that efforts must be made to reduce transaction costs and ensure the reliability and time-saving benefits of financial services for all populations, particularly those living in poverty.

5.1.3 The clients' attitudes toward the usefulness of financial technologies

The findings presented in Table 8 indicate that the majority of respondents had a positive attitude towards the usefulness of financial technologies in managing finances more efficiently. The mean score of 3.97 is above 3.0 as cutoff point which suggests that, on average, respondents had a positive attitude towards the usefulness of financial technologies for managing finances more efficiently. Overall, the findings suggest that there is a general positive attitude towards the usefulness of financial technologies for managing finances more efficiently, which could have a positive impact on users' livelihoods. However, efforts need to be made to raise awareness about these technologies and address any concerns or barriers that users may have in order to fully realise their potential benefits.

Moreover, the findings suggest that a majority of the respondents agreed with the statement that using financial technologies could potentially lead to greater control over financial situations, which in turn could reduce financial stress and uncertainty, and positively impact users' overall well-being and livelihoods. The findings suggest that there is a general positive attitude towards the potential benefits of financial technologies in providing greater control over financial situations and reducing financial stress and uncertainty, which could have a positive impact on users' overall

well-being and livelihoods. However, it is important to address any concerns or barriers that users may have in order to fully realise the potential benefits of financial technologies. Efforts should be made to increase awareness and education around the effective use of these technologies in providing greater financial control and reducing financial stress and uncertainty.

Based on the findings, the majority of the respondents held a neutral attitude towards recommending financial technologies to others. The mean score of this statement was 3.55 greater than 3 minimum score which implies a slightly positive attitude towards recommending financial technologies to others. However, the fact that half of the respondents were neutral suggests that there is still a need for more education and awareness-raising about the benefits of financial technologies. Encouraging satisfied users to share their positive experiences with others could help increase the adoption of these tools in society, potentially benefiting users' livelihoods and those of others.

Nonetheless, the statement that suggests that using financial technologies to manage finances could save time and effort, which could positively impact users' livelihood outcomes, majority of respondents either agreed or strongly agreed with the statement, with a mean score of 4.16. This suggests that the respondents perceive the use of financial technologies as a useful tool for saving time and effort in managing finances, which could potentially free up time and resources for other areas of their lives. Finally, clients generally have a positive attitude towards the usefulness of financial technologies for managing their finances. The mean score of 4.07 is above minimum score of 3 which implies that, on average, respondents agree that using financial technologies could lead to better financial outcomes, such as increased savings and investment opportunities, which could positively impact their livelihoods. It is worth noting that it is relatively small.

5.1.4 The challenges faced by bank clients in the usage of FinTech

The study was interested in determining the challenges facing bank clients' usage of FinTech. The study identified the main challenges were low network/ breakdown, insecurity of money and power breakdown. The minor challenges were inaccessibility of services, inconvenience in using, lack of insurance (ban insurance), and poor services from service providers, personal relationship/link and awareness on how to use/operate. The

5.2 Conclusion

The study concludes that, the most commonly used FinTech was agency banking as a way of and second most common was mobile banking while internet banking was the least commonly used FinTech, but with at least half of respondents having been accessing banks through this method. This could be due to its mobile banking and agency banking is commonly used due to convenience, accessibility and availability in areas with limited banking infrastructure. However, there may still be room for growth in its adoption, particularly among those who reported using it rarely or not at all.

The findings conclude that time saving, transaction costs, security, investment opportunities and reliability were statistically significant influencing users' livelihood outcomes since the $p<0.05$. This implies that FinTech can have a significant impact on livelihood outcomes in developing countries. This can be due to the fact that FinTech simplifies money transactions which allows the users to concentrate on doing other production activities rather than travelling for transaction purposes which wastes not only resources but also time.

Furthermore, the study concludes that the clients in the study area generally hold positive attitudes toward using FinTech. The clients were receptive to the idea of using financial technologies for managing their finances, and that using digital financial services can lead to positive outcomes such as increased financial inclusion, better financial management, and improved access to financial services. This agrees with the TAM model that users adopt FinTech due to perceived ease of use, perceived usefulness and perceived trust. Since FinTech such as mobile banking and agency banking are easy to use and ensure security, users' trusts and adopt them.

The study found that the findings presented indicate that there are several challenges associated with the use of FinTech in developing countries. These challenges include low network coverage, power breakdowns and insecurity of money as major challenges. Other minor challenges found were inaccessibility of services, inconvenience in using, lack of insurance, poor services from providers, personal relationship/link, and a lack of understanding or knowledge of how to use FinTech services.

5.3 Recommendations

Based on study findings, the study recommend the following;

- Increase awareness: Given the relatively low adoption rates of internet banking, financial institutions and FinTech companies should focus on increasing awareness of the benefits of digital financial services, particularly internet banking. This could involve targeted marketing campaigns, education programs, and collaborations with government agencies and community organisations.
- Address barriers to adoption: Financial literacy, trust in technology, and infrastructure are key barriers to adoption of digital financial services in developing countries. Financial institutions and FinTech companies should work with governments and other stakeholders to address these barriers, for example, by providing education and training programs, investing in infrastructure, and improving security measures.

- Reduce transaction costs: Policymakers should work to reduce transaction costs for financial services, particularly for low-income populations. This could include measures such as eliminating fees for basic financial services, promoting digital payments, and encouraging competition among financial institutions.

- Increase reliability: Financial institutions should prioritise reliability in their services, particularly in terms of security and customer support. This could include investing in secure and user-friendly digital platforms, as well as providing accessible and responsive customer service channels.

- Financial institutions and service providers should continue to promote and educate users on the potential benefits of using financial technologies, such as increased savings, better financial decision-making abilities, greater control over financial situations, and time-saving in managing finances.

Regarding the challenges Governments, policymakers, and financial institutions should work together to address these challenges by improving network coverage, providing reliable power supply, strengthening cybersecurity measures, improving financial literacy, and designing products and services that are tailored to the needs of

low-income and underserved populations. Furthermore, financial institutions can also develop customer-centric services that are easy to use and accessible to people from all walks of life. Financial institutions can also partner with telecommunication companies and mobile network operators to expand the reach of their services and to leverage on existing infrastructure.

5.4 Area for Further Study

Based on the findings, some potential areas for further study could include exploring the potential impact of financial technology education and awareness campaigns on attitudes towards these tools and the comparison between community banks and commercial banks. This could involve designing and implementing interventions to educate users on the potential benefits and risks of financial technologies and measuring changes in attitudes and behaviours over time. Moreover, investigating the potential role of financial technologies in promoting financial inclusion and reducing inequality need to be done. This could involve analysing how these tools are being used by underserved populations, such as those with limited access to traditional banking services, and assessing whether they are helping to bridge the gap in financial access and empowerment.

REFERENCES

Adedokun, A. O., Oresanya, T. O., Afolabi, A. O., and Adewole, O. S. (2019). Impact of financial technology on financial inclusion and poverty reduction in Nigeria. *International Journal of Advanced Research in Computer Science*, 10(1), 181-186.

Agarwal, S., and Chomsisengphet, S. (2018). Digital Financial Inclusion in Developing Countries. *Annual Review of Financial Economics*, 10(1), 291-310. https://doi.org/10.1146/annurev-financial-110217-023548

Ahmed, R. (2018). Customer adoption of online banking in Bangladesh: an empirical study. *Academy of Banking Studies Journal*, 16(1), 23-30.

Arhin, P., Erdiaw-Kwasie, M. O., and Abunyewah, M. (2022). Displacements and livelihood resilience in Ghana's mining sector: The moderating role of coping behaviour. Resources Policy, 78, 102820.

Azarenkova, G., Shkodina, I., Samorodov, B., and Babenko, M. (2018). The influence of financial technologies on the global financial system stability. Investment Management and Financial Innovations, 15(4), 229.

Banna, H., Mia, M. A., Nourani, M., and Yarovaya, L. (2022). Fintech-based financial inclusion and risk-taking of microfinance institutions (MFIs): Evidence from Sub-Saharan Africa. Finance Research Letters, 45, 102149.

Carlini, F., Del Gaudio, B. L., Porzio, C., and Previtali, D. (2022). Banks, FinTech and stock returns. Finance Research Letters, 45, 102252.

Chen, M. A., Wu, Q., and Yang, B. (2019). How valuable is FinTech innovation?. The Review of Financial Studies, 32(5), 2062-2106.

Demirguc-Kunt, A., Klapper, L., and Singer, D. (2017). Financial inclusion and inclusive growth: *A review of recent empirical evidence. Policy Research Working Paper No. 8040*. World Bank Group.

Devi, A., and Patro, S. K. (2018). An empirical study on usage of bank accounts in India. *International Journal of Engineering and Technology*, 7(3.22), 10-15.

Dimaunahan, J. (2019). Academic Motivation, Self-Efficacy and Academic Performance in Technology and Livelihood Education (TLE): Input to Understanding Affective Components of Learning in TLE. Ascendens Asia Journal of Multidisciplinary Research Abstracts, 3(2C).

Durai, T., and Stella, G. (2019). Digital finance and its impact on financial inclusion. Journal of Emerging Technologies and Innovative Research, 6(1), 122-127.

Durai, T., and Stella, G. (2019). Digital finance and its impact on financial inclusion. Journal of Emerging Technologies and Innovative Research, 6(1), 122-127.

Ferguson, K. K., Soutter, L., and Neubert, M. (2019). Digital payments in Africa-how demand, technology, and regulation disrupt digital payment systems. International Journal of Teaching and Case Studies, 10(4), 319-340.

Goyal, A., and Joshi, M. (2018). Adoption of Digital Financial Services in Developing Countries: A Literature Review. *Journal of Payments Strategy and Systems*, 12(2), 170-183. https://doi.org/10.21314/JPS.2018.253

Haider, H. (2018). Innovative financial technologies to support livelihoods and economic outcomes.

Hatayama, M. (2018). ICTs and livelihood supports of refugees and IDPs.

Hatayama, M. (2018). ICTs and livelihood supports of refugees and IDPs.

Huang, X., and Chen, J. (2019). Factors affecting bank account usage in rural China: Evidence from Guizhou Province. *Sustainability*, 11(11), 3094.

Jack, W., and Suri, T. (2014). Risk sharing and transactions costs: Evidence from Kenya's mobile money revolution. *American Economic Review*, 104(1), 183-223.

John, E. K., Gwahula, R., and Msemwa, F. M. (2018). The influence of perceived risk on the uptake of Mobile Money Services by SMEs operations in Karagwe

district, Tanzania. International Journal of Advanced Engineering, Management and Science, 4(9), 265251.

Kabir, M. R., Kari, F., and Yasmin, F. (2020). Mobile banking and livelihoods: An empirical investigation in Bangladesh. *Information Technology for Development*, 26(2), 348-372.

Kamau, M., and Chege, J. (2020). Effect of mobile banking on financial performance of commercial banks in Kenya. *Journal of Economics and Finance*, 11(1), 1-10.

Kangwa, D., Mwale, J. T., and Shaikh, J. M. (2021). The social production of financial inclusion of generation Z in digital banking ecosystems. Australasian Accounting, Business and Finance Journal, 15(3), 95-118.

Karjaluoto, H., et al. (2017). Factors driving consumers' adoption of mobile banking services in Finland. *Journal of Financial Services Marketing*, 22(2), 77-89. https://doi.org/10.1057/s41264-017-0015-5

Kedir, A., and Kouame, E. (2022). FinTech and women's entrepreneurship in Africa: the case of Burkina Faso and Cameroon. Journal of Cultural Economy, 1-16.

Kim, M., Zoo, H., Lee, H., and Kang, J. (2018). Mobile financial services, financial inclusion, and development: A systematic review of academic literature. The Electronic Journal of Information Systems in Developing Countries, 84(5), e12044.

Klapper, L., Love, I., and Randall, D. (2014). Financial inclusion, regulation, and inclusive growth. *Journal of Economic Perspectives*, 28(3), 107-132.

Komba, P. N., and Katundu, M. A. (2019). Assessing the effectiveness of agency banking in rural Tanzania: A case of Singida region. *European Journal of Business and Management Research*, 4(3), 1-11.

Kouame, E., and Kedir, A. M. (2020). Disruptive financial technology (FinTech) and entrepreneurship in Burkina Faso. In Disruptive Technologies, Innovation and Development in Africa (pp. 171-186). Palgrave Macmillan, Cham.

Leng, S. Y., Talib, A., and Gunardi, A. (2018). Financial technologies: A note on mobile payment. Jurnal Keuangan dan Perbankan, 22(1), 51-62.

Lim, J., et al. (2018). What drives mobile payment adoption? A study of young Singaporeans. *Journal of Retailing and Consumer Services*, 40, 221-232. https://doi.org/10.1016/j.jretconser.2017.10.010

Makate, C., and Makate, M. (2019). Interceding role of institutional extension services on the livelihood impacts of drought tolerant maize technology adoption in Zimbabwe. Technology in Society, 56, 126-133.

McIntosh, C., and Mansini, C. S. (2018). The use of financial technology in the agriculture sector.

Melnychenko, S., Volosovych, S., and Baraniuk, Y. (2020). Dominant ideas of financial technologies in digital banking. Baltic journal of Economic studies, 6(1), 92-99.

Michael, B., Koroleska, N., Tai, A., and Wong, D. W. H. A (2020). critical look at using financial technology policy to promote the sustainable development goals. Sustainable Development.

Mishra, S., and Mishra, A. (2020). Factors affecting adoption of internet banking in India. *Journal of Financial Services Marketing*, 25(2), 51-61

Mkwizu, J. L., Mwemezi, A. J., and Kibonde, B. (2018). Agency banking and financial inclusion: A case of Tanzania. *Journal of African Studies and Development*, 10(5), 55-65.

Munkhdalai, L., Munkhdalai, T., Namsrai, O. E., Lee, J. Y., and Ryu, K. H. (2019). An empirical comparison of machine-learning methods on bank client credit assessments. Sustainability, 11(3), 699.

Muthinja, M. M., and Chipeta, C. (2018). What drives financial innovations in Kenya's commercial banks? An empirical study on firm and macro-level drivers of branchless banking. Journal of African Business, 19(3), 385-408.

Muturi, W., and Gachanja, G. (2021). Determinants of mobile banking adoption among bank customers in Kenya. *International Journal of Bank Marketing*, 39(3), 590-611.

Naito, H., Ismailov, A., and Kimaro, A. B. (2021). The effect of mobile money on borrowing and saving: Evidence from Tanzania. World Development Perspectives, 23, 100342.

Neufeld, L., Huang, J., Badiane, O., Caron, P., and Sennerby-Forsse, L. (2021). Advance Equitable Livelihoods: A paper on Action Track 4. Science and Innovations, 143.

Ngoma, H. (2018). Does minimum tillage improve the livelihood outcomes of smallholder farmers in Zambia?. Food security, 10(2), 381-396.

Nnaeme, C. C., Patel, L., and Plagerson, S. (2020). How cash transfers enable agency through livelihoods in South Africa. World Development, 131, 104956.

Ogbu, O. G. (2020). Gender, peacebuilding and entrepreneurship: insights from a community skills-building project in Nigeria. Conflict Trends, 2020(2), 6-13.

Oladapo, A. A., and Falohun, T. O. (2017). Adoption of Online Banking in Nigeria: An Empirical Investigation. *Journal of Internet Banking and Commerce*, 22(3), 1-16.

Owusu, G. (2018). Examining users' intention to adopt mobile money services: Empirical evidence from Ghana. *International Journal of Bank Marketing*, 36(3), 484-498. https://doi.org/10.1108/IJBM-07-2016-0102

Oyebisi, T. O., and Rufai, I. A. (2020). Fintech and financial inclusion in Nigeria: *Analysis of drivers and challenges*. Heliyon, 6(2), e03420. https://doi.org/10.1016/j.heliyon.2020.e03420

Patnam, M., and Yao, W. (2020). The Real Effects of Mobile Money: Evidence from a Large-Scale Fintech Expansion.

PwC. (2017). Redrawing the lines: *FinTech's growing influence on financial services*. https://www.pwc.com/gx/en/industries/financial-services/assets/pwc-redrawing-the-lines.pdf

Rabbani, M. R., Bashar, A., Nawaz, N., Karim, S., Ali, M. A. M., Rahiman, H. U., and Alam, M. (2021). Exploring the role of islamic fintech in combating the aftershocks of covid-19: The open social innovation of the islamic financial system. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(2), 136.

Rahman, M. M. (2019). Prospect and Challenges of Agent Banking on Financial Inclusion in Bangladesh. Amity Global Business Review, 18.

Raza Rabbani, M., Asad Mohd. Ali, M., Rahiman, H. U., Atif, M., Zulfikar, Z., and Naseem, Y. (2021). The response of Islamic financial service to the COVID-19 pandemic: The open social innovation of the financial system. Journal of Open Innovation: Technology, Market, and Complexity, 7(1), 85.

Senyo, P. K., Karanasios, S., Gozman, D., and Baba, M. (2022). FinTech ecosystem practices shaping financial inclusion: the case of mobile money in Ghana. European Journal of Information Systems, 31(1), 112-127.

Sharma, M., Shrivastava, D., and Jain, P. (2019). Financial Inclusion and Fintech Solutions Post Lock Down: Covid-19 Crisis in India.

Simpson, N. P., Rabenold, C. J., Sowman, M., and Shearing, C. D. (2021). Adoption rationales and effects of off-grid renewable energy access for African youth: A case study from Tanzania. Renewable and Sustainable Energy Reviews, 141, 110793.

Ssewanyana, S., Tumuhimbise, G. A., and Namara, R. (2020). Adoption and use of mobile money in rural areas: Evidence from Uganda. *African Journal of Science, Technology, Innovation and Development*, 12(1), 67-77. https://doi.org/10.1080/20421338.2019.1646525

Statista (2020). Fintech adoption rate worldwide in 2019, by region. https://www.statista.com/statistics/967209/fintech-adoption-rate-by-region/

Suri, T., and Jack, W. (2016). *The long-run poverty and gender impacts of mobile money*. Science, 354(6317), 1288-1292. https://doi.org/10.1126/science.aah5309

Sy, M. A. N., Maino, M. R., Massara, M. A., Saiz, H. P., and Sharma, P. (2019). FinTech in Sub-Saharan African Countries: A Game Changer?. International Monetary Fund.

Tàbara, J. D., Takama, T., Mishra, M., Hermanus, L., Andrew, S. K., Diaz, P., ... and Lemkow, L. (2020). Micro-solutions to global problems: understanding social processes to eradicate energy poverty and build climate-resilient livelihoods. Climatic Change, 160(4), 711-725.

Tandon, N., and Madhur, S. (2017). Financial Inclusion in Developing Countries: The Role of Digital Financial Services. *Journal of Financial Management and Analysis*, 30(2), 61-75.

van den Berg, H., Phillips, S., Dicke, M., and Fredrix, M. (2020). Impacts of farmer field schools in the human, social, natural and financial domain: a qualitative review. Food Security, 12(6), 1443-1459.

Venet, B. (2019). FinTech and financial inclusion. In A Research Agenda for Financial Inclusion and Microfinance. Edward Elgar Publishing.

Were, M., Odongo, M., and Israel, C. (2021). Gender disparities in financial inclusion in Tanzania (No. 2021/97). WIDER Working Paper.

World Bank Group. (2019). Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution. *Washington, DC: World Bank Group*. https://doi.org/10.1596/978-1-4648-1259-0

Xu, X. (2020). Trust and financial inclusion: A cross-country study. Finance Research Letters, 35, 101310.

Yahya, M. M., and Al-Tamimi, H. A. (2018). Factors affecting the usage of bank accounts in Saudi Arabia: Evidence from individual level data. *International Journal of Business and Management*, 13(3), 170-183.

Zaman, R., van Vliet, O., and Posch, A. (2021). Energy access and pandemic-resilient livelihoods: The role of solar energy safety nets. Energy Research and Social Science, 71, 101805.

Zhao, Q., Tsai, P. H., and Wang, J. L. (2019). Improving financial service innovation strategies for enhancing China's banking industry competitive advantage during the fintech revolution: A Hybrid MCDM model. Sustainability, 11(5), 1419.

Zhu, F. (2019). Factors influencing the adoption of mobile payment services: A meta-analysis. *Electronic Commerce Research and Applications*, 34, 100806. https://doi.org/10.1016/j.elerap.2019.100806

APPENDICES

Appendix I: Questionnaire

Introduction

Dear respondents, my name is Jesca Maringo, a student at Moshi Co-operative University (MoCU) pursuing a Master Degree in Business Management (MBM). I am pursuing a research titled '**"Innovative Financial Technologies and Livelihood Outcomes: A Case of Uchumi Commercial Bank and CRDB Bank Branches in Moshi Municipality, Tanzania.** I am kindly requesting you to respond to some questions intended to collect data on the topic of study as a way to accomplish my study. Just be assured that any information you provide will be treated confidential and only for academic purposes as said earlier. Thank you very much for agreeing to participate in the study.

PART A: PERSONAL INFORMATION

1. Area/Street in which the business operates……

2. Sex:

(i.) Male ( )

(ii.) Female ( )

3. Age

(i.) 19 – 30 years ( )

(ii.) 31 – 39 years ( )

(iii.) 40 – 49 year ( )

(iv.) Above 50 years ( )

4. Highest Academic Qualification

(i.) Post graduate Degree/ Masters ( )

(ii.) First Degree/ Advanced Diploma ( )

(iv.) Certificate/Diploma ( )

(v.) Secondary education ( )

(vi). Primary education ( )

5. For how long have I been a bank customer?

(i) 1-2 yrs ( )

(ii.) 2-5 yrs ( )

(iii.) 5-10 yrs ( )

(iv.) 10-20 yrs ( )

(v.) Above 30 yrs ( )

SECTION B: LEVEL OF CUSTOMERS' ADOPTION OF ELECTRONIC BANKING

1. What type of Bank accounts do you use? i) Savings ( ) ii) current accounts ( )

   iii) others specify ……

2. Do you use Internet banking? i) Yes ( ) ii) No ( )

3. How long have you been using bank services?

   i) Less than a year ( )

   ii) 1-3 years ( )

   iii) 3-5 years' ( )

   iv) Over five years please specify……

4. How do you access bank services (tick the most used)

   i) Physical visiting bank holes ( )

   ii) Internet banking ( )

   iii) Mobile banking ( )

   iv) Agency banking ( )

5. Rate the use of FinTech ;

Type of FinTech		Rate of use	✓ Tick
	Mobile banking	Not at all	
		Rarely	
		Often	
		Usually	
		Always	
	Agency banking	Not at all	
		Rarely	
		Often	
		Usually	
		Always	
	Internet banking	Not at all	
		Rarely	
		Often	
		Usually	
		Always	

6. Which services do you access via internet banking (tick the appropriate response)

   i) Depositing money ( )

   ii) Encashment ( )

   iii) Balance of the account ( )

   iv) Min statement ( )

   v) Others please specify

   …….

PART C: EFFECTS OF FINTECH ON LIVELIHOOD OUTCOMES

Based on your perceptions of technological factors influencing livelihood outcome, please indicate the extent to which you agree or disagree with the following statements. Use a 5-point scale where a 1= strongly disagree; 2 = Disagree; 3 = Neutral; 4 = Agree and 5 = strongly agree. Tick the appropriate number

S/N	Effects of FinTech	1	2	3	4	5
1	FinTech is reliable bank service that improves your livelihood outcomes					
2	FinTech offers the quality service that leads to improvement of your livelihood outcomes					
3	FinTech reduces transaction costs that improves your livelihood outcomes					
4	FinTech saves your time that improves your livelihood outcomes					
5	FinTech has significant influence on your livelihood					

SECTION C: The Clients' Attitudes toward the Usefulness of Financial Technologies

Based on your perceptions of the effects of FinTech on livelihood outcomes, please indicate the extent to which you agree or disagree with the following statements. Use a 5-point scale where a 1= strongly disagree; 2 = Disagree; 3 = Neutral; 4 = Agree and 5 = strongly agree.

S/N	The Clients' Attitudes toward the Usefulness of FinTech	1	2	3	4	5
1	Using financial technologies to manage finances more efficiently could potentially lead to better financial outcomes, such as increased savings and investment opportunities, which could positively impact users' livelihoods.					
2	Improved financial decision-making abilities through the use of financial technologies could potentially lead to more informed and effective financial choices, which could also have a positive impact on users' livelihoods.					
3	Greater control over financial situations through the use of financial technologies could potentially reduce financial stress and uncertainty, which could positively impact users' overall well-being and livelihoods.					
4	Positive recommendations of financial technologies to others could potentially increase the use of these tools in society, which could lead to greater financial literacy and access to financial services, potentially benefiting users' livelihoods and those of others.					
5	Saving time and effort in managing finances through financial technologies could potentially free up time and resources for users to focus on other areas of their lives, such as work or personal development, which could also have a positive impact on their livelihood outcomes.					
6	Using financial technologies to manage finances more efficiently could potentially lead to better financial outcomes, such as increased savings and investment opportunities, which could positively impact users' livelihoods.					

SECTION D: CHALLENGES OF USING FINTECH

Basing on your knowledge about the use of FinTech, please tick the main challenges that you encounter when using them:

S/N	Challenges of using FinTech	Tick
1	Low network/ breakdown	
2	Inconvenience in using	
3	Power breakdown	
4	Insecurity of money	
5	Inaccessibility of services	
6	Poor services from service providers	
7	I don't know how to use/operate	

Other challenges please specify:

i) ……

ii) …….

iii) ……

iv) ……..

v) ……;;

Appendix II: Key Informant Interview

i) Is fintech helpful to your daily business activities?
ii) Which of the fintech companies do you prefer the most? If yes, why?
iii) Does the use of fintech have any positive effects in your daily life?
iv) How do you access credit through the use of fintech?
v) Do you think there is any cost to saving using finch tech to access your bank account?
vi) Benefits of using fintech on your livelihood outcomes?

INNOVATIVE FINANCIAL TECHNOLOGIES AND LIVELIHOOD OUTCOMES: A CASE OF UCHUMI COMMERCIAL BANK & CRDB BANK BRANCHES IN MOSHI MUNICIPALITY, TANZANIA

The widespread adoption of financial technologies (FinTech) has transformed the landscape of financial services, offering greater access, convenience, and efficiency for consumers. While there is increasing evidence of the positive impact of FinTech on financial inclusion and economic development, there is limited understanding of the relationship between FinTech and livelihood outcomes. However, FinTech are widely spread among individuals but the users' livelihood is still poor. The aim of this study was to assess the penetration of FinTech on livelihoods outcomes of CRDB bank and UCB clients in Moshi Municipality. Specifically, the study intends to determine the current level of FinTech adoption among customers in study area, determine the effects of financial technologies on livelihood outcomes, examine the clients' attitudes toward the usefulness of financial technologies and determine the challenges faced by bank clients in the usage of financial technologies. A cross-sectional research design was used to collect data from 360 respondents. The questionnaire tool and interview guide were employed to collect primary data which analyzed through descriptive statistics and ordinal logistic regression data analysis techniques. The study found that, the most commonly used FiTech was agency banking as a way of and second most common was mobile banking while internet banking was the least commonly used FinTech, but with at least half of respondents have been accessing bank through this method. moreover, the study found that, time saving, transaction costs, security, investment opportunities and reliability were statistically significant influencing users' livelihood outcomes since the $p<0.05$. Furthermore, the study found that, the clients in study area are generally hold positive attitudes toward using of FinTech. Nonetheless, the study revealed that, low network coverage, power breakdowns and insecurity of money were the major challenges facing FinTech.

Keywords: Financial technologies and livelihood in Moshi municipal, Tanzania.

1. Introduction

Access to digital financial technologies, in particular mobile phones, internet connectivity and biometric authentication, allows for a wider range of financial services, such as online banking, mobile phone banking, and digital credit for the unbanked (Haider, 2018). Digital financial services can be more convenient and affordable than traditional banking services, enabling low-income and poor people in developing countries to save and borrow in the formal financial system, earn a financial return and smoothen their consumption (Haider, 2018).

A financial digital system is the use of digital technologies, such as computers, mobile phones, and the internet, to conduct financial transactions and manage financial information. This includes activities such as online banking, mobile payments, digital wallets, and electronic trading (Van den Berg *et al.*, 2020). A financial digital system can provide a number of benefits, such as convenience, speed, and cost-effectiveness. For example, with digital banking services, customers can perform transactions from the comfort of their homes, and can access their account information and transaction history at any time. With mobile payments, customers can quickly and easily pay for goods and services using their mobile phones, without the need for cash or credit cards.

Inclusive digital financial systems enable poor people to save and borrow in the formal financial system, allowing them to build their account balances and assets, earn a financial return, smooth their consumption, and invest in entrepreneurial ventures (Ouma, Odongo, & Were, 2017; Wyman, 2017). This can contribute to improvements in livelihoods, higher profits among micro-enterprises and greater ability to deal with shocks (Islam *et al.*, 2016). Also digital financial systems can boost the gross domestic product of digitalized economies by providing individuals and firms with convenient access to a range of financial instruments (including credit facilities), increasing the volume of financial transactions and aggregate expenditure (Ozili, 2018).

2. Theoretical Literature Review

In this study, two theories are used. The Technology Acceptance Model informs the study on the technological part of FinTechs while Sustainable Livelihood Approach (SLA) will be used to inform the study on the part of livelihood outcomes to the two

bank clients. The two theories complement each other and each having an important weight in the study.

2.2.1 Technology Acceptance Model

The technology accepance model (TAM) was proposed by Fred Davis (1985) in his Doctral thesis at the MIT Sloan School of Management. He proposed that the system use is a response theat can be explained or predicted by user motivation, which in turn is directly influences by an external stimulus consisting of the actual system's features and capabilities which are stimulus (system features and capabilities), organism (user's motivation to use the system) and response (actual use).

In his Dissertation , Davis (1985), suggested that the users' motivation can be explained by three factors: perceived easy of use, perceived usefulness and attitude towards using the system. He hypothesised that the attitude a user toward a technology was a major determinant whether the user will actually use or reject it. The attitude of the user in turn, was considered to be influenced by two major beliefs: perceived usefulness and perceived ease of use, with perceived ease of use having a direct influence on perceived usefulness. Finally both these beliefs were hypothesised to be directly influenced by the system design characteristics, represented by X_1, X_2 and X_3. The are the three variables explained earlier.

2.2.2 The Sustainable Livelihood Approach (SLA)

The SLA was developed by DFID (2001); the theory advocates that, there are three insights into poverty underpinning this approach. The first is the realization that while economic growth may be essential for poverty reduction, there is no an automatic relationship between the two since it all depends on the capabilities of the poor to take advantage of expanding economic opportunities as supported by Kunze *et al*. (2019). Secondly, there is the realization that poverty as conceived by the poor themselves is not just a question of low income, but also includes other dimensions such as bad health, illiteracy, lack of social services, etc., as well as a state of vulnerability and feelings of powerlessness in general. Finally, it is recognised that the poor themselves often know their situation and needs best and must therefore be involved in the design of policies and project intended to better their livelihood. Therefore, in understanding clients' livelihood outcomes it is important to understand how users utilise the livelihood capabilities and assets to achieve the desired

livelihood outcomes in terms of sustainable use of resources, increased household income, reduced vulnerability, empowerment and ownership of household assets as qualified by DFID (2001).

3. Study Methodology

3.1 Research Design

This study adopted a concurrent research design with a mixed research approach where qualitative and quantitative data were collected at the same time. Descriptive design provides accurate means of assessing information and helps in collecting uniform and comparable data that captures respondents' similarities and differences across the sampled organisations to enrich the study findings. This research design supports the study's desired objectivity as a large amount of data can be collected with ease from a variety of people (Cooper & Schindler, 2008).

3.2 The Study Area

The study is conducted in Moshi Municipality in two banks i.e. Uchumi Commercial Bank (UCB) and CRDB Bank. The choice of the two banks is based on the sense that, one is a Community Bank (UCB) while the other one is a commercial bank (CRDB). The two banks give a good combination of clients in terms of the household outcomes.

3.3 Population

The population of the study was unknown since the clients who are using the agency and mobile banking in the study area is not determined.

3.4 Sample Size and Sampling Procedures

3.4.1 Sample Size

The sample size was 384 determined using the formula of Fisher *et al*. (1991) for unknown population.

$$n = \frac{Z^2pq}{d^2}$$

Where;

n = the desired sample size.

Z = the standard normal deviation, set at 1.96, which corresponds to 95 per cent confidence level.

p = Skewness level estimated at 50 per cent.

q =1.0 – p.

d = the degree of accuracy desired, here set at 0.05 corresponding to the 1.96.

In substitution, n = 0.052

$$\frac{1.962 \times 0.5 \times (1 - 0.5)}{0.052}$$

= **384** clients

3.4.2 Sampling Procedures

The clients that participated in the study were obtained conveniently at the bank and outlets of the agents in Moshi Municipality. The reason for the choice of the technique is that each client for the study were chosen entirely by convenience and each one having an equal chance of selection provided the client visited the bank or the agent. The advantages of convenience sampling are that it is cheap, efficient, and simple to implement and it is easy to interpret data collected using this method. Thus, it makes an accurate method of collecting data.

3.5 Data Collection Techniques and Tools

Two methods of data collection ware involved, Client Survey Under the survey method of data collection, a questionnaire data collection tool was used to collect primary data. Both closed-ended and open ended questions were used in this study to enhance the study to reside on both qualitative and quantitative data (Kothari, 2004). The type of questionnaire was also opted because it was easy to fill and does not put pressure on respondents. The questionnaire for the survey was administered by the researcher and research assistants to 384 respondents in the study area.

Also, Key Informant Interview, Under the interview data collection method, interview guide was employed to collect data from key informant interviewees to two (2) bank officials in each of the banks studied to include the heads of bank operations one from each banks. A key informant interview guide was used to collect opinions of the interviews and record their opinion with regards to the research questions to be answered by the study especially the data that could not be captured by questionnaire. This enabled study to gather more information and feelings.

3.6 Validity and Reliability

3.6.1 Validity

In this study a content validity which refers to the extent to which the items on a test are fairly representative of the entire domain the test seeks to measure was used. To verify content validity, the questionnaire was discussions with financial specialists and the supervisors at the university. The proposed changes were evaluated and considered in adjusting the questionnaire to enhance its validity.

3.6.2 Reliability

In this study, the questionnaire was tested by 5% of the target population to ensure that it was relevant and effective. Reliability was tested using a duly completed questionnaire by fifteen (15) randomly selected respondents tested by using a Cronbach Alpha Coefficient (Cronbach, 1951). A study found Alpha Coefficient greater than 0.7 which indicate a strong validity for the study to proceed as it is considered to be enough especially in social sciences (Cronbach, 1951).

Table 1 : Reliability of the items assessed

Category of items	Number of items	Total number of respondents	Cronbanch alpha coefficient
Time saving	15	360	0.707
Transaction Costs	15	360	0.870
Safety	15	360	0.729
Bank charges	15	360	0.846
Reliability	15	360	0.851

3.6.3 Data Analysis

The qualitative data were analysed through content data analysis technique where data were summarised to find the themes intended by respondents in relation to study objectives. Quantitative data were analysed objective wise where each objective had different data analysis technique. For the first objective which is to determine the current level of FinTech adoption among individuals in study area was analysed through descriptive statistics where frequencies and percentages were computed and compared. The second objective on the effects of financial technologies on livelihood outcomes were analysed through ordinal logistic regression to ascertain unique contribution of FinTech on livelihood outcomes. Ordinal logistic regression was

appropriate in this study since the dependent variable is the categorical variable (livelihood outcomes) measured into three levels i.e. low extent, 2 = moderate extent and 3 = high extent.

Ordinal logistic regression equation;

Where; $Logit[p(x)] = \log\left[\frac{p(x)}{1-p(x)}\right] = \propto + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots\ldots \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$

Logistic regression involves fitting an equation of the following form to the data:

Logit (pt) $= \propto + \beta_1 X_{1,t} , + \beta_2 X_{2,t} + \beta_3 X_{3,t} \ldots\ldots \beta_P X_{P,t} + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$

Whereby; Logit (P_i) = Y; represents the probability of livelihood outcome, coded as 1= Low, 2 = Moderate, 3 = High

$\propto = Intercept$

$\beta 1 - \beta p =$ Regression coefficients

$X_{1,\,i}$ - $X_{p,\,i}$ = Independent variables or predictor variables

e = Error term,

Table 2: Variables and unit of measurements

Variables		Variables' definition and unit of measurements
Dependent variable		
Livelihood outcomes		1 = Low, 2 = Moderate, 3=High
Independent variables		
X_1	Time saving	1 = low extent, 2 = moderate extent, 3 = high extent
X_2	Transaction Costs	1 = low extent, 2 = moderate extent, 3 = high extent
X_3	Safety	1 = low extent, 2 = moderate extent, 3 = high extent
X_4	Bank charges	1 = low extent, 2 = moderate extent, 3 = high extent
X_5	Reliability	1 = low extent, 2 = moderate extent, 3 = high extent

Third objective on the clients' attitudes toward the usefulness of financial technologies was analysed descriptively where five Likert scales 1= strong disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree were given to different questions to get the level of attitudes. Items that that scored mean 3 and above were regarded as positive attitudes and less than 3 were regarded as negative attitudes. Lastly, the fourth objective about the challenges faced by bank clients in the usage of financial technologies were analysed through multiple response in which respondents

were allowed to give more than one response (challenge) on single question. Multiple responses enabled the study to determine the main challenges facing use of FinTech in study area.

3.7 Ethical Consideration

Following ethics for research, all the necessary approvals were obtained from the University through the Directorate of Research the Postgraduate Studies (DRPS) and the Regional Administrative Secretary (RAS) of the Kilimanjaro Region before looking for information from the respondents; participants were under their own to participate or withdraw from the study and; confidentiality assurance was granted. Additionally, the objectives of the study were well clarified to respondents and that data to be collected only is used for academic purposes.

4 Findings and Discussion

4.0 Overview

This chapter presents demographic profiles of respondents and findings based on study objectives. The chapter also discusses the findings and justifies from other related studies.

4.1 Demographic Characteristics of Respondents

Overall, demographic factors can play an important role in shaping how FinTech affects users' livelihood outcomes. Therefore, it is essential to consider the intersection of these factors with the use and effects of FinTech when designing policies and interventions aimed at promoting financial inclusion and improving livelihoods.

Table 3: Demographic Characteristics of Respondents (N = 360)

Categories	Frequency (n)	Percentage (%)
Sex of respondent		
Male	212	58.9
Female	148	41.1
Age group (Years)		
< 19 years	25	06.9
19-30	100	27.7
31-40	110	30.5
41-50	92	25.5
51and above	34	09.4
Education level (Years)		
Primary education	36	10.0
Secondary education	80	22.2
Certificate/diploma	116	32.2
First Degree and above	128	35.6
Marital status		
Married	198	55.0
Otherwise	162	45.0
Type of occupation		
Employed	108	30
Business	187	51.9
Agriculture	65	18.1

The study analyzed the demographic characteristics of respondents in terms of their sex or gender, age group, education level, marital status, and type of occupation. Based on the data, there were 360 respondents who participated in the study, with 212 (58.9%) identifying as male and 148 (41.1%) identifying as female. Gender has also been identified as a key demographic factor that influences FinTech adoption and usage. Some studies have found that men are more likely to adopt and use FinTech services compared to women (Karjaluoto *et al*., 2017; Statista, 2020). However, other studies have found no significant gender differences in FinTech adoption and usage.

In terms of age group, the study found that 25 (6.9%) respondents were under 19 years old, 100 (27.7%) were between 19-30 years old, 110 (30.5%) were between 31-40 years old, 92 (25.5%) were between 41-50 years old, and 34 (9.4%) were 51 years old and above. Age has been identified as a key demographic factor that impacts FinTech adoption and usage. Several studies have found that younger individuals are more likely to adopt and use FinTech services compared to older individuals (Zhu *et al*., 2019; Statista, 2020). Additionally, older individuals may face barriers to FinTech adoption and usage, such as lack of digital literacy and concerns about data security and privacy (Lim *et al*., 2018).

Regarding education level, 36 (10.0%) respondents had primary education, 80 (22.2%) had secondary education, 116 (32.2%) had certificate/diploma, and 128 (35.6%) had first degree and above. This means that, majority of respondents were holder of first degree and above who were able to understand questions to meet the study objective. Education level has also been found to be associated with FinTech adoption and usage. Studies have shown that individuals with higher levels of education are more likely to adopt and use FinTech services compared to those with lower levels of education (Karjaluoto *et al*., 2017). This may be due to higher levels of financial literacy and a greater understanding of the potential benefits of FinTech.

Regarding marital status, 198 (55.0%) respondents were married, while 162 (45.0%) were not. this mean that, more than half of the respondents were married people and the rest were either single, widowed/widower and divorced or separated. this may imply that, the study obtained information with dependants who might affect their livelihood outcomes.

Regarding the type of occupation, 108 (30%) respondents were employed, 187 (51.9%) were in business, and 65 (18.1%) were in agriculture. This means that, most of respondents were business people who owns different business entities in study area. the findings agree with other studies that have shown that self-employed individuals and entrepreneurs are more likely to adopt and use FinTech services compared to those who are employed by others (PwC, 2017).

4.2 Level of Customers' Adoption of Electronic Banking

The study was interested to ascertain the extent tom which FinTech are adopted in study area. In order to achieve this, the study inquired the different information from respondents. The following are findings on level of FinTech adoption in study area.

4.2.1 Internet Usage

The study was interested to know the whether the clients in study area uses internet when accessing bank services. The findings in Figure 2 indicates that, vast majority of people (91.3%) use the internet for banking services while only a small percentage (8.7%) do not. This suggests that online banking has become increasingly popular, with more people using digital channels to manage their finances. The rise of mobile

devices and the internet has made it easier for people to access banking services from the comfort of their own homes or on the go.

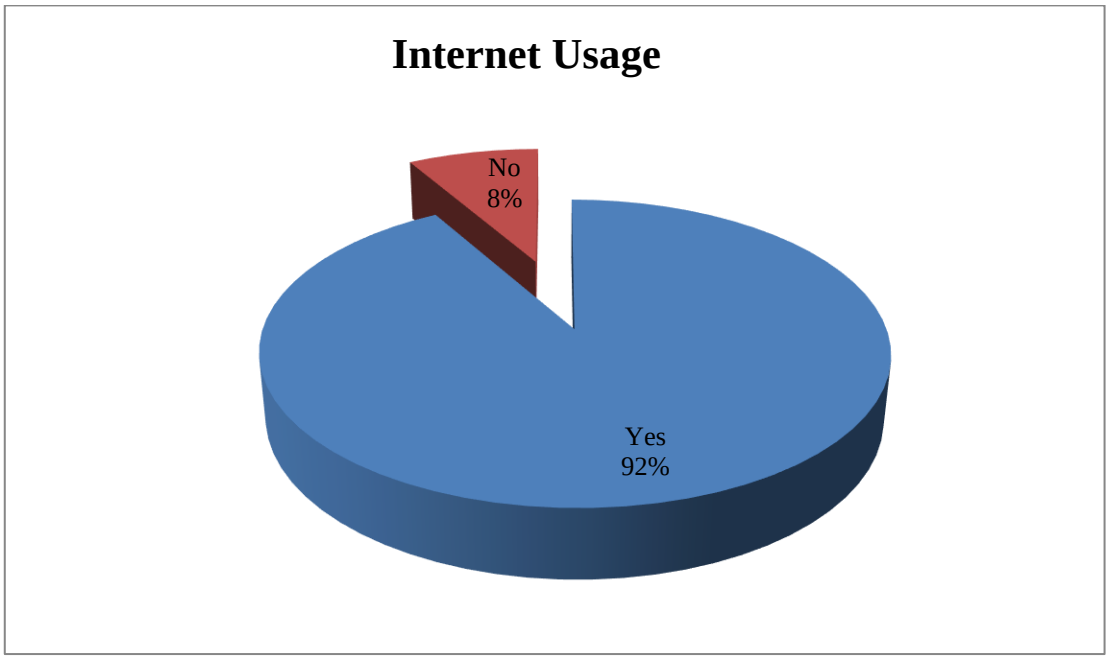

Figure 1: Internet Usage

The trend towards online banking is likely to continue, as banks and financial institutions continue to invest in digital technology to provide customers with more convenient and secure ways to manage their money. It's also worth noting that the COVID-19 pandemic has accelerated the shift towards digital banking, as more people avoid physical branches and opt for contactless transactions. Overall, the high percentage of people using internet banking services reflects the growing importance of digital technology in the banking sector, and highlights the need for financial institutions to continue to invest in online banking capabilities to meet the changing needs of their customers. The findings are in line with Mishra & Mishra (2020) who found that, over 80% of bank customers used digital channels for banking services, with mobile banking being the most popular digital channel. Similarly, a study in India found that internet banking adoption had increased significantly over the past decade, with 45% of consumers using internet banking services in 2020, compared to just 10% in 2010.

4.2.2 Usage duration

The study also was interested to know for how long clients have been using internet banking. The findings presented in Table 4 indicate the duration of time that users

have been using internet banking services. The majority of the respondents, about 62.8%, have been using online banking services for 3 to 5 years, followed by 20% of respondents using online banking for 1-3 years. A small percentage of respondents, 5%, have been using internet banking for less than a year, while 12.2% of respondents have been using it for over 5 years.

Table 3: Usage Duration

Durations	Frequencies (n)	Percentages (%)
Less than 1 year	18	05
1-3 years	72	20
3-5 years	226	62.8
Over 5 years	44	12.2
Total	**360**	**100.0**

This data implies that the majority of online banking users have been using the service for a significant period, indicating a growing trend towards long-term adoption of online banking. This could be attributed to the growing awareness and adoption of digital technologies by individuals and businesses, as well as the convenience and ease of access offered by online banking services. However, the relatively small percentage of respondents who have been using online banking for less than a year suggests that there may be some resistance to adopting this technology or a lack of awareness about its benefits. This highlights the need for financial institutions to continue to educate their customers about the benefits of online banking services and address any concerns or misconceptions they may have.

4.2.3 Types of Bank Account Used

The study was interested to know the type of bank accounts used by clients in study area. The findings in Table 5 indicate that, the majority of clients use saving accounts, with a usage rate of 87.8%. Current accounts are the second most popular type of bank account used by clients, with a usage rate of 10%. Fixed accounts are the least popular type of bank account, with a usage rate of 2.2%.

Table 4: Types of Bank Account Used

Types of bank accounts	Frequencies (n)	Percentage (%)
Saving accounts	316	87.8
Current accounts	36	10
Fixed accounts	08	2.2
Total	360	100%

The popularity of saving accounts can be attributed to their flexibility, accessibility, and low risk. Saving accounts typically come with low minimum balance requirements and are often easy to open and maintain. Current accounts are typically used by clients to deposit their regular income and to make day-to-day transactions which mostly owned by business owners. Current accounts often come with overdraft facilities, which can be useful for clients who need to borrow money for a short period. Fixed accounts are typically used by clients to earn higher interest rates on their deposits. Fixed accounts often require clients to deposit a specific amount of money for a fixed period, which can range from a few months to several years. The findings suggest that clients prefer saving accounts over other types of bank accounts, highlighting the importance of savings and the need for financial security among clients. The popularity of saving accounts also underscores the importance of banks in providing financial services that meet the needs of their clients which improves users' livelihood outcomes.

4.2.4 Ways of Accessing Bank Services

The given data provides information on the ways people access bank services through multiple response options. The most commonly used method was agency banking, with 324 respondents (90.0%) selecting it as a way of accessing bank services. The second most common method was physical visits to bank branches, with 295 respondents (81.9%) indicating that they accessed bank services through this method. Mobile banking was the third most commonly used method, with 252 respondents (70.0%) selecting it. Internet banking was the least commonly used method, with 180 respondents (50.0%) indicating that they accessed bank services through this method. The percentage values next to each response option indicate the proportion of respondents who chose that option.

Table 5: Ways of Accessing Bank Services

Ways of Accessing Bank Services	Responses		Percent of Cases (%)
	N	Percent (%)	
Agency banking	324	30.8	90.0
Physical visiting bank holes	295	28.1	81.9
Mobile banking	252	24.0	70.0
Internet banking	180	17.1	50.0
Total	**1051**	**100.0**	**291.9**

4.2.5 Rate of Customers' Use of FinTech

Based on the findings in Table 6 about the rate of use of FinTech for mobile banking, it can be inferred that a significant proportion of the population does use mobile banking, with 38.9% of respondents reporting that they often, usually or always use mobile banking. However, the majority of respondents (56.9%) reported that they rarely use mobile banking, which may suggest that there is still a significant segment of the population that is hesitant to use digital banking services, or that may not have access to mobile banking technology. It is also interesting to note that a very small percentage (2.0%) of respondents reported not using mobile banking at all. This suggests that mobile banking is becoming increasingly prevalent and widely adopted, and that there are few individuals who are completely resistant to using it.

Based on the findings about the rate of use of FinTech for agency banking, it can be inferred that a significant proportion of the population does use agency banking, with 88.1% of respondents reporting that they often, usually, or always use agency banking. Only 11.9% of respondents reported that they rarely or never use agency banking, which suggests that it is becoming a more common and widely adopted technology for financial transactions. It is interesting to note that a relatively small percentage of respondents reported using agency banking always (3.1%) or never (0%), which suggests that agency banking may have a more consistent user base compared to mobile banking, for which a larger percentage of respondents reported rarely using it.

The findings in Table 6 about the rate of use of FinTech for internet banking, it appears that a significant proportion of the population is not using this service, with 71.9% of respondents reporting that they either rarely or never use internet banking. Only a small percentage of respondents (28.1%) reported using internet banking often, usually, or always. This suggests that internet banking may not be as widely adopted as other FinTech services, such as agency banking or mobile banking. The relatively high percentage of respondents who reported not using internet banking at all (20%) may suggest that there are barriers to adoption, such as concerns about security or a lack of familiarity with the technology.

Table 6 : Rate of Use of FinTech

Type of FinTech	Rate of use	Frequency (n)	Percent (%)
Mobile banking	Not at all	07	2.0
	Rarely	205	56.9
	Often	122	33.9
	Usually	18	5.0
	Always	08	2.2
	Total	**360**	**100.0**
Agency banking	Not at all	0	0.0
	Rarely	43	11.9
	Often	198	55.0
	Usually	108	30.0
	Always	11	03.1
	Total	**360**	**100.0**
Internet banking	Not at all	72	20
	Rarely	187	51.9
	Often	54	15
	Usually	36	10
	Always	10	2.8
	Total	**360**	**100.0**

Overall, these findings indicate that while mobile banking is becoming more popular, there is still room for growth and further adoption among certain segments of the population. It may be necessary for FinTech companies and financial institutions to continue promoting the benefits and convenience of mobile banking in order to encourage more widespread adoption. This can be linked with the users' livelihood outcomes such as saving time and cost reduction. Nonetheless, the findings suggest that agency banking is a relatively popular and widely used FinTech service among the respondents. This could be due to its convenience, accessibility, and availability in areas with limited banking infrastructure. However, there may still be room for growth in its adoption, particularly among those who reported using it rarely or not at all.

4.3 Effects of Fintech on Livelihood Outcomes

The study was interested to examine the effects of financial technologies on livelihood outcomes. The livelihood outcomes such as time saving, transaction costs, safety, investment opportunities and reliability were tested through ordinal logistic regression to ascertain the unique contribution of variable on users' livelihood outcomes. The effects of FinTech tested through ordinal regression model were rated by respondents with five levels of effects i.e. 1 = strongly disagree, 2 = disagree, 3 =

neutral, 4 = agree and 5 = strongly agree. The study established the fitness of model used where a Chi-square statistic established the difference between the explanatory variables in the -2log likelihood against the model used. This was done to determine whether the model improves the study ability to predict the outcome at a selected probability level. The model was compared against the dependent variable to see whether it significantly fit the data (Table 7). Independent variables were qualified as significant predictors of the dependent variable provided that the p-value in the Chi-Square statistics was less than < 0.05).

The result of the ordinal logistic analysis indicates that the significant p-value in the model used was statistically significant. This is because the probability (p = 0.001) at 95% confidence level was less than 0.05 which is the cutoff point. The effects were time saving, transaction costs, security, investment opportunities and reliability do explain the variation on users' livelihood outcomes. On top of this, Goodness of Fit was conducted to test whether the observed data were consistent with the fitted model. The assumption was that, when the significant p-value was higher than the critical value, then it could be concluded that the data and the model predictions were similar and therefore we had a good model. Likewise, if p < 0.05, then the model used could not fit the data well. Table 7 contains Pearson's Chi-square statistic for the model and Chi – square statistic based on the deviance. The results for the analysis revealed that the model significantly fit very well (P = 0.675) as presented in Table 7.

Table 7 presents Wald statistics, parameters estimates (β) and contribution of each independent variable on users' livelihood outcomes at 95% confidence level. It was revealed that all five predictors variables were statistically significant since p<0.05. This means that, the FinTech effects i.e. time saving, transaction costs, safety, investment opportunities and reliability were significant variables that significantly improves clients' livelihood outcomes. The findings presented in the ordinal logistic regression model suggest that FinTech can have a significant impact on livelihood outcomes in developing countries. Specifically, the results indicate that reducing transaction costs and increasing the reliability and time-saving benefits of financial services can improve livelihood outcomes, particularly for low-income populations.

Table 7 : Parameter Estimates

FinTech Effects	Estimate	SE	Wald	df	Sig.
Transaction costs	-2.759	0.211	12.645	1	0.000
Time saving	2.884	0.586	11.483	1	0.001
Security	1.657	0.195	8.293	1	0.011
Reliability	1.702	0.736	8.179	1	0.036
Investment opportunities	1.595	0.582	6.826	1	0.000

Model Fitting Information (Chi-square = 32.85; sig. = 0.001); Goodness of Fit (Chi-square 28.35; Sig = 0.675), Pseudo R-Square (Cox & Snell R Square = 0.452; Nagelkerke = 0.698)

The findings suggest that transaction costs are the main FinTech effect that is statistically significant negative effect on livelihood outcomes, as indicated by the negative beta coefficient of -2.759 and the significant Wald value of 12.645 with a p-value of 0.000. This means that, the more banks' use FinTech, the more the transaction costs deceases and likelihood of having better livelihood outcomes. In other words, users who incur higher transaction costs when using FinTech may be less likely to experience positive changes in their livelihoods as a result of using these technologies. This result implies that, the clients who uses FinTech, are likely experiencing better livelihood outcomes like asset possession and higher disposable income.

The findings agree with the study by Demirguc-Kunt, Klapper, and Singer (2017) who found that, there is negative effect of transaction cost on livelihood outcomes. The study further noted that, high transaction costs for financial services negatively affect the use of these services, particularly among low-income populations in developing countries. This is consistent with the negative beta coefficient found in the model, suggesting that higher transaction costs lead to worse livelihood outcomes.

The findings in Table 7 Time saving was among of main FinTech effects that was statistically significant positive effect on livelihood outcomes, as indicated by the positive beta coefficient of 2.884 and the significant Wald value of 11.483 with a p-value of 0.001. This means that, the more banks' clients use FinTech, the more they enjoy time saving and likelihood of having better livelihood outcomes. This result is in line with the general expectation that time savings would lead to more positive livelihood outcomes, as it can free up time and resources for other productive

activities. This implies that users with better livelihood outcomes may be more likely to experience time savings as a result of using FinTech.

Furthermore, security was among of strong statistically significant positive effect on livelihood outcomes, as indicated by the positive beta coefficient of 1.657 and the significant Wald value of 8.293 with a p-value of 0.011. This means that, the more the use of FinTech, the more users are secured financially and likelihood of having better livelihood outcomes. This result is in line with the general expectation that greater security in financial transactions and activities would lead to more positive livelihood outcomes, as it can help protect against fraud, theft, and other risks. This implies that users with better livelihood outcomes may be more likely to prioritize and invest in security measures when using FinTech.

Moreover, the findings in Table 7 suggest that there is a statistically significant positive effect of reliability on livelihood outcomes, as indicated by the positive beta coefficient of 1.702 and the significant Wald value of 8.179 with a p-value of 0.036. This means that, the more the use of FinTech, the more the reliability increases and likelihood of having better livelihood outcomes. This result is in line with the general expectation that reliable financial services would lead to more positive livelihood outcomes, as it can help users to plan and manage their finances more effectively. This implies that, users who more use FinTech are more likely to experience better livelihood outcomes and may be influenced to use and benefit from reliable FinTech services.

Finally, the findings suggest that there is a statistically significant positive effect of investment opportunities on livelihood outcomes, as indicated by the positive beta coefficient of 1.595 and the significant Wald value of 6.826 with a p-value of 0.000. This means that, the more the use of FinTech, the more users' find investment opportunities and the likelihood of having better livelihood outcomes. This result is in line with the general expectation that access to investment opportunities and financial services can help users to build wealth and improve their financial well-being over time. this imply that, it is possible that users with better livelihood outcomes may be more likely to seek out and take advantage of investment opportunities.

4.4 The Clients' Attitudes toward the Usefulness of Financial Technologies

The findings presented in Table 8 indicate that the majority of respondents had a positive attitude towards the usefulness of financial technologies in managing finances more efficiently. Specifically, 51% of the respondents agreed that using financial technologies could lead to better financial outcomes such as increased savings and investment opportunities, while 24% strongly agreed with this statement. The mean score of 3.97 is above 3.0 as cutoff point which suggests that, on average, respondents had a positive attitude towards the usefulness of financial technologies for managing finances more efficiently. However, it is worth noting that a significant proportion of respondents (23%) had a neutral attitude towards the statement. This could be due to various reasons such as lack of awareness about financial technologies, lack of trust in digital financial services, or simply not having tried these services before. This was confirmed by one of respondent who said that;

> …" *the FinTech has been useful for use since we make transactions easily without travelling to bank branches for banking; it is very useful in saving time and cost as well as bill clearance*... (12nd April, 2023).

Overall, the findings suggest that there is a general positive attitude towards the usefulness of financial technologies for managing finances more efficiently, which could have a positive impact on users' livelihoods. However, efforts need to be made to raise awareness about these technologies and address any concerns or barriers that users may have in order to fully realize their potential benefits.

Table 8: The Clients' Attitudes toward the Usefulness of Financial Technologies

	1		2		3		4		5		Mean score
	f	%	f	%	f	%	f	%	f	%	
Using financial technologies to manage finances more efficiently could potentially lead to better financial outcomes, such as increased savings and investment opportunities, which could positively impact users' livelihoods.	0	0	6	2	84	23	182	51	88	24	**3.97**
Improved financial decision-making abilities through the use of financial technologies could potentially lead to more informed and effective financial choices, which could also have a positive impact on users' livelihoods.	0	0	11	3	36	10	223	62	90	25	**4.09**
Greater control over financial situations through the use of financial technologies could potentially reduce financial stress and uncertainty, which could positively impact users' overall well-being and livelihoods.	0	0	11	3	43	12	234	65	72	20	**3.82**
Positive recommendations of financial technologies to others could potentially increase the use of these tools in society, which could lead to greater financial literacy and access to financial services, potentially benefiting users' livelihoods and those of others.	0	0	18	5	180	50	108	30	54	15	**3.55**
Saving time and effort in managing finances through financial technologies could potentially free up time and resources for users to focus on other areas of their lives, such as work or personal development, which could also have a positive impact on their livelihood outcomes.	0	0	11	3	36	10	198	55	115	32	**4.16**
Using financial technologies to manage finances more efficiently could potentially lead to better financial outcomes, such as increased savings and investment opportunities, which could positively impact users' livelihoods.	0	0	29	8	43	12	162	45	126	35	**4.07**
Total mean score											**23.66**
Grand mean score											**03.94**

4.5 The Challenges Faced by Bank Clients in the Usage of FinTech

The study was interested to determine the challenges facing bank clients' usage of FinTech. The study identified the challenges such as low network/ breakdown, insecurity of money, power breakdown, inaccessibility of services, inconvenience in using, lack of insurance (ban insurance), poor services from service providers, personal relationship/link and I don't know how to use/operate. The study analysed the findings using multiple response data analysis technique and the findings are presented in Table 9.

Table 9: FinTech challenges

FinTech challenges	Responses		Percent of Cases (%)
	N	Percent (%)	
Low network/ breakdown	360	29.5	100.0
Insecurity of money	330	27.0	91.7
Power breakdown	288	23.6	80.0
Inaccessibility of services	108	08.8	30.0
Inconvenience in using	64	05.2	17.8
Lack of insurance (ban insurance)	57	04.7	15.8
Poor services from service providers	08	0.01	02.2
Personal relationship/link	04	0.0	01.1
I don't know how to use/operate	02	0.0	0.60
Total	**1221**	**100.0**	**345.2**

The most commonly reported challenge is low network/breakdown, which was cited by 29.5% of respondents. This suggests that issues with network connectivity or reliability are a major concern for users of FinTech. The findings are consistence with the findings by Oyebisi & Rufai (2020) in Nigeria that found network connectivity issues were a major challenge for users of FinTech services, particularly in rural areas where internet access is limited. Insecurity of money is also a commonly cited challenge in developing countries, particularly in areas where financial fraud and cybercrime are prevalent. One of the responded replied that;

> …" *the main challenge facing the4 use of FinTech in our country is low/poos network and insecurity issues. Some time you can log in particular page of payment system but fails to complete transaction on time them we afraid to lose our credits and money since we fill our bank details in these platforms*" …. (12nd April, 2023).

Insecurity of money is the second most frequently reported challenge, with 27.0% of respondents reporting this issue. This highlights the importance of security measures in FinTech services, such as encryption and fraud detection. The findings are similar with the study by Owusu (2018) who conducted in Ghana found that concerns about security and privacy were a major factor influencing the adoption of mobile money services.

Power breakdown is the third most frequently reported challenge, with 23.6% of respondents citing this issue. This suggests that power outages or disruptions may be a significant concern for users of FinTech, particularly in areas with unreliable power

grids. the findings agree with the findings by Suri & Jack (2016) in India who found that power outages were a significant barrier to the adoption of digital financial services, particularly among low-income households.

Inaccessibility of services, inconvenience in using, lack of insurance (ban insurance), poor services from service providers, personal relationship/link, and not knowing how to use/operate are reported less frequently, with percentages ranging from 0.0% to 8.8%. Lack of awareness or understanding of how to use FinTech services is another commonly cited challenge, particularly among low-income or less-educated populations. A study conducted in Kenya found that many users of mobile money services were not fully aware of the features and benefits of these services, which limited their adoption and use (Ssewanyana *et al*., 2020). Overall, these studies support the findings presented earlier regarding the challenges associated with the use of FinTech in developing countries. The challenges identified in these studies are similar to those reported in the earlier findings, highlighting the need for targeted interventions to address these challenges and promote the adoption and use of FinTech services in developing countries.

4. Conclusion and Recommendations

The study concludes that, use of FinTech is significant to improve users' livelihood outcomes in study area. The study recommends more efforts to improve the usefulness and trusts by improving technology and infrastructures for internet banking. The study suggests for further study to be made to compare the effects of Fintech on livelihood between commercial banks and community banks.

REFERENCES

Adedokun, A. O., Oresanya, T. O., Afolabi, A. O., and Adewole, O. S. (2019). Impact of financial technology on financial inclusion and poverty reduction in Nigeria. *International Journal of Advanced Research in Computer Science*, 10(1), 181-186.

Agarwal, S., and Chomsisengphet, S. (2018). Digital Financial Inclusion in Developing Countries. *Annual Review of Financial Economics*, 10(1), 291-310. https://doi.org/10.1146/annurev-financial-110217-023548

Ahmed, R. (2018). Customer adoption of online banking in Bangladesh: an empirical study. *Academy of Banking Studies Journal*, 16(1), 23-30.

Arhin, P., Erdiaw-Kwasie, M. O., and Abunyewah, M. (2022). Displacements and livelihood resilience in Ghana's mining sector: The moderating role of coping behaviour. Resources Policy, 78, 102820.

Azarenkova, G., Shkodina, I., Samorodov, B., and Babenko, M. (2018). The influence of financial technologies on the global financial system stability. Investment Management and Financial Innovations, 15(4), 229.

Banna, H., Mia, M. A., Nourani, M., and Yarovaya, L. (2022). Fintech-based financial inclusion and risk-taking of microfinance institutions (MFIs): Evidence from Sub-Saharan Africa. Finance Research Letters, 45, 102149.

Carlini, F., Del Gaudio, B. L., Porzio, C., and Previtali, D. (2022). Banks, FinTech and stock returns. Finance Research Letters, 45, 102252.

Chen, M. A., Wu, Q., and Yang, B. (2019). How valuable is FinTech innovation?. The Review of Financial Studies, 32(5), 2062-2106.

Demirguc-Kunt, A., Klapper, L., and Singer, D. (2017). Financial inclusion and inclusive growth: *A review of recent empirical evidence. Policy Research Working Paper No. 8040*. World Bank Group.

Devi, A., and Patro, S. K. (2018). An empirical study on usage of bank accounts in India. *International Journal of Engineering and Technology*, 7(3.22), 10-15.

Dimaunahan, J. (2019). Academic Motivation, Self-Efficacy and Academic Performance in Technology and Livelihood Education (TLE): Input to Understanding Affective Components of Learning in TLE. Ascendens Asia Journal of Multidisciplinary Research Abstracts, 3(2C).

Durai, T., and Stella, G. (2019). Digital finance and its impact on financial inclusion. Journal of Emerging Technologies and Innovative Research, 6(1), 122-127.

Durai, T., and Stella, G. (2019). Digital finance and its impact on financial inclusion. Journal of Emerging Technologies and Innovative Research, 6(1), 122-127.

Ferguson, K. K., Soutter, L., and Neubert, M. (2019). Digital payments in Africa-how demand, technology, and regulation disrupt digital payment systems. International Journal of Teaching and Case Studies, 10(4), 319-340.

Goyal, A., and Joshi, M. (2018). Adoption of Digital Financial Services in Developing Countries: A Literature Review. *Journal of Payments Strategy and Systems*, 12(2), 170-183. https://doi.org/10.21314/JPS.2018.253

Haider, H. (2018). Innovative financial technologies to support livelihoods and

adoption in Zimbabwe. Technology in Society, 56, 126-133.

McIntosh, C., and Mansini, C. S. (2018). The use of financial technology in the agriculture sector.

Melnychenko, S., Volosovych, S., and Baraniuk, Y. (2020). Dominant ideas of financial technologies in digital banking. Baltic journal of Economic studies, 6(1), 92-99.

Michael, B., Koroleska, N., Tai, A., and Wong, D. W. H. A (2020). critical look at using financial technology policy to promote the sustainable development goals. Sustainable Development.

Mishra, S., and Mishra, A. (2020). Factors affecting adoption of internet banking in India. *Journal of Financial Services Marketing*, 25(2), 51-61

Mkwizu, J. L., Mwemezi, A. J., and Kibonde, B. (2018). Agency banking and financial inclusion: A case of Tanzania. *Journal of African Studies and Development*, 10(5), 55-65.

Munkhdalai, L., Munkhdalai, T., Namsrai, O. E., Lee, J. Y., and Ryu, K. H. (2019). An empirical comparison of machine-learning methods on bank client credit assessments. Sustainability, 11(3), 699.