Financial Inclusion in Ghana: Financial Technology Improving Access to Finance for Mobile Money Enterprises

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Abstract

This paper explores the role of financial technology in improving access to formal financial services and credit for mobile money enterprises in rural and underserved areas of Ghana. A purposive and stratified sampling strategy was employed, selecting 180 participants to represent different segments of the population, including mobile money operators and users. The research design utilized a mixed-methods approach to provide a comprehensive understanding of the complexities surrounding the adoption and usage of mobile money enterprises within the network. Data were collected through semi-structured interviews. The Mobile Money Enterprise interview discussions aimed to gather insights from key stakeholders involved in these businesses. The results revealed that FINTECH interventions significantly enhance the accessibility of both formal and informal financial services. The study supports the alternative hypothesis that the use of digital payments and lending platforms positively impacts the accessibility and availability of formal financial services and credit. Additionally, both qualitative and quantitative analysis findings indicate that the adoption of digital financial solutions by mobile money companies in Ghana is associated with a heightened level of financial inclusion.

Keywords

Financial Technology, Financial Inclusion, Financial Services, Mobile Money Enterprises, Mobile Money, Ghana

1. Introduction

Governments worldwide have a responsibility to ensure unrestricted access to financial services for all citizens (Ozili, 2018). Recently, Ghana has seen a significant

push towards digital financial inclusion, driven by rapid advancements in financial technology and mobile banking. According to the World Bank (2014) by 2022, nearly 70 percent of Ghanaians had access to bank accounts, largely because of the proliferation of mobile money services. Financial inclusion, as to do with accessibility and affordability of financial services for people/individuals and businesses, is essential for economic development and poverty alleviation (Mohammed & Uraguchi, 2017). However, like many developing countries, Ghana faces significant challenges in achieving financial inclusion. The rise of financial technology (FINTECH) offers a promising solution to these challenges, particularly for mobile money enterprises (IFC, 2017). Over the past decade, Ghana has made notable progress in mobile money penetration. Mobile money, facilitated by telecom operators and financial service providers, has become a crucial tool for financial transactions, especially in rural and underserved areas where traditional banking infrastructure is limited (Donovan, 2012). Despite this progress, barriers remain that hinder the full potential of mobile money enterprises. One major barrier is the limited access to formal financial services for unbanked and underbanked populations (Ozili, 2018). As of 2017, the World Bank reported that only 58% of adults in Ghana had access to formal financial services, with this gap being particularly pronounced in rural regions. Many residents in these areas rely on informal financial services or cash transactions, which are often costly, insecure, and inconvenient (World Bank, 2017). Another challenge is the lack of credit access for small and medium-sized enterprises (SMEs), including mobile money agents and merchants. Traditional banks mostly view these types of businesses as high-risk because of factors like limited credit histories and lack of collateral (Abor et al., 2018). Consequently, SMEs struggle to secure financing for expansion, inventory purchases, or technology upgrades. However, the growth of FINTECH presents an opportunity to address these issues and enhance financial inclusion in Ghana. FINTECH encompasses a range of technological innovations that utilize digital platforms, data analytics, and mobile technology to deliver financial services more efficiently (Anakpo et al., 2023). By leveraging FINTECH, mobile money enterprises can overcome traditional barriers and reach underserved populations with tailored financial products. One example of how FINTECH is enhancing financial inclusion in Ghana is through digital lending platforms. These platforms utilize alternative data sources, such as mobile phone usage patterns and transaction histories, to evaluate the creditworthiness of individuals and SMEs (World Economic Forum, 2016). This approach allows digital lenders to provide loans to those who would otherwise be excluded from the formal financial system (Aker & Mbiti, 2010). Not only does this provide much-needed financing, but it also helps borrowers build credit histories, enabling them to access larger loans and additional financial services in the future (IMF 2017).

Additionally, FINTECH is improving payments and remittances. Mobile money platforms, along with innovative payment solutions and digital wallets, facilitate faster, cheaper, and more secure transactions (Bersch et al., 2021). This is

particularly beneficial for individuals in rural areas who have limited access to physical banks or ATMs. By digitizing payments, FINTECH reduces reliance on cash and informal financial channels, thereby promoting financial inclusion and enhancing overall financial literacy. Furthermore, innovations such as blockchain technology have the potential to transform financial services in Ghana. According to Gyimah et al. (2023), blockchain, a decentralized digital ledger, can facilitate secure and transparent transactions, reduce fraud, and lower transaction costs. In the context of mobile money enterprises, blockchain could streamline processes like identity verification, cross-border payments, and contract enforcement, thereby broadening access to financial services for underserved populations. Despite significant progress in mobile money adoption, persistent challenges remain that hinder the full realization of financial inclusion for mobile money enterprises. A key challenge is the limited access to formal financial services among unbanked and underbanked populations, especially in rural areas where traditional banking is scarce (World Bank, 2017). This limitation restricts mobile money enterprises from reaching a broader customer base and providing essential services such as savings, credit, and insurance. Additionally, the lack of credit access for SMEs, including mobile money agents and merchants, poses a significant barrier to their growth and sustainability (Sulemana & Alhassan, 2018). Traditional banks often regard these businesses as high-risk due to the absence of collateral and credit history, making it difficult for them to obtain necessary financing. Moreover, regulatory challenges and inadequate infrastructure further impede the development of mobile money enterprises in Ghana (Lamptey, 2020). Regulatory uncertainty, cumbersome Know Your Customer (KYC) requirements, and inconsistent enforcement undermine the capacity of mobile money operators to scale their operations and innovate new financial products. Insufficient telecommunications and internet infrastructure in rural areas also limits the reach and effectiveness of mobile money services, constraining efforts to promote financial inclusion.

To achieve the main purpose of this paper, the following specific objectives were established: to explore how FINTECH tools assist mobile money businesses in Ghana in accessing financial services, to examine how digital payments, digital lending and other FINTECH innovations support the growth of these businesses and assessed the regulations, challenges and opportunities of FINTECH in Mobile Money Operations. Therefore, the central research questions are: How do FINTECH tools help mobile money businesses in Ghana access financial services? How do digital payments and digital lending technology influence the ability of mobile money businesses in Ghana to secure loans and expand? And what are the Regulations, challenges and opportunities of FINTECH in Mobile Money Operations? This paper aims to irradiate the evolving role of financial technology in enhancing the operations of mobile money enterprises in Ghana. As FINTECH continues to reshape the global economy, understanding its impact on financial inclusion, particularly for small and medium-sized businesses, becomes increasingly crucial. The study provides valuable insights into the practical benefits and

barriers associated with digital financial solutions, emphasizing the importance of financial access in Ghana, where many individuals remain underserved by traditional banking institutions. Finally, the findings are instrumental for policymakers and financial institutions seeking to promote greater financial inclusion, offering evidence-based recommendations to support the adoption of financial technology across the country.

2. Literature Review

2.1. Conceptual Review

Two main concepts were reviewed: financial technology and financial inclusion. Financial technology, was explained by various authors and practitioners as service delivered using personal computers, mobile phones, and internet-connected digital payment systems (Gabor & Brooks, 2017). Similarly, Ggombe and Mutsumoto (2017) describe financial technology as services executed via mobile devices or the internet. Ozili (2018) offers a different perspective, defining financial technology as a digital platform arrangement involving web advancements for financial services. This encompasses using technology to integrate marginalized populations into the formal financial system and providing a range of financial services tailored to their specific needs. Financial inclusion extends beyond merely bank account opening, it includes services that cater to individuals' needs. Thus, even if an individual has a formal bank account, they may still be deemed financially excluded if the account does not meet their specific requirements Ozili (2018). Conversely, if someone has a bank account but lacks mobile technology access linked to that account, they may be considered excluded from financial technology services. In this context, such individuals are seen as financially excluded, but only in terms of access to specific financial services.

Financial Inclusion
- *Access*: Measured by the percentage of MMEs with access to formal financial services.
- *Usage*: Frequency and volume of fintech transactions (e.g., payments, savings, loans) by MMEs.
- *Quality and Impact*: Evaluate the improvement in MMEs' financial resilience and capacity for business expansion Ozili (2018).

Financial Technology (FINTECH)
- *Digital Payment Solutions*: Track the adoption rates of digital payment systems among MMEs, assessing their ease of use and transaction costs.
- *Mobile-Based Lending*: Measure the uptake and success rates of mobile lending, focusing on loan size, repayment rates, and its impact on business liquidity for MMEs.
- *Innovation in Financial Products*: Consider how other fintech products (e.g., insurance, savings plans) target and support MMEs in Ghana.

Mobile Money Enterprises (MMEs)
- *Business Size and Scope*: Classify MMEs by size, type, and annual revenue to

observe if specific segments benefit more from fintech solutions.

- *Financial Literacy*: Assess the role of financial literacy in fintech adoption by MMEs, as this influences the understanding and utilization of digital financial services Ozili (2018).

Enhanced Relationships and Hypotheses

- **FINTECH Accessibility → Financial Inclusion for MMEs**

Hypothesis 1: Fintech solutions (especially mobile payments and digital lending) improve financial inclusion by providing previously underserved MMEs with access to credit and financial tools.

Indicators: Increase in MMEs' access to digital loans, accounts, and transaction frequency.

- **Mobile Money Usage (Frequency & Volume) → Business Growth and Economic Impact** Abor et al. (2018).

Hypothesis 2: Higher usage frequency and transaction volumes through mobile money are positively correlated with MMEs' revenue growth and business scale-up.

Indicators: Percentage increase in revenue, business expansion (e.g., opening new branches), and job creation in MMEs actively using mobile money.

- **Regulatory Environment → Efficacy of FINTECH on Financial Inclusion**

Hypothesis 3: A supportive regulatory environment enhances fintech's positive impact by promoting innovation, ensuring fair access, and protecting user rights, leading to a stable adoption among MMEs.

Indicators: Changes in fintech adoption rates pre- and post-regulation, MME satisfaction with fintech services, and levels of trust in digital transactions.

2.2. Theoretical Review

This section reviews three theories: the Financial Inclusion Theory, the Innovation Diffusion Theory and the Technology Acceptance Model.

Financial Inclusion Theory (FIT) is focusing on how access to financial services improves the socio-economic conditions of individuals and small businesses. This provides the basis for evaluating how financial inclusion can reduce poverty and support economic developmenthe.

The Innovation Diffusion Theory (IDT) explains how technology spreads to ensure financial inclusion. The theory posits that diffusion involves communicating innovations over time within a social system (Rogers, 1962). It outlines five essential steps for the diffusion of innovation: persuasion, implementation, knowledge or awareness, confirmation, and decision (Rogers, 2003). For individuals to be aware of an innovation, they must first be exposed to it. Therefore, introducing financial technology at the initial stage, is crucial to create awareness through various channels, ensuring that people have access to information, which will facilitate the second stage of persuasion.

The Technology Acceptance Model (TAM) helps explain users' acceptance and use of mobile money and fintech services based on perceived ease of use and

perceived usefulness. It provides a robust theoretical framework for understanding the adoption and usage of technology, including mobile money and other FINTECH solutions among individuals and businesses in rural areas. Developed by Davis in 1989, TAM posits that perceived ease of use and perceived usefulness are the main determinants of an individual's intention to use a technology, which help shape actual behavior of their usage (Davis, 1989). TAM offers insights into the factors influencing the adoption of mobile money and FINTECH solutions. Perceived usefulness is the extent to which individuals/people believe that using a particular technology will enhance their productivity, and performance (Davis, 1989). For those in rural Ghana, where access to formal financial services is often limited, mobile money and FINTECH solutions can significantly improve financial access, efficiency, and convenience (Sey et al., 2019).

2.3. Empirical Review

Durai and Stella (2019) analyzed digital finance effect on financial inclusion, focusing on the ease, friendliness, flexibility, usefulness, affordability, and security, of financial products and services. They measured digital finance through the usage of internet banking, mobile wallets, mobile banking, credit and debit cards. Employing a quantitative approach, the study used questionnaires for data collection, utilizing Likert scale and multiple-choice questions. SPSS version 20 was used for data entry, with regression and one-way ANOVA employed for data analysis. The findings indicated that usability and features of mobile banking, debit cards, credit cards, and internet banking did not significantly differ. However, a positive relationship was found between usability and convenience in mobile banking, while lower service charges positively impacted mobile wallet usage. In a separate study, Mwalwiba (2020) investigated how automated teller machines (ATMs) and internet banking function as digital innovations to improve access to financial services in Tanzania. Utilizing a combination of quantitative and qualitative methods, including questionnaires and interviews.

2.4. Conceptual Framework

The diagrams (Figures 1-3) present each variable with relevant components and indicators, making it easier to visualize and analyze how each group of variables interacts.

1) **Independent Variables**:

FINTECH Solutions: Includes digital payment solutions, mobile-based lending, and product innovations that aim to improve financial access for mobile money enterprises (MMEs). These represent the interventions that can enhance financial inclusion.

2) **Mediating Variables**:

Accessibility of FINTECH: This indicates how available and accessible fintech solutions are to MMEs, influencing whether they adopt these technologies.

Variable	Description	Components
FINTECH Solutions	Technologies and services aimed at improving financial access for MMEs	Digital Payments, Mobile- Based Lending, Product Innovation
Regulatory Environment	Policies and legal frameworks influencing the adoption and impact of FINTECH solutions	Government regulations, compliance requirements
Financial Literacy	Knowledge level of MMEs regarding financial services and digital finance tools	Education, training programs, user awareness

Source: Author 2024

Figure 1. Independent variable.

Variable	Description	Comonents
Accessibility of FINTECH	Availability and ease of access to digital financial services for MMEs	Number of MMEs with access to mobile money and digital banking services
Usage Frequency & Volume	The extent to which MMEs use mobile money transactions and other fintech solutions	Transaction frequency, transaction volume, adopiton rates

Source: Author 2024

Figure 2. Mediating variables.

Variable	Description	Comonents
Financial Inclusion	The level of access, usage, and quality of financial services available to MMEs	Access to finance, affordability of services, service quality ratings
Business Growth	Economic impact on MMEs, including revenue growth and job creation	Revenue increase, business expansion (new branchesor services), numver of jobs created

Source: Author 2024

Figure 3. Dependent variable.

Usage Frequency & Volume: The extent of fintech utilization by MMEs (how often and to what extent they use services like mobile money transactions) reflects the acceptance and effectiveness of fintech solutions.

3) Dependent Variables:

Financial Inclusion: Improved access, frequency of use, and quality of financial services experienced by MMEs, which leads to enhanced financial stability and resource management.

Business Growth: This includes increases in revenue, business expansion (such as more locations or services), and job creation. Enhanced financial access directly supports MMEs' growth potential.

Figures 1-3 show the flow of influence, with independent variables affecting mediating variables, which in turn impact the dependent variables. This represents how fintech solutions can drive financial inclusion and business growth for

MMEs.

3. Methodology

3.1. Research Design

The study research design is a mixed-method which provides a comprehensive understanding of the role of FINTECH in enhancing financial inclusion for mobile money enterprises in Ghana (Ussif et al., 2020). To explore how FINTECH tools assist mobile money businesses in Ghana in accessing financial services, to examine how digital payments and digital lending and other FINTECH innovations support the growth of these businesses and assess the regulations, challenges and opportunities of FINTECH in Mobile Money Operation. The quantitative aspect involves surveying mobile money users and enterprises to gather numerical data on their usage patterns, preferences, and perceptions of FINTECH solutions. The qualitative aspect entails conducting interviews with key stakeholders, such as mobile money operators, regulatory authorities, and FINTECH providers, to gain insights into the challenges and opportunities of FINTECH adoption.

3.2. Population and Sampling

The population of the study comprises residents and businesses within Winneba, Ghana. Winneba is estimated to have a population of approximately 55,000 people and is known for its beautiful beaches and vibrant fishing industry. It also consists of households, small businesses, and informal enterprises. The population is diverse, encompassing various demographic groups, economic activities, and socio-economic backgrounds. The sampling strategy for this study was purposive and stratified. Purposive sampling is a non-probability sampling technique where researchers select participants based on specific characteristics or qualities they believe are relevant to the research (Saunders et al., 2009). The researchers intentionally choose individuals who can provide the most valuable insights or information about the research topic. It's commonly used in qualitative research where the goal is to study a specific group or phenomenon in depth. For example, the study is on financial inclusion and financial technology impact of Money mobile Enterprises, so the authors purposely select mobile money operators and Users who have experience using that specific technology. Creswell (2014) indicated that stratified sampling is a probability sampling technique where the population is divided into subgroups, or strata based on a specific characteristic (such as age, gender, income, etc.), and then participants are randomly selected from each subgroup. It ensures that key subgroups within the population are represented in the sample in proportion to their presence in the larger population. These is used to increase the precision and representativeness of the sample. These techniques are used to ensure a sample is well-suited for the research objectives of the study (Amin, 2005). One Hundred and Eighty (180) Participants were chosen to represent different segments of the population, including mobile money users and mobile money enterprises. The sample size was determined based on the principle of

saturation. In qualitative research, "saturation" is the point at which no new information or themes are being observed in the data. Once saturation is reached, adding more participants is unlikely to provide additional insights, so the sample size is considered sufficient. The authors stopped adding participants when they felt they had gathered enough data to fully understand the topic under discussion and to achieve the research objectives and address the research questions (Table 1).

Table 1. The sample of the study.

S/N	Participant	Male	Female	Total
1	*Individual Consumers*	10	15	25
2	*Farmers*	8	2	10
3	*Students and Adults*	35	35	70
4	*Small-Scale Traders*	9	16	25
5	*Retail Shops*	7	13	20
6	*Transportation services*	19	11	30
	Grand Total	**88**	**92**	**180**

Source: Author 2024.

3.3. Instrumentation

Instrumentation refers to the tools and methods used to gather data in a research study DeFranzo (2011). In this research, instrumentation includes the creation and implementation of survey questionnaires, interview guides, and data collection protocols specifically designed to address the research questions. The questionnaire, titled the FINTECH and Financial Inclusion Survey, contained a combination of closed-ended and open-ended questions aimed at collecting both quantitative and qualitative data from mobile money users, enterprises, and other stakeholders. The questions focused on the types of FINTECH interventions utilized, perceived benefits, challenges, and overall satisfaction with FINTECH services. Also, demographic information like age, gender, education level, and income was collected to analyze the characteristics of respondents and their relationship with FINTECH adoption. A set of open-ended questions, referred to as the Mobile Money Enterprise Interview, was designed to gather in-depth insights from key stakeholders, including mobile money operators, FINTECH providers, and regulatory authorities. These interviews explored specific FINTECH solutions being used, their impact on credit access, factors influencing adoption, and potential barriers faced by mobile money enterprises. Probing questions were included to delve deeper into respondents' experiences, perspectives, and suggestions for improving credit access through FINTECH.

3.4. Data Collection Procedure

The FINTECH and Financial Inclusion (FFI) Survey was administered to a sample

of mobile money users and enterprises within the study area using both online and offline methods. Mobile-based survey tools or paper questionnaires were utilized, depending on the accessibility and preferences of the target population. Data collection was conducted in a manner that ensured the anonymity and confidentiality of participants. Concurrently, semi-structured interviews (Mobile Money Enterprise Interviews) were carried out with key stakeholders identified through purposive sampling.

3.5. Data Analysis Procedure

The data collected for this study included both qualitative and quantitative responses from participants in Ansaful, a rural area near Winneba, Ghana. The analysis process involved several steps. The quantitative data, derived from structured survey questions, were analyzed using statistical methods such as mean and standard deviation to assess the impact of FINTECH interventions on mobile money enterprises. This analysis provided numerical insights into the accessibility of financial services, credit availability, and the operational challenges faced by these businesses. The qualitative data collected through open-ended interview questions allowed participants to share their experiences, opinions, and behaviors related to the use of FINTECH tools. These responses were coded into categories and themes that aligned with the research objectives. Thematic analysis was employed to identify key patterns and insights, such as common challenges faced by businesses in adopting FINTECH solutions, as well as the perceived benefits and opportunities these technologies provide. The researchers input the data into the SPSS software for analysis.

4. Data Analysis and Results Presentation

Demographic Characteristics of Participants

This section presents the preliminary analysis of the participants' profiles, reflecting their age and gender characteristics.

Table 2 indicates that the majority of respondents (30%) are between 26 - 35 years old, followed by 18 - 25 years (25%) and 36 - 45 years (22%). This indicates that the survey captured a significant portion of young to middle-aged adults, which is critical as this demographic is often more tech-savvy and likely to use FINTECH services. Males constitute the majority (53%), followed by females (44.5%), with a small percentage (3%) identifying as other. This distribution shows a relatively balanced representation of genders, with slightly more males participating. Most respondents have tertiary (40%) or secondary education (30%), suggesting that a higher level of education may correlate with the usage and understanding of FINTECH services. Only 5% have no formal education, which may influence their adoption and usage patterns. A diverse range of occupations is represented, with students and professionals each making up 22% and 28% respectively. Small-scale traders and farmers are also significant (28% and 15%), highlighting the importance of FINTECH in various economic activities.

Table 2. Biodata of the participants.

Question	Options	Frequency (n)	Percentage (%)
Age	Under 18	10	6%
	18 - 25	45	25%
	26 - 35	55	30%
	36 - 45	40	22%
	46 - 55	20	11%
	56 and above	10	6%
Gender	Male	95	53%
	Female	80	44%
	Other	5	3%
Education Level	No formal education	10	6%
	Primary	30	16%
	Secondary	60	33%
	Tertiary	70	39%
	Other	10	6%
Occupation	Student	40	20%
	Farmer	30	15%
	Small-scale trader	50	25%
	Professional	50	25%
	Other	10	15%
Income Level (monthly)	Below GHS 500	35	15%
	GHS 500 - 1000	45	25%
	GHS 1001 - 1500	60	30%
	GHS 1501 - 2000	20	15%
	Above GHS 2000	20	15%

Source: Author (2024).

Respondents' income levels are fairly distributed, with the majority earning between GHS 1001 - 1500 (33%). This spread indicates that FINTECH services appeal to a wide income range, but especially to those in the middle-income bracket.

FINTECH and Financial Inclusion

The second section of the survey presents the quantitative and qualitative data to understand the usage, benefits, and challenges of FINTECH services in enhancing financial inclusion.

Research Question One: *How do FINTECH tools help mobile money businesses in Ghana access financial services?*

Table 3 indicates that the majority use mobile money services daily (35%) or

Table 3. FINTECH and financial inclusion.

Question	Options	Frequency (n)	Percentage (%)
1. How frequently do you use mobile money services?	Daily	70	39%
	Weekly	40	22%
	Monthly	30	17%
	Rarely	30	17%
	Never	10	5%
2. What types of FINTECH services do you use?	Mobile payments	180	90%
	Digital lending	60	30%
	Online banking	120	60%
	Insurance services	40	20%
	Savings platforms	100	50%
	Blockchain services	30	15%
3. How satisfied are you with the ease of use of FINTECH services?	Very satisfied	70	39%
	Satisfied	60	34%
	Neutral	30	17%
	Dissatisfied	10	5%
	Very dissatisfied	10	5%
4. How has FINTECH impacted your access to financial services?	Greatly improved	60	34%
	Improved	85	41.5%
	No impact	30	17%
	Reduced access	10	5%
	Greatly reduced access	5	2.5%
5. What are the main benefits you have experienced from using FINTECH services?	Convenience	180	90%
	Lower transaction costs	120	60%
	Faster transactions	140	70%
	Better financial management	90	45%
	Access to credit	60	30%
	Increased security	70	35%
6. What challenges have you faced while using FINTECH services?	Poor internet connectivity	80	40%
	Lack of trust in the service	40	20%
	High transaction fees	50	25%
	Difficulty understanding how to use the services	40	20%
	Limited access to mobile devices	20	10%

Continued

7. Have you ever used digital lending platforms to access credit?	Yes	70	39%
	No	110	61%
8. If yes, how would you rate your experience with digital lending platforms?	Excellent	20	10%
	Good	30	15%
	Average	10	5%
	Poor	5	2.5%
	Very poor	5	2.5%
9. To what extent do you trust FINTECH services to protect your personal and financial information?	Completely trust	30	15%
	Somewhat trust	90	45%
	Neutral	40	20%
	Distrust	20	10%
	Completely distrust	20	10%
10. How likely are you to recommend FINTECH services to others?	Very likely	70	39%
	Likely	60	34%
	Neutral	30	17%
	Unlikely	10	5%
	Very unlikely	10	5%

weekly (25%), indicating high engagement and reliance on these services for daily transactions. Mobile payments are the most popular (90%), followed by online banking (60%) and savings platforms (50%). Digital lending is used by 30%, reflecting a growing but still emerging market for digital credit. Most respondents are satisfied (35%) or very satisfied (40%) with the ease of use of FINTECH services. This indicates that the services are generally user-friendly and accessible to the majority of users. A significant number of respondents (40%) report that FINTECH has improved their access to financial services, and 35% say it has greatly improved their access. This shows that FINTECH is playing a crucial role in enhancing financial inclusion. Convenience (90%) and faster transactions (70%) are the most commonly cited benefits, followed by lower transaction costs (60%) and better financial management (45%). This highlights the practical advantages that FINTECH services provide to users. Poor internet connectivity (40%) and high transaction fees (25%) are the most reported challenges. Other significant issues include difficulty understanding the services (20%) and lack of trust (20%). These challenges indicate areas where improvements are needed to enhance user experience and trust. A substantial number of respondents (35%) have used digital lending platforms, indicating a considerable uptake of digital credit services. Among those who used digital lending platforms, the majority rated their experience as good (15%) or excellent (10%), suggesting a positive reception. However, some found it average (5%), poor (2.5%), or very poor (2.5%), indicating

room for improvement. Many respondents consider blockchain technology important (30%) or very important (25%) for improving transaction security, reflecting an awareness of and interest in advanced security features. Trust levels vary, with 45% somewhat trusting and 15% completely trusting FINTECH services. However, there is also a notable level of neutrality (20%) and distrust (10%), highlighting a need for increased security and trust-building measures. A significant number of respondents (35% each) are very likely or likely to recommend FINTECH services to others, suggesting general satisfaction and positive word-of-mouth potential.

Table 4. The open-ended questions summary.

Question	Key Themes from Responses
1. What specific features of FINTECH services do you find most useful?	Convenience, speed of transactions, ease of access, security features, and availability of credit.
2. What improvements would you suggest for FINTECH services?	Better internet connectivity, lower transaction fees, improved user interfaces, more educational resources on usage, and enhanced customer support.
3. Can you describe a situation where FINTECH services significantly helped you manage your finances better?	Examples included managing savings more effectively, receiving quick loans for business expansion, and making secure transactions without the need for physical banks.
4. Any other comments or suggestions regarding FINTECH and financial inclusion?	Suggestions for increased regulation to ensure security, more awareness campaigns to educate rural populations, and the need for more inclusive services tailored to low-income users.

From Table 4, the respondents find convenience, speed, ease of access, security features, and availability of credit as the most useful features of FINTECH services. Improvements suggested include better internet connectivity, lower transaction fees, improved user interfaces, more educational resources on usage, and enhanced customer support. Respondents shared examples such as managing savings more effectively, receiving quick loans for business expansion, and making secure transactions without the need for physical banks. Additional suggestions included increased regulation to ensure security, more awareness campaigns to educate rural populations, and the need for more inclusive services tailored to low-income users.

Research Question Two: *How does digital lending affect the ability of mobile money businesses in Ghana to get loans and grow?*

Data was collected through semi-structured interview related to gather comprehensive insights from key stakeholders involved in mobile money enterprises and FINTECH services. Data was analysed thematically.

From Table 5, the interview results indicate that mobile money enterprises in Ghana are highly reliant on mobile money services for daily operations, with 75%

Table 5. Interview results on the impact of FINTECH on mobile money enterprises in Ghana.

Interview Topic	Key Responses	Frequency (n)	Percentage (%)
1. Business Operations	Describes daily operations as busy, handling numerous transactions, and providing customer support.	15	75
	Uses mobile money primarily for business transactions and managing payments.	10	50
	Operations include managing digital payments, customer service, and record-keeping.	12	60
	Primarily focuses on transaction management and ensuring smooth operations.	13	65
2. Challenges	Faces issues with internet connectivity and customer trust.	8	40
	High transaction fees and regulatory compliance are major challenges.	12	60
	Difficulty in understanding new FINTECH solutions and poor network infrastructure.	7	35
	Challenges include limited access to credit and high operational costs.	9	45
3. Opportunities	Sees potential in expanding services to rural areas and offering new FINTECH solutions.	14	70
	Opportunity to grow business by adopting blockchain for secure transactions.	10	50
	Believes digital lending can significantly boost business operations.	11	55
	Identifies growth opportunities in integrating more FINTECH services to attract customers.	12	60
4. FINTECH Solutions Utilized	Uses mobile payments and digital lending platforms.	15	75
	Recently adopted blockchain technology for secure transactions.	6	30
	Primarily uses mobile payments and online banking services.	14	70
	Uses a combination of mobile payments and digital wallets.	10	50
5. Impact on Financial Inclusion	FINTECH has greatly improved access to financial services and customer satisfaction.	16	80
	Noted an increase in customer base due to easier access to credit through digital lending.	12	60
	Enhanced financial management and record-keeping through FINTECH solutions.	14	70
	Positive impact is seen in terms of reach and service efficiency.	15	75
6. Barriers to Adoption	Encountered resistance due to lack of trust and understanding of FINTECH.	8	40
	Regulatory hurdles and high compliance costs are major barriers.	12	60
	Faces difficulties with poor internet infrastructure and limited access to digital devices.	10	50
	Barriers include high transaction costs and technical challenges.	11	55

describing their activities as busy and transaction-focused. Key challenges include poor internet connectivity (40%), high transaction fees (60%), and regulatory compliance issues (60%). Opportunities for growth are seen in expanding services to rural areas (70%) and adopting new technologies like blockchain (50%) and digital lending (55%). Most participants (75%) use mobile payments extensively, with 80% reporting significant improvements in financial access and customer satisfaction due to FINTECH. However, barriers such as lack of trust (40%) and regulatory hurdles (60%) need to be addressed to fully leverage the potential of FINTECH solutions.

Analyses of the Result

H0: There is no significant impact of FINTECH interventions on financial inclusion and the growth of mobile money enterprises in Ghana.

H1: There is a significant impact of FINTECH interventions on financial inclusion and the growth of mobile money enterprises in Ghana.

The analysis presented in Table 6 indicates that participants regularly utilize mobile money services, with a mean frequency score of 40 and a high variability (SD = 20). The variety of FINTECH services used is broad, as reflected by a mean score of 88.33 and a substantial standard deviation (SD = 56.71). Satisfaction regarding ease of use and the impact on financial access both yield a mean score of 40, with similar standard deviations (SD ≈ 33.17), indicating moderate satisfaction and impact. The primary benefits experienced have a high mean score of 110 (SD = 45.60), demonstrating significant positive effects. Challenges encountered and the likelihood of recommending FINTECH services show moderate mean scores (46 and 40, respectively) with notable variability. The data suggests considerable usage and benefits from FINTECH services, while also highlighting

Table 6. Mean and standard deviation of FINTECH services in enhancing financial inclusion.

Question	Mean	Standard Deviation
1. How frequently do you use mobile money services?	40.00	20.00
2. What types of FINTECH services do you use?	88.33	56.71
3. How satisfied are you with the ease of use of FINTECH services?	40.00	33.17
4. How has FINTECH impacted your access to financial services?	40.00	33.17
5. What are the main benefits you have experienced from using FINTECH services?	110.00	45.60
6. What challenges have you faced while using FINTECH services?	46.00	21.91
7. Have you ever used digital lending platforms to access credit?	100.00	42.43
8. If yes, how would you rate your experience with digital lending platforms?	14.00	10.84
9. How important is blockchain technology in improving the security of your financial transactions?	40.00	15.81
10. To what extent do you trust FINTECH services to protect your personal and financial information?	40.00	29.15
11. How likely are you to recommend FINTECH services to others?	40.00	28.28

areas needing improvement, particularly in understanding and trust. Thus, FINTECH interventions positively influence the accessibility of formal financial services for mobile money enterprises in rural and underserved areas of Ghana, evidenced by frequent use, high satisfaction, improved access, and tangible benefits observed.

Descriptive Analysis of Open-ended Questions Summary

Question	Key Themes from Responses	Descriptive Analysis
12. What specific features of FINTECH services do you find most useful?	Convenience, speed of transactions, ease of access, security features, and availability of credit.	The most commonly cited features of FINTECH services are their convenience and speed, which make financial transactions quicker and easier. Security features and credit access are also valued.
13. What improvements would you suggest for FINTECH services?	Better internet connectivity, lower transaction fees, improved user interfaces, more educational resources on usage, and enhanced customer support.	Participants suggest enhancing internet connectivity and reducing transaction fees. There is also a need for more user-friendly interfaces and better educational resources. Customer support improvements are recommended.
14. Can you describe a situation where FINTECH services significantly helped you manage your finances better?	Examples included managing savings more effectively, receiving quick loans for business expansion, and making secure transactions without the need for physical banks.	Respondents shared specific instances where FINTECH services improved their financial management, such as easier savings management, quick access to business loans, and secure transactions.
15. Any other comments or suggestions regarding FINTECH and financial inclusion?	Suggestions for increased regulation to ensure security, more awareness campaigns to educate rural populations, and the need for more inclusive services tailored to low-income users.	Additional comments highlight the importance of regulatory measures to enhance security and the need for educational campaigns. There's a strong call for services to be inclusive, especially for low-income users.

Table 6 reveals that respondents highly value the convenience and speed of FINTECH services, along with ease of access, security features, and the availability of credit. These features are integral to the positive reception of FINTECH services. Key areas for improvement include enhancing internet connectivity, lowering transaction fees, improving user interfaces, providing more educational resources, and strengthening customer support. These enhancements could improve user experience and adoption rates. Additionally, many respondents provided examples of how FINTECH services have helped them manage their finances better, such as through effective savings management, quick business loans, and secure transactions, demonstrating the practical benefits of these

services. Moreover, respondents emphasized the need for increased regulation to ensure security, educational campaigns to raise awareness, and more inclusive services tailored to the needs of low-income users. These suggestions aim to broaden the reach and impact of FINTECH services.

Overall, FINTECH interventions are positively impacting the accessibility of formal financial services in rural and underserved areas of Ghana, thus rejecting the null hypothesis (H0).

H0: FINTECH tools do not significantly improve financial access or growth for mobile money businesses in Ghana.

H1: FINTECH tools significantly improve financial access and growth for mobile money businesses in Ghana.

Table 7. Analysis result of the impact of fintech tools on mobile money enterprises in Ghana.

Interview Topic	Mean	Standard Deviation
Business Operations	2.50	1.96
Challenges	1.80	1.76
Opportunities	2.35	1.37
FINTECH Solutions Utilized	2.25	3.11
Impact on Financial Inclusion	2.85	1.97
Barriers to Adoption	2.05	2.06

The analysis of the impact of FINTECH tools on mobile money enterprises in Ghana, as presented in Table 7, reveals several key insights. The mean values indicate that respondents rated the impact on financial inclusion highest (2.85), suggesting that FINTECH tools have had a significant positive effect in this area. However, the standard deviation of 1.97 shows some variability in these responses, indicating differing experiences among businesses. Business operations and opportunities also show relatively high mean scores (2.50 and 2.35, respectively), suggesting that FINTECH tools are generally viewed positively in enhancing daily operations and creating growth opportunities. In contrast, the challenges and barriers to adoption have lower mean scores (1.80 and 2.05), highlighting that while these areas present some difficulties, they are not as predominant as the benefits. Notably, the FINTECH solutions utilized have a high standard deviation of 3.11, which may indicate a wide range of experiences and possibly varying levels of adoption or effectiveness among different enterprises. Overall, the data suggest that while FINTECH tools are beneficial, there are still significant challenges and barriers that need to be addressed.

5. Summary

The study focuses on enhancing financial inclusion through FINTECH interventions, specifically targeting mobile money enterprises in rural and underserved

areas of Ghana. Financial inclusion, which involves providing accessible and affordable financial services to individuals and businesses, is vital for economic development and poverty reduction. The demographic analysis reveals that the majority of respondents (35%) are between 26 and 35 years old, followed by 18 to 25 years (25%) and 36 to 45 years (20%). This indicates a significant representation of young to middle-aged adults who are typically more tech-savvy and likely to adopt FINTECH services. Males constitute 55% of the respondents, while females make up 42.5%, and 2.5% identify as other. Most respondents have secondary (30%) or tertiary education (40%), suggesting that higher education levels correlate with the usage and understanding of FINTECH services. Moreover, the quantitative data indicates high engagement with mobile money services, with 35% of participants using these services daily and 25% weekly. Mobile payments are the most popular (90%), followed by online banking (60%) and savings platforms (50%). Digital lending is used by 30%, reflecting its emerging role in providing credit access. High satisfaction levels with the ease of use of FINTECH services were reported, with 40% very satisfied and 35% satisfied. This satisfaction correlates with the reported improvements in access to financial services, where 40% of respondents stated that FINTECH had improved their access, and 35% said it had greatly improved access.

The key benefits of FINTECH services include convenience (90%), faster transactions (70%), and better financial management (45%). However, challenges such as poor internet connectivity (40%), high transaction fees (25%), difficulty in understanding the services (20%), and lack of trust (20%) were noted. These challenges highlight areas for improvement to enhance user experience and trust. Qualitative data from open-ended questions revealed that respondents highly value the convenience, speed of transactions, ease of access, security features, and availability of credit offered by FINTECH services. Suggested improvements include better internet connectivity, lower transaction fees, improved user interfaces, more educational resources, and enhanced customer support. Respondents also emphasized the need for increased regulation to ensure security, more awareness campaigns, and inclusive services tailored to low-income users.

The analysis supports the alternative hypothesis (H1) that FINTECH interventions positively influence the accessibility of formal financial services for mobile money enterprises in rural and underserved areas of Ghana. The frequent use, high satisfaction, improved access, and practical benefits observed support this conclusion. Similarly, the study found that FINTECH solutions like digital lending platforms and blockchain technology positively impact the availability of credit for small and medium-sized mobile money enterprises in Ghana.

The findings indicate that FINTECH interventions significantly improve access to formal financial services and credit for mobile money enterprises in rural and underserved areas of Ghana. Despite challenges such as poor internet connectivity and high transaction fees, the benefits of convenience, speed, and improved

financial management underscore the positive impact of FINTECH solutions. These insights align with previous research highlighting the potential of FINTECH to enhance financial inclusion.

5.1. Conclusion

The paper concluded using financial technology is vital for advancing the agenda of financial inclusion. An enhancement and improvement in mobile money technology will result in a lot of individuals being financially included. Conversely, if mobile money usage fails to improve, a lot of people will remain financially excluded. Most importantly, mobile money services and operators continue to permeate society as many people/individuals prefer them for monetary transactions. Furthermore, the enhancement of internet banking technology will make many people opt to use it, thereby improving financial inclusion. Nevertheless, a decline or fall in internet banking technology will lead to greater financial exclusion and the vice versa. Therefore, it can be concluded from the summary of the findings that financial technology is an influencial and powerful tool for ensuring that many people within the Winneba metropolis become financially included. Where there is lack of financial technology, individuals will be excluded, which will affect the growth and development of the country.

5.2. Recommendations

The paper recommends that:

- The providers of Mobile money should enhance the features of financial technologies like internet banking and mobile money to make them accessible to all.
- Mobile money service providers ensure mobile phone network efficiency to promote the use of these services.
- There should be no charges on mobile money or minimal charges should be charged to encourage more individuals to use the services, thereby fostering financial inclusion.
- Collaborate with telecom companies to improve network coverage and quality in underserved regions, ensuring that users can consistently access FINTECH services.
- Internet banking services should be enhanced by Banks to help increase financial inclusion, making service features user-friendly.
- Regulatory frameworks should be strengthened to ensure the security of FINTECH services, protecting users' personal and financial information.

Invest in research and development to explore new technologies and approaches that can further enhance financial inclusion, making services cost-effective, accessible, and convenient to everyone.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Abbreviations

FINTECH	Financial Technology
KYC	Know Your Customer
MMEs	Mobile Money Enterprises
MM	Mobile Money
SMEs	Small and Medium-Sized Enterprises
FFI	FINTECH and Financial Inclusion