International Journal of Economics, Finance and Management Sciences
2025, Vol. 13, No. 1, pp. 1-19
https://doi.org/10.11648/j.ijefm.20251301.11

Research Article

Examining the Role of Financial Technology (FinTech) in Financial Inclusion in Ghana: An Evaluation of the Strategies, Impacts, and Challenges in Practice

Ibrahim Zubairu*, Benjamin Amoako Amanquah, Francis Kwarteng, Nathan Bortey

Department of Accounting & Finance, Accra Technical University, Accra, Ghana

Abstract

This study aims to investigate the role of financial technology, or FinTech, in financial inclusion in Ghana through a comparative analysis of strategies, impacts, and difficulties. Financial inclusion is critical for economic development and aims to provide everyone with access to meaningful and cheap financial services. Despite the progress made, Ghana still confronts substantial challenges to financial inclusion, such as regulatory gaps, infrastructure deficiencies, and disparities in socioeconomic status. The study explores several initiatives used in Ghana to increase financial inclusion through Fintech, assesses their success, and highlights the main challenges encountered. Data were collected from a wide demographic using both qualitative and quantitative approaches in order to determine the amount of Fintech adoption and its impact on financial accessibility. The findings show that, while Fintech considerably improves access to financial services and contributes to economic empowerment, difficulties such as insufficient financial literacy, limited digital infrastructure, and regulatory impediments remain. A comparative review of different countries suggests that specific policies and educational programs are critical for solving these challenges. The study concludes with recommendations for governments, financial institutions, and Fintech companies on how to use technology to promote financial inclusion. These include increasing digital literacy, establishing strong regulatory frameworks, and strengthening infrastructure. The insights are intended to assist stakeholders in effectively leveraging Fintech to achieve inclusive growth and contribute to global sustainable development goals.

Keywords

Financial Technology (FinTech), Financial Inclusion, Regulatory Frameworks, Infrastructure Development, Digital Education

1. Introduction

Financial inclusion, an essential component of economic development, has recently received much attention because it generates growth and stability in various economies. Financial inclusion aims to ensure that all members of an economy have easy access to and can efficiently use financial services [1]. Access to formal financial institutions empowers people, increases social inclusion, and improves overall economic well-being [2]. Financial inclusion is advancing through financial technology integration (FinTech) [3]. The rise of financial technology, or FinTech, has dramatically impacted

*Corresponding author: izubairu@atu.edu.gh (Ibrahim Zubairu), ibrazubairu@gmail.com (Ibrahim Zubairu)

Received: 23 November 2024; **Accepted:** 19 December 2024; **Published:** 5 February 2025

global financial inclusion. Financial inclusion is acknowledged as being significantly facilitated by FinTech, especially in developing countries. Research has demonstrated that FinTech is essential in helping underserved populations access formal financial services and getting beyond market flaws that prevent them from being financially included [4]. Furthermore, to advance FinTech-led financial inclusion, stakeholders, including governments, civil society groups, and charitable foundations, must play a crucial role [5]. In nations such as Vietnam, FinTech has played an essential role in improving financial health, particularly during crises such as the COVID-19 pandemic, by allowing the unbanked populace to access financial services through technology. Similarly, the government's commitment to financial inclusion and a large unbanked population in India has produced a favorable atmosphere for FinTech growth and adoption [6]. Moreover, FinTech's potential to drive financial inclusion in developing and emerging markets has been recognized, underlining the significance of tackling obstacles and establishing appropriate regulations to improve financial inclusion [7]. Government policies play an essential role in reaching financial inclusion goals through FinTech. Policies that focus on expanding mobile and internet infrastructure, improving financial and digital education, creating a trustworthy environment for FinTech clients, and establishing effective legal and regulatory frameworks are critical for promoting financial inclusion through FinTech [8]. Furthermore, financial literacy and gender influence FinTech adoption, emphasizing the significance of educational initiatives and targeted strategies to boost adoption and expedite financial inclusion [9]. Ultimately, the study of FinTech's role in promoting financial inclusion involves investigating strategies, impacts, and challenges in various countries and regions, particularly Ghana. Understanding the dynamics of FinTech ecosystems, government policies, stakeholder involvement, and the impact on disadvantaged groups is critical to driving financial inclusion through technology innovation.

1.1. Statement of the Problem

Financial inclusion in Ghana has encountered significant challenges despite some advancements in recent years. The country's persistently low level of financial inclusion remains a pressing issue [10]. While digital technologies, particularly mobile banking, have shown promise in enhancing financial inclusion in developing countries [11], factors such as age, literacy levels, wealth disparities, lack of formal documentation, and trust issues in traditional financial institutions have been identified as critical determinants influencing financial inclusion in Ghana [12]. Moreover, obstacles like ineffective regulatory frameworks, inadequate infrastructure, unreliable power supply, and poor mobile network coverage in rural areas, frequent network disruptions, high service charges, information disparities, and data privacy breaches further exacerbate the financial inclusion gap. The acceptance and utilization of FinTech payment services by Small and Medium Enterprises (SMEs) in Ghana are influenced by various factors, underscoring the complexities in integrating FinTech solutions to promote financial inclusion.

Financial inclusion plays a crucial role in the economic development of nations, particularly in developing countries like Ghana. The integration of financial technology (FinTech) holds the potential to enhance financial services by improving accessibility and efficiency. Therefore, there is a need to delve into the strategies, impacts, and challenges associated with FinTech in advancing financial inclusion in Ghana.

1.2. Objectives of the Study

1) The main objective of this research project is to explore and analyze the impact of financial technology (FinTech) in increasing financial inclusion in Ghana. The specific objectives are listed below:
2) To examine the strategies implemented in Ghana for promoting financial inclusion through FinTech.
3) To evaluate FinTech's impact on financial inclusion in Ghana, considering aspects such as access to financial services, digital literacy, and regulatory frameworks.
4) To identify the problems associated with implementing FinTech for financial inclusion in Ghana, such as financial literacy, accessibility, and use of FinTech services.
5) To make recommendations to policymakers, financial institutions, and FinTech firms on how to best use financial technology to advance financial inclusion, taking into account regulatory frameworks, infrastructure development, and digital education.

1.3. Research Questions

1) What are the strategies implemented in Ghana to promote financial inclusion through FinTech, and how effective are these strategies?
2) How does FinTech impact financial inclusion in Ghana concerning access to financial services, digital literacy, and regulatory frameworks?
3) What are the main challenges associated with implementing FinTech for financial inclusion in Ghana, mainly regarding financial literacy, accessibility, and the utilization of FinTech services?
4) How does the effectiveness of FinTech-led financial inclusion initiatives in Ghana compare to other regions, considering factors such as income per capita, the digital divide, and economic structure?

1.4. Significance of the Study

Financial inclusion is a crucial driver of economic development, particularly in countries like Ghana. Understanding the impact of financial technology (FinTech) on enhancing financial inclusion is imperative for policymakers, financial institutions, and FinTech firms to develop effective strategies. By investigating the strategies employed in Ghana to promote financial inclusion through FinTech, assessing the effectiveness of FinTech in enhancing financial inclusion, identifying implementation challenges, and comparing initiatives with other regions, this study will offer valuable insights into leveraging FinTech for inclusive growth. The findings will enrich the existing knowledge base on FinTech and financial inclusion and provide practical recommendations to improve financial access and inclusion in Ghana. The outcomes of this research are expected to guide stakeholders in adopting best practices for utilizing FinTech to advance financial inclusion, considering regulatory frameworks, infrastructure development, and digital education. This study holds significant implications for policymakers, financial institutions, and other stakeholders in advancing financial inclusion. By conducting a comparative analysis of the role of FinTech, the research will identify effective strategies and best practices for harnessing technology to broaden financial access. Insights from the study can inform the design of targeted interventions and policies tailored to address the specific needs of underserved populations. Moreover, understanding the challenges faced by FinTech initiatives can inform regulatory reforms and capacity-building efforts to create an enabling environment for inclusive finance. Ultimately, the findings of this research have the potential to contribute to global efforts aimed at achieving Sustainable Development Goal 8 (Decent Work and Economic Growth) and Goal 10 (Reduced Inequalities).

This introduction is the first of the five parts that make up this study. The second section provides an overview of Ghana's financial inclusion and FinTech landscape through existing literature and discusses the study's relevant themes, such as the strategies, impacts, and challenges of promoting financial inclusion using fintech solutions. The third section discusses in full the research methods and data used in this study. It describes the research design, the study instruments and data-gathering processes and analysis used. The fourth section presents the outcomes from the data acquired during the study and thoroughly discusses the findings in light of the study's aims and research problems, examining the strategies, impacts, and challenges of promoting financial inclusion by employing FinTech in Ghana. The final section consolidates the study's findings and summarizes significant discoveries and offers conclusions based on its findings, emphasizing the consequences for practice, policy implications and recommendations for financial sector stakeholders, policymakers, and potential scholars seeking to enhance financial inclusion in Ghana through FinTech solutions.

2. Literature Review

The literature review functions as an in-depth review of previous studies and academic works relevant to the topic of this project. This section explores the complex web of scholarly discussion around the role of fintech in promoting financial inclusion in Ghana, including viewpoints, theoretical frameworks, and insights that support our understanding of the field today. Through a critical examination and synthesis of many sources, this literature review seeks to establish a strong framework for the ensuing analysis and discussion. This review attempts to add to a deeper understanding of the topic by examining important themes, arguments, and gaps in the literature; this serves as a foundation for the unique contributions and insights that will be offered in the upcoming chapters.

Financial inclusion is an important part of economic development, and recent literature has focused heavily on the role of financial technology (FinTech) in encouraging financial inclusion. Several studies have underlined the role of FinTech in enhancing marginalized people' access to financial services [4, 13, 8]. FinTech has been acknowledged as a crucial facilitator of financial inclusion, particularly in addressing financial market flaws that prevent the poor from accessing formal financial services [4]. Furthermore, research has examined the favourable association between financial inclusion, FinTech, and monetary policy effectiveness, emphasizing the interdependence of these factors in generating economic growth [13].

2.1. Theoretical Review

Definitions and Conceptual Frameworks of Financial Inclusion and Fintech.

Financial exclusion, a significant barrier to growth in developing countries, is more likely to occur in rural areas with underdeveloped economies, low-income levels, and remote geographies [14]. Factors such as gender, social class, age, marital status, household income, ethnicity, region, educational attainment, employment status, housing tenure, and the number of people in the household have been associated with financial exclusion [15]. This exclusion can lead to poverty as it hinders individuals' ability to accumulate wealth [16]. Financial inclusion is a fundamental aspect that influences economic development by enabling individuals to access and utilize formal financial services [17]. It encompasses the accessibility, availability, and utilization of the financial system by all members of an economy [1]. While there is no universally accepted definition of financial inclusion, it generally refers to the ease of access, availability, and usage of formal financial services [18]. This concept includes both access to and the use of formal financial services by households and firms [19].

Furthermore, financial inclusion goes beyond access to credit and includes the utilization of formal insurance products to effectively manage financial risks [20]. It plays a significant role in promoting sustainable economic growth by providing financial services in a convenient and appropriate manner to meet societal needs and support vulnerable groups [21]. Additionally, indicators such as telephone and internet usage are associated with financial inclusion, emphasizing the importance of connectivity and information in enhancing levels of financial inclusion [22].

On the other hand, FinTech, encompassing innovative financial solutions enabled by technology, is utilized by both start-up companies and traditional financial service providers like banks and insurers [23]. FinTech contributes to financial inclusion by advocating for inclusive finance, such as financing underdeveloped sectors like agriculture and small enterprises [24].

Financial technology, commonly known as Fintech, refers to new technology designed to boost and automate the delivery and usage of financial services. It includes a wide range of technological innovations into personal and commercial finance, such as money transfers, check depositing with cellphones, generating funds for business start-ups, managing investments, and so on, all of which are done without the aid of a person. Simply put, Fintech is the process of leveraging technology to deliver traditional financial services.", "Fintech is the intersection of banks and technology." [25]. Financial technology (FinTech) is an innovative activity that utilizes science and technology to enhance financial productivity, [26]. The emergence of FinTech, driven by technological advancements, provides efficiency in financial services [27]. Fintech uses sophisticated algorithms and software on computers and smartphones to assist businesses, entrepreneurs, and households better manage their financial transactions and procedures. The word "financial technology" can also refer to any breakthrough in how people do business, such as the introduction of digital money or double-entry bookkeeping [28].

In Ghana, there is a study deficit about how FinTech complements or substitutes traditional financial institutions [29]. This gap emphasizes the need for further research into the specific dynamics of FinTech adoption and its impact on financial inclusion in Ghana. Furthermore, research have shown that FinTech can significantly enhance financial health, particularly during difficult times such as the COVID-19 pandemic [30]. FinTech's ability to close the financial literacy gap and accelerate the achievement of financial inclusion targets has also been highlighted [9].

To add, the literature emphasizes the importance of regulatory frameworks and infrastructural development in promoting FinTech growth and increasing financial inclusion [8]. Public policies focused at extending mobile and internet infrastructure, enhancing financial and digital education, and creating a stable environment for FinTech clients are proposed as ways for promoting financial inclusion through FinTech [8]. Moreover, the adoption of FinTech payment services by small and medium-sized firms (SMEs) in Sub-Saharan Africa, particularly Ghana, has been identified as an important topic of research to understand better the drivers of FinTech diffusion and its influence on financial inclusion [8].

Financial inclusion is a multifaceted concept that involves access to formal financial services, affordability, and usage by individuals and firms, ultimately contributing to economic development and inclusive growth. The integration of FinTech further enhances financial inclusion by leveraging technology to provide innovative financial solutions and promote inclusive finance practices.

2.2. Empirical Literature Review

2.2.1. The Role of Fintech in Extending Access to Financial Services for Underserved Populations

The integration of digital technologies in financial services, spearheaded by the emergence of FinTech, has significantly expanded access to financial services, particularly for underserved populations. The advent of Financial Technology (FinTech) has brought about transformative changes in extending access to financial services, particularly for underserved populations. In Ghana, the adoption of Mobile Money technology witnessed a remarkable surge beginning in the year 2009.

FinTech initiatives, such as mobile banking and digital payment infrastructure, have played a pivotal role in bridging the financial inclusion gap in regions like Sub-Saharan Africa (SSA) [31]. The transformative potential of FinTech is evident in its ability to leverage technology to reach previously inaccessible populations, as demonstrated by studies focusing on regions like Nigeria and Ghana [32]. Furthermore, the adoption of mobile money services has been instrumental in enhancing financial inclusion and well-being among marginalized groups, including smallholder farmers [33]. The surge is indicative of FinTech's pivotal role in reaching previously excluded segments of society [34]. Additionally, collaborative efforts between Telecommunication Companies and Banks have led to the establishment of e-cash operations, further expanding financial service provision [35].

Research underscores that FinTech initiatives such as mobile banking, SMS banking, and internet banking have significantly contributed to financial inclusion. For instance, internet banking has been associated with increased financial inclusion among respondents [32]. Furthermore, the strategic adoption of alternative banking channels, especially targeted at women entrepreneurs, has led to significant improvements in financial inclusion [36].

Despite these advancements, barriers to financial inclusion persist, including age, literacy levels, wealth class, and distance to financial institutions [37]. However, the FinTech ecosystem, particularly the mobile money sector, has demonstrated effectiveness in addressing these barriers through innovative practices [38]. The blend of financial innovation and technology highlights how FinTech challenges the dominance of traditional financial institutions [39]. By bridging the gap between unbanked, under-banked, and developed societies, FinTech holds the potential to usher in a transformative societal change, enabling access to the global digital economy. This innovation is crucial, given that a significant portion of the global population remains financially excluded or underserved, perpetuating inequality [39]. Furthermore, financial inclusion is a key policy priority for governments in developing nations, aligned with the Sustainable Development Goals (SDGs) [40]. In Sub-Saharan Africa, the potential of financial inclusion in advancing the SDGs is underscored, particularly through mobile money and digital payments [41]. Commercial agent banking services are also identified as a valuable tool for extending financial inclusion to nonbank populations, thereby contributing to the acceleration of SDG performance in emerging economies [42]. The emergence of FinTech represents a significant departure from traditional financial institutions, offering promising solutions to address the longstanding challenge of financial exclusion. Bridging the gap between unbanked and under-banked individuals and developed societies emphasize that FinTech, heralds a transformational shift towards financial inclusion [39]. Moreover, the potential of FinTech to overcome barriers such as prohibitive costs and lack of documentation, in order to broaden access to financial services was emphasised in the conducted by [43].

Drawing from experiences across various countries, a staged and progressive approach to financial inclusion is advocated, focusing on key pillars. These include the establishment of digital identification systems, digital payment infrastructure, and the integration of government services to scale up the use of digital finance [39]. Additionally, other studies underscores the sensitivity of saving behaviour to the introduction of digital technologies, suggesting that digitalization penetrates all facets of the economy and alters economic agents' behavior [44].

2.2.2. Impact of Fintech Initiatives on Inclusive Economic Growth and Poverty Alleviation

Research indicates a positive correlation between FinTech adoption and inclusive economic growth, particularly in emerging markets like Sub-Saharan Africa. A growing body of literature highlights the substantial impact of FinTech initiatives on inclusive economic growth and poverty alleviation. FinTech innovations have not only facilitated financial inclusion but also contributed to poverty alleviation efforts by empowering individuals economically [45]. The intersection between green economic growth and FinTech presents promising opportunities for transitioning towards sustainability while promoting inclusive economic development [46]. Moreover, the utilization of FinTech solutions has led to increased efficiency in financial transactions, thereby fostering economic growth and stability [47].

Financial inclusion offers previously unbanked persons with mechanisms for savings, investment, and insurance, thus supporting more inclusive growth. [48]. Furthermore, the diffusion of technology and financial inclusion have long-term implications for economic growth and investment [49]. The fintech revolution, characterized by enhanced accessibility and personalized experiences, contributes to inclusive economic growth by democratizing access to financial services [50]. Moreover, decentralized finance (DeFi) expands the possibilities of financial technology by fostering transparency, accessibility, and efficiency, thus addressing the needs of excluded and underserved populations [51]. Studies suggest that harnessing the potential of FinTech can significantly reduce income inequality [4]. Specifically, FinTech encourages individuals to engage with formal banking systems, thereby promoting financial inclusion [52]. Moreover, Islamic FinTech interventions have shown promise in mitigating poverty while strengthening the financial system. Compared to mere economic growth, Islamic FinTech demonstrates potential for sustained socio-economic development, particularly benefiting Shariah-compliant enterprises [53]. Similarly, utilizing FinTech to enhance financial inclusion has been identified as a method to reduce poverty [54]. FinTech initiatives have the potential to foster inclusive economic growth and alleviate poverty by expanding access to financial services; discussing how mobile money taxes influence revenue mobilization, financial inclusion, and the realization of SDGs in Africa [55]. This suggests that leveraging FinTech, particularly mobile money, can contribute to achieving sustainable development objectives. Additionally, the adoption of FinTech is driven by various factors, including unmet demand for financial services in developing economies, high finance costs, supportive regulatory environments, and demographic trends favoring younger cohorts [56].

2.2.3. Regulatory Frameworks Governing Fintech and Their Implications for Financial Inclusion

The regulatory landscape plays a crucial role in shaping the impact of FinTech on financial inclusion. While some economies benefit from supportive regulatory environments that facilitate FinTech adoption, others face barriers hindering its development. Understanding these regulatory frameworks is essential for harnessing the full potential of FinTech in promoting financial inclusion and achieving broader socio-economic goals. The four-pillar approach required for regulatory adaptations to promote digital financial transformation was proposed, as stressed in the paper by [39]. These regulatory changes, though challenging, hold the potential to significantly transform financial inclusion and foster digital economic development.

In Ghana, regulatory standards and business issues are identified as potential hindrances to mobile money operations [35]. However, efforts to integrate mobile money and technology into the financial sector, coupled with recommendations for competition policies, underscore the importance of regulatory adaptability in promoting financial inclusion [57]. Effective regulatory frameworks play a crucial role in shaping the impact of FinTech on financial inclusion. Effective regulatory frameworks are essential for fostering the growth of FinTech while ensuring financial inclusion and consumer protection. Studies emphasize the importance of legislative climates that support innovation and competition, as well as collaborations between governments and private sector stakeholders to extend financial inclusion [58]. A framework that supports infrastructure and an enabling policy and regulatory environment, based on a solid foundation of digital identification and electronic payment systems, will support much broader digital financial transformation in order to maximize the potential of FinTech and reap the greatest benefits for financial inclusion [59]. The full potential of FinTech for financial inclusion may be realized with a strategic framework of underlying infrastructure and an enabling policy and regulatory environment to support digital financial transformation. Regulatory regimes must be backed by the rule of law, judicial independence, and political stability to promote financial inclusion effectively [60]. Additionally, regulatory challenges post-crisis highlight the need for regulators to balance innovation benefits with potential risks associated with FinTech [59]. Government initiatives aimed at enhancing financial inclusion often emphasize the importance of digitizing payments, promoting agent banking, and leveraging data to improve access to finance [61].

Countries like Kenya, India and Vietnam have implemented robust regulatory frameworks that have significantly contributed to the success of their financial inclusion initiatives and the growth of their digital payment ecosystems. In Kenya, the "test and learn" approach adopted by the Central Bank of Kenya (CBK) for M-Pesa, along with the National Payment System (NPS) Act, has played a crucial role in fostering trust, security, and widespread adoption of mobile money services [62].

Similarly, in India, the Unified Payments Interface (UPI) benefited from the regulatory sandbox provided by the Reserve Bank of India (RBI), ensuring interoperability and driving digital financial inclusion [63]. Vietnam's State Bank initiatives and the National Financial Inclusion Strategy have led to significant growth in digital payment services and improved financial access [64]. Moreover, regulatory bodies need to balance the promotion of innovation with ensuring consumer protection and financial stability. Regulators should be cautious when mandating interoperability to avoid hindering early investment [65].

2.2.4. Comparative Analysis of Fintech Strategies and Best Practices Across Different Regions and Economic Context

A comparative analysis of FinTech strategies and best practices across regions and economic contexts is vital for identifying effective approaches to fostering financial inclusion. By examining successful implementations of FinTech solutions in diverse settings, policymakers and practitioners can gain insights into the factors driving adoption and overcoming challenges. This comparative analysis can inform the development of targeted interventions tailored to specific contexts, maximizing the impact of FinTech on inclusive economic growth and poverty alleviation. A comparative analysis reveals common elements in the regulatory frameworks of these countries that can serve as best practices for Ghana. Regulatory sandboxes, as seen in Kenya, India, and Vietnam, provide a conducive environment for testing FinTech innovations with minimal regulatory burden initially [66]. Interoperability and infrastructure, such as Kenya's mobile money platforms and India's UPI model, are essential for fostering competition and improving user experience [67]. Robust consumer protection and security measures, like those implemented in all three countries, are crucial for building trust in digital financial services [68]. Moreover, financial inclusion programs, exemplified by M-Pesa in Kenya, Jan Dhan Yojana in India, and Vietnam's NFIS, are vital for increasing financial access, especially in rural and underserved areas [69].

While Ghana provides a compelling case study for the impact of FinTech on financial inclusion, comparative analyses across different regions offer valuable insights. The experiences of countries like India and Vietnam in implementing interoperable digital financial services underscore the importance of monitoring and understanding regional variations [65]. Additionally, exploring the dynamics of FinTech ecosystems in various economic contexts can shed light on best practices and inform policy decisions. Comparative analyses facilitate identifying effective strategies that can be adapted and scaled across different regions to enhance financial inclusion in Ghana and globally.

2.2.5. Challenges of Fintech Implementation in Ghana

Challenges of FinTech Implementation in Ghana can be attributed to various factors based on the available literature. One of the key challenges identified is the regulatory framework. The study by [70] highlights the determinants of FinTech payment services diffusion by SMEs in Sub-Saharan Africa, specifically in Ghana. The critical review on the interoperability policy in Ghana and the need for banks to leverage financial technology to increase profits are emphasized by [29]. These findings suggest that regulatory challenges and the need for strategic alignment with financial technology are crucial aspects affecting FinTech implementation in Ghana. Moreover, the study by [38] emphasizes the importance of the FinTech ecosystem in shaping financial inclusion, particularly through mobile money in Ghana. However, challenges such as balancing potential benefits and risks in FinTech innovations, especially in developing countries like Ghana, are highlighted by [71]. This indicates that managing risks associated with FinTech adoption is a significant challenge that needs to be addressed for successful implementation in Ghana. Additionally, the study by [72] raises the question of whether FinTech leads to better accounting practices, focusing on the impact of FinTech on accounting in Ghana. Understanding how accountants perceive the impact of FinTech and efforts to enhance accounting practices underscore the challenges faced in integrating financial technology into traditional financial practices in the country. Furthermore, the computational codification of Sharia principles and environmental impact are debated challenges that need to be addressed to promote sustainable Islamic FinTech development [73]. In terms of financial inclusion, which is a key aspect of FinTech, challenges such as low levels of financial literacy, regulatory hurdles, and Sharia FinTech policies can hinder the development and adoption of FinTech solutions in Ghana [74]. The challenges of FinTech implementation in Ghana revolve around regulatory frameworks, risk management, strategic alignment with financial technology, and the impact on traditional financial practices. Addressing these challenges is crucial for the successful adoption and integration of FinTech in Ghana's financial landscape. It was discovered that the key constraints faced by MFIs in Ghana include poor regulatory environment, regular vicissitudes in government policies, paucity of capital, inadequate skills and professionalism, infrastructural inadequacies, socio-cultural misconceptions, corruption, frauds and forgeries and poor corporate governance. Despite this plethora of challenges, the study identified growing entrepreneurial awareness, increasing government interest, large unbanked and/or underserved rural area and high population of poor and low income households and their microenterprises as opportunities that exist for MFIs subsector [75].

3. Data and Methodology

The study employed a mixed method analysis to explore the strategies, impacts, and challenges of FinTech in enhancing financial inclusion in Ghana; where quantitative and qualitative approaches to research were explored. The mixed method analysis allows for the collection of both numerical and qualitative data to objectively measure the effectiveness of various FinTech strategies on financial inclusion [76]. A comparative analysis research design was utilized to assess the strategies, impacts, and challenges of FinTech in promoting financial inclusion in Ghana. This design facilitated a comprehensive evaluation of different FinTech approaches and their outcomes in the Ghanaian financial landscape. The target population for this research included individuals and entities involved in the financial sector in Ghana, particularly those engaged with FinTech solutions and financial inclusion initiatives interacting with stakeholders such as financial institutions, regulators, FinTech companies, and consumers. The study employed a purposive sampling method to select participants with direct experience or knowledge of FinTech and financial inclusion in Ghana. The sample size was determined based on data saturation, aiming for a diverse representation of perspectives within the financial sector. This study used both primary and secondary data. The primary data was collected through semi-structured questionnaire surveys with key stakeholders in the Ghanaian financial ecosystem adopting a five-point Likert scale questions, while secondary data from existing literature, reports, and studies on FinTech and financial inclusion was also utilized to enrich the analysis [2]. Informed consent was obtained from all participants, and their confidentiality and privacy was strictly maintained. The study also adhered to ethical guidelines to ensure the well-being and rights of all stakeholders involved [77]. Data collected was analysed using SPSS version 27 and thematic analysis was employed to derive meaningful insights into the strategies, impacts, and challenges of FinTech in promoting financial inclusion in Ghana [78].

4. Results and Discussions

This section focused primarily on data presentation and discussion of the research findings. The data presented was analysed and discussed using a two-step approach starting with descriptive analysis and inferential analysis informed by the information or data collected through primary data source with the help of questionnaires.

4.1. Bio Data and Descriptive Statistics of the Respondent's Knowledge and Usage of FinTech Products in Ghana

4.1.1. Gender of Respondents

Table 1 below presents the results on the gender background of the respondents. The results show that majority of the respondents were males representing 51.5%, whiles the remaining 48.5% were female respondents. The results revealed that more men participated in this survey than women.

Table 1. *Gender of respondents*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	53	51.50	51.50	51.50
	Female	50	48.50	48.50	100.0
	Total	103	100.0	100.0	

Source: Author's Fieldwork

4.1.2. Age Range of Respondents

Table 2 below presents the results on the age groups of the respondents. The results show that majority of the respondents were between the ages of 18 to 30 years representing 56.3% whereas 34% of the respondents were in the age groups between the age group of 31 to 40 years. However, 2% of the respondents were either between the years of 41 to 50 years or more than 50 years respectively.

Table 2. Age Range of Respondents.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Under 18 years	1	1.0	1.0	1.0
	18-30 years	58	56.3	56.3	57.3
	31-50 years	39	37.9	37.9	95.1
	Above 50 years	5	4.9	4.9	100.0
	Total	103	100.0	100.0	

Source: Author's Fieldwork

4.1.3. Educational Qualification of Respondents

Table 3 below show the educational background of the respondents. From the survey, the majority of the respondents representing 56.3% were Bachelors/Masters graduates whereas 22.3%, 17.5% and 3.9% were Diploma/Certificate holders, Primary/Secondary School graduates and PHD or Higher qualification holders respectively. The results revealed that more of the respondents have a higher level of education and may be privileged with knowledge concerning the study.

Table 3. Educational Qualification of Respondents.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Primary/Secondary	18	17.5	17.5	17.5
	Diploma/Certificate	23	22.3	22.3	39.8
	Bachelors/Masters	58	56.3	56.3	96.1
	PHD or Higher	4	3.9	3.9	100.0
	Total	103	100.0	100.0	

Source: Author's Fieldwork

4.1.4. Working Experience of Respondents

Table 4 below shows the employment status of the respondents. From the survey, the majority of the respondents representing 55.3% are actively employed in either Full Time or Part time job, 25.2% of the respondents are unemployed or students, 16.5% are self-employed while the remaining respondents which represent 2.9% are retired. The results revealed that more of the respondents have active jobs and are well aware of the study they participated in.

Table 4. *Employment Status of respondents.*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Employed Full/Part Time	57	55.3	55.3	55.3
	Self Employed	17	16.5	16.5	71.8
	Unemployed/Student	26	25.2	25.2	97.1
	Retired	3	2.9	2.9	100.0
	Total	103	100.0	100.0	

Source: Author's Fieldwork

Table 5. *Descriptive Statistics on Respondents' knowledge of FinTech products in Ghana.*

	Q1_Mobile_Money	Q1_Zeepay	Q1_Hubtel	Q1_ExpressPay	Q1_Binance	Q1_Fido
N Valid	103	103	103	103	103	103
Mean	0.98	0.3	0.19	0.21	0.09	0.3
Median	1	0	0	0	0	0
Std. Dev.	0.139	0.461	0.397	0.412	0.284	0.461
Variance	0.019	0.212	0.158	0.17	0.081	0.212

Source: Author's Fieldwork

4.1.5. Frequency Tables for Respondents' Knowledge on Individual FinTech Products in Ghana

Table 6. *Q1_Mobile_Money.*

	N	%
No	2	1.9%
Yes	101	98.1%

Source: Author's Fieldwork

Table 7. *Q1_Zeepay.*

	N	%
No	72	69.9%
Yes	31	30.1%

Source: Author's Fieldwork

Table 8. *Q1_Hubtel.*

	N	%
No	83	80.6%
Yes	20	19.4%

Table 9. *Q1_ExpressPay.*

	N	%
No	81	78.6%
Yes	22	21.4%

Source: Author's Fieldwork

Table 10. *Q1_Binance.*

	N	%
No	94	91.3%
Yes	9	8.7%

Source: Author's Fieldwork

4.1.6. Respondents' Usage of Fintech Products in Ghana

Table 11 below shows the results on the respondent's usage of Mobile Money in Ghana using a cross tabulation analysis against Gender. From the survey, 53 of the male respondents of which 52 used Mobile Money and 1 did not use. Whiles 50 of the female respondents of which 48 use Mobile Money and 2 do not use. This is an indication that about 97.09% of the respondents use Mobile Money.

Table 11. *Cross Tab Analysis on the use of Mobile Money.*

		Q2_Mobile_Money		Total
		No	Yes	
Gender	Male	1	52	53
	Female	2	48	50
Total		3	100	103

Source: Author's Fieldwork

Table 12 below shows the results on the respondents' usage of Zeepay in Ghana using a cross tabulation analysis. From the survey, 53 of the male respondents of which 6 used Zeepay and 47 did not use. Whiles 50 of the female respondents of which 6 use Zeepay and 44 do not use. This is an indication that about 11.65% of the respondents use Zeepay.

Table 12. *Cross Tab Analysis on the use of Zeepay.*

		Q2_Zeepay		Total
		No	Yes	
Gender	Male	47	6	53
	Female	44	6	50
Total		91	12	103

Source: Author's Fieldwork

Table 13 below shows the results on the respondents' usage of Hubtel in Ghana using a cross tabulation analysis. From the survey, 53 of the male respondents of which 3 used Hubtel and 50 did not use. Whiles 50 of the female respondents of which 1 use Hubtel and 49 do not use. This is an indication that about 3.88% of the respondents use Hubtel.

Table 13. *Cross Tab Analysis on the use of Hubtel.*

		Q2_Hubtel		Total
		No	Yes	
Gender	Male	50	3	53
	Female	49	1	50
Total		99	4	103

Source: Author's Fieldwork

Table 14 below shows the results on the respondents' usage of ExpressPay in Ghana using a cross tabulation analysis. From the survey, 53 of the male respondents of which 7 used ExpressPay and 46 did not use. Whiles 50 of the female respondents of which 1 use ExpressPay and 49 do not use. This is an indication that about 7.77% of the respondents use ExpressPay.

Table 14. *Cross Tab Analysis on the use of ExpressPay.*

		Q2_ExpressPay		Total
		No	Yes	
Gender	Male	46	7	53
	Female	49	1	50
Total		95	8	103

Source: Author's Fieldwork

Table 15 below shows the results on the respondents' usage of Binance in Ghana using a cross tabulation analysis. From the survey, 53 of the male respondents of which 3 used Binance and 50 did not use. Whiles 50 of the female respondents of which 1 use Binance and 49 do not use. This is an indication that about 3.88% of the respondents use Binance.

Table 15. *Cross Tab Analysis on the use of Binance.*

		Q2_Binance		Total
		No	Yes	
Gender	Male	50	3	53
	Female	49	1	50
Total		99	4	103

Source: Author's Fieldwork

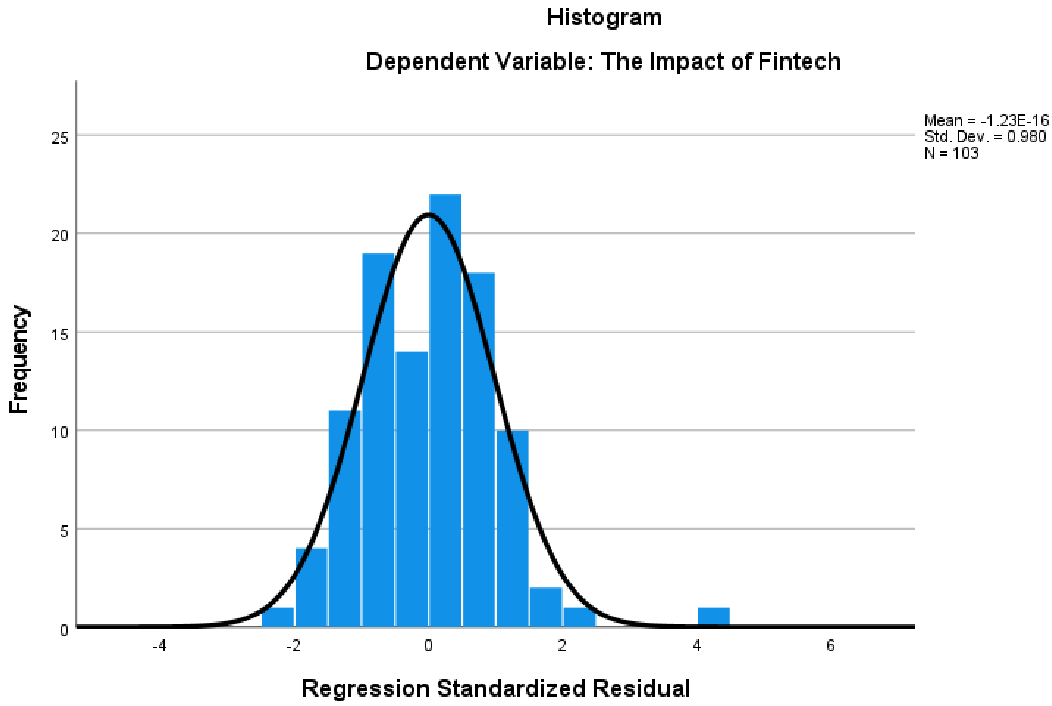
Table 16 below shows the results on the respondents' usage of Fido in Ghana using a cross tabulation analysis. From the survey, 53 of the male respondents of which 9 used Fido and 44 did not use. Whiles 50 of the female respondents of which 3 use Fido and 47 do not use. This is an indication that about 11.65% of the respondents use Fido.

Table 16. Cross Tab Analysis on the use of Fido.

		Q2_Binance		Total
		No	Yes	
Gender	Male	44	9	53
	Female	47	3	50
Total		91	12	103

4.2. Inferential Statistical Analysis on the Impacts, Strategies and Challenges of Fintech in Ghana

Inferential analysis was conducted on the Impacts, strategies and the challenges associated with FinTech in Ghana, using Regression analysis. The tables and charts below show the outcome of the analysis.



Source: Author's Fieldwork

Figure 1. Histogram Showing Regression analysis on The Impact of FinTech in Ghana.

Table 17. Regression analysis on The Impact of FinTech in Ghana.

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.236[a]	.056	.017	.62395

a. Predictors: (Constant), Employment Status, Gender, Age, Educational Background

b. Dependent Variable: The Impact of FinTech

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	2.242	4	.561	1.440	.227[b]
1	Residual	38.152	98	.389		
	Total	40.395	102			

a. Dependent Variable: The Impact of FinTech

b. Predictors: (Constant), Employment Status, Gender, Age, Educational Background

Table 18. Regression Analysis on the Challenges of FinTech in Ghana.

Model Summaryb				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.143a	.020	-.041	.76356

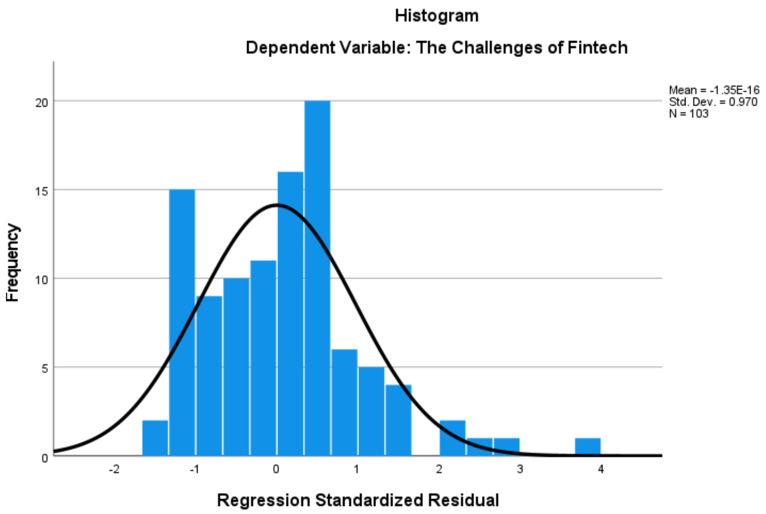
a. Predictors: (Constant), Q2_Fido, Q2_Binance, Q2_Mobile_Money, Q2_Hubtel, Q2_Zeepay, Q2_ExpressPay

b. Dependent Variable: The Challenges of FinTech

ANOVAa						
Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	1.163	6	.194	.332	.918b
1	Residual	55.970	96	.583		
	Total	57.132	102			

a. Dependent Variable: The Challenges of FinTech

b. Predictors: (Constant), Q2_Fido, Q2_Binance, Q2_Mobile_Money, Q2_Hubtel, Q2_Zeepay, Q2_ExpressPay



Source: Author’s Fieldwork

Figure 2. Histogram Showing Regression Analysis on the Challenges of FinTech in Ghana.

Table 19. Table Regression Analysis on the Challenges of FinTech in Ghana.

Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.210a	.044	.005	.75810

a. Predictors: (Constant), Employment Status, Gender, Age, Educational Background

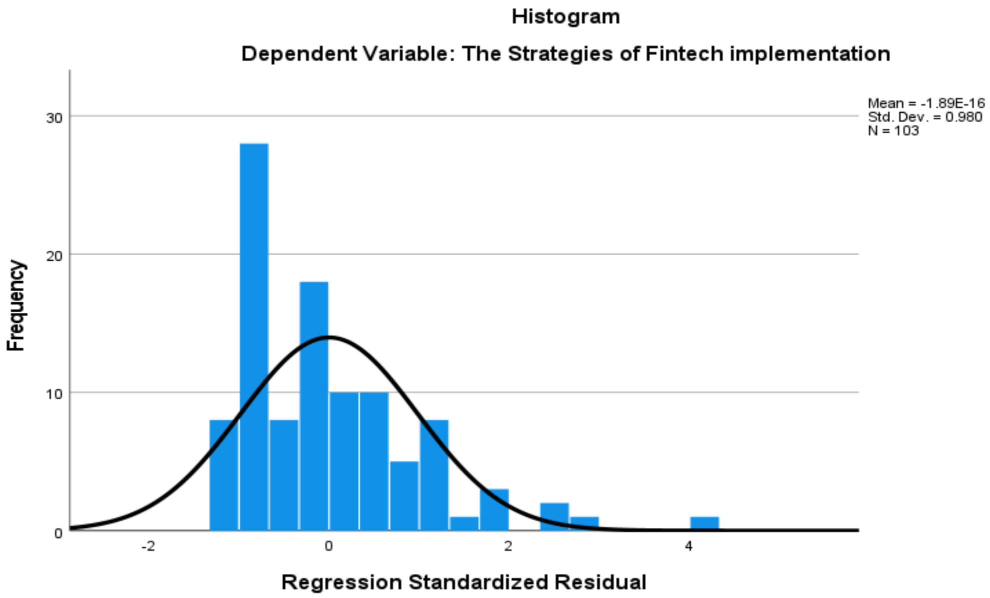
b. Dependent Variable: The Strategies of FinTech implementation

ANOVAa

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	2.605	4	.651	1.133	.345b
1	Residual	56.322	98	.575		
	Total	58.927	102			

a. Dependent Variable: The Strategies of FinTech implementation

b. Predictors: (Constant), Employment Status, Gender, Age, Educational Background



Source: Author’s Fieldwork

Figure 3. Histogram Showing Regression Analysis on the Challenges of FinTech in Ghana.

4.3. Discussion of Finding

4.3.1. Demographics and FinTech Awareness

The demographic profile of respondents provides insights into the potential influencers of FinTech awareness. The predominance of males, younger individuals, and those with higher education and employment status in the sample suggests that these groups may have greater exposure to technology and financial services, influencing their awareness of FinTech products.

4.3.2. Age and Educational Attainment

The higher awareness among younger respondents aligns with expectations, given their familiarity and comfort with technology. Similarly, the association between educational attainment and awareness suggests that individuals with higher education levels are more likely to engage with and comprehend FinTech innovations.

4.3.3. Gender Disparity

The slight male dominance in the survey sample may reflect broader societal trends or disparities in access to information and technology. Addressing this gender gap in FinTech awareness is crucial for ensuring equitable access to financial services and opportunities.

4.3.4. Implications for FinTech Adoption

The high awareness of Mobile Money, the most established FinTech product in Ghana, indicates a strong foundation for FinTech adoption. However, the lower awareness levels of other products suggest opportunities for further education and marketing efforts to promote their usage and benefits.

The data analysis sheds light on the demographic characteristics of respondents and their awareness of FinTech products in Ghana. Understanding these patterns is essential for designing targeted interventions to enhance FinTech literacy and drive inclusive financial innovation and adoption. Further research could explore the factors influencing FinTech adoption and its impact on financial inclusion and economic development in Ghana.

4.3.5. Reliability Analysis

The reliability analysis conducted on the survey items related to the impact of FinTech in Ghana reveals promising internal consistency, with Cronbach's Alpha coefficients of 0.821 for the awareness of FinTech products and 0.742 for the impact of FinTech. These values indicate a high level of reliability and consistency among the items within each scale.

4.3.6. Awareness of FinTech Products

The high Cronbach's Alpha coefficient (0.821) for the awareness of FinTech products suggests that the items measuring respondents' knowledge of FinTech solutions in Ghana are internally consistent. However, upon closer examination of the item-total statistics, it's evident that the corrected item-total correlations vary, indicating differences in the contribution of each item to the overall scale reliability.

For instance, the item assessing awareness of Mobile Money exhibits a very low corrected item-total correlation (0.008), suggesting that this item may not be strongly associated with the overall awareness of FinTech products. On the other hand, items related to Zeepay, Hubtel, ExpressPay, Binance, and Fido demonstrate moderate to high corrected item-total correlations, indicating their stronger relationship with the overall awareness construct.

4.3.7. Impact of FinTech

Similarly, the reliability analysis for the impact of FinTech in Ghana yields a Cronbach's Alpha coefficient of 0.742, indicating acceptable internal consistency among the survey items. The item-total statistics further reveal varying levels of contribution to the overall scale reliability.

Items assessing the potential of FinTech to increase access to financial services for underserved populations, reduce financial exclusion among rural communities, and facilitate easier access to credit and loans for small businesses exhibit relatively high corrected item-total correlations, indicating their strong association with the overall impact of FinTech construct.

However, items related to the impact of FinTech on increasing financial literacy, reducing poverty levels, and empowering women and marginalized groups demonstrate moderate corrected item-total correlations, suggesting a somewhat weaker relationship with the overall impact construct.

4.3.8. Interpretation and Implications

The findings from the reliability analysis provide valuable insights into the internal consistency and reliability of the survey instruments used to measure awareness of FinTech products and their impact in Ghana. While the scales demonstrate acceptable levels of reliability, the varying contribution of individual items underscores the importance of carefully evaluating and refining survey items to enhance construct validity.

Furthermore, the disparities in item contributions highlight potential areas for further investigation and refinement in future research. For instance, exploring the factors influencing awareness and perception of specific FinTech products could help optimize educational and promotional efforts to enhance FinTech adoption and usage in Ghana.

Additionally, addressing the nuanced impacts of FinTech on financial inclusion, literacy, poverty reduction, and empowerment requires targeted interventions and policy initiatives tailored to the diverse needs and challenges facing different population segments in Ghana.

5. Conclusion

This chapter provides a comprehensive summary of the entire research project, encapsulates the key findings, presents the conclusions drawn from the study, and offers recommendations for future research and practical applications. The research aimed to investigate the role of FinTech in promoting financial inclusion in Ghana, analyzing the various strategies, impacts, and challenges encountered.

The study concludes that FinTech plays a pivotal role in promoting financial inclusion in Ghana. The analysis revealed a high awareness and usage of mobile money, which indicates a strong foundation for FinTech adoption. However, awareness of other FinTech products remains low, suggesting a need for further education and marketing efforts. The demographic analysis showed that younger individuals, males, and those with higher education levels are more likely to engage with FinTech. Addressing the gender gap and enhancing FinTech literacy across all demographics are crucial for maximizing the benefits of financial inclusion. The study underscores the importance of leveraging FinTech to reduce financial exclusion, particularly among underserved and rural populations.

5.1. Summary of Findings

The research study was structured into five chapters, each contributing uniquely to the overall objective of the study: Section one laid the foundation of the study by elaborating on the background of the study. It defined the key concepts and sources of inspiration, and further explained the statement of the problem, objectives of the study, importance of the study, and the organization of the study. This chapter set the context for understanding the critical role of FinTech in enhancing financial inclusion in Ghana. Section two was dedicated to the review of related literature. It provided an in-depth exploration of various themes such as the definition and history of financial inclusion and FinTech, the types of FinTech services, and their impacts on financial inclusion. It also examined existing studies on the strategies employed by FinTech firms to promote financial inclusion, the challenges they face, and the potential benefits for the underserved populations with insights from countries like Vietnam, India, and Kenya following their successes in the implementation of FinTech initiatives. Section three outlined the methodology used in the research. This section detailed the research design, data collection instruments, and methods of data analysis. Structured questionnaires were the primary data collection tool, and the data was analyzed using both quantitative and qualitative methods. The chapter ensured the study's rigor by discussing ethical considerations and the reliability of the data collected. Section four presented the results and discussions. The data collected was analyzed and discussed using descriptive and inferential statistics. This section highlighted the demographic characteristics of the respondents, their awareness and usage of FinTech products, and the impact of these products on financial inclusion. It also discussed the implications of the findings for FinTech adoption and the broader financial inclusion agenda in Ghana. Section five concluded the study and provided summary, conclusion and policy implication.

5.2. Managerial Implications

The study concludes that FinTech plays a pivotal role in promoting financial inclusion in Ghana. The analysis revealed a high awareness and usage of mobile money, which indicates a strong foundation for FinTech adoption. However, awareness of other FinTech products remains low, suggesting a need for further education and marketing efforts. The demographic analysis showed that younger individuals, males, and those with higher education levels are more likely to engage with FinTech. Addressing the gender gap and enhancing FinTech literacy across all demographics are crucial for maximizing the benefits of financial inclusion. The study underscores the importance of leveraging FinTech to reduce financial exclusion, particularly among underserved and rural populations.

5.3. Policy Recommendations

Based on the study's results and conclusions, the following recommendations were made:

Enhance FinTech Education and Awareness

Implement targeted educational programs to raise awareness about the benefits and usage of various FinTech products beyond Mobile Money. Utilize digital platforms and community outreach to educate underserved populations about FinTech solutions.

Improve Infrastructure and Interoperability

Invest in technological infrastructure to support the seamless operation and integration of various FinTech services. Ensure interoperability between different FinTech platforms to enhance user experience and service accessibility.

Strengthen Consumer Protection

Develop and enforce robust consumer protection regulations to build trust and confidence in digital financial services. Establish grievance redressal mechanisms to address consumer issues promptly and effectively.

Promote Financial Inclusion Initiatives

Launch programs similar to India’s Jan Dhan Yojana and Vietnam’s National Financial Inclusion Strategy to increase access to financial services, especially in rural and underserved areas. Encourage public-private partnerships to drive innovation and expand the reach of FinTech services.

Supportive Regulatory Environment

Create regulatory sandboxes to allow for the testing and development of new FinTech innovations in a controlled environment. Collaborate with international bodies to adopt best practices and standards in FinTech regulation and implementation.

5.4. Limitations to the Study

Despite its comprehensive scope, this study has certain limitations that warrant consideration. One area for improvement is FinTech's rapid development, which may make it challenging to capture the most recent information and industry trends [79]. Additionally, the comparative analysis may encounter challenges related to data availability, consistency, time and resource constraints, and comparability across different regions. The study's reliance on existing literature, primary and secondary data sources in Ghana limits ability to generalize the results from it. Given the diverse regulatory landscapes governing FinTech globally, the study may only capture some relevant policy dynamics impacting financial inclusion relating to study context.

Abbreviations

FinTech	Financial Technology
CBK	Central Bank of Kenya
DeFi	Decentrarised Finance
MFIs	Micro Finance Institutions
RBI	Reserve Bank of India
SDGs	Sustainable Development Goals
SMEs	Small and Medium Enterprises
SSA	Sub-Saharan Africa
UPI	Unified Payment Interface

Author Contributions

Ibrahim Zubairu: Conceptualization, Formal Analysis, Methodology, Supervision, Validation, Writing–original draft, Writing–review & editing

Benjamin Amoako Amanquah: Data curation, Formal Analysis, Methodology, Project administration, Software, Supervision, Validation, Writing–review&editing

Francis Kwarteng: Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Validation, Writing–original draft

Nathan Bortey: Formal Analysis, Funding acquisition, Investigation, Methodology, Validation

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] Ren, C., Zhou, X., Wang, C., Y. Guo, Y., Diao, Y., Shen, S., Reis, S., Li, W., Xu, J. & Gu, B. (2023). Aging threatens sustainability of smallholder farming in China. Nature, 616 (2023), pp. 96-103.

[2] Ozili, P., Ademiju, A., & Rachid, S. (2022). Impact of financial inclusion on economic growth: review of existing literature and directions for future research. International Journal of Social Economics, 50(8), 1105-1122. https://doi.org/10.1108/ijse-05-2022-0339

[3] Ozili, P. K. & Mhlanga, D. (2023). Why is financial inclusion so popular? An analysis of development buzzwords. Journal of International Development. John Wiley & Sons, Ltd., vol. 36(1), pp 231-253. https://doi.org/10.1002/jid.3812

[4] Demir, A., Pesqué‐Cela, V., Altunbaş, Y., & Murinde, V. (2020). Fintech, financial inclusion and income inequality: a quantile regression approach. European Journal of Finance, 28(1), 86-107. https://doi.org/10.1080/1351847x.2020.1772335

[5] Lagna, L. & Ravishankar, M. N. (2021). Making the world a better place with fintech research. Information Systems Journal Volume 32, Issue 1. https://doi.org/10.1111/isj.12333

[6] Mantri, A., & Mishra, R. (2023). Empowering Small Businesses with the Force of Big Data Analytics and AI: A Technological Integration for Enhanced Business Management. The Journal of High Technology Management Research, 34. 100476. https://doi.org/10.1016/j.hitech.2023.100476

[7] Ediagbonya, V. & Tioluwani, C. T. (2022). The role of fintech in driving financial inclusion in developing and emerging markets: issues, challenges and prospects. Technological Sustainability, 2(5). https://doi.org/10.1108/TECHS-10-2021-0017

[8] Joia, L. A., & Cordeiro, J. P. V. (2021). Unlocking the Potential of Fintechs for Financial Inclusion: A Delphi-Based Approach. Sustainability, 13(21), 11675. https://doi.org/10.3390/su132111675

[9] Setiawan, N. A., Kinanti, R. & Nanda F. A. (2023). Performance Motivation of Taekwondo Athletes: Coach-Athlete Relationship. Journal of Coaching and Sports Science, 2(1), 41-49.

[10] Koomson, I., Afoakwah, C. (2022). Can Financial Inclusion Improve Children’s Learning Outcomes and Late School Enrolment in a Developing Country? Appl. Econ. 55(3), 1–18. https://doi.org/10.1080/00036846.2022.2086683

[11] Muchandigona, A. K. & Kalema, B. M. (2023). "The Catalytic Role of Mobile Banking to Improve Financial Inclusion in Developing Countries," International Journal of E-Services and Mobile Applications (IJESMA), IGI Global, vol. 15(1), pages 1-21.

[12] Nyarko, K. A., Temoso, O. & Ng’ombe, J. N. (2023). Heterogeneous Effects of Agricultural Technology Adoption on Smallholder Household Welfare in Ghana. Journal of Agricultural and Applied Economics, 1–21. https://doi.org/10.1017/aae.2023.16

[13] Mittal, I. (2023). Effect of Social Media Influencers on Buying Behavior of Consumers and Impact on their Decision. Social Science Journal for Advanced Research. Vol. 3, Issue 3. https://doi.org/10.54741/ssjar.3.3.6

[14] Wentzel, K. R., Muenks, K., McNeish, D. & Russell, S. (2016). Peer and Teacher Supports in Relation to Motivation and Effort: A Multi-level Study. Contemporary Educational Psychology, 49. https://doi.org/10.1016/j.cedpsych.2016.11.002

[15] Ren, B., Li, L., Zhao, H. & Zhou, Y. (2018). The Financial Exclusion in the Development of Digital Finance — A Study Based on Survey Data in the Jingjinji Rural Area. The Singapore Economic Review, Vol. 63, No. 1, pp. 65–82. https://doi.org/10.1142/S0217590818500017 65

[16] Adeleye, B. N. (2024). Income Inequality, Human Capital and Institutional Quality in Sub-Saharan Africa. Social Indicators Research. 171, 133–157. https://doi.org/10.1007/s11205-023-03244-0

[17] Fungacova, Z., & Weill, L. (2015). Understanding Financial Inclusion in China. China Economic Review, 34, 196-206. https://doi.org/10.1016/j.chieco.2014.12.004

[18] Park, C.-Y., & Mercado Jr., R. (2018b). Financial Inclusion, Poverty, and Income Inequality. The Singapore Economic Review, 63, 185-206. https://doi.org/10.1142/S0217590818410059

[19] Jonker, N. & Kosse, A. (2022). The Interplay of Financial Education, Financial Inclusion and Financial Stability and The Role of Big Tech. Contemporary Economic Policy, Western Economic Association International, Vol. 40(4), pages 612-635.

[20] Demirgüç-Kunt, A., Klapper, L. F., Singer, D., & Van Oudheusden, P. (2015). The Global Findex database 2014: Measuring Financial Inclusion around the World. World Bank Policy Research Working Paper, No. 7255.

[21] Nguyen, T. M., & Le, G. N. H. (2021). The Influence of COVID-19 Stress on Psychological Well-Being among Vietnamese Adults: The Role of Self-Compassion and Gratitude. Traumatology. Advance online publication. http://dx.doi.org/10.1037/trm0000295

[22] Sarma, M. & Pais, J. (2011) Financial Inclusion and Development. Journal of International Development, 23, 613-625. https://doi.org/10.1002/jid.1698

[23] Stoeckli, E., Dremel, C. & Uebernickel, F. (2018). Exploring Characteristics and Transformational Capabilities of InsurTech Innovations to Understand Insurance Value Creation in a Digital World. Electronic Markets, Springer; IIM University of St. Gallen, vol. 28(3), pages 287-305.

[24] Hudaefi, F. A. (2020). How does Islamic Fintech Promote the SDGs? Qualitative Evidence from Indonesia. Qualitative Research in Financial Markets, 12(4), pp. 353-366.

[25] Aicha, E. (2023). Effect of fintech services on financial inclusion in Kenya. https://doi.org/10.21203/rs.3.rs-2544433/v1

[26] Feng, H. (2018). Migrant Peers in the classroom: Is the Academic Performance of Local Students Negatively Affected? Journal of Comparative Economics, Elsevier, vol. 46(2), pages 582-597.

[27] Risha, S. V. M., & Samudro, A. I. (2021). Peer-To-Peer Lending vs. Commercial Bank’s Credit System: Financing Solutions for MSMEs in Indonesia. The Lawpreneurship Journal, 1(1), 5881. https://doi.org/10.21632/tlj.1.1.58-81

[28] Julia, C. (2020). Beneath the China Boom: Labour, Citizenship, and the Making of a Rural Land Market. University of California Press

[29] Antwi-Wiafe, K., Nkansa Asante, G. & Paul Owusu Takyi, P. O. (2023). Is Financial Technology a Complement or Substitute for Domestic Financial Institutions in Ghana? Journal of Financial Economic Policy, Emerald Group Publishing Limited, vol. 15(4/5), pages 424-443.

[30] Atkinson, A. and Messy, F. (2013). Promoting financial inclusion through financial education. https://doi.org/10.1787/5k3xz6m88smp-en

[31] Siano, A., Raimi, L., Palazzo, M., & Panait, M. (2020). Mobile banking: an innovative solution for increasing financial inclusion in sub-Saharan African countries: Evidence from Nigeria. Sustainability, 12(23), 10130. https://doi.org/10.3390/su122310130

[32] Iwedi, M., N. F., O., & O. K., W. (2023). Effect of financial technology on financial inclusion in Nigeria. African Journal of Accounting and Financial Research, 6(1), 21-36. https://doi.org/10.52589/ajafr-a7lqzbe9

[33] Peprah, J., Oteng, C., & Sebu, J. (2020). Mobile money, output and welfare among smallholder farmers in Ghana. Sage Open, 10(2), 215824402093111. https://doi.org/10.1177/2158244020931114

[34] Abbey, W. (2021). Bridging the Racial Weath Gap: Leveraging Technology to Create a Permanent Bridge to Financial Access and Inclusion. Esusu, New York.

[35] Attopley, F. Y. (2016). Emerging Trends in the Financial Industry of Ghana. International Journal of Management and Scientific Research, 1(2), 4-9.

[36] Ragui, A. (2017). Prospects for Egypt’s Population and Labour Force: 2000 to 2050," Working Papers 1398, Economic Research Forum, revised 20 Aug 2020.

[37] Akudugu, M. A. (2013). The Determinants of Financial Inclusion in Western Africa: Insights from Ghana. Research Journal of Finance and Accounting, 4, 1-10.

[38] Senyo, P. K. & Karanasios, S., (2020). How do Fintech Firms Address Financial Inclusion?” ICIS 2020 Proceedings. 7. https://aisel.aisnet.org/icis2020/societal_impact/societal_impact/7

[39] Salampasis, D. & Mention, A. L. (ed.), (2017). Open Innovation: Unveiling the Power of the Human Element," World Scientific Books, World Scientific Publishing Co. Pte. Ltd., number 10056.

[40] Thathsarani, U. S., Wei, J. & Samaraweera, G. R. S. R. C. (2021). "Financial Inclusion’s Role in Economic Growth and Human Capital in South Asia: An Econometric Approach," Sustainability, MDPI, vol. 13(8), pages 1-18.

[41] Yawe, B., Ddumba-Ssentamu, J., Nnyanzi, J., & Mukisa, I. (2022). Role of mobile money and digital payments in financial inclusion for sustainable development goals in Africa. https://doi.org/10.5772/intechopen.105858

[42] Hossain, M., Al-Amin, M., & Toha, M. (2021). Are commercial agent banking services worthwhile for financial inclusion? Business Management and Strategy, 12(2), 206. https://doi.org/10.5296/bms.v12i2.19070

[43] Zedeli, K. H. (2019). The Role of Fintech in Promoting Financial Inclusion in Developing Countries: The Case of Mexico. url= https://api.semanticscholar.org/CorpusID:226571285

[44] Varlamova, J., Larionova, N. & Kukushkina, O. (2020). How digital technologies affect consumers' financial behaviour. Rivista internazionale di scienze sociali. - Milano: Vita e Pensiero, ISSN 1125-9868, ZDB-ID 205554-5. - Vol. 128(3), p. 321-344.

[45] Sharif, S., Naghavi, N., Waheed, H., & Ehigiamusoe, K. (2022). The role of education in filling the gender gap in financial inclusion in low-income economies. International Journal of Emerging Markets, 18(12), 5755-5777. https://doi.org/10.1108/ijoem-07-2021-0991

[46] Tamasiga, P., Guta, A. T., Onyeaka, H. & Kalane, M. S. (2022). The Impact of Socio-economic Indicators on COVID-19: An Empirical Multivariate Analysis of Sub-Saharan African Countries. Journal of Social and Economic Development. 24, 493–510 (2022). https://doi.org/10.1007/s40847-022-00184-2

[47] Birochi, R. and Pozzebon, M. (2016). Improving financial inclusion: towards a critical financial education framework. Revista De Administração De Empresas, 56(3), 266-287. https://doi.org/10.1590/s0034-759020160302

[48] Ito, H., & Kawai, M. (2021). The Global Monetary System and the Use of Local Currencies in ASEAN+3. Discussion papers 21019, Research Institute of Economy, Trade and Industry (RIETI).

[49] Tian, L., & Kling, G. (2021). Financial Inclusion and Financial Technology: Finance for Everyone? The European Journal of Finance, 28(1), 1–2. https://doi.org/10.1080/1351847X.2021.1981418

[50] Saini, K. (2023). Fintech Innovations in MENA: Redefining Financial Landscape. Journal of Innovative Digital Transformation and Business Architecture Vol. 2(1), pp 1-8.

[51] Pepescu, A. (2022). Cross-Border Central Bank Digital Currencies, Bank Runs and Capital Flows Volatility. IMF Working Paper No. WP/22/83. Strategy, Policy & Review Department.

[52] Ashenafi, B. B. & Dong, Y. (2022). Financial Inclusion, Fintech, and Income Inequality in Africa. FinTech 1(4), pp. 376-387. https://doi.org/10.3390/fintech1040028

[53] Nuryitmawan, T. R. (2023). The Impact of Islamic Fintech on Poverty Alleviation in Indonesia: A Socio-Economic Implications. Airlangga Journal of Innovation Management, 4(2), pp. 136-146. https://doi.org/10.20473/ajim.v4i2.49478

[54] Aba, F., & Linardy, D. (2021). Financial Technology in Financial Inclusions and Its Implications on Poverty from Indonesia. Preprints. https://doi.org/10.20944/preprints202111.0061.v

[55] Mpofu, F. (2022). Industry 4.0 in financial services: mobile money taxes, revenue mobilization, financial inclusion, and the realisation of sustainable development goals (sdgs) in Africa. Sustainability, 14(14), 8667. https://doi.org/10.3390/su14148667

[56] Stewart & Jürjens (2018). Data security and consumer trust in fintech innovation in Germany. Information and computer security, 26(1), 109-128. https://doi.org/10.1108/ics-06-2017-0039

[57] Gyeke-Dako, A., Agbloyor, E. K., Agoba, A. M., Turkson, F. & Abbey, E. (2022). Central Bank Independence, Inflation, and Poverty in Africa. Journal of Emerging Market Finance, Institute for Financial Management and Research, Vol. 21(2), pages 211-236.

[58] Danladi, S., Prasad, M. S. V., Modibbo, U. M., Ahmadi, S. A., & Ghasemi, P. (2023). Attaining Sustainable Development Goals through Financial Inclusion: Exploring Collaborative Approaches to Fintech Adoption in Developing Economies. Sustainability, Vol. 15(17), 13039. https://doi.org/10.3390/su151713039

[59] Arner, D., Barberis, J., & Buckley, R. (2015). The evolution of fintech: a new post-crisis paradigm? SSRN Electronic Journal. https://doi.org/10.2139/ssrn.2676553

[60] Emara, N.; El Said, A. Financial inclusion and economic growth: The role of governance in selected MENA countries. International Review of Economics and Finance. 75(5), pp.34–54.

[61] Geiger, M. & Oranburg, S. C (2019). Underrepresented Groups and Venture Funding: An Examination of Funding Raised Through Equity Crowdfunding in the US. Arthur M. Blank Centre for Entrepreneurship, Babson College, Wellesley, Massachusetts, USA.

[62] Sharma, D. (2016). Nexus between Financial Inclusion and Economic Growth: Evidence from the Emerging Indian Economy. Journal of Finance and Economic Policy. Vol. 8, 13–36.

[63] Van, N. P. & L.-T. Nguyen, L.-T. (2017). Performance measurement of supply chain integration in Manufacturing firms' of Southeast Vietnam. European Journal of Economic Management, Vol. 6, No. 2, pp. 23–32, 2017.

[64] Khera, P., Ng, S., Ogawa, S., & Sahay, R. (2022). Measuring digital financial inclusion in emerging market and developing economies: A new index. Asian Economic Policy Review, 17(2), 213-230.

[65] Mattern, M. & McKay, C. (2018). Building Inclusive Payment Ecosystems in Tanzania and Ghana. CGAP Focus Note; No. 110. World Bank, Washington, DC. http://hdl.handle.net/10986/30274

[66] Syed, A. A., Grima, S. & Sood, K. (2024). Assessing the Role of the Fintech Era on the Banking Stability of an Emerging Economy: Interaction Analysis of the Indian Banking Industry. Folia Oeconomica Stetinensia, 24(1), 182–202. https://doi.org/10.2478/foli-2024-0011

[67] Ajide, F. (2021). Shadow economy in Africa: how relevant is financial inclusion? Journal of Financial Regulation and Compliance. Vol. 29, Issue 3, pp. 297-316. https://doi.org/10.1108/JFRC-10-2020-0095

[68] Makarov, D. (2022) Mathematics, 10, Article No. 4794. https://doi.org/10.3390/math10244794

[69] Allen, K. (2020). The Value of Perception. Philosophy and Phenomenological Research. Vol. 100, Issue 3. https://doi.org/10.1111/phpr.12574

[70] Coffie, C. P. K., Hongjiang, Z., Mensah, I. A., Kiconco, R., & Simon, A. E. O. (2020). Determinants of FinTech payment services diffusion by SMEs in Sub-Saharan Africa: evidence from Ghana. Information Technology for Development, 27(3), 539–560. https://doi.org/10.1080/02681102.2020.1840324

[71] Nawayseh, M. K. A. (2020). FinTech in COVID-19 and Beyond: What Factors are Affecting Customers' Choice of FinTech Applications? Journal of Open Innovation: Technology, Market, and Complexity 6(4): 1–15.

[72] Bonsu, E. M. & Baffour-Koduah, D. (2023). From the Consumers' Side: Determining Students' Perception and Intention to Use ChatGPT in Ghanaian Higher Education. Journal of Education Society & Multiculturalism. https://doi.org/10.2478/jesm-2023-0001

[73] Cociug, V. and Turcan-Munteanu, N. (2021). Low financial inclusion as an educational gaps result: the republic of Moldova case. SHS Web of Conferences, 97, 01027. https://doi.org/10.1051/shsconf/20219701027

[74] Yahya, A. (2021). Sharia Fintech Development in Indonesia. INCEESS 2020, July 17-18, Bekasi, Indonesia. EAI https://doi.org/10.4108/eai.17-7-2020.2302984

[75] Boateng, A. A. (2015). An Examination of Challenges and Prospects of Microfinance Institutions in Ghana. Journal of Economics and Sustainable Development, 6, 52-60.

[76] Ozili, P. (2020). Theories of financial inclusion. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3526548

[77] Bongomin, G., Munene, J., Ntayi, J., & Malinga, C. (2019). Collective action among rural poor. The International Journal of Bank Marketing, 37(1), 20-43. https://doi.org/10.1108/ijbm-08-2017-0174

[78] Shahani, A. (2022). The impact of financial inclusion and fin-tech on financial sustainability: empirical evidence-emerging and frontier markets. Does Value Co-Creation Impacts Customer Loyalty and Repurchase Intention? 18(2). https://doi.org/10.46745/ilma.jbs.2022.18.02.0

[79] Hua, X., Y Huang, Y. & Zheng, Y. (2019). Current Practices, New Insights, and Emerging Trends of Financial Technologies. Industrial Management & Data Systems, Vol. 119 No. 7, pp. 1401-1410. https://doi.org/10.1108/IMDS-08-2019-0431