**Review article**

**FINANCIAL TECHNOLOGY AND ITS EFFECTS ON SMALL AND MEDIUM-SCALE ENTERPRISES**

**Abstract**

The study is motivated by the growing importance of financial technology in SME operations and the need to understand its impact on business performance in developing economies like Ghana. The research pursued three objectives: exploring awareness and perceptions of fintech adoption among SMEs, investigating the relationship between fintech adoption and SME performance, and examining the role of financial literacy in this relationship. The study was grounded in the Technology Acceptance Model and Resource-Based View Theory. An explanatory research design with a quantitative approach was employed, focusing on SMEs registered with the Association of Ghana Industries. Primary data was collected through structured questionnaires from 169 SMEs, examining fintech adoption and usage (12 items), financial literacy (15 items), and SME performance (10 items). Data analysis using PLS-SEM revealed high adoption rates for basic fintech solutions (M = 3.90) but lower rates for advanced technologies. A strong positive relationship was found between fintech adoption and SME performance (β = 0.910, p < 0.001). Financial literacy demonstrated a significant mediating effect (β = 0.530, p = 0.004) but not a moderating effect (β = 0.036, p = 0.312) on this relationship. The study recommended establishing demonstration centers for advanced fintech solutions, developing digital transformation policies, and creating integrated training programs combining fintech skills with financial management knowledge. These recommendations were directed at various stakeholders including the Ghana Association of Industries, Ministry of Trade and Industry, and financial institutions to enhance fintech adoption and its impact on SME performance.

**Keywords**: Financial technology, small and medium-scale enterprises, fintech adoption, business performance, financial literacy, developing economies, Ghana, Technology Acceptance Model, Resource-Based View Theory, SME growth, digital transformation.

**1.1 Introduction**

Financial technology (fintech) has significantly transformed the global financial landscape, particularly in its impact on Small and Medium-sized Enterprises (SMEs) (Hasanudin & Rahmiyanti, 2023). Fintech encompasses the use of digital platforms and innovative financial solutions to enhance business operations, accessibility, and efficiency (Lontchi et al., 2023). SMEs, which play a significant role in economic development, often face challenges such as limited access to financial services and inefficiencies in business operations (World Bank, 2020). Even though fintech has the potential to address these challenges, its adoption and effectiveness are influenced by financial literacy, the ability to understand and apply financial knowledge in business decision-making (Utami & Sitanggang, 2021). Studies have shown that higher financial literacy enhances the benefits of fintech adoption, leading to improved SME performance (Hamidah et al., 2020). Despite prior research exploring the relationship between fintech adoption, financial literacy, and SME performance, most of these studies are on developed economies with limited empirical evidence existing on emerging economies such as Ghana. With Ghana’s fintech sector experiencing rapid growth (BoG, 2024), there is a need to understand how fintech adoption impacts SMEs in the country, as well as the role financial literacy plays in moderating or mediating this relationship (Asiedu et al., 2024).

This study investigated the awareness and perception of fintech adoption among SMEs in Ghana, analyzed its impact on SME performance, and assessed the role of financial literacy in moderating or mediating this relationship. The fintech industry in Ghana has expanded significantly, with 52 licensed fintech firms and a total transaction value of GHS 195.76 billion as of February 2024 (BoG, 2024). Despite this growth, many SMEs in Ghana struggle to survive, mirroring global trends where 67% of SMEs face financial difficulties (World Economic Forum, 2022). Prior research in Ghana has examined the determinants of fintech payment services diffusion among SMEs (Coffie et al., 2021) and factors influencing fintech adoption rates (Krah et al., 2024). However, there remains a lack of comprehensive analysis on the direct impact of fintech adoption on SME performance and the influence of financial literacy in this relationship. Furthermore, although some studies have highlighted the role of financial literacy in fintech adoption and SME performance (Astari et al., 2022; Lontchi et al., 2023), the peculiar economic condition of Ghana necessitates this study before generalization can be made as there is very little evidence from prior studies that focused on countries that have comparable economic conditions with Ghanaian. Addressing these gaps provide valuable insights for SME owners, fintech service providers, and policymakers in developing strategies that enhance fintech adoption, improve financial literacy, and promote SME growth in Ghana (Al-Amudi et al., 2024; Gunawan et al., 2023).

**2.0 LITERATURE REVIEW/ METHODS**

This aspect presents a review of literature relevant to financial technology (FinTech) and its impact on small and medium-sized enterprises (SMEs).

**2.1 Financial Technology**

Financial technology, commonly known as FinTech, refers to innovative technological solutions designed to improve and automate the delivery and use of financial services (Abbasi et al., 2021; Al-Amudi et al., 2024). According to Alkhawaldeh et al. (2023), FinTech has to do with a wide range of applications, including mobile banking, digital payments, robo-advisors, blockchain technology, and peer-to-peer lending platforms (Atisu et al., 2024). These technologies leverage artificial intelligence, big data analytics, and cloud computing to enhance financial processes and user experiences (Al-Shari & Lokhande, 2023). The study of Asiedu et al. (2024) noted that FinTech solutions aim to make financial services more accessible, efficient, and cost-effective for both consumers and businesses. The scope of FinTech extends across various segments of the financial industry, transforming traditional banking, insurance, investment management, and regulatory compliance (Astari et al., 2022; Coffie et al., 2021). The study of Daulay et al. (2023) highlighted that FinTech innovations enable faster transaction processing, improved risk assessment, and personalized financial products.

According to Dwivedi et al. (2021), these technologies facilitate real-time data analysis and decision-making, enhancing operational efficiency and customer satisfaction. Moreover, Fasano and Cappa (2022) emphasized that FinTech solutions often integrate seamlessly with existing financial systems, creating a more interconnected and dynamic financial ecosystem. FinTech has profound implications for financial inclusion and economic development, particularly in emerging markets (Frimpong, 2022; Gunawan et al., 2023). Hamidah et al. (2020) argued that FinTech bridges gaps in traditional financial infrastructure, providing services to underbanked populations. According to Hasan et al. (2023), mobile payment systems and digital wallets have revolutionized financial transactions in regions with limited access to conventional banking services. Also, Hasanudin and Rahmiyanti, (2023) noted that FinTech solutions empower small businesses and entrepreneurs by offering alternative funding sources and streamlined financial management tools. This democratization of financial services has the potential to drive economic growth and reduce income inequality (Hasanudin & Panigfat, 2023; Hasyim et al., 2023).

**2.2 Historical Evolution of Financial Technology**

The roots of financial technology can be traced back to the mid-20th century, with the introduction of credit cards and ATMs marking early innovations in financial services (Karim et al., 2022; Krah et al., 2024). According to Lontchi et al. (2023), the 1960s and 1970s saw the development of electronic stock trading systems and the establishment of SWIFT (Society for Worldwide Interbank Financial Telecommunication) for international money transfers. Marini et al. (2024) note that these advancements laid the groundwork for the digitalization of financial services. The 1980s brought further progress with the widespread adoption of computer systems in banks and financial institutions, enhancing data processing capabilities and operational efficiency (Marrara et al., 2021; Moreira-Santos et al., 2022).

The 1990s marked a significant turning point in the evolution of FinTech with the rise of the internet and e-commerce (Morgan, 2021; Morgan & Trinh, 2020). According to Mutamimah and Indriastuti, (2023), online banking services emerged during this period, allowing customers to access account information and perform transactions remotely. The study of Nugraha et al. (2022) highlighted that the dot-com boom also saw the launch of pioneering online payment platforms like PayPal. Moreover, Ololade (2024) noted that these developments coincided with advancements in data encryption and cybersecurity. This addresses concerns about the safety of digital financial transactions. The late 1990s and early 2000s witnessed the growth of electronic trading platforms and the increasing automation of financial markets (Rabaa’i, 2021; Rahadjeng et al., 2023).

The global financial crisis of 2008 served as a catalyst for the modern FinTech revolution, sparking a wave of innovation and disruption in the financial sector (Rehman et al., 2023; Rizqiya et al., 2022). According to Siddik et al. (2023), the crisis exposed vulnerabilities in traditional financial systems and created opportunities for new entrants to offer alternative solutions. Also, Silaya (2022) argued that this period saw the emergence of cryptocurrency and blockchain technology, with Bitcoin introduced in 2009 as a decentralized digital currency. The proliferation of smartphones and mobile internet in the early 2010s further accelerated FinTech adoption, enabling the development of mobile banking apps and digital wallets (Utami & Sitanggang, 2021; Yoshino et al., 2020).

In recent years, FinTech has expanded into diverse areas such as insurtech, regtech, and wealthtech, leveraging advanced technologies like artificial intelligence and machine learning (Amoako et al. 2025; Al-Amudi et al., 2024; Alkhawaldeh et al., 2023). According to Asiedu et al. (2024), the COVID-19 pandemic has further accelerated digital transformation in finance, driving increased adoption of contactless payments and online financial services. The study of Coffie et al. (2021) noted that open banking initiatives and regulatory sandboxes have fostered collaboration between traditional financial institutions and FinTech startups. Moreover, Daulay et al. (2023) highlighted the growing focus on financial inclusion, with FinTech solutions targeting underserved markets and promoting access to credit and financial services for small businesses and individuals.

## **2.3 Conceptual Framework and Hypotheses Development**

The conceptual framework depicted in Figure 1 illustrates the relationships between fintech adoption and usage, SME performance, and financial literacy. This framework is grounded in several key theories and is supported by empirical evidence from recent studies. The first relationship depicted is between fintech adoption and usage and SME performance (H1). This link is supported by the Technology Acceptance Model (TAM) (Davis, 1989), which posits that perceived usefulness and ease of use drive technology adoption. In the context of fintech, studies have shown that SMEs adopting fintech solutions often experience improved financial efficiency and overall performance (Utami & Sitanggang, 2021; Lontchi et al., 2023). The Diffusion of Innovation Theory (Rogers, 2003) further explains how innovative technologies like fintech spread through a population of potential adopters, in this case, SMEs.

Fintech (product) Adoption and Usage

SME Performance

Financial Literacy

H1

H3

H2

Figure 1: Conceptual Framework

Source: Author’s Construct (2024)

The framework also incorporates financial literacy as both a moderator (H2) and mediator (H3) in the relationship between fintech adoption and SME performance. This dual role is supported by the Resource-Based View (RBV) of the firm (Barney, 1991), which suggests that unique resources and capabilities, such as financial literacy, can enhance a firm’s competitive advantage. Empirical studies have demonstrated that financial literacy strengthens the positive impact of fintech adoption on SME performance (Astari et al., 2022; Al-Amudi et al., 2024), acting as a moderator. Additionally, research has shown that financial literacy serves as a pathway through which fintech adoption translates into improved business outcomes (Lontchi et al., 2023; Frimpong, 2022; Umoren et al., 2025), supporting its role as a mediator. The inclusion of both moderating and mediating effects of financial literacy reflects the complex nature of its role in the fintech-performance relationship. This complexity is consistent with the findings of Siddik et al. (2023), who observed that financial literacy can influence this relationship both directly and indirectly through improved access to finance. Based on the conceptual framework, the study proposed the following hypotheses as discussed below.

**2.4.H1: Awareness and Perceptions of FinTech Adoption**

H1a: There is a significant relationship between SMEs’ awareness of FinTech products and their adoption of FinTech solutions.
H1b: SMEs’ perception of FinTech (in terms of security, ease of use, and efficiency) significantly influences their adoption and usage of FinTech solutions.

H2: FinTech Adoption and SME Performance

H2a: The adoption and usage of FinTech solutions have a positive and significant effect on the financial performance of SMEs.
H2b: The adoption and usage of FinTech solutions have a positive and significant effect on the operational efficiency of SMEs.
H2c: The adoption and usage of FinTech solutions positively impact SMEs’ market competitiveness.

H3: The Role of Financial Literacy in the Relationship Between FinTech Adoption and SME Performance

H3a: Financial literacy moderates the relationship between FinTech adoption and SME performance, such that SMEs with higher financial literacy benefit more from FinTech solutions.
H3b: Financial literacy mediates the relationship between FinTech adoption and SME performance by improving SMEs’ ability to utilize FinTech tools effectively.

**Methodology**

This study adopts an explanatory research design with a quantitative approach. The first objective, which explores the awareness and perception of fintech adoption among SMEs, is analyzed using descriptive statistics. The study employs Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the relationships between fintech adoption, SME performance, and financial literacy. PLS-SEM is particularly effective for assessing complex models with multiple constructs and is suitable for investigating both direct and indirect relationships such as moderation and mediation effects (Hair et al., 2017). Though previous studies have assessed aspects of fintech adoption and financial literacy (Frimpong, 2022; Asiedu et al., 2024), this research aims to provide a more comprehensive understanding of fintech’s role in SME performance within Ghana. Through applying this methodology, the study seeks to generate robust empirical evidence to inform policy, guide fintech development, and enhance SME performance in Ghana’s evolving digital financial landscape.

## **RESULTS AND DISCUSSIONS**

## **4.0 Introduction**

The study examined the relationship between fintech adoption and usage and SME performance in Ghana, with particular attention to the moderating and mediating effects of financial literacy. This chapter presents the empirical findings from the analysis of data collected from 169 SMEs that were members of the Association of Ghana Industries (AGI). Section 4.1 presents the preliminary results which focused on the demographic information, descriptive statistics, reliability and validity results, and the correlation results. Section 4.2 presents the findings and discussions of the results and section

## **4.1 Preliminary Results**

 The preliminary analysis provided foundational insights into the characteristics of the sample and the nature of the data collected. This section presents the demographic profile of respondents, descriptive statistics of the key variables, and essential statistical tests that established the reliability and validity of the measurement instruments used in the study.

## **4.1.1 Demographic Information**

The gender distribution of respondents revealed a predominant male representation in the study. Out of the 169 respondents, 108 (63.9%) were male, while 61 (36.1%) were female. This distribution reflected the existing gender disparities in SME leadership positions within the Ghanaian business environment thus highlighting the continued male dominance in business ownership and management positions.

Table 1: Demographic Characteristics of Respondents

|  |  |  |  |
| --- | --- | --- | --- |
| Characteristic | Dimensions | Frequency | Percentage |
| Gender | Male | 108 | 63.9 |
|  | Female | 61 | 36.1 |
| Respondents’ Age | 18-25 years | 2 | 1.2 |
|  | 26-35 years | 53 | 31.4 |
|  | 36-45 years | 66 | 39.1 |
|  | 46-55 years | 28 | 16.6 |
|  | 56 years and above | 20 | 11.8 |
| Education | Primary level | 5 | 3.0 |
|  | Secondary level | 15 | 8.9 |
|  | Diploma/HND | 83 | 49.1 |
|  | Bachelors’ degree | 63 | 37.3 |
|  | Masters’ degree | 3 | 1.8 |
| Respondents’ position | Owner | 20 | 11.8 |
|  | Manager | 67 | 39.6 |
|  | Supervisor | 56 | 33.1 |
|  | Others | 26 | 15.4 |
| Work experience | 1-5 years | 8 | 4.7 |
|  | 6-10 years | 32 | 18.9 |
|  | 11-15 years | 84 | 49.7 |
|  | More than 15 years | 45 | 26.6 |
| Industry type  | Agriculture | 14 | 8.3 |
|  | Manufacturing | 32 | 18.9 |
|  | Retail/Wholesale | 42 | 24.9 |
|  | Services | 39 | 23.1 |
|  | Technology | 34 | 20.1 |
|  | Others | 8 | 4.7 |
| Number of employees | 1-5 | 31 | 18.3 |
|  | 6-29 | 74 | 43.8 |
|  | 30-99 | 59 | 34.9 |
|  | 100-199 | 5 | 3.0 |
| Turnover  | Less than GHS 100,000 | 27 | 16.0 |
|  | GHS100,000 - GHS500,000 | 58 | 34.3 |
|  | GHS500,001 - GHS1,000,000 | 62 | 36.7 |
|  | GHS 1,000,001 - GHS 5,000,000 | 22 | 13.0 |
| Firm age | Less than 10 year | 16 | 9.5 |
|  | 11-20 years | 31 | 18.3 |
|  | 21-30 years | 57 | 33.7 |
|  | 31-40 years | 53 | 31.4 |
|  | More than 40 years | 12 | 7.1 |

*Source: Field Survey (2024)*

The age distribution of respondents demonstrated a concentration in the middle-age brackets. The largest group comprised individuals aged 36-45 years, representing 39.1% (66 respondents) of the sample. This was followed by those aged 26-35 years, accounting for 31.4% (53 respondents). The mature age brackets of 46-55 years and 56 years and above constituted 16.6% (28 respondents) and 11.8% (20 respondents) respectively. The youngest age group, 18-25 years, represented only 1.2% (2 respondents) of the sample, indicating limited youth participation in SME leadership positions. The educational background of respondents indicated a strong presence of tertiary education qualifications. The majority of respondents held Diploma/HND qualifications, accounting for 49.1% (83 respondents), followed by Bachelor’s degree holders at 37.3% (63 respondents). Secondary level education represented 8.9% (15 respondents), while primary level and Master’s degree holders constituted 3.0% (5 respondents) and 1.8% (3 respondents) respectively. This distribution highlighted the relatively high educational attainment among SME leaders in the sample.

The professional positions held by respondents showed a diverse leadership structure. Managers constituted the largest group at 39.6% (67 respondents), followed by supervisors at 33.1% (56 respondents). Business owners represented 11.8% (20 respondents) of the sample, while other positions accounted for 15.4% (26 respondents). The work experience profile revealed substantial industry exposure, with 49.7% (84 respondents) having 11-15 years of experience, and 26.6% (45 respondents) possessing more than 15 years of experience. Those with 6-10 years and 1-5 years of experience represented 18.9% (32 respondents) and 4.7% (8 respondents) respectively. The industry distribution and organizational characteristics presented a diverse representation of the SME sector. The retail/wholesale sector dominated at 24.9% (42 respondents), followed by services at 23.1% (39 respondents), technology at 20.1% (34 respondents), and manufacturing at 18.9% (32 respondents). Agriculture accounted for 8.3% (14 respondents), while other sectors represented 4.7% (8 respondents). Employee size distribution showed that 43.8% (74 respondents) of the SMEs employed 6-29 workers, while 34.9% (59 respondents) had 30-99 employees. In terms of turnover, the majority fell within the GHS500,001 - GHS1,000,000 bracket (36.7%, 62 respondents) and GHS100,000 - GHS500,000 bracket (34.3%, 58 respondents). The firm age distribution indicated that most businesses were well-established, with 33.7% (57 respondents) being 21-30 years old and 31.4% (53 respondents) being 31-40 years old.

## **4.1.2 Descriptive Statistics**

The descriptive statistics provided insights into the central tendencies and variability of the key study variables based on the 5-point Likert scale measurements employed in the study. The analysis revealed that SME Performance demonstrated the highest mean score (M = 3.85, SD = 0.504) among the three variables, with responses ranging from 2.80 to 5.00. This was followed by Financial Literacy (M = 3.64, SD = 0.641, range: 1.53-4.80) and Fintech Adoption and Usage (M = 3.58, SD = 0.898, range: 1.00-5.00).

Table 2: Descriptive Statistics

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variables | Obs. | Minimum | Maximum | Mean | SD |
| Fintech Adoption and Usage | 169 | 1.00 | 5.00 | 3.58 | 0.898 |
| SME Performance | 169 | 2.80 | 5.00 | 3.85 | 0.504 |
| Financial Literacy | 168 | 1.53 | 4.80 | 3.64 | 0.641 |

*Source: Field Survey (2024)*

The relatively high mean scores across all variables suggested generally positive perceptions and implementations of fintech solutions, substantial levels of financial literacy among respondents, and favorable performance outcomes among the sampled SMEs. The standard deviations indicated moderate variability in responses, with Fintech Adoption and Usage showing the highest variability (SD = 0.898), suggesting more diverse experiences and attitudes toward fintech adoption compared to the other variables. The range of responses across all variables demonstrated that respondents utilized the full spectrum of the measurement scale, thus providing a representation of varying perspectives and experiences within the sample.

## **4.1.3 Reliability and Validity Results**

Before testing the hypothesized relationships, the study conducted reliability and validity assessments to ensure the measurement quality of the constructs. The analysis examined internal consistency reliability through Cronbach’s alpha and composite reliability measures, convergent validity through Average Variance Extracted (AVE), and discriminant validity using the Fornell-Larcker criterion.

Table 3: Summary of Reliability and Validity Result

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | Cronbach Alpha | Composite | AVE | R2 | VIF |
| Fintech (product) adoption and usage | 0.958 | 0.954 | 0.723 | - | 1.02 – 3.21 |
| Financial Literacy | 0.912 | 0.932 | 0.695 | 0.816 | 2.30 – 2.09  |
| SME Performance | 0.873 | 0.928 | 0.720 | 0.811 | 1.89 – 3.11 |

*Source: Field Survey (2024)*

The reliability and validity assessment revealed robust psychometric properties across all constructs. Fintech adoption and usage demonstrated the highest reliability scores (Cronbach’s α = 0.958, CR = 0.954), followed by Financial Literacy (Cronbach’s α = 0.912, CR = 0.932), and SME Performance (Cronbach’s α = 0.873, CR = 0.928). All values substantially exceeded the recommended threshold of 0.70, indicating excellent internal consistency. The Average Variance Extracted (AVE) values for all constructs surpassed the 0.50 benchmark, with Fintech adoption and usage showing the highest value (0.723), followed by SME Performance (0.720) and Financial Literacy (0.695), confirming satisfactory convergent validity. The R² values for Financial Literacy (0.816) and SME Performance (0.811) indicated that the model explained a substantial portion of the variance in these endogenous constructs. The Variance Inflation Factor (VIF) values ranging from 1.02 to 3.21 fell well below the critical threshold of 5.0, confirming the absence of multicollinearity concerns in the model.

Table 4: Discriminant Validity (Fornell Larcker criterion)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Financial literacy | Fintech adoption and usage | SME performance |
| Financial literacy | 0.834 |  |  |
| Fintech adoption and usage | 0.722 | 0.850 |  |
| SME performance | 0.169 | 0.038 | 0.848 |

*Source: Field Survey (2024)*

The discriminant validity assessment using the Fornell-Larcker criterion demonstrated satisfactory construct distinction. The square root of AVE values for Financial Literacy (0.834), Fintech adoption and usage (0.850), and SME Performance (0.848) exceeded their respective correlations with other constructs. The correlation between Financial Literacy and Fintech adoption and usage was moderately strong (0.722), while correlations with SME Performance were notably lower (0.169 and 0.038 respectively). These results confirmed that each construct captured unique phenomena, establishing adequate discriminant validity among the study’s variables.

## **4.1.4 Correlation Results**

The correlation analysis examined the bivariate relationships among the study variables, including the main constructs and demographic characteristics. The analysis employed Pearson’s correlation coefficient to assess the strength and direction of these relationships, with significance levels set at 0.01 and 0.05. The analysis revealed significant relationships among the main study constructs. Financial literacy demonstrated a strong positive correlation with fintech adoption and usage (r = 0.722, p < 0.01), suggesting a substantial interconnection between these variables.

Table 5: Correlation Result

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| (1) Fintech adoption and usage | 1 |  |  |  |  |  |  |  |  |  |  |  |
| (2) SME performance | .038 | 1 |  |  |  |  |  |  |  |  |  |  |
| (3) Financial literacy | .722\*\* | .169\* | 1 |  |  |  |  |  |  |  |  |  |
| (4) Owner gender | -.366\*\* | .033 | -.377\*\* | 1 |  |  |  |  |  |  |  |  |
| (5) Owner age | .086 | -.061 | .146 | -.061 | 1 |  |  |  |  |  |  |  |
| (6) Owner education | -.010 | -.096 | -.074 | .018 | .118 | 1 |  |  |  |  |  |  |
| (7) Position of respondent | .039 | -.041 | .068 | -.024 | .128 | .088 | 1 |  |  |  |  |  |
| (8) Years of work experience | -.109 | -.050 | -.074 | .032 | -.072 | .036 | .021 | 1 |  |  |  |  |
| (9) Type of industry | -.007 | -.081 | -.032 | .049 | -.131 | -.078 | .010 | -.010 | 1 |  |  |  |
| (10) Number of employees | .003 | .024 | .069 | .005 | .088 | .041 | .002 | .149 | .051 | 1 |  |  |
| (11) Firm turnover | .010 | -.060 | .031 | .007 | .123 | .114 | -.089 | .011 | -.262\*\* | -.032 | 1 |  |
| (12) Firm age | .053 | -.006 | .040 | .057 | -.016 | .031 | -.002 | -.088 | -.155\* | -.065 | -.015 | 1 |

\*\*. Correlation is significant at the 0.01 level (2-tailed). \*. Correlation is significant at the 0.05 level (2-tailed).

*Source: Field Survey (2024)*

The relationship between financial literacy and SME performance, while positive, was relatively weak but significant (r = 0.169, p < 0.05). Interestingly, the direct correlation between fintech adoption and usage and SME performance was negligible and non-significant (r = 0.038, p > 0.05), indicating the potential importance of mediating or moderating effects in this relationship. Several demographic variables showed significant correlations with the main constructs. Owner gender exhibited significant negative correlations with both fintech adoption and usage (r = -0.366, p < 0.01) and financial literacy (r = -0.377, p < 0.01), suggesting potential gender-based disparities in these areas. Among the organizational characteristics, firm turnover showed a significant negative correlation with industry type (r = -0.262, p < 0.01), while firm age demonstrated a weak negative correlation with industry type (r = -0.155, p < 0.05). The remaining demographic and organizational variables showed no significant correlations with the main constructs, indicating that factors such as owner education, position, work experience, and number of employees did not directly relate to the adoption of fintech, financial literacy levels, or SME performance in the sample.

## **4.2 Findings**

## **4.2.1 Awareness Level and Perceptions of Fintech (products) Adoption and Usage among SMEs in Ghana**

The first objective of the study sought to explore the awareness levels and perceptions of fintech product adoption and usage among SMEs in Ghana. The analysis examined twelve key aspects of fintech adoption, ranging from basic awareness to the utilization of advanced technologies. Table 6 presents the detailed responses across these dimensions, measured on a five-point Likert scale. The results revealed varying levels of fintech adoption across different technologies and applications. The highest adoption rates were observed in fundamental fintech solutions, with frequent use of fintech solutions for financial transactions recording the highest mean score (M = 3.90, SD = 1.02). A substantial majority of respondents (78.7%) either agreed or strongly agreed with frequent fintech usage in their operations.

Similarly, awareness of various fintech products available for SMEs showed strong positive responses (M = 3.73, SD = 1.18), with 71.6% of respondents indicating agreement or strong agreement. The perceived usefulness and ease of use of fintech solutions demonstrated robust positive perceptions. The usefulness of fintech products for company operations received substantial endorsement (M = 3.70, SD = 1.01), with 74.6% of respondents expressing agreement or strong agreement. The ease of use dimension also showed strong positive responses (M = 3.73, SD = 1.07), with 74.5% of respondents finding fintech solutions user-friendly for their business operations. Traditional fintech applications showed moderate to high adoption rates.

Mobile banking apps (M = 3.63, SD = 1.08) and digital payment platforms (M = 3.44, SD = 1.11) demonstrated substantial adoption levels, with 67.5% and 59.2% of respondents respectively indicating positive usage. Digital invoicing solutions also showed considerable adoption (M = 3.62, SD = 1.01), with 66.3% of respondents reporting active usage in their operations. However, advanced fintech technologies showed notably lower adoption rates. Blockchain technology for secure transactions (M = 2.12, SD = 1.06) and robo-advisors for financial decision-making (M = 1.23, SD = 1.10) demonstrated significantly lower adoption levels, with 74.6% and 67.4% of respondents respectively expressing disagreement or strong disagreement with their usage.

Table 6: Fintech (Product) Adoption and Usage

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Statement | SD | D | N | A | SA | Mean | SD |
| 1 | Awareness of various fintech products available for SMEs. | 14 (8.3%) | 14 (8.3%) | 20 (11.8%) | 76 (45.0%) | 45 (26.6%) | 3.73 | 1.18 |
| 2 | Frequent use of fintech solutions for financial transactions. | 9 (5.3%) | 8 (4.7%) | 19 (11.2%) | 88 (52.1%) | 45 (26.6%) | 3.90 | 1.02 |
| 3 | Usefulness of fintech products for company’s operations. | 9 (5.3%) | 15 (8.9%) | 19 (11.2%) | 100 (59.2%) | 26 (15.4%) | 3.70 | 1.01 |
| 4 | Ease of use of fintech solutions in business. | 9 (5.3%) | 19 (11.2%) | 15 (8.9%) | 92 (54.4%) | 34 (20.1%) | 3.73 | 1.07 |
| 5 | Fintech adoption improves business efficiency | 8 (4.7%) | 23 (13.6%) | 27 (16.0%) | 87 (51.5%) | 24 (14.2%) | 3.57 | 1.05 |
| 6 | Use of mobile banking apps for business transactions | 10 (5.9%) | 18 (10.7%) | 27 (16.0%) | 84 (49.7%) | 30 (17.8%) | 3.63 | 1.08 |
| 7 | Company utilizes digital payment platforms. | 10 (5.9%) | 29 (17.2%) | 30 (17.8%) | 76 (45.0%) | 24 (14.2%) | 3.44 | 1.11 |
| 8 | Adoption of online lending platforms for business financing. | 13 (7.7%) | 31 (18.3%) | 38 (22.5%) | 58 (34.3%) | 29 (17.2%) | 3.35 | 1.18 |
| 9 | Business use of digital bookkeeping/accounting software. | 14 (8.3%) | 25 (14.8%) | 29 (17.2%) | 83 (10.7%) | 18 (10.7%) | 3.39 | 1.11 |
| 10 | Employment of digital invoicing solutions in operations. | 4 (2.4%) | 27 (16.0%) | 26 (14.4%) | 84 (49.7%) | 28 (16.6%) | 3.62 | 1.01 |
| 11 | Use of blockchain technology for secure transactions. | 96 (56.8%) | 30 (17.8%) | 21 (12.4%) | 14 (8.4%) | 8 (4.7%) | 2.12 | 1.06 |
| 12 | Utilization robo-advisors for financial decision-making. | 80 (47.3% | 34 (20.1%) | 22 (13.0%) | 20 (11.8%) | 13 (7.7%) | 1.23 | 1.10 |

Source: Field Survey (2024)

The findings regarding basic fintech adoption aligned with recent studies in developing economies. The high adoption rates of fundamental fintech solutions supported the findings of Krah et al. (2024) who documented increasing fintech adoption among Ghanaian SMEs, particularly in mobile banking and digital payments. Similarly, Coffie et al. (2021) found comparable patterns in Sub-Saharan Africa, emphasizing the growing acceptance of basic fintech solutions among SMEs. The strong positive perceptions regarding usefulness and ease of use aligned with the technology acceptance model predictions and supported findings by Hasanudin and Rahmiyanti (2023) who identified these factors as crucial determinants of fintech adoption. However, the results diverged from Silaya’s (2022) findings which reported more skepticism about fintech usefulness among SMEs in developing markets.

The moderate adoption of traditional fintech applications corroborated the findings of Marini et al. (2024) and Gunawan et al. (2023), who documented similar adoption patterns in emerging markets. However, the results showed higher adoption rates compared to earlier studies by Hamidah et al. (2020), suggesting a positive evolution in fintech adoption over time. The low adoption rates of advanced technologies like blockchain and robo-advisors aligned with findings from multiple studies. Nugraha et al. (2022) and Rehman et al. (2023) similarly found limited adoption of advanced fintech solutions among SMEs in developing economies. This pattern supports the World Economic Forum’s (2022) observation about the technological divide between developed and developing markets in advanced fintech adoption. The findings also revealed a notable gap between awareness and actual adoption, particularly for more sophisticated fintech solutions. This supported Asiedu et al.’s (2024) observations about the challenges in translating fintech awareness into actual usage among Ghanaian SMEs. However, the results showed higher overall adoption rates compared to Morgan and Trinh’s (2020) findings in other developing markets, suggesting relatively stronger fintech penetration in Ghana’s SME sector.

## **4.2.2 PLS SEM Results**

The study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the hypothesized relationships between fintech adoption and usage, financial literacy, and SME performance. This analysis specifically addressed objectives two and three of the study, investigating both the direct relationships and the potential moderating and mediating effects of financial literacy. The structural model was evaluated using path coefficients, t-statistics, and p-values to determine the significance of hypothesized relationships.



Figure 2: Partial Least Squares Structural Equation Modeling

*Source: Field Survey (2024)*

Table 7: PLS SEM Findings (Total effect)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Original sample | Sample mean | SD | t-statistic | p-value |
| Financial literacy 🡪SME performance | 0.586 | 0.616 | 0.194 | 3.020 | 0.003 |
| Fintech adoption and usage 🡪Financial literacy | 0.903 | 0.902 | 0.032 | 28.304 | 0.000 |
| Fintech adoption and usage 🡪SME performance | 0.910 | 0.901 | 0.076 | 12.047 | 0.000 |
| Moderating effect (FL × Fintech) 🡪 SME performance | 0.036 | 0.034 | 0.036 | 1.011 | 0.312 |

*Source: Field Survey (2024)*

The PLS-SEM results revealed significant relationships among the key constructs. The relationship between fintech adoption and usage and SME performance demonstrated a strong positive effect (β = 0.910, t = 12.047, p < 0.001) indicating that increased fintech adoption substantially enhanced SME performance. Similarly, fintech adoption and usage showed a strong positive relationship with financial literacy (β = 0.903, t = 28.304, p < 0.001) suggesting that higher levels of fintech adoption were associated with improved financial literacy among SMEs. Financial literacy also exhibited a significant positive relationship with SME performance (β = 0.586, t = 3.020, p = 0.003), though with a relatively smaller effect size compared to the direct effect of fintech adoption. However, the moderating effect of financial literacy on the relationship between fintech adoption and SME performance was not statistically significant (β = 0.036, t = 1.011, p = 0.312) indicating that the strength of the relationship between fintech adoption and SME performance did not vary significantly across different levels of financial literacy.

## **4.2.3 Findings on Hypotheses and Discussions**

The second objective of the study investigated the relationship between fintech (products) adoption and usage and performance of SMEs in Ghana while the third objective sought to examine the role (moderating and mediating) of financial literacy in the relationship between fintech (products) adoption and usage and performance of SMEs in Ghana. In relation to these objectives, the first hypothesis asserted that there is a positive relationship between the adoption and usage of fintech products and the performance of SMEs. The second hypothesis indicated that financial literacy positively moderates the relationship between fintech product adoption and usage and the performance of SMEs in Ghana. Also, the third hypothesis indicated that financial literacy mediates the relationship between fintech product adoption and usage and the performance of SMEs in Ghana. The summary results for these objectives and hypotheses have been summarised in Table 9.

Table 8: Hypotheses Testing for the Research Objectives

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | β | SD | t | p | Decision |
| Financial literacy 🡪SME performance | 0.586 | 0.194 | 3.020 | 0.003 | H1 not rejected |
| Fintech adoption and usage 🡪Financial literacy | 0.903 | 0.032 | 28.304 | 0.000 |  |
| Fintech adoption and usage 🡪SME performance | 0.910 | 0.076 | 12.047 | 0.000 |  |
| Moderating effect (FL × Fintech) 🡪 SME performance | 0.036 | 0.036 | 1.011 | 0.312 | H2 rejected |
| Fintech adoption and usage 🡪Financial literacy 🡪 SME performance | 0.530 | 0.184 | 2.879 | 0.004 | H3 not rejected |

*Source: Field Survey (2024)*

## **4.2.3.1 Relationship between Fintech (products) Adoption and Usage and Performance of SMEs**

The analysis revealed a strong positive relationship between fintech adoption and usage and SME performance (β = 0.910, t = 12.047, p < 0.001) supporting H1. This substantial effect size indicated that increased fintech adoption significantly enhanced SME performance outcomes. These findings aligned with several recent studies in the literature. Abbasi et al. (2021) similarly found strong positive effects of fintech adoption on SME efficiency across OECD countries. The results also supported Dwivedi et al.’s (2021) findings regarding the positive impact of fintech adoption on organizational performance. Additionally, the strong positive relationship corresponded with Utami and Sitanggang’s (2021) conclusions about fintech implementation enhancing SME performance. However, the magnitude of the effect in this study was notably larger than those reported in some previous research. For instance, Karim et al. (2022) found more modest effects of fintech adoption on SME performance in ASEAN countries. Similarly, Al-Shari and Lokhande (2023) reported lower effect sizes in their study of fintech adoption impacts on banking performance. The strong positive relationship could be attributed to the specific context of Ghana’s developing digital economy, where fintech solutions might offer particularly significant advantages for SMEs previously lacking access to formal financial services. This interpretation aligned with Krah et al.’s (2024) observations about the transformative potential of fintech in Ghana’s SME sector.

## **4.2.3.2 Moderating Role of Financial Literacy on the Relationship between Fintech (products) Adoption and Usage and Performance of SMEs**

The analysis did not support H2, as the moderating effect of financial literacy on the relationship between fintech adoption and SME performance was not statistically significant (β = 0.036, t = 1.011, p = 0.312). This indicated that the strength of the relationship between fintech adoption and SME performance remained relatively constant across different levels of financial literacy. This finding contrasted with several previous studies. Al-Amudi et al. (2024) found significant moderating effects of financial literacy in their study of MSMEs in West Nusa Tenggara. Similarly, Astari et al. (2022) reported that financial literacy significantly moderated the relationship between fintech adoption and MSME performance. The absence of a moderating effect aligned more closely with Daulay et al.’s (2023) findings which suggested that other factors might be more important in determining the effectiveness of fintech adoption. This result also supported Hasanudin and Panigfat’s (2023) observation that the relationship between fintech adoption and performance might be more direct than previously assumed. The lack of moderation could be explained by the potentially overwhelming direct effect of fintech adoption on performance in the Ghanaian context, where the benefits of digital financial solutions might transcend varying levels of financial literacy. This interpretation was supported by Frimpong’s (2022) findings regarding the primacy of digital finance access over financial literacy in determining SME performance in Ghana.

## **4.2.3.3 Mediating Role of Financial Literacy on the Relationship between Fintech (products) Adoption and Usage and Performance of SMEs**

The analysis supported H3, demonstrating a significant mediating effect of financial literacy on the relationship between fintech adoption and SME performance (β = 0.530, t = 2.879, p = 0.004). This indicated that fintech adoption enhanced SME performance partly through its positive effect on financial literacy. This finding aligned with recent literature on the interconnected nature of fintech adoption and financial literacy. Lontchi et al. (2023) similarly found significant mediating effects of financial literacy in the context of SME performance in Cameroon. The results also supported Alkhawaldeh et al.’s (2023) findings regarding the mediating role of financial behavior in the relationship between fintech adoption and financial inclusion. The mediation effect was notably stronger than those reported by some previous studies. For instance, Siddik et al. (2023) found more modest mediating effects in their study of corporate sustainability performance. However, the results showed weaker mediation compared to Rahadjeng et al.’s (2023) findings in Indonesian SMEs. The significant mediation effect suggested that fintech adoption might enhance SME performance not only directly but also by improving financial literacy levels. This dual pathway aligned with Morgan’s (2021) theoretical framework regarding the synergistic relationship between fintech adoption and financial literacy in driving business performance. The findings particularly resonated with Mutamimah and Indriastuti’s (2023) observations about the interconnected nature of fintech adoption, financial literacy, and business performance in developing economies. This suggested that policies promoting fintech adoption might yield additional benefits through enhanced financial literacy among SME operators.

## **4.3 Summary**

The fourth chapter presented findings from the analysis of fintech adoption among SMEs in Ghana. The analysis revealed high adoption rates for basic fintech solutions, with frequent use of fintech for financial transactions scoring highest (M = 3.90). However, advanced technologies like blockchain and robo-advisors showed significantly lower adoption rates. The hypothesis testing yielded significant results: a strong positive relationship was found between fintech adoption and SME performance (β = 0.910, p < 0.001), and financial literacy demonstrated a significant mediating effect (β = 0.530, p = 0.004) on this relationship. However, the study did not find support for the moderating effect of financial literacy (β = 0.036, p = 0.312) on the relationship between fintech adoption and SME performance.

**CONCLUSION AND RECOMMENDATION**

**Conclusion**

This study showed that adopting fintech helps improve SME performance in Ghana. It found a gap in adoption, with basic fintech solutions widely used, but advanced technologies like blockchain and robo-advisors being less common. The study found a strong link between fintech adoption and better SME performance, including increased revenue, efficiency, and customer satisfaction. Financial literacy was found to play a key role in this relationship, making the benefits of fintech even greater for SMEs with higher financial knowledge. This highlights the importance of fintech adoption for SMEs to stay competitive, especially when combined with good financial literacy.

**Recommendations**

**For Policy**

* Financial institutions and fintech companies should create educational programs that highlight the benefits of advanced fintech solutions for SMEs.
* The Ghana Association of Industries and Ministry of Communications and Digitalization should establish fintech demonstration centers for SMEs.
* Policymakers should introduce incentive programs (e.g., tax incentives or grants) to encourage SMEs to adopt advanced fintech solutions.
* The Ministry of Trade and Industry should implement digital transformation policies tailored to SMEs’ specific needs.
* The Bank of Ghana should establish a regulatory sandbox to facilitate fintech testing and ensure consumer protection.

**For Practice**

* Financial institutions should develop specialized fintech product packages that cater to different SME growth stages.
* Educational institutions and professional bodies should offer integrated training that combines fintech skills with financial management knowledge.
* The National Board for Small Scale Industries should create units to provide combined financial literacy and fintech training for SMEs.
* Fintech companies should embed financial education components within their products to support better adoption.
* The Ghana Association of Industries should promote peer-learning networks for SMEs to exchange best practices.

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