

## Digital Financial Inclusion and Small and Medium Enterprise Growth in Sokoto State, Nigeria: An Econometric Analysis

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### Abstract

Digital financial inclusion has become an important channel for improving access to financial services among small and medium enterprises, especially in developing economies. In Sokoto State, Nigeria, SMEs contribute significantly to employment generation and income creation, yet many continue to face constraints linked to limited access to formal financial systems. This study examines the effect of digital financial inclusion on SME growth in Sokoto State using an econometric framework. Cross sectional data were obtained from 397 SMEs through structured questionnaires administered across selected sectors. Digital financial inclusion is measured using indicators such as mobile banking usage, digital payments, mobile money services and access to fintech credit, while SME growth is proxied by revenue performance, business expansion and employment size. An Ordinary Least Squares regression model is applied to estimate the relationship between digital financial inclusion and SME growth, controlling for firm specific characteristics. The results show that digital financial inclusion has a positive and statistically significant effect on SME growth. Internet access and firm age also exert positive effects, while firm size is negatively associated with growth. The model explains about 79.6 percent of the variation in SME growth. The findings indicate that digital financial services play a key role in improving SME performance through enhanced financial access and operational efficiency. The study provides evidence relevant for policy formulation on financial inclusion and SME development, with implications for SDG 8 and SDG 9.

**Keywords:** Digital financial inclusion, small and medium enterprises, SME growth, econometric analysis.

### 1. Introduction

Small and medium enterprises (SMEs) are widely recognized as a central driver of economic development due to their contribution to employment generation, income creation and poverty reduction (Beck *et al.*, 2005). In developing economies, SMEs account for a substantial share of business activities and provide livelihoods for a large proportion of the population (Ayyagari *et al.*, 2007). In Nigeria, SMEs play a critical role in economic activity, yet their growth remains constrained by structural challenges, particularly limited access to formal financial services (Okpara, 2011). Recent evidence from the World Bank (2025) indicates that access to finance remains uneven, especially among small businesses operating in underserved regions. Financial exclusion continues to limit the capacity of SMEs to expand and compete effectively. Traditional banking systems often impose stringent requirements such as collateral constraints, high transaction costs and complex procedures, which disproportionately affect small businesses (Beck & Demirgüç-Kunt, 2006). As a result, many SMEs rely on informal financing mechanisms that are often insufficient for long-term growth. Empirical studies have consistently shown that financial constraints remain one of the most significant barriers to SME expansion, particularly in developing economies where financial systems are less inclusive (Shokunbi, 2024). Similarly, cross-country evidence indicates that while SMEs contribute significantly to employment and economic growth, they face severe financial and institutional limitations that hinder innovation and productivity (Ayyagari *et al.*, 2007). Financial inclusion, defined as access to and use of formal financial services, plays a critical role in addressing these challenges. However, access alone is insufficient; effective usage remains a key

determinant of impact. Allen *et al.* (2016) demonstrate that financial inclusion outcomes depend on factors such as income, education and institutional quality, while also emphasizing that active usage of financial services is more important than mere access. Despite progress, a significant financing gap persists for micro, small and medium enterprises in Sub-Saharan Africa, limiting their growth potential (Abdulai & Issahaku, 2024). The emergence of digital financial services has created new opportunities for addressing these constraints. Digital financial inclusion—defined as access to and use of affordable digital financial services—has transformed financial systems by reducing transaction costs and expanding access to underserved populations. Technologies such as mobile banking, electronic payments and fintech-based lending platforms have improved financial accessibility and efficiency (Ozili, 2018). Evidence from the GSMA (2023) highlights the rapid expansion of mobile money adoption in developing economies, with important implications for SME participation in formal financial systems. However, some studies caution that digital finance may also introduce new inequalities where digital infrastructure is weak (Ozili *et al.*, 2024). Empirical literature increasingly supports the positive role of digital financial inclusion in enhancing SME performance. For instance, Suri and Jack (2016), using longitudinal data from Kenya, find that mobile money adoption significantly improves household welfare and small business outcomes through increased savings and investment capacity. Similarly, Bongomin *et al.* (2017) show that financial inclusion positively affects SME performance in Uganda, particularly when supported by financial literacy. Cross-country firm-level analyses by Chauvet and Jacolin (2017) further indicate that firms with better access to financial services exhibit higher productivity and stronger growth outcomes, although the effects vary across institutional contexts. Additional evidence reinforces these findings. Bongomin *et al.* (2020) demonstrate that digital financial services such as mobile banking and digital credit enhance SME performance in East Africa, while Osei Assibey (2021) finds that mobile money adoption improves sales and liquidity management among SMEs in Ghana. More recent studies, including Enaigbe and Ezeliora (2025),

reveal a strong positive relationship between mobile banking usage and SME growth in Sub-Saharan Africa. Reports from the World Bank (2021) and IMF-based studies (2023–2024) further confirm that digital finance enhances access to payments, savings and credit, thereby improving enterprise development and financial resilience. Despite this growing body of evidence, important gaps remain. Most existing studies rely on cross-country or regional data, with limited attention to sub-national contexts such as Sokoto State, Nigeria. Moreover, many studies examine financial inclusion and SME performance independently, rather than integrating both dimensions within a unified empirical framework. Methodologically, the reliance on conventional estimation techniques may also limit the ability to fully capture the dynamic relationship between digital financial access and enterprise growth. From a policy perspective, understanding this relationship is essential for designing strategies that promote inclusive economic development. Expanding access to digital financial services has the potential to stimulate entrepreneurship, enhance productivity and support job creation. These outcomes align with global development priorities such as Sustainable Development Goal 8 (Decent Work and Economic Growth) and Sustainable Development Goal 9 (Industry, Innovation and Infrastructure), which emphasize inclusive growth and innovation-driven development. This study therefore examines the effect of digital financial inclusion on SME growth in Sokoto State, Nigeria, using an econometric approach. By integrating firm-level data with key indicators of digital financial access, it provides empirical evidence on how digital financial services influence enterprise outcomes. The findings are expected to contribute to both academic literature and policy discourse by offering a more comprehensive understanding of the role of digital finance in supporting SME growth.

## **2. Methodology**

### **2.1 Population and Sampling Procedure**

The target population comprises owners and managers of small and medium enterprises (SMEs) operating within Sokoto State, Nigeria. The study covers firms across key sectors including trading, services, agriculture and small scale manufacturing, reflecting the structure of SME activity within the

state. A multistage sampling technique was employed to ensure adequate representation. First, stratification was carried out based on sectoral classification to capture heterogeneity in business activities. Second, simple random sampling was applied within each stratum to select respondents and minimize selection bias. This approach ensures that firms with different operational characteristics are proportionately represented in the sample. A total of 397 SMEs were surveyed and included in the final analysis after data screening. This sample size is consistent with empirical studies that employ cross sectional regression techniques for firm level analysis and is sufficient to ensure statistical reliability of the estimates.

## **2.2 Data Collection and Instrument Design**

Primary data were collected using a structured questionnaire administered through a direct field survey. The instruments were distributed physically to SME owners and managers at their business locations with the assistance of trained research assistants. Respondents were guided on how to complete the questionnaire and completed copies were retrieved immediately where possible. Follow up visits were conducted in cases of delayed responses to improve response completeness. The questionnaire was structured into four sections covering firm characteristics, digital financial inclusion, SME growth indicators and control variables related to business environment and firm structure. The digital financial inclusion section captured mobile banking usage, digital payment adoption, mobile money utilization, access to fintech based credit and frequency of digital transactions. SME growth was assessed using indicators such as revenue growth, customer expansion, business expansion, profitability and employment growth. All items were measured on a five point Likert scale. The instrument was reviewed for content validity and internal consistency was assessed using Cronbach's Alpha. The reliability coefficient of 0.879 indicates a high level of internal consistency across the measurement items.

## **2.3 Data Analysis and Model Specification**

The analysis was conducted using quantitative techniques. Descriptive statistics, including means and standard deviations, were used to summarize the

characteristics of the variables, while correlation analysis was employed to examine pairwise associations and preliminary relationships among variables. To estimate the effect of digital financial inclusion on SME growth, the study employs Ordinary Least Squares regression. The empirical model is specified as:

(1)

where SMEG represents the SME growth index, DFI denotes digital financial inclusion, fage captures firm age, fsize represents firm size and internet reflects access to internet services.  $\mu_i$  is the stochastic error term. Hypothesis testing was conducted at the 5 percent significance level. The estimated coefficients provide information on both the direction and magnitude of the relationship between digital financial inclusion and SME growth, while controlling for firm specific characteristics. To ensure the robustness of the regression estimates, diagnostic checks were performed. Multicollinearity was assessed using the Variance Inflation Factor (VIF) and the results indicate that all variables fall within acceptable thresholds, confirming the absence of multicollinearity.

## **2.4 Ethical Considerations**

Ethical standards were maintained throughout the study. Participation was voluntary and respondents were informed of the purpose of the research. Confidentiality and anonymity were assured and all data collected were used strictly for academic purposes.

### 3. Results

#### 3.1 Sample Characteristics and Descriptive Statistics

Table 1: Demographic and Business Characteristics of Respondents

| Variable           | Category      | Frequency | Percentage (%) |
|--------------------|---------------|-----------|----------------|
| Gender             | Female        | 246       | 62             |
|                    | Below 25      | 151       | 38             |
|                    | 25–34         | 123       | 31             |
| Age                | 35–44         | 137       | 34.5           |
|                    | 45–54         | 110       | 27.7           |
|                    | 55 and above  | 14        | 3.5            |
| Sector             | Agriculture   | 13        | 3.3            |
|                    | Trading       | 168       | 42.3           |
|                    | Services      | 104       | 26.2           |
|                    | Manufacturing | 72        | 18.1           |
|                    | Other         | 30        | 7.6            |
|                    | Less than 1   | 23        | 5.8            |
| Years of Operation | 1–3           | 55        | 13.9           |
|                    | 4–6           | 96        | 24.2           |
|                    | 7–10          | 150       | 37.8           |
|                    | Above 10      | 41        | 10.3           |
| Employees          | 1–5           | 55        | 13.9           |
|                    | 6–10          | 301       | 75.8           |
|                    | 11–20         | 41        | 10.3           |
|                    | Above 20      | 14        | 3.5            |
|                    | Above 20      | 41        | 10.3           |

The sample consists largely of female owned enterprises. Most respondents fall within the younger age brackets. Trading and services account for the largest share of business activities. A high proportion of firms operate with fewer than ten employees, indicating a strong presence of micro and small enterprises. The distribution of years of operation reflects both new and moderately established firms.

Table 2: Descriptive Statistics of Study Variables

| Variable | Mean  | Std. Deviation | Min  | Max  | N   |
|----------|-------|----------------|------|------|-----|
| SMEG     | 4.079 | 0.916          | 1.33 | 5.00 | 397 |
| DFI      | 3.141 | 0.626          | 1.67 | 5.00 | 397 |
| fage     | 2.88  | 1.172          | 1    | 5    | 397 |
| fsize    | 1.44  | 0.837          | 1    | 4    | 397 |
| Internet | 4.46  | 1.028          | 1    | 5    | 397 |

SME growth records a high mean value. Digital financial inclusion shows moderate to high adoption. Internet access is also high across firms. The mean for firm size confirms that most businesses are small in scale, while firm age shows variation across stages of business development.

#### 3.2 Correlation Analysis

Table 3: Correlation Matrix of Key Variables

|          | DFI     | SMEG    | fage   | fsize  | internet |
|----------|---------|---------|--------|--------|----------|
| DFI      | 1       |         |        |        |          |
| SMEG     | .683**  | 1       |        |        |          |
| fage     | -.314** | -.195** | 1      |        |          |
| fsize    | -0.086  | -.448** | .355** | 1      |          |
| Internet | .218**  | .579**  | -      | -      | 1        |
|          |         |         | .273** | .252** |          |

Note: \*\*p < 0.01

Digital financial inclusion shows a strong positive association with SME growth. Internet access also has a positive relationship with firm performance. The correlations among the explanatory variables are moderate, suggesting that collinearity is not a concern.

Table 4: OLS Regression Estimates of the Effect of Digital Financial Inclusion on SME Growth

| Variable          | Coefficient (B) | Std. Error | Std. Beta | t-value | p-value | VIF   |
|-------------------|-----------------|------------|-----------|---------|---------|-------|
| Constant          | -0.563          | 0.172      | —         | -3.284  | 0.001   | —     |
| (DFI              | 0.726           | 0.028      | 0.639     | 26.272  | 0.000   | 1.137 |
| Firm Age (fage)   | 0.198           | 0.020      | 0.253     | 9.757   | 0.000   | 1.290 |
| Firm Size (fsize) | -0.414          | 0.027      | -0.378    | -15.232 | 0.000   | 1.183 |
| Internet Access   | 0.369           | 0.022      | 0.414     | 16.982  | 0.000   | 1.140 |

Digital financial inclusion has a positive and statistically significant effect on SME growth. The coefficient indicates that higher levels of engagement with digital financial services are associated with increased business performance. Firm age shows a positive and significant relationship with SME growth. Internet access also has a strong positive effect. Firm size has a negative and significant coefficient, suggesting that smaller firms tend to record higher growth rates. The VIF values are low, indicating no multicollinearity concerns.

Table 5: Model Fit Statistics for the OLS Regression of SME Growth

| Statistic | R     | R Square | Adjusted R Square | F-statistic | Prob (F-statistic) | Standard Error of Estimate |
|-----------|-------|----------|-------------------|-------------|--------------------|----------------------------|
| Value     | 0.892 | 0.796    | 0.794             | 382.086     | 0                  | 0.416                      |

The model explains a large proportion of the variation in SME growth and the F statistic confirms that the model is statistically significant.

#### 4. Discussion

The results show that digital financial inclusion has a positive and statistically significant effect on SME growth, as reported in Table 4. This finding is consistent with recent evidence that digital financial services improve firm performance through lower transaction costs, faster payments and improved access to finance (Demirgüç-Kunt *et al.*, 2022; GSMA, 2023). It also agrees with evidence that fintech adoption supports SME performance in emerging economies (World Bank, 2024). The size of the coefficient for digital financial inclusion indicates that SMEs with stronger use of mobile banking, digital payments and fintech credit record better growth outcomes. This reflects the shift away from traditional banking systems, especially in environments with limited physical financial infrastructure. Firm age shows a positive and significant effect on SME growth. Older firms tend to perform better due to accumulated experience, stronger networks and improved managerial capacity.

Similar findings appear in recent studies on SMEs in developing economies (IMF, 2023). Internet access also has a positive relationship with SME growth. Firms with better connectivity benefit from improved access to markets, financial platforms and digital tools for customer engagement. Recent

evidence shows that internet access supports SME adaptation to digital financial systems (OECD, 2023). Firm size has a negative and significant coefficient. Smaller firms tend to record higher growth rates compared to larger firms. This may relate to flexibility, simpler structures and faster adoption of digital financial tools. Similar results are reported in recent SME studies in developing economies (UNCTAD, 2022). The model fit reported in Table 5 shows strong explanatory power, with 79.6 percent of variation in SME growth explained. This indicates that digital financial inclusion and firm characteristics provide a strong framework for explaining SME performance. The findings suggest that digital financial inclusion remains a key driver of SME growth in developing economies, especially when supported by internet access and firm level capacity.

## 5. Conclusion

This study assessed the effect of digital financial inclusion on SME growth in Sokoto State using an econometric model. The results confirm a positive and statistically significant relationship between digital financial inclusion and SME growth. Internet access and firm age also contribute positively, while firm size shows a negative association with growth. The evidence indicates that digital financial services play a central role in improving SME performance through enhanced access to financial transactions and improved operational efficiency. Internet connectivity further strengthens these effects by enabling continuous access to digital financial platforms. Policy actions should prioritize expansion of digital financial infrastructure to improve access for SMEs. Strengthening mobile banking systems and fintech credit platforms will support enterprise growth. Improving internet coverage and affordability will further enhance adoption of digital financial services among small businesses. Attention should also be given to financial literacy programs tailored to SME operators to improve effective use of digital tools.

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