



Financial Literacy and Its Impact on the Performance of Small Business Owners/Entrepreneurs

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Abstract

This study examines financial literacy and its relationship with the performance of small-business owners/entrepreneurs in Nigeria. For empirical purposes, the performance of small-business owners/entrepreneurs is operationalized as the perceived performance of the businesses they own or manage, rather than as personal job performance. The study also examines whether financial management practices statistically mediate the financial-literacy-performance relationship and whether digital financial capability is directly associated with performance or moderates the financial-management-practice-performance association. A cross-sectional survey was administered through Google Forms between June and August 2026. Of 605 questionnaire links distributed, 503 completed questionnaires were returned; three were excluded during screening, yielding 500 usable responses from key financial decision-makers in six selected locations representing Nigeria's six geopolitical zones. Owner-level respondents accounted for 92.8% of the analytical sample, while 7.2% were financially responsible managers. Reflective Mode-A partial least squares path modeling and 5,000 nonparametric bootstrap resamples were used. Financial literacy was positively associated with perceived business performance ($\beta = 0.236, p < .001$) and financial management practices ($\beta = 0.480, p < .001$). Financial management practices were positively associated with performance ($\beta = 0.293, p < .001$), and the bootstrapped financial-literacy $\rightarrow$ financial-management-practices $\rightarrow$ performance indirect path was significant ($\beta = 0.141, 95\% \text{ CI } [0.099, 0.187]$), a pattern consistent with complementary partial statistical mediation. Digital financial capability also showed a positive direct association with performance ($\beta = 0.162, p < .001$). However, the financial-management-practices $\times$ digital-financial-capability interaction was not significant ($\beta = 0.049, p = .164$), and the index of moderated mediation was likewise nonsignificant (index = 0.023, 95% CI [-0.010, 0.056]). The findings indicate that financial literacy is positively associated with the performance of the sampled businesses, partly through financial-management routines, while digital financial capability operates primarily as an additive capability rather than a statistically established multiplier of those routines. Because the design is cross-sectional, the findings should be interpreted as statistical relationships rather than evidence of causal impact.

Keywords: financial literacy; small-business owners; entrepreneurs; business performance; financial management practices; digital financial capability; micro and small businesses; Nigeria; PLS path modeling.

Original Research Article

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1. Introduction

Micro, small, and medium enterprises are central to Nigeria's productive economy. The PwC MSME Survey 2024, citing the NBS/SMEDAN 2021 survey, reports that MSMEs account for 96.9% of businesses, 87.9% of employment, 46.32% of national GDP, and 6.21% of exports (PwC Nigeria, 2024). Their economic significance coexists with persistent constraints, including weak access to finance, limited managerial systems, volatile operating costs, informality, and uneven adoption of digital tools. The present study is restricted analytically to micro and small businesses with fewer than 50 employees. In such firms, owners and entrepreneurs commonly retain substantial responsibility for budgeting, borrowing, pricing, working-capital, and investment decisions. The central question is therefore whether financial literacy is related to the performance of the businesses owned or managed by these entrepreneurs.

Financial literacy is therefore increasingly treated as an entrepreneurial resource rather than only a household-finance skill. Lusardi and Mitchell (2014) conceptualize financial knowledge as a form of human-capital investment, while SME-focused reviews show that financial literacy commonly encompasses financial knowledge, awareness, and skills and is repeatedly linked to access to finance, financial behavior, organizational capabilities, and enterprise performance (Graña-Alvarez et al., 2024; Rekha et al., 2025). In small firms, literacy may affect whether entrepreneurs distinguish profit from cash flow, understand borrowing costs, prepare budgets, evaluate investments, interpret records, and manage financial risk.

Empirical studies generally report a favorable relationship between owner-manager financial literacy and enterprise outcomes. Wise (2013) linked financial literacy with more frequent production of financial statements and improved venture survival outcomes. Agyapong and Attram (2019) found a positive relationship between owner-manager financial literacy and SME performance in Ghana. Nigerian evidence likewise reports positive associations between financial knowledge, behavior,

financial capabilities, and SME performance or sustainability (Babajide et al., 2023; Ibitomi et al., 2024; Onyejedum & Okoli, 2024). Recent systematic reviews, however, also emphasize that the field remains fragmented in construct definition and measurement and requires closer attention to the mechanisms linking financial literacy to enterprise outcomes (Graña-Alvarez et al., 2024; Rekha et al., 2025).

The direct financial-literacy-performance relationship is the core relationship identified in the study title, but the process through which that relationship may operate is also important. An entrepreneur may understand budgeting or cash-flow concepts without routinely preparing a budget, separating personal and business finances, monitoring receivables, or reviewing records before major decisions. Financial management practices therefore provide a plausible behavioral pathway between what an owner-manager knows and what the business repeatedly does. Prior studies support this distinction. Wise (2013) shows that greater literacy is associated with use of financial tools; Appiah and Agblewornu (2024) demonstrate that financial capability can statistically mediate the literacy-performance relationship; and Mang'ana et al. (2024) find that financial-management practices are positively associated with organizational performance among agri-SMEs in Tanzania. These findings justify examining the title relationship both directly and through a specified behavioral pathway.

A second development is the increasing digitization of small-business finance. Mobile banking, internet banking, point-of-sale payments, digital credit, online transaction records, and accounting applications have changed how entrepreneurs access and process financial information. Luo et al. (2021) define digital financial capability as the capacity to use digital financial tools effectively and report positive effects on entrepreneurial outcomes. In Nigeria, Ojeleye and Mustapha (2024) find that digital knowledge, financial knowledge, awareness of digital-finance risks, risk control, and knowledge of digital-finance systems positively relate to female entrepreneurial performance. Sam-Abugu et al. (2025) similarly

show that financial literacy remains important even as FinTech access expands in Nigeria. Evidence from other contexts also points to joint roles for financial literacy, financial technology, financial inclusion, and access to finance in SME performance (Gunawan et al., 2023; Kurniasari et al., 2025).

The unresolved question is whether digital financial capability merely adds another direct source of performance or whether it changes the effectiveness of sound financial-management practices. A digitally capable entrepreneur may be able to execute budgeting, reconciliation, transaction monitoring, or working-capital control more efficiently. This creates a plausible moderation hypothesis. Yet resource complementarity should be demonstrated rather than assumed. The present study therefore tests both the direct contribution of digital financial capability and its proposed moderating role in the financial-management-practices → performance relationship.

This study addresses these issues with 500 valid responses from key financial decision-makers in micro and small businesses: 92.8% occupied owner-level roles (owner, founder, co-owner/partner, or owner-manager) and 7.2% were financially responsible managers. Respondents were drawn from six selected study locations, one representing each of Nigeria's six geopolitical zones. The multi-regional design broadens geographic coverage but is not a nationally representative probability sample. The paper centers on the relationship between financial literacy and the performance of small-business owners/entrepreneurs, with performance measured at the enterprise level. It then tests financial management practices as a behavioral mechanism, supplements self-assessed literacy with an objective knowledge index, and evaluates digital financial capability as a direct capability and possible boundary condition. All empirical path estimates are interpreted as cross-sectional associations; causal impact is not claimed.

Research objectives

1. To assess the association between financial literacy and the performance of small-business

owners/entrepreneurs, operationalized as perceived small-business performance.

2. To examine the association between financial literacy and financial management practices among key financial decision-makers in micro and small businesses in the six study locations.
3. To assess the association between financial management practices and small-business performance.
4. To test whether financial management practices statistically mediate the association between financial literacy and small-business performance.
5. To examine the direct association between digital financial capability and small-business performance.
6. To test whether digital financial capability moderates the association between financial management practices and small-business performance.
7. To evaluate whether the estimated indirect association between financial literacy and performance through financial management practices varies with digital financial capability.

2. Literature Review, Theory, and Hypothesis Development

2.1 Financial literacy and the performance of small-business owners/entrepreneurs

Financial literacy generally refers to the knowledge and competence required to understand financial information and make informed financial decisions. In the small-business context, the construct is more demanding than basic personal financial literacy because owners and entrepreneurs must apply financial knowledge to credit, working capital, pricing, tax, investment, budgeting, record keeping, and business risk. SME-focused reviews conclude that knowledge, awareness, and skills are the most common dimensions, while also highlighting the absence of a universally standardized owner-manager financial-literacy scale (Graña-Alvarez et al., 2024; Rekha et al., 2025). In

this study, financial literacy is treated as perceived financial understanding and applied competence, while the performance outcome refers to the perceived performance of the respondent's business relative to competitors.

From a human-capital perspective, financial literacy can raise decision quality because it increases the entrepreneur's ability to interpret costs, compare financing alternatives, anticipate liquidity requirements, and evaluate financial consequences. Consistent with this view, evidence from Ghana and Nigeria generally links financial literacy with SME performance, sustainability, or growth (Agyapong & Attram, 2019; Babajide et al., 2023; Ibitomi et al., 2024). Recent work also shows that financial literacy can interact with other entrepreneurial resources, including access to finance, resource flexibility, FinTech adoption, and corporate-governance capabilities (Adomako et al., 2016; Kurniasari et al., 2025; Padi et al., 2025).

2.2 Financial management practices as a behavioral mechanism

Financial management practices are the recurrent routines through which entrepreneurs plan, record, control, and evaluate the financial resources of the business. They include budgeting, cash-flow forecasting, separation of personal and business finances, monitoring receivables and payables, reconciliation, debt planning, and use of financial information in decision-making. These practices are conceptually distinct from literacy. Literacy concerns what the entrepreneur knows and can understand; financial management practices concern what the enterprise repeatedly does.

This distinction provides a mechanism for translating human capital into organizational capability. Wise (2013) found that financially literate entrepreneurs were more likely to generate financial statements frequently. Appiah and Agblewornu (2024) show that financial capability statistically mediates the relationship between financial literacy and small-business performance, while Mang'ana et al. (2024) report positive associations between financial-management practices and performance in

African agri-SMEs. The proposed logic is sequential: financial knowledge is expected to be associated with greater adoption of disciplined routines, and those routines are expected to be associated with better-informed and more timely enterprise decisions.

2.3 Digital financial capability

Digital financial capability integrates financial competence with the ability to use digital financial tools effectively and securely. It includes the ability to perform and verify digital transactions, interpret digital records, compare digital financial products, recognize fraud or phishing, and use digital financial information in business decisions. Luo et al. (2021) provide an influential conceptualization of digital financial capability and report positive relationships with entrepreneurial performance. Nigerian evidence likewise indicates that digital-finance knowledge and risk-control competence are positively associated with entrepreneurial outcomes (Ojeleye & Mustapha, 2024). In the present study, DFC is conceptually distinct from both financial literacy and financial management practices: it concerns competence in the digital-finance environment rather than general financial knowledge or the frequency of routine financial-management behaviors.

Digital tools may enhance the speed, traceability, and accessibility of financial information, making digital financial capability plausibly complementary to financial-management routines. Under this logic, greater DFC could strengthen the association between sound financial-management practices and performance by making budgeting, reconciliation, transaction monitoring, and working-capital control more timely or usable. However, basic digital competence does not guarantee deep managerial integration. Small businesses may use mobile banking or POS systems mainly for transactions while continuing to budget, forecast, and analyze performance informally. Accordingly, the direct and moderating roles of digital financial capability are treated as separate empirical propositions rather than assumed to be equivalent.

2.4 Theoretical foundation

The study combines Human Capital Theory and the Resource-Based View (RBV). Human Capital Theory treats education, knowledge, and skills as productive investments that improve decision capability (Becker, 1964). Financial literacy fits this logic because it represents specialized knowledge that can raise the quality of entrepreneurial financial decisions. Lusardi and Mitchell (2014) similarly frame financial knowledge as an economically valuable form of human capital.

RBV emphasizes internal resources and capabilities that can produce performance differences across firms (Barney, 1991). Financial management practices represent organizational routines through which owner-manager knowledge is deployed, while digital financial capability represents a technology-related intangible capability. Combining the two perspectives suggests that financial knowledge should matter most when it is converted into useful routines, while digital capability may contribute directly or condition the effectiveness of those routines.

2.5 Hypotheses

Table 1. Research hypotheses

Hypothesis	Statement
H1	Financial literacy is positively associated with the performance of small-business owners/entrepreneurs, operationalized as perceived small-business performance.
H2	Financial literacy is positively associated with financial management practices.
H3	Financial management practices are positively associated with small-business performance.
H4	Financial management practices statistically mediate the positive association between financial literacy and small-business performance.
H5	Digital financial capability is positively associated with small-business performance.
H6	Digital financial capability positively moderates the association between financial management practices and small-business performance.
H7	The positive indirect association between financial literacy and small-business performance through financial management practices is stronger as digital financial capability increases.

Conceptual model tested: FL → BP; FL → FMP → BP; DFC → BP; FMP × DFC → BP

3. Materials and Methods

3.1 Research design and population

The study employed a quantitative, explanatory, cross-sectional survey design. The substantive population of interest was small-business owners/entrepreneurs operating micro and small businesses in Nigeria. Eligible key informants

included business owners, founders, co-owners/partners, owner-managers, and financially responsible managers with substantial responsibility for financial decisions. The business constituted the unit of analysis, while the respondent served as the key informant. In this paper, "performance of small business owners/entrepreneurs" refers to the

performance of the business owned or managed by the respondent; it does not refer to personal employee or job performance. Eligibility required respondents to be at least 18 years old, represent a business operating for at least 12 months, hold substantial responsibility for financial decisions, and represent an enterprise with fewer than 50 employees. In the final analytical sample, 464 respondents (92.8%) occupied owner-level roles (owner, founder, co-owner/partner, or owner-manager) and 36 (7.2%) were financially responsible managers who served as knowledgeable business informants.

Data collection was conducted in six selected locations, with one location used to represent each geopolitical zone: Lagos (South-West), Rivers (South-South), Anambra (South-East), FCT Abuja (North-Central), Kano (North-West), and Adamawa (North-East). A quota-controlled, nonprobability multi-regional design was used to avoid concentration in a single location and to obtain broad regional coverage. The final location quotas were 85 responses each from Lagos, Rivers, Anambra, and FCT Abuja and 80 each from Kano and Adamawa. The design was not a nationally representative

probability sample, and the study does not infer population prevalence estimates for all Nigerian micro and small businesses.

3.2 Data collection, sample, and response rate

Data were collected between June and August 2026 using an electronic questionnaire administered through Google Forms. The questionnaire link was distributed to eligible key financial decision-makers in micro and small businesses in the six selected study locations. Participation was voluntary, and the form did not request bank-account numbers, Bank Verification Numbers, passwords, personal identification numbers, or authentication credentials. A total of 605 questionnaire links were distributed and 503 completed questionnaires were returned, yielding a gross response rate of 83.14%. Following data screening, three responses were excluded and 500 valid responses were retained, representing a usable response rate of 82.64%. The analytical workbook therefore contains 500 unique usable cases, consistent with the documented response flow.

Table 2. Survey response flow

Stage	Number	% of distributed
Questionnaire links distributed	605	100.00
Completed questionnaires returned	503	83.14
Excluded after screening	3	0.50
Final usable responses	500	82.64

3.3 Geographic distribution of the analytical sample

Table 3. Geographic distribution across the six study locations

Geopolitical zone	State/location	n	%
South-West	Lagos	85	17.0
South-South	Rivers	85	17.0
South-East	Anambra	85	17.0

Geopolitical zone	State/location	n	%
North-Central	FCT Abuja	85	17.0
North-West	Kano	80	16.0
North-East	Adamawa	80	16.0
Total	—	500	100.0

3.4 Instrument and construct measurement

The structured questionnaire contained sections on respondent and business characteristics, financial literacy, objective financial knowledge, financial management practices, digital financial capability, small-business performance, and supplementary performance indicators. The four primary reflective constructs comprised 34 items: 10 financial-literacy items, eight financial-management-practice items, eight digital-financial-capability items, and eight business-performance items. Six additional objective knowledge questions were scored separately. The constructs were operationalized as conceptually distinct: financial literacy captured perceived financial understanding and applied competence; financial management practices captured recurrent financial behaviors; digital financial capability captured self-reported competence in using, interpreting, and safeguarding digital financial tools and records; and business performance captured perceived outcomes relative to competitors.

Financial literacy

Financial literacy measured the respondent's perceived understanding and ability to apply business-relevant financial concepts, including revenue versus profit, financial records, cash-flow requirements, borrowing costs, financing alternatives, inflation, budgeting, working capital, financial risk, and investment evaluation. Items were measured from 1 = Strongly Disagree to 5 = Strongly Agree.

Objective financial knowledge

Six objective items assessed simple interest,

compound interest, inflation, comparative loan cost, diversification, and the distinction between profit and cash flow. Correct answers were coded 1 and incorrect or 'don't know' answers were coded 0. The percentage score was calculated as the number of correct answers divided by six and multiplied by 100. Because the final KR-20 was modest, this score was treated as an auxiliary observed index used only for exploratory and robustness analyses; no primary latent-construct hypothesis depended on this index.

Financial management practices

Eight items assessed separation of personal and business finances, record keeping, budgeting, cash-flow forecasting, monitoring of receivables and payables, reconciliation of bank and digital-payment records, use of financial information before major decisions, and planning of debt or other financial obligations. Responses ranged from 1 = Never to 5 = Always.

Digital financial capability

Eight items measured competence in mobile/internet banking, POS and electronic payments, digital transaction records, comparison of digital financial products, digital-finance risks, fraud/phishing recognition, transaction verification, and use of digital financial records or accounting tools. Responses ranged from 1 = Strongly Disagree to 5 = Strongly Agree. The measure therefore captures user-level digital-finance competence, verification/security awareness, and use of digital financial information; it does not directly measure the depth to which digital records are integrated into budgeting, forecasting, inventory control, or management accounting.

Small-business performance

Eight items measured business-level performance: perceived performance relative to principal competitors in sales growth, profitability, cash-flow position, cost control, customer growth, market position, ability to meet financial obligations, and overall growth/resilience. Responses ranged from 1 = Much Worse to 5 = Much Better. Perceptual performance measures were used because many owner-managed firms do not disclose audited financial information and because the study included heterogeneous sectors and firm sizes. Thus, the outcome is enterprise performance as reported by the owner/entrepreneur or financially responsible key informant, not the respondent's personal performance.

3.5 Data screening and analysis

The dataset was screened for duplicate respondent IDs, missing values, invalid scale values, and inconsistencies between item-level responses and stored construct scores. The final dataset contained 500 unique cases, no missing responses among the principal measurement items, and no duplicate IDs. Independently recalculated construct means exactly matched the stored construct means.

The hypothesized relationships were estimated with reflective Mode-A partial least squares path modeling. The interaction between financial management practices and digital financial capability was estimated using a two-stage latent-score procedure. Statistical inference was based on 5,000 nonparametric bootstrap resamples. Measurement-model evaluation included standardized outer loadings, Cronbach's alpha, composite reliability, Average Variance Extracted (AVE), and heterotrait-monotrait (HTMT) ratios. Following Hair et al. (2022), loadings around or above 0.70, reliability around or above 0.70, and AVE of at least 0.50 were treated as satisfactory. HTMT was used to assess discriminant validity following Henseler et al. (2015). Procedurally, the questionnaire used different response anchors where appropriate across constructs (agreement, behavioral frequency, and relative performance), participation was confidential, and sensitive banking credentials

were not collected. Nevertheless, because the principal focal constructs and perceived performance were reported by the same respondent in the same survey, common-method variance cannot be ruled out. The first unrotated factor was therefore inspected only as a limited screening diagnostic and was not treated as definitive evidence that common-method bias was absent.

Structural-model assessment included standardized path coefficients, bootstrap standard errors, two-sided p-values, 95% bootstrap confidence intervals, R^2 , effect sizes (f^2), variance inflation factors, and ten-fold cross-validated predictive coefficients. Mediation was assessed from the bootstrapped indirect path rather than the causal-steps logic criticized by Zhao et al. (2010). Moderated mediation was evaluated using the index of moderated mediation described by Hayes (2015). Given the cross-sectional design, the mediation, moderation, and moderated-mediation estimates are interpreted as statistical conditional-process associations and not as proof of temporal or causal mechanisms.

Robustness analyses examined the objective financial-knowledge index and re-estimated the business-performance model while controlling for education, business age, employee size, external-finance access, registration status, geopolitical zone, and sector.

3.6 Ethical considerations

Participation was voluntary and respondents were informed of the academic purpose of the study and the confidential treatment of their responses before completing the Google Forms instrument. No sensitive banking credentials were collected. Only anonymized respondent identifiers were retained in the analytical dataset.

4. Results

4.1 Sample characteristics and descriptive statistics

The analytical dataset contained 500 unique respondents, all key financial decision-makers in the

sampld micro and small businesses. Owner-level respondents (owners, founders, co-owners/partners, and owner-managers) accounted for 92.8% of the sample, while financially responsible managers accounted for 7.2%. The sample was predominantly micro-enterprise based: 54.8% of firms employed 3–

9 persons and 26.8% employed 1–2 persons. Most businesses were registered (71.8%), 43.6% had obtained external finance during the preceding three years, and 84.0% accepted digital payments. Bank transfer (89.4%) and mobile banking (81.0%) were the most widely used digital financial services.

Table 4. Selected respondent and business characteristics

Variable	Category	n	%
Gender	Male	263	52.6
Gender	Female	226	45.2
Age	30–39 years	177	35.4
Education	HND/Bachelor's degree	234	46.8
Business age	4–7 years	151	30.2
Employees	3–9 employees	274	54.8
Sector	Wholesale/Retail	130	26.0
Registration	Registered	359	71.8
External finance (3 years)	Yes	218	43.6
Accepts digital payments	Yes	420	84.0
Respondent role	Owner-level role*	464	92.8

Note. Table reports selected dominant categories; percentages are based on $N = 500$. *Owner-level role combines business owner, founder, co-owner/partner, and owner-manager categories.

The mean financial-literacy score was 3.48 (SD = 0.96), financial management practices averaged 3.34 (SD = 1.00), digital financial capability averaged 3.55 (SD = 0.94), and perceived business performance averaged 3.38 (SD = 1.01). The objective financial-knowledge score averaged 60.97% (SD = 24.41%; median = 66.7%).

4.2 Reliability, convergent validity, and discriminant validity

Table 5. Descriptive statistics, reliability, and convergent validity

Construct	Mean	SD	Cronbach α	CR	AVE
Financial Literacy (FL)	3.48	0.96	0.928	0.939	0.606
Financial Management Practices (FMP)	3.34	1.00	0.909	0.926	0.611
Digital Financial Capability (DFC)	3.55	0.94	0.896	0.916	0.579

Construct	Mean	SD	Cronbach α	CR	AVE
Business Performance (BP)	3.38	1.01	0.904	0.922	0.598

All four reflective constructs exceeded conventional reliability and convergent-validity criteria. Cronbach's alpha ranged from 0.896 to 0.928, composite reliability from 0.916 to 0.939, and AVE from 0.579 to 0.611. The objective six-item knowledge index produced KR-20 = 0.409 and was therefore retained only as an auxiliary observed index for exploratory and robustness analyses rather than interpreted as a reliable reflective scale. Its modest internal consistency may reflect both the

small number of items and their deliberately heterogeneous coverage of distinct knowledge domains.

All standardized outer loadings exceeded 0.70, ranging from 0.719 to 0.805. No measurement indicator required deletion on indicator-reliability grounds. Full item-level loadings are reported in Appendix A.

Table 6. HTMT discriminant-validity matrix

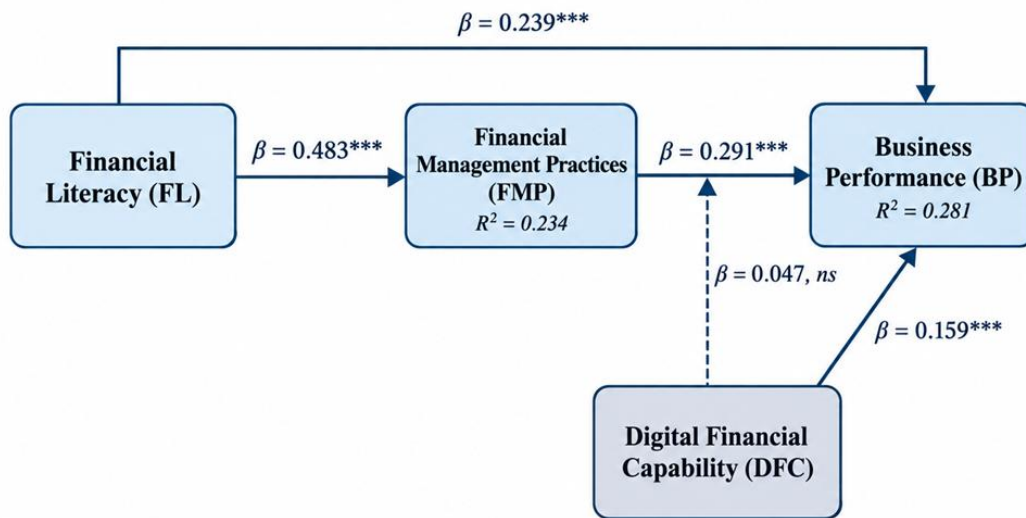
	FL	FMP	DFC	BP
FL	—	0.520	0.285	0.453
FMP	0.520	—	0.336	0.497
DFC	0.285	0.336	—	0.339
BP	0.453	0.497	0.339	—

Note. All HTMT values are below the conservative 0.85 criterion.

The first unrotated factor accounted for 32.2% of total item variance, below the commonly used 50% screening threshold. This result is reported only as a limited common-method-variance diagnostic and does not establish that common-method bias is absent. Structural predictor VIFs ranged from 1.01 to 1.36, indicating no material multicollinearity problem in the structural model; these VIFs are not treated as a substitute for a dedicated common-method-bias test.

4.3 Structural model and direct associations

The model explained 23.1% of the variance in financial management practices ($R^2 = 0.231$) and 28.2% of the variance in business performance ($R^2 = 0.282$). Ten-fold cross-validated predictive coefficients were positive for both endogenous constructs ($Q^2_{\text{predict}} = 0.226$ for FMP and 0.271 for BP), indicating predictive relevance within the present sample.



Note: *** $p < 0.001$; ns = not significant.

Figure 1. Final structural model results

Table 7. Structural path coefficients and bootstrap inference

Hyp.	Path	β	Boot SE	95% CI	p	Decision
H1	FL $\rightarrow$ BP	0.236	0.044	[0.147, 0.322]	< .001	Supported
H2	FL $\rightarrow$ FMP	0.480	0.033	[0.417, 0.546]	< .001	Supported
H3	FMP $\rightarrow$ BP	0.293	0.043	[0.208, 0.376]	< .001	Supported
H5	DFC $\rightarrow$ BP	0.162	0.040	[0.088, 0.244]	< .001	Supported
H6	FMP $\times$ DFC $\rightarrow$ BP	0.049	0.034	[-0.020, 0.114]	.164	Not supported

The primary financial-literacy-performance relationship was supported statistically: financial literacy showed a positive direct association with perceived business performance ($\beta = 0.236$, $p < .001$). Financial literacy was also positively associated with financial management practices ($\beta = 0.480$, $p < .001$), which was the largest direct structural coefficient in the model. Financial management practices were positively associated

with performance ($\beta = 0.293$, $p < .001$), and digital financial capability showed an independent positive association with performance ($\beta = 0.162$, $p < .001$). In contrast, the FMP $\times$ DFC interaction was not statistically significant ($\beta = 0.049$, $p = .164$), providing no statistical evidence that DFC moderates the FMP-performance association. These coefficients are interpreted as cross-sectional associations rather than causal effects.

Table 8. Approximate structural effect sizes

Predictor/path	f ²	Magnitude
FL → BP	0.058	Small
FL → FMP	0.300	Medium
FMP → BP	0.088	Small
DFC → BP	0.032	Small
FMP × DFC → BP	0.003	Negligible

4.4 Mediation and moderated mediation

Table 9. Indirect and conditional indirect effects

Hyp.	Effect	Estimate	Boot SE	95% CI	p	Decision
H4	FL → FMP → BP at mean DFC	0.141	0.023	[0.099, 0.187]	< .001	Supported
—	Conditional indirect effect: low DFC (-1 SD)	0.118	0.026	[0.068, 0.170]	< .001	Significant
—	Conditional indirect effect: high DFC (+1 SD)	0.164	0.030	[0.107, 0.226]	< .001	Significant
H7	Index of moderated mediation	0.023	0.017	[-0.010, 0.056]	.164	Not supported

The bootstrapped indirect path from financial literacy to business performance through financial management practices was positive and statistically significant ($\beta = 0.141$, 95% CI [0.099, 0.187], $p < .001$). Because the direct FL → BP path also remained positive and significant, the pattern is consistent with complementary partial statistical mediation rather than full mediation. H4 was therefore supported within the specified cross-sectional model.

Conditional indirect estimates were significant at both low and high levels of digital financial capability and increased numerically from 0.118 at -1 SD to 0.164 at +1 SD. However, the index of moderated mediation was not significantly different from zero (index = 0.023, 95% CI [-0.010, 0.056], $p = .164$). Thus, the fact that the conditional indirect

estimate is significant at each selected DFC level does not establish that the indirect pathway differs significantly across DFC levels. H7 was not supported.

4.5 Robustness checks

Objective financial knowledge correlated positively with subjective financial literacy ($r = 0.573$), financial management practices ($r = 0.374$), and business performance ($r = 0.307$). In separate standardized regressions, objective financial knowledge was positively associated with FMP ($\beta = 0.374$, $p < .001$) and BP ($\beta = 0.307$, $p < .001$). When objective knowledge was entered alongside subjective FL, FMP, DFC, and the interaction, its unique direct coefficient was nonsignificant ($\beta =$

0.032, $p = .495$), suggesting that its relationship with performance is largely shared with the broader financial-literacy and behavioral constructs. Given the KR-20 of 0.409, these objective-knowledge results are treated as exploratory robustness evidence.

A controlled model including education, business age, employee size, external-finance access,

registration status, geopolitical-zone indicators, and sector indicators produced substantively similar conclusions. FL ($\beta = 0.236$, $p < .001$), FMP ($\beta = 0.300$, $p < .001$), and DFC ($\beta = 0.163$, $p < .001$) remained significant, while the interaction remained nonsignificant ($\beta = 0.040$, $p = .300$). The controlled model explained 33.0% of the variance in business performance (adjusted $R^2 = 0.294$).

4.6 Hypothesis summary

Table 10. Final hypothesis decisions

Hypothesis	Decision
H1	Supported
H2	Supported
H3	Supported
H4	Supported
H5	Supported
H6	Not supported
H7	Not supported

5. Discussion

5.1 Financial literacy and the performance of small-business owners/entrepreneurs

Financial literacy was positively associated with the perceived performance of the businesses owned or managed by respondents ($\beta = 0.236$, $p < .001$), supporting H1. This finding directly addresses the study's central financial-literacy-performance relationship and is consistent with Agyapong and Attram (2019), Nigerian evidence from Babajide et al. (2023) and Ibitomi et al. (2024), and the general conclusion of recent systematic reviews that financial literacy is an important correlate of enterprise performance. Financially literate entrepreneurs may be better positioned to compare credit alternatives, understand borrowing costs, anticipate inflation effects, interpret basic records, and evaluate investments. The effect size of the

direct path was nevertheless small ($f^2 = 0.058$), indicating that financial literacy is only one of several factors associated with business performance. Because the study is cross-sectional, the observed relationship should not be interpreted as proof that financial literacy causes higher performance.

5.2 Financial literacy and the formation of financial-management routines

The strongest coefficient in the structural model was the association between financial literacy and financial management practices ($\beta = 0.480$; $f^2 = 0.300$), supporting H2. Respondents reporting higher financial literacy also reported more frequent separation of personal and business funds, record keeping, budgeting, cash forecasting, obligation monitoring, and use of financial information in

decisions. The finding aligns with Wise (2013), who linked literacy with greater use of financial statements, and with broader systematic-review evidence that financial literacy is related to financial behavior and organizational capabilities (Graña-Alvarez et al., 2024; Rekha et al., 2025). The cross-sectional design does not establish that literacy temporally precedes these routines.

The result also provides a practical bridge between Human Capital Theory and RBV. Financial literacy represents owner-manager human capital, but it becomes strategically meaningful when converted into organizational routines. The medium effect size for FL $\rightarrow$ FMP, compared with the smaller direct path coefficients to performance, suggests that training programs should be judged not only by what entrepreneurs know after training but also by whether their firms adopt budgeting, reconciliation, cash-flow, record-keeping, and debt-planning routines.

5.3 Financial management practices as a partial mediator

Financial management practices were positively associated with business performance ($\beta = 0.293$, $p < .001$), and the bootstrapped FL $\rightarrow$ FMP $\rightarrow$ BP indirect path was significant ($\beta = 0.141$). Because the direct FL $\rightarrow$ BP path remained significant, the model shows complementary partial statistical mediation. This is the central pathway supported by the specified model, but the cross-sectional data do not establish temporal or causal mediation.

The result is consistent with the broader idea that financial capability and managerial routines transmit financial knowledge into enterprise outcomes. Appiah and Agblewornu (2024) identify financial capability as an important mediator between financial literacy and small-business performance in Ghana, while Mang'ana et al. (2024) show that the perceived usefulness and implementation of financial-management practices are associated with performance among Tanzanian agri-SMEs. The current study sharpens this mechanism by focusing on concrete financial-management routines rather than a general capability construct.

The mediation pattern also offers a possible explanation for why some studies report heterogeneous direct associations between financial literacy and performance. One interpretation is that financial knowledge may be more strongly related to outcomes when it is accompanied by record keeping, cash-flow forecasting, and obligation planning. This behavioral pathway therefore deserves explicit longitudinal attention in future financial-literacy research.

5.4 Digital financial capability: positive direct association, no established multiplier effect

Digital financial capability showed a significant positive direct association with business performance ($\beta = 0.162$, $p < .001$), supporting H5. This result is consistent with Luo et al. (2021), who report a positive relationship between digital financial capability and entrepreneurial performance, and with Ojeleye and Mustapha (2024), who report positive associations involving digital-finance knowledge and risk-control competencies among Nigerian female entrepreneurs. It also fits the broader Nigerian context in which FinTech adoption and financial literacy remain important for financial participation and inclusion (Sam-Abugu et al., 2025).

However, DFC did not significantly moderate the association between financial management practices and performance ($\beta = 0.049$, $p = .164$), and the index of moderated mediation was also nonsignificant. The distinction is important. DFC was positively associated with performance, but the data do not support the claim that it amplifies the FMP-performance association. The most defensible interpretation is additive rather than multiplicative: stronger financial-management practices and stronger digital financial capability each show positive direct associations with performance, but their interaction was not statistically established.

Several mechanisms could explain the null interaction, but they remain hypotheses for future research. First, digital adoption was already widespread: 84.0% of sampled businesses accepted digital payments, potentially reducing variation in basic digital access. Second, digital tools may be used mainly for transactions rather than deeply

integrated into budgeting, forecasting, or management accounting. Third, the DFC measure captures user competence, verification/security awareness, and use of digital records, but does not directly measure the depth of analytical integration of those records into financial-management routines. Future research should test these explanations with measures that distinguish transactional digital capability from integrated digital financial management.

The null interaction is theoretically useful because RBV does not require every valuable resource to interact synergistically with every other resource. Complementarity is an empirical proposition. In this cross-sectional sample, DFC was positively associated with performance, but there was insufficient evidence that the strength of the FMP-performance association or the FL $\rightarrow$ FMP $\rightarrow$ BP indirect pathway varied by DFC. H6 and H7 therefore remain unsupported.

5.5 Objective financial knowledge and robustness

The objective knowledge index provides an additional perspective. Objective financial knowledge correlated with subjective literacy, financial management practices, and performance. Yet its unique performance coefficient became nonsignificant when the broader literacy, FMP, and DFC constructs were entered together. Given the modest KR-20 of 0.409, these results should be interpreted cautiously and only as robustness evidence. They suggest that factual financial knowledge is related to business outcomes, but much of its observed association is shared with broader perceived competence and the behavioral routines through which knowledge is used.

The robustness model further supports the main pattern of associations. FL, FMP, and DFC remained statistically significant after controlling for education, business age, employee size, external finance, registration, study location/geopolitical zone, and sector, while the interaction remained nonsignificant. These controls reduce, but do not eliminate, concerns that the observed associations reflect measured business characteristics or other

unmeasured confounding.

6. Theoretical Implications

First, the study extends Human Capital Theory by showing that financial literacy is positively associated with the perceived business performance of small-business owners/entrepreneurs. The association is present both as a direct path and through a statistically significant behavioral pathway involving financial management practices. Human capital may become more economically meaningful when accompanied by repeatable routines. The stronger FL $\rightarrow$ FMP path and significant indirect path support a process-oriented interpretation of entrepreneurial human capital, while the cross-sectional design requires caution about temporal and causal ordering.

Second, the results refine RBV-based interpretations of digital capability. Digital financial capability was a positive predictor of performance, but it did not significantly strengthen the FMP-performance association. This indicates that the resources are not automatically complementary. Future RBV research on small businesses should distinguish resource possession, resource deployment, and resource complementarity, and should measure the depth of digital integration into managerial routines.

Third, the study contributes to the measurement debate in small-business financial-literacy research by including both subjective and objective measures. The modest KR-20 of the six-item objective index (0.409) cautions against automatically treating short knowledge quizzes as reliable reflective scales. In this study, objective knowledge is therefore used only as an auxiliary observed robustness index, while the primary latent constructs capture broader applied competence and behavior.

Fourth, the nonsignificant moderated-mediation result is itself informative. Conditional-process models should be used to test boundary conditions, not to guarantee complex significant findings. The evidence indicates that the supported mechanism is partial mediation through financial-management practices, with DFC operating independently rather

than as a statistically established multiplier.

7. Practical and Policy Implications

For small-business development agencies and business-support organizations, the results are consistent with financial-literacy interventions that move beyond classroom knowledge and encourage practical adoption of simple routines: separation of business and household cash, weekly cash-flow monitoring, monthly budget-versus-actual review, receivables tracking, digital reconciliation, debt calendars, and basic investment appraisal. Program evaluation can assess changes in these practices in addition to post-training knowledge scores.

For financial institutions and FinTech providers, the positive direct association between DFC and performance supports attention to small-business users' ability to interpret digital transaction records, compare digital financial products, verify transactions, recognize fraud, and use digital data for decisions. Yet because the interaction was nonsignificant, providing apps or digital-payment access should not be assumed to substitute for financial-management training. Digital competence and managerial discipline are better treated as parallel capabilities.

For policymakers, the six-location design provides evidence from one location representing each geopolitical zone but should not be interpreted as nationally representative. The findings nevertheless support consideration of standardized core financial-management modules delivered through regionally adapted support structures. The high prevalence of digital-payment acceptance in the sample also identifies a practical opportunity for future programs to link digital transaction histories with bookkeeping and cash-flow tools, while evaluating such interventions prospectively.

For small-business owners and entrepreneurs, the main practical implication is that financial knowledge is positively associated with business performance and is most useful when accompanied by disciplined financial routines. Understanding interest rates or budgeting is useful, but regularly recording, forecasting, reconciling, reviewing, and

acting on financial information is the behavioral pathway most strongly supported by the present statistical model. These implications should be viewed as evidence-informed considerations rather than causal claims about what a particular intervention will produce.

8. Limitations and Future Research

The study has several limitations. First, the cross-sectional design identifies associations rather than causal effects. Although mediation and moderation were estimated statistically, temporal ordering cannot be established. Longitudinal or panel studies should examine whether changes in financial literacy precede changes in financial-management routines and whether those changes subsequently precede changes in performance.

Second, the principal business-performance measure is perceptual and relative to competitors. Although this approach is useful for heterogeneous private firms, future studies should triangulate survey measures with revenue growth, profit margins, cash-flow records, tax records, or other objective performance data where access is feasible.

Third, the study used an online Google Forms survey and a quota-controlled multi-regional design based on six selected locations, one representing each geopolitical zone. The sample should not be interpreted as a probability sample of all Nigerian micro and small businesses or as nationally representative. Future studies can use official business registers and stratified probability sampling where reliable sampling frames are available.

Fourth, most focal constructs and perceived business performance were reported by the same respondent in the same questionnaire, creating potential common-method variance. The first unrotated factor accounted for 32.2% of item variance, but this single-factor diagnostic has limited sensitivity and does not rule out common-method bias. Future studies should consider temporal separation, multiple respondents or data sources, validated marker-variable approaches, and objective performance measures where feasible. Fifth, the six-item objective financial-knowledge index had

modest internal consistency ($KR-20 = 0.409$). Future research should use a broader business-specific objective test covering credit, working capital, financial statements, taxation, investment appraisal, inflation, and digital-finance risk, with item-response analysis and separate validation.

Sixth, the null moderation result may reflect how DFC was operationalized. The current measure captures digital-finance competence, transaction verification, risk awareness, and use of digital records, but it does not directly quantify analytical integration of digital data into budgeting, inventory control, receivables management, forecasting, or management accounting. Future research should distinguish transactional digital capability from analytical digital-finance integration; such differentiation may reveal more specific complementarities.

Finally, sectoral and regional heterogeneity should be examined more deeply. The relationship among literacy, financial routines, digital capability, and performance may differ across retail, manufacturing, agriculture, professional services, and digitally intensive firms.

9. Conclusion

This study examined financial literacy and its relationship with the performance of small-business owners/entrepreneurs. Performance was operationalized as the perceived performance of the businesses owned or managed by respondents. Using 500 valid responses from key financial decision-makers in micro and small businesses in six selected locations representing Nigeria's six geopolitical zones, the study found a positive and statistically significant association between financial literacy and perceived business performance ($\beta = 0.236$, $p < .001$). This is the central empirical finding of the study. Because the design is cross-sectional, however, the observed relationship should not be interpreted as evidence of a causal effect.

Digital financial capability is independently and positively associated with business performance, indicating that competence in digital financial services is an economically relevant entrepreneurial

capability within the specified model. However, the study finds no statistically sufficient evidence that digital financial capability moderates the association between financial management practices and performance or significantly changes the $FL \rightarrow FMP \rightarrow BP$ indirect pathway.

The principal conclusion is therefore that higher financial literacy is associated with better perceived small-business performance in the sampled firms, while disciplined financial-management routines provide a supported complementary partial statistical pathway linking literacy with performance. Digital financial capability adds explanatory value as a parallel capability, but it should not be assumed to multiply the association between conventional financial-management routines and performance because neither the interaction nor the index of moderated mediation was statistically significant. For the sampled micro and small businesses, the evidence supports an associational conclusion rather than a causal-impact claim, and policy or training implications should be evaluated prospectively rather than generalized as national causal effects.

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Appendix A. Standardized Outer Loadings

Table A1. Item-level standardized outer loadings

Item	Loading	Item	Loading
FL1	0.769	FL2	0.802
FL3	0.775	FL4	0.788
FL5	0.735	FL6	0.788
FL7	0.790	FL8	0.767
FL9	0.771	FL10	0.796
FMP1	0.778	FMP2	0.775
FMP3	0.779	FMP4	0.805
FMP5	0.782	FMP6	0.786
FMP7	0.783	FMP8	0.767
DFC1	0.782	DFC2	0.719
DFC3	0.785	DFC4	0.773
DFC5	0.759	DFC6	0.740

Item	Loading	Item	Loading
DFC7	0.740	DFC8	0.785
BP1	0.788	BP2	0.733
BP3	0.769	BP4	0.767
BP5	0.776	BP6	0.802
BP7	0.764	BP8	0.785

Note. All indicators were retained because all standardized loadings exceeded 0.70.