



## Digital financial management, leadership skills and school accountability among principals in south East Nigeria

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### Abstract

The increasing digitalisation of public-sector financial administration has created new opportunities for strengthening transparency, efficiency, and accountability in secondary school management. This study examined the relationship among digital financial management, leadership skills, and financial accountability among principals of public secondary schools in South East Nigeria. Specifically, the study investigated whether principals' digital financial literacy, adoption of digital financial tools, and compliance with digital financial policies relate to financial accountability directly and indirectly through leadership skills. The study was anchored on Digital Leadership Theory and Resource Dependency Theory. A quantitative cross-sectional survey design was adopted, with data obtained from 206 principals of public secondary schools across Abia, Anambra, Ebonyi, Enugu, and Imo States. Digital financial management was operationalised through digital financial literacy, adoption of digital tools, and digital policy compliance, while leadership skills were measured through transformational financial leadership, accountability and transparency leadership, and data-driven decision-making. Financial accountability was assessed using financial planning and budgeting effectiveness, financial reporting and record keeping, and overall financial accountability and management. Descriptive analysis indicated generally high levels of digital financial management, leadership competence, and financial accountability. Digital financial literacy recorded the highest mean ( $M = 4.04$ ), while financial planning and budgeting effectiveness recorded the lowest substantive mean ( $M = 3.54$ ). Inspection of the supplied data, however, revealed deterministic linear relationships among the substantive variables, producing perfect or near-perfect collinearity. Consequently, the proposed mediation effect could not be independently identified without overstating the inferential evidence. The study concludes that digital financial competence, leadership capability, and financial accountability are closely connected dimensions of contemporary school administration, while recommending stronger budgeting capacity, data-driven decision-making, digital policy compliance, electronic audit trails, and integrated leadership and digital-finance development.

**Keywords:** Digital financial management, digital financial literacy, leadership skills, financial accountability, school principals, digital tools, school financial management, South East Nigeria

### Introduction

The digital transformation of contemporary organisations has fundamentally altered the ways in which financial resources are mobilised, allocated, monitored, reported, and accounted for. Educational institutions are increasingly affected by this transformation because schools operate not merely as pedagogical environments but also as administrative organisations responsible for managing financial, human, physical, and information resources. Consequently, the responsibilities of school principals have expanded beyond conventional instructional supervision and personnel administration to encompass increasingly sophisticated financial-management and accountability functions. Contemporary principals are expected to plan budgets, maintain financial records, manage internally and externally generated funds, comply with procurement regulations, communicate financial information to stakeholders, and ensure that available resources are applied transparently toward institutional priorities. In an increasingly digital public-sector environment, these responsibilities also require competence in electronic payment systems, spreadsheets, management information systems (MIS), digital banking applications, electronic documentation, and technology-enabled audit trails (UNESCO, 2024; Tømte, 2024) <sup>[3, 10]</sup>.

The growing importance of these competencies reflects a broader shift in the conception of educational leadership. UNESCO (2024) <sup>[10]</sup> emphasises that effective school leadership increasingly requires practical competencies in data use, financial management, and digital literacy alongside traditional leadership capabilities. Greater autonomy over school resources should therefore be accompanied by clearly defined accountability mechanisms and sufficient capacity among school leaders to use financial and other resources effectively. Financial decentralisation and school-level decision-making need to be complemented by leadership capabilities capable of translating financial autonomy into accountable educational outcomes.

Digital financial management can be understood as an emerging dimension of educational administration that integrates financial-management principles with digital technologies. Within secondary school administration, it encompasses principals' ability to employ digital technologies in budgeting, payment processing, financial recording, procurement documentation, monitoring, reporting, and auditing. It is broader than merely owning or accessing computers. It requires digital financial literacy, actual adoption and competent use of appropriate digital tools, and compliance with policies regulating electronic

financial transactions and financial documentation. Recent international scholarship indicates that school digitalisation depends substantially on leaders' ability to understand technology, develop appropriate organisational practices, and mobilise people and resources around digital transformation (Willermark *et al.*, 2024; Witthöft *et al.*, 2024) <sup>[12, 13]</sup>.

The first dimension of digital financial management considered in this study is digital financial literacy. It refers to the knowledge, skills, confidence, and judgement necessary to use digital technologies effectively for financial decision-making and administration. For a secondary school principal, such literacy may involve the ability to use Microsoft Excel or related spreadsheet applications for budgeting and expenditure analysis, operate school management information systems, access electronic banking platforms, verify electronic transactions, maintain digital records, and interpret digitally generated financial reports. Data literacy research similarly shows that principals require specialised competence to access, interpret, analyse, communicate, and use data for organisational and strategic decision-making (Lee *et al.*, 2024) <sup>[3]</sup>.

The second dimension is the adoption of digital financial tools. Digital literacy represents capacity, whereas digital-tool adoption represents the translation of such capacity into actual administrative practice. Digital financial tools potentially allow schools to reduce dependence on cash transactions, accelerate payment processing, improve the retrievability of financial information, establish verifiable transaction histories, and enhance the monitoring of receipts and expenditures. Relevant applications within Nigeria include bank applications, electronic transfers, government payment platforms, spreadsheets, electronic receipts, and school management information systems. Nigeria's wider payments architecture has increasingly promoted electronic payments and digital financial services, reinforcing the relevance of such tools to public-sector administration (Central Bank of Nigeria [CBN], 2022).

Digitalisation nevertheless does not automatically produce accountability. Technology may increase the speed and traceability of transactions, but its governance effects depend on how users operate it, the controls surrounding its use, and the leadership culture within the organisation. Consequently, the third dimension investigated is digital policy compliance. This refers to adherence to established procedures governing procurement, authorisation, payment, documentation, record retention, audit trails, reporting, and financial oversight. Electronic systems can potentially improve accountability because transactions generate records that can be subjected to subsequent verification, but these advantages are realised only where users comply with financial regulations and digital records form part of an effective internal-control architecture.

The issue is especially pertinent in Nigerian public schools because principals manage financial resources derived from multiple sources. Depending on the level and administrative arrangement of the school, resources may include government allocations, grants, approved school charges, Parent-Teacher Association contributions, donations, community support, intervention funds, and funds associated with school-improvement activities. These multiple streams create significant fiduciary responsibilities. Principals must not only mobilise and allocate resources but also demonstrate that expenditures correspond to authorised

purposes and institutional priorities. Accountability therefore involves accurate budgeting, transparent expenditure decisions, appropriate record keeping, periodic reporting, auditing, and disclosure to relevant education authorities and stakeholders.

The magnitude of public educational financing further underlines the need for effective accountability systems. UBEC's intervention framework and revised guidelines emphasise financial management, monitoring, accountability, school development planning, and oversight of school fund utilisation (Universal Basic Education Commission [UBEC], 2025). Although UBEC funding should not be conflated with every secondary-school funding stream, the scale and governance expectations surrounding public education financing illustrate the broader fiduciary environment in which Nigerian education administrators operate.

Leadership skills are therefore an important explanatory mechanism. Digital systems can provide information, but leaders determine how information is interpreted and used. A principal may possess access to electronic banking, spreadsheets, MIS platforms, and digital reports but still fail to achieve effective accountability where leadership practices do not encourage transparency, evidence-based decision-making, participation, and responsible resource utilisation. Conversely, principals who combine digital competence with strong leadership capabilities may be better positioned to convert financial data into institutional decisions, identify expenditure irregularities, communicate resource constraints to stakeholders, prioritise competing needs, and establish organisational norms of transparency.

This study conceptualises leadership skills through transformational leadership in finance, accountability and transparency leadership, and data-driven decision-making. Transformational financial leadership concerns the principal's ability to establish a clear vision for responsible resource management, motivate relevant personnel to embrace improved financial practices, encourage innovation, and create organisational commitment to transparency and efficiency. Accountability and transparency leadership concerns commitment to openness, ethical resource utilisation, accurate disclosure, and answerability to stakeholders. Data-driven decision-making concerns the systematic use of financial records, reports, expenditure patterns, and other quantitative information in school-management decisions.

Within Nigeria, empirical evidence increasingly supports the importance of principals' financial-management and accountability competencies. Manafa (2025) <sup>[4]</sup> reported significant positive relationships between principals' cash budgeting, cash-control and cash-auditing practices and administrative effectiveness in Anambra State. Amachree (2025) <sup>[1]</sup> examined principals' managerial competencies in relation to the utilisation of financial resources in Rivers State. Obona *et al.* (2025) <sup>[5]</sup> similarly reported positive relationships between principals' financial and leadership accountability practices and secondary-school goal attainment in Cross River State. These studies indicate that financial accountability is central to effective educational administration rather than merely a bookkeeping obligation. However, much of the Nigerian literature has concentrated on conventional financial-management practices such as budgeting, auditing, cash control, record keeping, and expenditure monitoring. Comparatively less empirical

attention has been devoted to the intersection between digital financial management and leadership capabilities, particularly the mechanisms through which digital financial competence may translate into stronger financial accountability. There is also a geographical gap: evidence covering Abia, Anambra, Ebonyi, Enugu, and Imo as a coherent South East geopolitical context remains limited, particularly regarding digital financial management.

The conceptual foundation of the study draws principally from Digital Leadership Theory and Resource Dependency Theory. From a digital leadership perspective, technology-enabled organisational transformation depends on leaders who can integrate technological knowledge with strategic direction, organisational change, human capacity development, and responsible decision-making. Resource Dependency Theory (Pfeffer & Salancik, 1978)<sup>[8]</sup> provides a complementary explanation: schools depend on governments, education boards, parents, communities, development partners, and other stakeholders for essential resources, and such dependency generates expectations regarding transparent and accountable resource utilisation.

Integrating the two perspectives suggests a sequential mechanism in which digital financial management influences leadership capabilities, which in turn relate to financial accountability. Digital financial literacy, adoption of digital tools, and compliance with digital financial policies may enhance principals' access to accurate and timely financial information. Such information may strengthen transformational financial leadership, transparency-oriented leadership, and data-driven decision-making. These leadership capabilities may subsequently improve financial planning and budgeting, reporting and record keeping, and overall financial accountability.

Against this background, this study examines Digital Financial Management, Leadership Skills and School Accountability among 206 principals of public secondary schools in Abia, Anambra, Ebonyi, Enugu, and Imo States. It seeks to extend Nigerian educational-management scholarship from conventional school financial management toward a more integrated model of digital finance, leadership, and accountability.

## **Review of Related Literature**

### **1. Concept of Digital Financial Management in Secondary School Administration**

Digital financial management refers to the application of digital technologies, electronic platforms, information systems, and data-processing tools to the planning, mobilisation, allocation, expenditure, monitoring, reporting, and auditing of financial resources. In educational administration, it represents an extension of conventional school financial administration into a technology-enabled environment where transactions and decisions are supported by electronic payment platforms, spreadsheets, management information systems, mobile banking applications, electronic records, and digitally generated audit trails. UNESCO (2024)<sup>[10]</sup> observes that school leaders increasingly operate within accountability frameworks in which they exercise discretion over financial and human resources while remaining answerable to governments, communities, and other stakeholders.

#### **1.1 Digital Financial Literacy**

Digital financial literacy is the ability to understand and effectively use digital technologies in financial planning,

decision-making, transactions, record keeping, monitoring, and reporting. It extends conventional financial literacy by adding competence in spreadsheets, electronic payment systems, online banking, digital records, management information systems, data security, and interpretation of digitally generated information. Lee *et al.* (2024)<sup>[3]</sup> identified principals' data literacy as a multidimensional competence involving the ability to access, interpret, analyse, communicate, and use data for organisational decisions. This has direct relevance to school financial administration.

#### **1.2 Adoption of Digital Financial Tools**

Digital-tool adoption refers to the actual utilisation of technological applications and platforms in institutional financial-management activities. Relevant tools may include electronic transfers, bank applications, government payment platforms, spreadsheets, electronic receipts, and school management information systems. Effective adoption occurs when technologies become embedded in regular activities such as collecting approved fees, paying vendors, preparing budgets, tracking expenditure, maintaining receipts, producing reports, and storing financial records. Digital tools may strengthen accountability by increasing traceability, improving retrieval, and reducing reliance on cash and purely manual records.

#### **1.3 Digital Policy Compliance**

Digital policy compliance refers to adherence to prescribed rules, financial procedures, procurement requirements, authorisation mechanisms, documentation standards, reporting obligations, and audit requirements within digitally mediated financial systems. Financial technology cannot substitute for governance: an electronic transfer may be traceable but still be unauthorised. UNESCO (2024)<sup>[10]</sup> stresses that greater autonomy in resource management must be accompanied by well-defined accountability systems, capacity building, and monitoring.

## **2. Leadership Skills in Financial Management**

Leadership skills refer to the behavioural, strategic, interpersonal, ethical, and analytical competencies through which principals influence organisational members and coordinate resources toward institutional objectives. In financial management, leadership includes communicating priorities, promoting transparency, involving appropriate stakeholders, enforcing controls, evaluating financial information, addressing deviations, and establishing a culture of responsible resource utilisation.

### **2.1 Transformational Leadership in Finance**

Transformational leadership involves articulating a compelling organisational vision, motivating followers, encouraging innovation, modelling desired values, and developing employees' capabilities. In financial administration, transformational leadership involves promoting a shared commitment to prudent resource utilisation, financial discipline, innovation, accountability, and technology adoption. Digital transformation research indicates that technology adoption in schools requires leadership capable of mobilising organisational members and embedding new practices in institutional routines (Willermark *et al.*, 2024; Witthöft *et al.*, 2024)<sup>[12, 13]</sup>.

## 2.2 Accountability and Transparency Leadership

Accountability leadership concerns leaders' willingness to explain, justify, and take responsibility for organisational decisions and resource use, while transparency leadership concerns systems through which relevant stakeholders can obtain reliable information about transactions and performance. Obona *et al.* (2025) <sup>[5]</sup> reported significant positive relationships between principals' financial accountability practices, leadership accountability practices, and school-goal attainment in Cross River State.

## 2.3 Data-Driven Decision-Making

Data-driven decision-making refers to the systematic collection, interpretation, evaluation, and use of credible information to guide organisational decisions. Within school finance, this includes determining spending priorities, preparing budgets, identifying funding gaps, monitoring expenditure, evaluating financial performance, and reallocating resources. Lee *et al.* (2024) <sup>[3]</sup> demonstrate that principals require specialised data competence for organisational decision-making.

## 3. Financial Accountability and Management

Financial accountability refers to the obligation of organisational leaders to manage entrusted resources responsibly and provide accurate, verifiable, and timely information explaining how those resources were obtained, allocated, and utilised. In schools it includes budgeting, revenue documentation, expenditure authorisation, procurement compliance, record keeping, reporting, internal controls, auditing, reconciliation, and disclosure.

### 3.1 Financial Planning and Budgeting Effectiveness

Financial planning determines future financial requirements and strategies for mobilising and allocating resources, while budgeting translates plans into quantified revenue and expenditure estimates. Manafa (2025) <sup>[4]</sup> found strong positive and significant relationships between principals' cash-budgeting, cash-control and cash-auditing practices and administrative effectiveness in Anambra State. Digital competence may improve budgeting by enabling projections, calculations, scenario comparisons, expenditure tracking, and variance analysis.

### 3.2 Financial Reporting and Record Keeping

Financial reporting involves systematic presentation of information concerning revenues, expenditures, balances, and other financial activities. Record keeping provides the evidence underlying such reports. Digital technologies can improve accessibility, organisation, searchability, and durability of records through electronic receipts, transaction histories, spreadsheet ledgers, and electronic bank statements. These records must nevertheless remain accurate, secure, backed up, and protected against unauthorised alteration.

### 3.3 Overall Financial Accountability and Management

Overall financial accountability integrates planning, control, transparency, compliance, record keeping, reporting, and answerability. Amachree (2025) <sup>[1]</sup> reinforces the importance of principals' managerial competencies for effective financial-resource utilisation, while Obona *et al.* (2025) <sup>[5]</sup> connect financial accountability with school-goal attainment.

## 4. Theoretical Review

### 4.1 Digital Leadership Theory

Digital Leadership Theory provides the first theoretical foundation for the study. It describes leaders' capacity to combine technology, strategic vision, organisational change, communication, human development, and evidence-based decision-making in achieving organisational goals. Within educational administration, technology availability alone does not transform schools; leaders determine whether technology is appropriately selected, adopted, integrated, monitored, and institutionalised.

### 4.2 Resource Dependency Theory

Resource Dependency Theory, associated principally with Pfeffer and Salancik (1978) <sup>[8]</sup>, proposes that organisations depend on their external environments for resources required for survival and effectiveness. Public secondary schools rely on governments, education boards, parents, PTAs, communities, donors, and other stakeholders. This dependency creates accountability obligations. Digital financial systems may reduce information asymmetry by creating more timely and verifiable transaction information, while leadership determines whether that information is communicated and used responsibly.

## 5. Empirical Review

Recent Nigerian studies consistently show that principals' financial-management and digital-leadership practices are associated with administrative outcomes. Manafa (2025) <sup>[4]</sup> reported significant relationships between budgeting, cash control, auditing, and administrative effectiveness in Anambra State. Amachree (2025) <sup>[1]</sup> examined managerial competencies and financial-resource utilisation in Rivers State. Obona *et al.* (2025) <sup>[5]</sup> found positive relationships between financial and leadership accountability and school-goal attainment in Cross River State. Ogbeche *et al.* (2025) <sup>[5]</sup> linked principals' digital leadership skills with secondary-school effectiveness. These studies establish the importance of both digital leadership and financial accountability but generally examine them separately.

## 6. Relationship Among Digital Financial Management, Leadership Skills and Financial Accountability

The conceptual model proposes that digital financial management should relate positively to financial accountability and leadership skills, and that leadership skills should relate positively to financial accountability. Digital systems generate information and transaction trails, while leadership determines whether such information is translated into transparent decisions, effective planning, and responsible resource utilisation. The proposed mediation model therefore treats leadership skills as a potential mechanism through which digital financial management relates to accountability.

## 7. Research Gap

The reviewed literature reveals several gaps. Nigerian studies largely treat digital leadership and financial management as separate domains; limited attention has been given specifically to digital financial management among principals; leadership skills have rarely been tested as a mediator between digital financial management and financial accountability; and few studies integrate transformational financial leadership, accountability and

transparency leadership, and data-driven decision-making within one model. Geographically, much recent evidence is confined to individual states. The present study addresses these gaps by examining a unified model across the five South East states.

## 8. Summary of Reviewed Literature

The literature establishes that digital transformation is changing school leadership and administrative practice, that principals' digital competence is increasingly important, and that effective financial-management practices contribute to accountability and institutional performance. However, the evidence remains fragmented. The present study therefore integrates digital financial literacy, digital-tool adoption, digital policy compliance, transformational financial leadership, accountability and transparency leadership, data-driven decision-making, and financial accountability in a single framework.

## Methodology

### 1. Research Design

The study adopted a quantitative cross-sectional survey research design. The design was appropriate because the study sought to examine relationships among digital financial management, leadership skills, and financial accountability among principals at a particular point in time. The study was non-experimental because the predictor variables were not manipulated.

### 2. Area of the Study

The study was conducted in South East Nigeria, comprising Abia, Anambra, Ebonyi, Enugu, and Imo States. Public secondary schools in the region operate in urban, rural, and semi-urban environments, which may differ in digital infrastructure, connectivity, financial-service access, and administrative support.

### 3. Population of the Study

The target population comprised principals of public secondary schools in the five South East states. Principals constituted the unit of analysis because they exercise significant administrative responsibility for budgeting, expenditure supervision, record keeping, reporting, management of school-generated and externally provided funds, and accountability to education authorities and stakeholders.

### 4. Sample Size

A total of 206 public secondary-school principals constituted the study sample. The sample covered the five states and included principals working across urban, rural, and semi-urban school environments.

### 5. Sampling Procedure

A multistage stratified sampling procedure was used to obtain representation across the five states and school-location categories. The states constituted geographical strata, while schools were classified as urban, rural, or semi-urban. Principals' years of experience were captured as 1–5 years, 6–10 years, 11–15 years, and 16 years and above and treated as a contextual control variable.

### 6. Instrument for Data Collection

Data were collected with a structured questionnaire using a five-point Likert-type response format. Section A covered

state, school location, and years of experience. Section B measured Digital Financial Literacy (DIG\_LIT), Adoption of Digital Financial Tools (DIG\_TOOLS), and Digital Policy Compliance (DIG\_POLICY). Section C measured Transformational Leadership in Finance (LEAD\_TRANS), Accountability and Transparency Leadership (LEAD\_ACCOUNT), and Data-Driven Decision-Making (LEAD\_DECIS). Section D measured Financial Planning and Budgeting Effectiveness (FIN\_PLAN), Financial Reporting and Record Keeping (FIN\_REPORT), and Overall Financial Accountability and Management (FIN\_ACCOUNT).

### 7. Measurement of Composite Constructs

Digital Financial Management (DFM) was computed as the mean of DIG\_LIT, DIG\_TOOLS, and DIG\_POLICY. Leadership Skills (LS) was computed as the mean of LEAD\_TRANS, LEAD\_ACCOUNT, and LEAD\_DECIS. Financial Accountability (FA) was computed as the mean of FIN\_PLAN, FIN\_REPORT, and FIN\_ACCOUNT. Mean composites retained the original 1–5 metric.

### 8. Validity and Reliability

The instrument was subjected to face and content validation to ensure adequate representation of the study constructs. Internal consistency reliability was assessed using Cronbach's alpha, with 0.70 adopted as the conventional minimum criterion for acceptable reliability. Reliability should be confirmed from the underlying item-level responses where available.

### 9. Method of Data Collection

Questionnaires were administered to selected public secondary-school principals across the five South East states. Participation was voluntary, respondents were informed of the academic purpose of the research, and confidentiality was maintained. A total of 206 valid responses formed the analytical dataset.

### 10. Method of Data Analysis

Data analysis employed descriptive and inferential procedures. Frequencies and percentages were appropriate for categorical characteristics, while means and standard deviations described substantive constructs. Pearson correlation and regression were intended to examine associations, and a mediation framework was specified for  $DFM \rightarrow LS \rightarrow FA$ . Statistical significance was set at  $p < .05$ . Categorical controls should be dummy-coded where included in regression models.

### 11. Mediation Model

The proposed mediation model specified Digital Financial Management as the predictor, Leadership Skills as the mediator, and Financial Accountability as the outcome. Ordinarily, the indirect effect would be estimated as  $a \times b$  and evaluated using a bootstrap confidence interval based on 5,000 resamples. However, valid mediation requires sufficient independent variation among the predictor and mediator.

### 12. Diagnostic Tests

Prior to inferential analysis, the data were examined for missing values, coding errors, linearity, residual normality, homoscedasticity, independence, and multicollinearity. Variance Inflation Factor and tolerance statistics were

identified as relevant diagnostics because the substantive variables represent closely related constructs.

### 13. Ethical Considerations

Ethical principles relating to voluntary participation, confidentiality, anonymity, and responsible use of research data were observed. No individual principal or school was identified in reporting the findings.

### 14. Methodological Caution

Although the mediation framework specifies theoretically directional relationships, the cross-sectional design does not

establish temporal or causal ordering. Any indirect association should therefore be interpreted as statistical mediation consistent with the theoretical model rather than definitive causal proof.

## Results and Discussion

### 1. Descriptive Statistics

The study analysed responses from 206 principals. Descriptive statistics for the nine substantive variables and the three composite constructs are presented in Table 1.

| Variable                                        | Mean | SD   | Minimum | Maximum |
|-------------------------------------------------|------|------|---------|---------|
| Digital Financial Literacy                      | 4.04 | 0.39 | 3.40    | 4.70    |
| Adoption of Digital Financial Tools             | 3.94 | 0.39 | 3.30    | 4.60    |
| Digital Policy Compliance                       | 3.84 | 0.39 | 3.20    | 4.50    |
| Transformational Leadership in Finance          | 3.74 | 0.39 | 3.10    | 4.40    |
| Accountability and Transparency Leadership      | 3.84 | 0.39 | 3.20    | 4.50    |
| Data-Driven Decision-Making                     | 3.64 | 0.39 | 3.00    | 4.30    |
| Financial Planning and Budgeting Effectiveness  | 3.54 | 0.39 | 2.90    | 4.20    |
| Financial Reporting and Record Keeping          | 3.64 | 0.39 | 3.00    | 4.30    |
| Overall Financial Accountability and Management | 3.74 | 0.39 | 3.10    | 4.40    |
| Composite Digital Financial Management          | 3.94 | 0.39 | 3.30    | 4.60    |
| Composite Leadership Skills                     | 3.74 | 0.39 | 3.10    | 4.40    |
| Composite Financial Accountability              | 3.64 | 0.39 | 3.00    | 4.30    |

Digital financial literacy recorded the highest mean ( $M = 4.04$ ,  $SD = 0.39$ ), followed by adoption of digital financial tools ( $M = 3.94$ ,  $SD = 0.39$ ) and digital policy compliance ( $M = 3.84$ ,  $SD = 0.39$ ). The composite Digital Financial Management score was  $M = 3.94$  ( $SD = 0.39$ ), indicating a comparatively high reported level of digital financial-management practice.

Leadership skills were also relatively high. Accountability and transparency leadership recorded  $M = 3.84$  ( $SD = 0.39$ ), transformational leadership in finance  $M = 3.74$  ( $SD = 0.39$ ), and data-driven decision-making  $M = 3.64$  ( $SD = 0.39$ ). The composite Leadership Skills score was  $M = 3.74$  ( $SD = 0.39$ ). The comparatively lower data-driven decision-making score suggests an area for further capacity development.

Financial planning and budgeting effectiveness recorded  $M$

$= 3.54$  ( $SD = 0.39$ ), financial reporting and record keeping  $M = 3.64$  ( $SD = 0.39$ ), and overall financial accountability and management  $M = 3.74$  ( $SD = 0.39$ ). Composite Financial Accountability was  $M = 3.64$  ( $SD = 0.39$ ). Financial planning and budgeting therefore emerged as the comparatively weakest substantive dimension.

### 2. Correlation and Model Diagnostics

Inspection of the supplied dataset revealed an exceptional mathematical structure. The substantive variables follow virtually fixed additive differences from digital financial literacy. Consequently, the three composite constructs satisfy the exact relationships  $LS = DFM - 0.20$ ,  $FA = DFM - 0.30$ , and  $FA = LS - 0.10$ . Because adding or subtracting a constant does not change correlation, the correlations among the composite constructs are effectively  $r = 1.000$ .

| Variable                     | DFM   | Leadership Skills | Financial Accountability |
|------------------------------|-------|-------------------|--------------------------|
| Digital Financial Management | 1.000 | 1.000             | 1.000                    |
| Leadership Skills            | 1.000 | 1.000             | 1.000                    |
| Financial Accountability     | 1.000 | 1.000             | 1.000                    |

The numerical pattern indicates perfect positive association within the supplied scores. However, correlations of exactly 1.000 across conceptually distinct social-science constructs are highly unusual in independently collected field data. The magnitude therefore reflects the deterministic structure of the supplied values and should not be interpreted as evidence of perfect real-world relationships.

### 3. Regression Relationships and Proposed Mediation

Simple regression of Financial Accountability on Digital Financial Management yields the deterministic equation  $FA = -0.30 + 1.00(DFM)$ , with  $R^2 = 1.000$ . Likewise, Leadership Skills satisfies  $LS = -0.20 + 1.00(DFM)$ , with  $R^2 = 1.000$ , and Financial Accountability satisfies  $FA = -0.10 + 1.00(LS)$ , again with  $R^2 = 1.000$ .

| Relationship                                       | Estimated Equation        | R <sup>2</sup> | Interpretation                                                   |
|----------------------------------------------------|---------------------------|----------------|------------------------------------------------------------------|
| DFM → Leadership Skills                            | $LS = -0.20 + 1.00DFM$    | 1.000          | Perfect deterministic positive relationship                      |
| DFM → Financial Accountability                     | $FA = -0.30 + 1.00DFM$    | 1.000          | Perfect deterministic positive relationship                      |
| Leadership Skills → Financial Accountability       | $FA = -0.10 + 1.00LS$     | 1.000          | Perfect deterministic positive relationship                      |
| DFM + Leadership Skills → Financial Accountability | Not uniquely identifiable | —              | Perfect multicollinearity prevents valid mediation decomposition |

A conventional mediation model cannot be uniquely estimated because Digital Financial Management and Leadership Skills contain the same underlying variation. Entering both simultaneously as predictors produces perfect multicollinearity, so the direct and indirect effects cannot be independently separated. It would therefore be statistically misleading to report a bootstrap indirect effect or claim full or partial mediation from these data.

#### 4. Discussion of Findings

The descriptive findings suggest generally favourable levels of digital financial management, leadership skills, and financial accountability. The high digital-financial scores are consistent with the growing importance of digital literacy, information systems, electronic payments, and data use in contemporary school administration (UNESCO, 2024; Lee *et al.*, 2024) [3, 10]. Nigerian evidence similarly indicates that financial-management practices and digital leadership competencies are associated with administrative effectiveness (Manafa, 2025; Ogbeche *et al.*, 2025) [4, 5].

The comparatively lower mean for data-driven decision-making suggests that principals may require stronger analytical capacity to translate digitally generated financial information into planning and resource-allocation decisions. Similarly, the relatively lower financial planning and budgeting mean reinforces evidence from Nigerian school-management research that budgeting, cash control, auditing, and record keeping are important dimensions of effective administration (Manafa, 2025; Ohamobi *et al.*, 2025) [4, 7].

The direction of the relationships is consistent with Digital Leadership Theory and Resource Dependency Theory: digital systems can improve information availability and transaction traceability, while leadership can shape whether those capabilities are converted into transparent and responsible resource management. Nevertheless, the deterministic structure of the supplied dataset prevents the strength of these theoretical relationships from being independently tested. A revised item-level dataset with naturally varying responses would be required for defensible correlation, regression, and mediation inference.

#### Conclusion and Recommendations

##### Conclusion

This study examined digital financial management, leadership skills, and financial accountability among 206 principals of public secondary schools in Abia, Anambra, Ebonyi, Enugu, and Imo States. The descriptive findings indicate generally high levels of digital financial-management capability, leadership skills, and financial accountability. Digital financial literacy recorded the highest substantive mean ( $M = 4.04$ ), while financial planning and budgeting effectiveness recorded the lowest ( $M = 3.54$ ). Leadership skills were also relatively high, although data-driven decision-making ( $M = 3.64$ ) was comparatively weaker than accountability and transparency leadership. The supplied data exhibit perfect deterministic relationships among the substantive variables, resulting in perfect or near-perfect correlations and multicollinearity. Consequently, although the direction of the observed relationships is consistent with the proposed theoretical model, the data do not permit an independently identifiable mediation effect. The study therefore concludes that digital financial competence, leadership capability, and financial accountability are closely connected dimensions of

contemporary school administration, but it does not claim that leadership skills have been statistically established as a mediator from the present dataset.

From a practical perspective, digitalising school finance should not be understood merely as replacing cash payments and handwritten records with electronic platforms. Effective digital financial management requires principals who understand financial technologies, comply with financial regulations, interpret financial information, provide transparent leadership, and translate financial data into defensible decisions.

#### Recommendations

1. State Ministries of Education and relevant secondary-school management authorities should strengthen principals' financial planning and budgeting capacity, particularly needs assessment, revenue forecasting, expenditure prioritisation, budget preparation, variance analysis, and periodic budget review.
2. Capacity-development programmes should strengthen data-driven financial decision-making so that principals can interpret financial reports, analyse expenditure patterns, identify budget variances, project resource requirements, and use quantitative evidence in resource allocation.
3. Continuous professional development should consolidate digital financial literacy in spreadsheets, electronic banking, digital payment systems, financial MIS applications, electronic documentation, cybersecurity awareness, and digital record management.
4. Education authorities should institutionalise standard digital platforms and procedures for approved school financial transactions, budgeting, record keeping, and reporting rather than relying solely on individual principals' technology preferences.
5. Digital policy compliance should be reinforced through clear procedures for authorisation, procurement documentation, electronic payment controls, retention of digital receipts, segregation of duties, reconciliation, and audit trails.
6. Leadership development should be integrated with financial-management and technology training so that principals combine digital competence with transformational leadership, transparency, ethical resource management, stakeholder communication, and evidence-based decision-making.
7. Schools should maintain appropriate mechanisms for communicating approved budgets, major expenditures, and financial performance to authorised stakeholders while protecting confidential information.
8. Additional digital infrastructure and technical support should be provided where required, especially in less connected environments, including reliable computers, internet connectivity, power solutions, secure data storage, and technical assistance.
9. Relevant supervisory authorities should conduct periodic digital-financial compliance assessments focusing on budgeting, documentation, electronic transactions, record integrity, procurement compliance, reconciliation, and reporting.
10. Future research should collect independently varying multi-item measures and use construct-validation procedures before regression or structural modelling.

Bootstrap mediation analysis should be conducted only after adequate discriminant validity and absence of prohibitive multicollinearity have been established.

### Suggestions for Further Studies

Future studies should investigate the model using larger probability samples and independently measured questionnaire items across the five South East states. Longitudinal designs would be valuable for determining whether improvements in principals' digital financial-management competence precede subsequent improvements in leadership practices and financial accountability. Further research could compare urban, rural, and semi-urban schools; examine state differences; investigate moderating effects of digital infrastructure and administrative experience; and incorporate objective indicators such as audit observations, reporting timeliness, budget variance, procurement compliance, and completeness of financial records.

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