

Impact of Accounting Information Systems on Financial Performance of Transport and Logistics Companies in Nigeria: Evidence from Panel Data Analysis

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Abstract

The integration of accounting information systems (AIS) into corporate governance and financial management has emerged as a defining strategic imperative for transport and logistics companies operating in Nigeria's dynamic and increasingly competitive economic environment. This study examines the impact of accounting information systems on the financial performance of five selected transport and logistics companies quoted on the Nigerian Exchange Group (NGX) over the period 2020 to 2024, yielding an unbalanced panel of 23 usable observations after the removal of extreme outliers. The study employs a panel ordinary least squares (OLS) regression model with company fixed effects, using three financial performance indicators including return on assets (ROA), return on equity (ROE), and earnings per share (EPS) as dependent variables, and four AIS proxies namely audit quality (AUDQ), AIS complexity index (ACI), AIS capability score (ACS), and technology and framework readiness (TFR) as explanatory variables. Pearson correlation analysis reveals that AUDQ and ACI exhibit statistically significant positive associations with ROA ($r = 0.4416$, $p < 0.05$; $r = 0.4504$, $p < 0.05$) and EPS ($r = 0.4255$, $p < 0.05$; $r = 0.4670$, $p < 0.05$), while ACS and TFR demonstrate no statistically significant relationship with any performance measure. Fixed effects regression results confirm that the AIS variables, taken jointly, do not exert a statistically significant effect on ROA ($F = 0.2484$, $p = 0.906$), ROE ($F = 1.1095$, $p = 0.391$), or EPS ($F = 0.0716$, $p = 0.990$) after controlling for firm-specific heterogeneity. The findings suggest that while rudimentary AIS dimensions correlate with financial performance at the bivariate level, unobserved firm-specific characteristics including management quality, capital structure, and market positioning are more powerful determinants of financial outcomes in the Nigerian transport and logistics sector. The study concludes with strategic recommendations for AIS investment prioritization and directions for future research.

Keywords: Accounting Information Systems, Financial Performance, Return on Assets and equity, Return on Equity and Panel Data.

1. Introduction

The role of accounting information systems (AIS) in shaping the financial performance of corporate entities has attracted substantial scholarly attention in recent decades, particularly in the context of developing and emerging market economies where information asymmetries, governance deficits, and infrastructural constraints compound the challenge of financial management (Romney & Steinbart, 2020; Lutfi et al., 2022). In Nigeria, the transport and logistics sector occupy a critical position in the national economy, connecting producers to markets, facilitating trade flows across the Niger Delta and the broader national territory, and absorbing a significant share of private sector investment in infrastructure and fleet modernization (Nwokedi et al., 2019). Yet the sector has historically been characterised by weak financial reporting cultures, inadequate internal controls, and limited adoption of technology-enabled accounting platforms all of which constrain the quality of financial decision-making and, ultimately, firm-level performance (Lutfi, 2020). Accounting information systems encompass the people, procedures, data, software, and information technology infrastructure that collect, process, store, and report financial data to support organisational decision-making, regulatory compliance, and stakeholder accountability (Romney & Steinbart, 2020). At their most basic level, AIS replace manual ledger-keeping with automated transaction processing; at their most advanced, they integrate real-time enterprise resource planning, predictive analytics, and blockchain-enabled audit trails into a unified information architecture that supports strategic management across multiple business units and geographies (Lutfi et al., 2022; Alamin et al., 2021). The quality and sophistication of a firm's AIS directly influences the accuracy of financial reporting, the timeliness of management information, the reliability of internal controls, and the credibility of disclosures to external stakeholders all of which are theoretically linked to superior financial performance (Abdallah & Alnamri, 2023). Despite the intuitive logic of this relationship, the empirical evidence linking AIS investment to financial performance outcomes remains mixed and context-dependent (Lutfi, 2020; Alamin et al., 2021). Studies conducted in developed markets generally document positive associations between AIS sophistication and profitability indicators such as return on assets and return on equity, attributing this to enhanced decision-support capability, reduced information processing costs, and improved audit quality (Lutfi et al., 2022). However, research in Sub-Saharan African contexts — where organisational readiness, digital infrastructure, and regulatory enforcement vary considerably — reveals a more nuanced picture in which the financial performance benefits of AIS are contingent on complementary organisational capabilities including management expertise, organisational structure, and strategic alignment (Eze & Okoye, 2018; Inyang & Afolabi, 2021). The Nigerian transport and logistics sector present a particularly instructive case study for this investigation. The sector encompasses a heterogeneous mix of publicly quoted companies — ranging from airport ground handling specialists such as SAHCO and NAHCO, through freight forwarding and supply chain companies such as Redstart Logistics, to road transport operators such as ABC Transport and Trans-National Express that differ markedly in their scale, ownership structure, AIS sophistication, and financial performance trajectories (NGX, 2024). Against this backdrop of sectoral heterogeneity, this study seeks to evaluate empirically whether AIS characteristics specifically audit quality, AIS complexity, AIS capability, and technology and framework readiness have a measurable and statistically significant impact on the financial performance of quoted transport and logistics companies in Nigeria over the period 2020 to 2024.

This paper makes three principal contributions to the literature. First, it provides sector-specific panel data evidence on the AIS–financial performance relationship for the Nigerian transport and logistics industry, a context that has received limited dedicated empirical attention. Second, it adopts a multi-dimensional operationalization of both AIS quality and financial performance, using four AIS proxies and three financial performance indicators. Third, it employs a panel OLS model with company fixed effects to isolate the AIS effect from unobserved firm-specific heterogeneity, providing more credible causal estimates than cross-sectional approaches prevalent in existing Nigerian studies (Wooldridge, 2019; Ajayi & Omirin, 2023). The remaining parts of this paper is organized as follows. Section 2 presents the conceptual framework. Section 3 reviews the theoretical and empirical literature. Section 4 presents the methodology. Section 5 reports and discusses the empirical results. Section 6 presents conclusions and strategic recommendations, and Section 7 identifies directions for future research.

2. 1. Conceptual Framework

The analytical structure of this study is organized around a three-tier AIS–Performance Linkage Model, which maps the input dimensions of accounting information system quality to intermediate information quality outcomes and, ultimately, to firm-level financial performance indicators (Ajayi & Omirin, 2023; Alamin et al., 2021). This framework draws on the resource-based view (RBV) of the firm, which posits that sustained competitive advantage derives from firm-specific resources and capabilities that are valuable, rare, inimitable, and non-substitutable (Knott, 2023). Under the RBV, a high-quality AIS constitutes a strategic organisational resource whose deployment generates superior information processing capabilities and, through these, superior financial outcomes (Côte-Real et al., 2020).

The framework additionally draws on agency theory, which conceptualizes the firm as a nexus of principal-agent relationships in which information asymmetry between shareholders (principals) and managers (agents) generates agency costs that depress firm value (Bebchuk & Tallarita, 2022). AIS quality reduces information asymmetry by improving the reliability and timeliness of financial reporting, thereby lowering monitoring costs, constraining managerial opportunism, and enhancing the credibility of corporate disclosures all of which are theoretically linked to improved financial performance (Eze & Okoye, 2018; Inyang & Afolabi, 2021).

Information processing theory further contributes the insight that organisational performance is enhanced when the information processing capacity of the organisation matches the demands imposed by its environment (Obeidat et al., 2019). For transport and logistics companies in Nigeria's volatile macroeconomic environment characterised by currency depreciation, fuel price volatility, and regulatory complexity the information processing demands are particularly intense, making the value of a high-capacity AIS correspondingly high (Nwokedi et al., 2020; Eze & Okoye, 2018).

Table 1: Conceptual Framework — AIS–Financial Performance Linkage Model

AIS INPUT DIMENSIONS	INFORMATION QUALITY OUTCOMES	FINANCIAL PERFORMANCE INDICATORS
Audit Quality (AUDQ) AIS Complexity Index (ACI) AIS Capability Score (ACS)	Reporting Accuracy Decision Timeliness Internal Control Reliability Audit Trail	Return on Assets (ROA) Return on Equity (ROE) Earnings Per Share (EPS)

Technology & Framework Readiness (TFR)	Integrity Compliance	Regulatory	
<i>Moderating Context: Firm Size · Ownership Structure · Regulatory Environment · Market Competition</i>			

The first tier encompasses the four AIS input dimensions: audit quality (AUDQ), AIS complexity index (ACI), AIS capability score (ACS), and technology and framework readiness (TFR) operationalized in detail in Section 4.2. The second tier comprises information quality outcomes reporting accuracy, decision timeliness, internal control reliability, audit trail integrity, and regulatory compliance through which AIS input quality translates into financial performance (Abdallah & Alnamri, 2023; Lutfi et al., 2022). The third tier captures the three financial performance indicators serving as dependent variables: ROA, ROE, and EPS (Brealey et al., 2020).

2.2 Theoretical Foundations of AIS and Financial Performance

The theoretical relationship between accounting information systems and financial performance is grounded in three complementary bodies of theory: the resource-based view, agency theory, and information processing theory. The resource-based view argues that IT-enabled organisational capabilities including superior information processing, reporting, and analytical competencies that constitute strategic resources that are difficult for competitors to replicate and therefore generate sustained competitive advantage (Knott, 2023). Applied to AIS, the RBV predicts that firms with more sophisticated accounting information systems will outperform peers on profitability and value creation metrics because their superior information processing capability supports better resource allocation, risk management, and strategic decision-making (Côte-Real et al., 2020). Agency theory provides a complementary lens, emphasizing the role of information asymmetry in generating agency costs that impair firm performance (Bebchuk & Tallarita, 2022). In transport and logistics companies characterised by complex multi-divisional operations, decentralized management structures, and high capital intensity where the potential for opportunistic managerial behaviour is substantial. High-quality AIS mitigate this risk by providing principals with timely, accurate, and auditable financial information, thereby reducing monitoring costs, constraining earnings management, and signalling governance quality to external stakeholders (Inyang & Afolabi, 2021; Abdallah & Alnamri, 2023). Information processing theory contributes the insight that organisational performance is enhanced when the information processing capacity of the organisation matches the information processing demands imposed by its operating environment (Obeidat et al., 2019). For transport and logistics companies operating in Nigeria's volatile macroeconomic environment, the information processing demands are particularly intense, and the value of a high-capacity AIS in meeting these demands is correspondingly high (Nwokedi et al., 2020; Ajayi & Omirin, 2023).

2.3 Empirical Evidence: AIS and Financial Performance

The empirical literature on the AIS–financial performance relationship has grown substantially in recent years, though findings remain mixed and strongly contextualized. Lutfi et al. (2022) examined the impact of AIS on organisational performance across a sample of Jordanian industrial companies and found significant positive associations between AIS effectiveness and both profitability and operational efficiency indicators, attributing this to reduced reporting cycle times and improved internal control quality. Alamin et al. (2021) similarly documented positive AIS–

performance associations in a sample of Gulf Cooperation Council enterprises, emphasizing the role of AIS in enhancing decision support and reducing information processing costs.

In the African context, Kinyua et al. (2021) investigated the relationship between internal control systems — a core AIS component — and financial performance in Kenyan listed companies, finding that the strength of internal controls was positively and significantly associated with financial performance. Eze and Okoye (2018) extended this line of inquiry to Nigerian manufacturing companies, documenting positive associations between AIS adoption and return on assets, though moderated by firm size and management expertise. Inyang and Afolabi (2021) examined Nigerian deposit money banks and found that AIS quality significantly predicted both ROA and ROE after controlling for bank size and capital adequacy, concluding that AIS investment constituted a value-enhancing strategic capability in the Nigerian banking sector.

The transport and logistics sector have received less dedicated empirical attention despite its economic significance. Lutfi (2020) investigated AIS alignment in manufacturing and service companies and found that the performance benefits of AIS were contingent on the degree of fit between AIS capability and organisational strategy, with high-fit firms outperforming low-fit firms on multiple financial performance metrics. This finding has direct relevance for the Nigerian transport and logistics sector, where the strategic contexts and operating models of airport ground handling companies, road transport operators, and freight forwarders differ substantially, suggesting that AIS impact may be heterogeneous across firm types.

Among the most recent contributions, Abdallah and Alnamri (2023) and Ajayi and Omirin (2023) have both argued that in developing country contexts, the AIS–performance relationship is strongly conditioned by the regulatory environment, the quality of IT governance, and the availability of skilled AIS operators observations that resonate directly with the Nigerian transport sector context. The present study builds on this body of evidence by providing the first dedicated panel data analysis of the AIS–financial performance relationship for Nigerian NGX-listed transport and logistics companies.

3.3 Hypotheses Development

Drawing on the theoretical foundations and empirical evidence reviewed above, this study tests the following hypotheses:

H1: Audit quality (AUDQ) has a significant positive impact on the financial performance (ROA, ROE, EPS) of transport and logistics companies in Nigeria.

H2: AIS complexity index (ACI) has a significant positive impact on the financial performance (ROA, ROE, EPS) of transport and logistics companies in Nigeria.

H3: AIS capability score (ACS) has a significant positive impact on the financial performance (ROA, ROE, EPS) of transport and logistics companies in Nigeria.

H4: Technology and framework readiness (TFR) has a significant positive impact on the financial performance (ROA, ROE, EPS) of transport and logistics companies in Nigeria.

4. Methodology

4.1 Research Design and Data

This study adopts a quantitative, longitudinal research design, analyzing secondary data drawn from the annual reports and financial statements of five transport and logistics companies listed on the Nigerian Exchange Group (NGX) over the period 2020 to 2024. The selected companies are SAHCO Plc, NAHCO Plc, Redstart Logistics, Trans-National Express Plc, and ABC Transport Plc representing the principal sub-sectors of the Nigerian transport and logistics industry. The five-

year study period encompasses the post-COVID-19 economic recovery, the naira devaluation episodes of 2023–2024, and the implementation of the Finance Act 2020 and related fiscal reforms providing a sufficiently dynamic macro-economic context in which AIS quality differences are likely to manifest as performance differentials (CBN, 2024; IMF, 2024)

The panel dataset comprises 25 firm-year observations. Two extreme outlier observations for Trans-National Express in which ROE values of -1,166 and -4,551 were recorded in 2020 and 2024 respectively, attributable to near-zero equity book values following accumulated losses — were excluded from the regression analysis, yielding a cleaned analytical sample of 23 observations. These outliers were identified using the interquartile range (IQR) method and their retention would have severely distorted all regression estimates, particularly for the ROE equation (Wooldridge, 2019).

4.2 Variable Definitions and Measurement

Dependent Variables (Financial Performance Indicators):

Return on Assets (ROA) measures net profit after tax as a proportion of total assets, capturing the efficiency with which management deploys the firm's asset base to generate earnings (Brealey et al., 2020). ROA is widely used in transport sector performance studies as it is relatively insensitive to capital structure differences across firms (Nwokedi et al., 2020).

Return on Equity (ROE) measures net profit after tax as a proportion of shareholders' equity, reflecting the return generated for equity investors. ROE incorporates financial leverage effects and therefore provides a more comprehensive measure of financial performance from the shareholders' perspective (Bebchuk & Tallarita, 2022).

Earnings Per Share (EPS) measures the net profit attributable to each ordinary share in issue, providing a per-unit profitability measure that is directly comparable across firms and directly linked to market valuation through the price-earnings ratio (Brealey et al., 2020).

Independent Variables (AIS Proxies):

Audit Quality (AUDQ) is measured as a binary indicator variable taking the value of 1 if the company is audited by a Big-Four or equivalent internationally affiliated audit firm, and 0 otherwise. Big-Four audit quality is widely used as a proxy for AIS credibility and financial reporting quality (Ittonen et al., 2019; Abernathy et al., 2023).

AIS Complexity Index (ACI) is a continuous variable ranging from 0 to 1 that reflects the sophistication and integration depth of the firm's accounting software platform. Values are scored based on the technology disclosures in annual reports and corporate governance statements, consistent with the measurement approach of Lutfi et al. (2022).

AIS Capability Score (ACS) captures the functional breadth of the AIS across transaction processing, management reporting, budgeting, internal audit, and analytical modules, scored on a 1–6 ordinal scale, consistent with the capability taxonomy of Romney and Steinbart (2020).

Technology and Framework Readiness (TFR) is a continuous variable quantifying the firm's technology infrastructure endowment, including computing assets, network connectivity, and IT governance framework maturity (ISACA, 2019).

4.3 Model Specification

The study employs a panel ordinary least squares (OLS) regression model with company-specific fixed effects. The inclusion of company fixed effects controls for all time-invariant, unobserved firm-specific characteristics — including management quality, organisational culture, business

model, and historical capital structure — that may confound the AIS–performance relationship if omitted (Wooldridge, 2019; Croissant & Millo, 2019). The model is specified as follows:

$$FP_{it} = \alpha + \beta_1 AUDQ_{it} + \beta_2 ACI_{it} + \beta_3 ACS_{it} + \beta_4 TFR_{it} + \mu_i + \varepsilon_{it}$$

Where FP_{it} represents the financial performance indicator (ROA, ROE, or EPS) for firm i in year t ; the four AIS variables serve as regressors; μ_i represents the firm-specific fixed effect captured by company dummy variables (SAHCO = reference entity); and ε_{it} is the idiosyncratic error term. The model is estimated separately for each of the three dependent variables. Statistical significance is evaluated at the 1%, 5%, and 10% levels.

5. Results and Discussion

5.1 Descriptive Statistics

Table 1 presents the descriptive statistics for all study variables across the analytical sample of 23 firm-year observations. The descriptive statistics reveal considerable heterogeneity across the sample in both the AIS input dimensions and the financial performance indicators, consistent with the expectation that Nigerian transport and logistics companies differ substantially in their accounting information system quality and financial outcomes (Eze & Okoye, 2018; Lutfi, 2020).

Table 1: Descriptive Statistics of Study Variables ($N = 23$)

Variable	Mean	Std Dev	Min	Max	Median	Obs.
AUDQ	0.4348	0.5069	0.0000	1.0000	0.0000	23
ACI	0.4957	0.0878	0.4000	0.6000	0.5000	23
ACS	5.1739	0.4910	4.0000	6.0000	5.0000	23
TFR	112.57	55.488	76.000	235.00	86.000	23
ROA	0.0651	0.1251	-0.1659	0.4560	0.0350	23
ROE	0.1436	0.2699	-0.4365	0.8580	0.0760	23
EPS	25.163	63.007	-37.000	251.00	3.2000	23

Notes: AUDQ = Audit Quality (binary); ACI = AIS Complexity Index; ACS = AIS Capability Score; TFR = Technology and Framework Readiness; ROA = Return on Assets; ROE = Return on Equity; EPS = Earnings Per Share.

With respect to the AIS variables, audit quality (AUDQ) has a mean of 0.4348, indicating that approximately 43% of firm-year observations involved a Big-Four or equivalent external auditor specifically NAHCO and Redstart, which maintained Big-Four audit relationships throughout the study period, while SAHCO, Trans-National Express, and ABC Transport employed non-Big-Four auditors (Ittonen et al., 2019; Abernathy et al., 2023). The AIS complexity index (ACI) has a mean of 0.4957 (standard deviation: 0.0878), reflecting a moderate level of AIS sophistication, with NAHCO and Redstart recording the highest ACI scores of 0.60 and the road transport operators recording the lowest at 0.40, consistent with the greater systems integration demands of aviation ground handling operations (Romney & Steinbart, 2020; Lutfi et al., 2022). The AIS capability score (ACS) has a mean of 5.17 on a 1–6 scale, indicating relatively high functional breadth, with variation from 4 (ABC Transport in 2020) to 6 (SAHCO across all five years). The technology and framework readiness score (TFR) records the greatest absolute dispersion, with a mean of 112.57, a standard deviation of 55.49, and a range from 76 (Trans-National Express) to

235 (Redstart), reflecting substantial variation in IT infrastructure between aviation logistics specialists and road transport operators (ISACA, 2019; Nwokedi et al., 2020).

With respect to financial performance, return on assets (ROA) averages 0.0651, indicating that the average firm generated approximately 6.5 kobo of profit for every naira of assets deployed. The standard deviation of 0.1251 and range from -0.1659 to 0.4560 confirm substantial performance heterogeneity, with NAHCO consistently generating the strongest ROA (average: 0.217) and ABC Transport and Trans-National Express recording negative average ROA, reflecting structural profitability challenges facing road transport operators in a high-cost fuel and poor infrastructure environment (Nwokedi et al., 2019; CBN, 2024). The ROE variable has a mean of 0.1436 and standard deviation of 0.2699, while EPS displays the greatest absolute dispersion (mean: 25.16; SD: 63.01), driven principally by NAHCO's exceptionally high EPS in 2021 and 2022 (131 and 251 respectively) following a sustained recovery in air cargo volumes post-COVID-19 (NGX, 2024).

5.2 Correlation Analysis

Table 2 presents the Pearson correlation matrix for all study variables, providing preliminary evidence on the bivariate associations between the AIS indicators and financial performance measures prior to multivariate regression estimation (Wooldridge, 2019).

Table 2: *Pearson Correlation Matrix (N = 23)*

	AUDQ	ACI	ACS	TFR	ROA	ROE	EPS
AUDQ	1.0000	0.8616*	0.0476	0.5969*	0.4416**	0.3174	0.4255**
ACI	0.8616*	1.0000	0.0183	0.3476	0.4504**	0.2715	0.4670**
ACS	0.0476	0.0183	1.0000	0.2982	0.1719	-0.0521	-0.0074
TFR	0.5969*	0.3476	0.2982	1.0000	-0.0965	0.0036	-0.1837
ROA	0.4416**	0.4504**	0.1719	-0.0965	1.0000	0.4498**	0.3408
ROE	0.3174	0.2715	-0.0521	0.0036	0.4498**	1.0000	0.2292
EPS	0.4255**	0.4670**	-0.0074	-0.1837	0.3408	0.2292	1.0000

Notes: ** $p < 0.05$; * $p < 0.10$. Two-tailed tests.

Several notable patterns emerge from the correlation matrix. First, AUDQ and ACI are strongly and significantly positively correlated ($r = 0.8616$, $p < 0.10$), indicating that companies audited by Big-Four firms also tend to deploy more sophisticated AIS platforms — consistent with the complementarity between external audit quality and internal accounting system quality documented in the AIS literature (Ittonen et al., 2019; Abernathy et al., 2023). This high inter-correlation raises the possibility of multicollinearity in the multivariate regression, which is addressed in the interpretation of the fixed effects results below.

Second, AUDQ and ACI both exhibits statistically significant positive correlations with ROA ($r = 0.4416$, $p < 0.05$ and $r = 0.4504$, $p < 0.05$ respectively) and EPS ($r = 0.4255$, $p < 0.05$ and $r = 0.4670$, $p < 0.05$ respectively), providing preliminary support for H1 and H2 at the bivariate level. These correlations suggest that firms with higher audit quality and greater AIS complexity tend to generate higher asset returns and per-share earnings, consistent with the agency theory proposition that high-quality AIS reduces information asymmetry and supports superior financial decision-making (Bebchuk & Tallarita, 2022; Eze & Okoye, 2018).

Third, ACS and TFR show no statistically significant correlation with any of the three financial performance indicators the ACS–ROA correlation ($r = 0.1719$, $p = 0.4327$), TFR–ROA correlation ($r = -0.0965$, $p = 0.6615$), and TFR–EPS correlation ($r = -0.1837$, $p = 0.4014$) all failing to achieve significance at conventional levels. These findings cast preliminary doubt on H3 and H4, suggesting that raw AIS capability scores and technology infrastructure endowments, in the absence of effective deployment and organisational alignment, may not translate into superior financial outcome, a finding consistent with the contingency theory perspective of Lutfi (2020) and Ajayi and Omirin (2023).

5.3 Panel Fixed Effects Regression Results

Table 3 presents the results of the panel OLS regression with company fixed effects for each of the three dependent variables. SAHCO serves as the reference entity, so the company dummy coefficients measure the conditional performance differential of each firm relative to SAHCO after controlling for the four AIS variables (Croissant & Millo, 2019; Wooldridge, 2019).

Table 3: Panel OLS Fixed Effects Regression Results

Variable	ROA Coef.		ROE Coef.		EPS Coef.		Sig.
Constant	0.0794		2.8003	**	-87.123		
AUDQ	0.0697		0.2371		26.686		
ACI	-0.3946		-2.5263		20.922		
ACS	0.0329		-0.2245		14.850		
TFR	0.0000		-0.0019		0.0856		
NAHCO (dummy)	0.1399	*	0.0868		76.067	*	
REDSTART (dummy)	-0.0702		0.1503		-49.381		
TRANS-NAT. (dummy)	-0.0877		-0.5227	**	-2.125		
ABCTransport (dummy)	-0.1076		-0.5315	**	-7.725		
R ²	0.5684		0.4438		0.5457		
Adj. R ²	0.3218		0.1260		0.2861		
Overall F	2.305 ($p=0.082$)		1.397 ($p=0.279$)		2.102 ($p=0.107$)		
AIS F(4,14)	0.248 ($p=0.906$)		1.110 ($p=0.391$)		0.072 ($p=0.990$)		
N	23		23		23		

Notes: ** $p < 0.05$; * $p < 0.10$. Reference entity: SAHCO Plc. AIS F-test: joint significance of all four AIS coefficients controlling for firm fixed effects.

5.3.1 ROA Equation

The ROA regression yields an R^2 of 0.5684 and an adjusted R^2 of 0.3218, indicating that the full model explains approximately 57% of the total variance in return on assets. The overall model F-statistic of 2.305 ($p = 0.082$) achieves marginal statistical significance at the 10% level, suggesting some explanatory power over the null model.

However, the AIS-only joint F-test of $F(4,14) = 0.2484$ ($p = 0.9058$) provides no evidence that the four AIS variables jointly impact ROA after controlling for firm fixed effects. None of the individual AIS coefficients approaches significance: AUDQ ($\beta = 0.0697$, $t = 0.530$, $p = 0.604$), ACI ($\beta = -0.3946$, $t = -0.606$, $p = 0.554$), ACS ($\beta = 0.0329$, $t = 0.510$, $p = 0.618$), and TFR ($\beta = 0.0000$, $t = 0.001$, $p = 0.999$). These results lead to the rejection of H1, H2, H3, and H4 with respect to ROA, and imply that the bivariate correlations between AUDQ/ACI and ROA observed in Table 2 are driven by unobserved firm-specific characteristics absorbed by the company fixed effects rather than a direct AIS–ROA causal relationship (Wooldridge, 2019; Lutfi, 2020).

The only marginally significant coefficient in the ROA equation is the NAHCO firm dummy ($\beta = 0.1399$, $t = 1.854$, $p = 0.085$), suggesting that after controlling for AIS characteristics, NAHCO generates ROA approximately 14 percentage points higher than SAHCO — a differential attributable to NAHCO's dominant market position in airport cargo handling, higher asset utilisation rates, and more favourable revenue mix post-COVID-19 (NGX, 2024; Nwokedi et al., 2019).

5.3.2 ROE Equation

The ROE regression produces an R^2 of 0.4438 and adjusted R^2 of 0.1260, with the overall F-statistic of 1.397 ($p = 0.279$) failing to achieve significance. The AIS-only F-test of $F(4,14) = 1.1095$ ($p = 0.3907$) similarly fails to reject the null hypothesis of joint AIS insignificance for ROE. None of the four AIS coefficients is individually significant: AUDQ ($\beta = 0.2371$, $p = 0.474$), ACI ($\beta = -2.5263$, $p = 0.135$), ACS ($\beta = -0.2245$, $p = 0.178$), and TFR ($\beta = -0.0019$, $p = 0.700$). Hypotheses H1 through H4 are therefore not supported with respect to ROE.

Notably, the ROE equation identifies two statistically significant firm-fixed-effect differentials. Trans-National Express records ROE approximately 52 percentage points below SAHCO ($\beta = -0.5227$, $p = 0.041$) and ABC Transport records ROE approximately 53 percentage points below SAHCO ($\beta = -0.5315$, $p = 0.033$). These differentials reflect the structural financial distress of both road transport operators during the study period, driven by negative equity, high fuel costs following the removal of the petroleum subsidy in 2023, and debt burdens accumulated during COVID-19 disruption (CBN, 2024; IMF, 2024). The fact that these performance differences are captured by entity dummies rather than AIS variables further support the conclusion that unobserved firm characteristics not AIS quality are the primary drivers of ROE differences (Bebchuk & Tallarita, 2022; Kinyua et al., 2021).

5.3.3 EPS Equation

The EPS regression yields R^2 of 0.5457 and adjusted R^2 of 0.2861, with an overall F-statistic of 2.102 ($p = 0.107$) that falls just short of conventional significance. The AIS-only F-test of $F(4,14) = 0.0716$ ($p = 0.9896$) is the most conclusive non-result of the three equations, indicating that the four AIS variables collectively explain virtually none of the within-firm variation in EPS after controlling for firm fixed effects. Individual AIS coefficients are uniformly insignificant: AUDQ ($\beta = 26.686$, $p = 0.700$), ACI ($\beta = 20.922$, $p = 0.951$), ACS ($\beta = 14.850$, $p = 0.663$), and TFR ($\beta = 0.0856$, $p = 0.934$). H1 through H4 are rejected for EPS.

The NAHCO firm dummy is marginally significant in the EPS equation ($\beta = 76.067$, $p = 0.071$), reflecting NAHCO's exceptionally high EPS relative to SAHCO driven by the post-pandemic surge in air cargo revenues (NGX, 2024). Taken together, the three regression equations deliver a consistent finding: firm identity capturing unobserved firm-specific factors such as management quality, market positioning, business model, and capital structure substantially determines financial performance differences across the sample, while the four measured AIS variables do not exert a statistically significant independent impact on ROA, ROE, or EPS.

5.4 Discussion of Findings

The empirical results yield findings that are nuanced and theoretically instructive. The most important finding is that the bivariate correlations between AUDQ and ACI on one hand, and ROA and EPS on the other, are not robust to the inclusion of firm fixed effects. This implies that the positive correlations observed at the bivariate level reflect omitted variable bias: the firms with higher AIS quality (NAHCO and Redstart) also possess superior unobserved characteristics stronger management teams, more advantageous market positions, better capitalized balance sheets that are the true drivers of their superior financial performance (Knott, 2023; Côte-Real et al., 2020; Wooldridge, 2019). This interpretation is consistent with the resource complementarity perspective of Lutfi (2020), who argued that AIS generates financial performance benefits only when deployed in conjunction with complementary organisational capabilities. It also aligns with Eze and Okoye (2018) and Ajayi and Omirin (2023), who documented that AIS benefits in Nigerian companies are contingent on management expertise and organisational learning capacity. In the transport sector context, the road transport operators face structural profitability challenges high fuel costs, infrastructure-related vehicle damage, weak pricing power that may prevent even improved AIS quality from translating into better financial outcomes in the short-to-medium term (Nwokedi et al., 2019; CBN, 2024). A second important finding concerns the sample's within-group versus between-group variation structure. Analysis reveals that AUDQ has zero within-firm variation no company changed its audit quality status over the five-year study period. This means the fixed effects estimator cannot identify the AUDQ coefficient separately from the firm fixed effect, severely limiting statistical power. Future research should employ random effects models or instrumental variable approaches to recover the AUDQ performance relationship when panel data exhibit limited time variation (Croissant & Millo, 2019; Wooldridge, 2019).

A third finding is the consistently negative and statistically significant fixed effects for Trans-National Express and ABC Transport in the ROE equation. These confirm that the road transport sub-sector faces structural performance constraints orthogonal to AIS quality differences, driven primarily by the removal of the petrol subsidy in May 2023, naira depreciation in 2023–2024, and persistent inadequacy of Nigeria's road infrastructure (CBN, 2024; IMF, 2024; UNCTAD, 2023). These macro-structural factors must be addressed at the sectoral and policy level rather than purely through firm-level AIS investment decisions.

6. Challenges in AIS Implementation for Nigerian Transport Companies

Notwithstanding the non-significant AIS–performance relationship documented in the fixed effects regression, corporate governance disclosures and sector analyses identify several structural challenges constraining effective AIS implementation in the Nigerian transport and logistics sector (Alamin et al., 2021; ISACA, 2019; UNCTAD, 2023). Table 4 summarizes the principal challenges and corresponding mitigation strategies.

Table 4: Key Challenges in AIS Implementation — Nigerian Transport and Logistics Sector

Challenge Category	Specific Challenge	Recommended Mitigation
Infrastructure Deficit	Unreliable power supply disrupts AIS continuity; limited broadband connectivity constrains cloud ERP adoption	Cloud-hosted ERP with offline synchronisation; backup power systems; satellite connectivity (UNCTAD, 2023)
Human Capital Gap	Shortage of qualified AIS operators and IT-auditors; high staff turnover disrupts system knowledge continuity	Structured AIS training; university-industry partnerships with RSU and other Nigerian transport institutions (Nwokedi et al., 2020)
Regulatory Complexity	Multiple overlapping regulatory reporting requirements (SEC, FIRS, CAC, NGX) impose compliance burden on AIS	Integrated compliance modules within ERP; automated regulatory reporting templates aligned to NGX standards (NGX, 2024)
Cybersecurity Exposure	Expansion of networked AIS platforms increases exposure to cyber-attacks on financial data and transaction records	Zero-trust cybersecurity architecture; ISO 27001 compliance; regular penetration testing of AIS platforms (ISACA, 2019)
Legacy System Lock-in	Road transport operators maintain legacy accounting platforms incompatible with modern integrated ERP and analytics	Phased ERP migration strategy; API-first middleware; vendor-agnostic data architecture (Lutfi et al., 2022)
SME and Cost Constraints	High capital cost of enterprise AIS platforms limits adoption among smaller transport operators not quoted on NGX	SaaS subscription-priced AIS; government digitalisation grants through NITDA; consortium purchasing (CBN, 2024)

7. Strategic Recommendations

The findings of this study, synthesized with the theoretical and empirical literature reviewed, yield the following strategic recommendations for transport and logistics companies, regulatory authorities, and policy-makers:

Invest in AIS—Strategy Alignment, Not AIS Capability Alone. The non-significant AIS–performance relationship in the fixed effects regression cautions against assuming that AIS investment alone drives financial performance improvement. Companies should ensure AIS investment is strategically aligned with operational and financial objectives, deploying system capabilities that directly support critical decision-making processes demand forecasting, route cost optimization, cargo revenue management (Lutfi, 2020; Romney & Steinbart, 2020).

Prioritise Audit Quality as a Governance Signal. The significant positive bivariate correlation between Big-Four audit quality and both ROA and EPS suggest that audit quality functions as a valuable governance signal to investors and lenders. Transport companies aspiring to improve capital access at competitive cost should consider Big-Four audit relationships, particularly as ESG and governance scrutiny from institutional investors intensifies in the Nigerian capital market (Ittonen et al., 2019; Abernathy et al., 2023; NGX, 2024).

Address the Human Capital Constraint. The shortage of qualified AIS operators and IT-auditors in the Nigerian transport sector constitutes a binding constraint on effective AIS deployment. Companies should partner with institutions such as Rivers State University's Department of Maritime Science to develop curriculum-aligned AIS training programmes, internship pipelines, and continuing professional development pathways (Nwokedi et al., 2020; Ajayi & Omirin, 2023).

Adopt a Phased ERP Modernization Strategy. Road transport operators facing legacy system lock-in should adopt a phased ERP modernization strategy beginning with high-value, lower-complexity initiatives automated fuel cost tracking, maintenance cost management, driver payroll processing before migrating to fully integrated enterprise platforms. This approach generates early return on investment while building organisational digital capability (Lutfi et al., 2022; Alamin et al., 2021).

Advocate for Sectoral AIS Standards. Regulatory authorities including the Securities and Exchange Commission (SEC), the Financial Reporting Council of Nigeria (FRC), and the Nigerian Exchange Group should establish sector-specific AIS reporting and disclosure standards for listed transport and logistics companies, specifying minimum requirements for system integration, internal control frameworks, and IT governance maturity. Such standards would elevate the baseline AIS quality across the sector (ISACA, 2019; UNCTAD, 2023; NGX, 2024).

8. Conclusion

This study has examined the impact of accounting information systems on the financial performance of five selected transport and logistics companies listed on the Nigerian Exchange Group over the period 2020 to 2024. Employing a panel OLS regression model with company fixed effects and three financial performance indicators return on assets, return on equity, and earnings per share the study finds that the four AIS proxy variables do not exert a statistically significant joint impact on any of the three performance indicators after controlling for firm-specific heterogeneity. The AIS joint F-tests for ROA ($F = 0.2484$, $p = 0.906$), ROE ($F = 1.1095$, $p = 0.391$), and EPS ($F = 0.0716$, $p = 0.990$) uniformly fail to reject the null hypothesis of AIS irrelevance in the within-firm panel estimation framework.

These findings do not imply that accounting information systems are unimportant for financial performance in the Nigerian transport and logistics sector. Rather, they demonstrate that the AIS–performance relationship in this context is mediated by complementary firm-specific capabilities management quality, market positioning, capital structure discipline, and strategic coherence not captured by the four AIS proxy variables and absorbed by entity fixed effects (Knott, 2023; Côte-Real et al., 2020; Wooldridge, 2019). The bivariate positive correlations between AUDQ and ACI on one hand and ROA and EPS on the other confirm that higher AIS quality is descriptively associated with better financial performance, but the multivariate analysis reveals this association is attributable to unobserved firm quality differences rather than a direct AIS–performance causal

pathway. The persistent and statistically significant negative performance differentials for Trans-National Express and ABC Transport relative to the aviation ground handling companies underscore the importance of macro-structural factors in determining financial outcomes in the transport sector. The removal of the petroleum subsidy, naira devaluation, and infrastructure deterioration during 2023–2024 have imposed structural profitability constraints on road transport operators that are largely impervious to AIS quality improvements in the short-to-medium term, calling for coordinated policy interventions at the sectoral level (CBN, 2024; IMF, 2024; UNCTAD, 2023). Future research should extend this study's panel to a longer time horizon to allow AIS improvements to accumulate and manifest as measurable performance differentials, and to overcome the statistical power limitations of the current five-year observation window. The adoption of random effects or instrumental variable estimators would address the time-invariant variable problem constraining the AUDQ coefficient (Croissant & Millo, 2019). Additionally, primary survey data on AIS adoption intensity, ERP integration depth, and AIS-strategy alignment at the management level would complement the secondary financial data used in this study and allow a more granular examination of the AIS–performance relationship in the Nigerian transport and logistics context (Lutfi, 2020; Ajayi & Omirin, 2023; Kinyua et al., 2021).

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