

ACCOUNTING INFORMATION SYSTEMS, AUTOMATION, AND FINANCIAL INFORMATION QUALITY: EVIDENCE FROM SMALL AND MEDIUM-SIZED ENTERPRISES IN THE DEMOCRATIC REPUBLIC OF CONGO

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Highlights:

- AIS structure, automation, performance, and staff training significantly improve accounting information quality.
- Foundational AIS capabilities matter more than managerial integration in low-digitalisation SME environments.
- Evidence from SMEs in the DRC supports context-sensitive digitalisation strategies to enhance information quality.

Abstract:

The quality of accounting information is a critical determinant of transparency, decision-making, and sustainability in small and medium-sized enterprises (SMEs), particularly in developing economies characterised by low levels of digitalisation. This study examines the impact of key Accounting Information System (AIS) dimensions—performance, automation, integration, structure, and training—on accounting information quality in SMEs operating in the Democratic Republic of Congo (DRC), a context marked by limited ICT infrastructure, weak institutional support, and low AIS adoption. Using survey data collected from 133 SMEs and applying Partial Least Squares Structural Equation Modeling (PLS-SEM), the results show that AIS structure ($\beta = 0.377$, $p < 0.01$), system automation ($\beta = 0.351$, $p < 0.05$), AIS performance ($\beta = 0.267$, $p < 0.01$), and continuous staff training ($\beta = 0.160$, $p < 0.05$) have significant positive effects on accounting information quality, explaining 58.2% of its variance ($R^2 = 0.582$). In contrast, AIS integration into organisational management processes does not exhibit a significant effect. These findings suggest that, in low-digitalisation environments, foundational system attributes and human capital development are more decisive for improving accounting information quality than advanced managerial integration. The study contributes to AIS literature by providing empirical evidence from an underexplored, institutionally constrained context and offers practical insights for SME managers and policymakers seeking to enhance financial information quality through incremental and context-sensitive digitalisation strategies.

Keywords: accounting information systems; accounting information quality; SMEs; PLS-SEM; digitalisation; developing economies; Democratic Republic of Congo.

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1. Introduction

The quality of accounting and financial information is a fundamental determinant of organisational decision-making, financial transparency, and economic sustainability. In both developed and developing economies, Accounting Information Systems (AIS) have become a central mechanism through which organisations enhance the reliability, timeliness, and relevance of financial reporting (Romney et al., 2021; Trigo et al., 2016). By integrating technological tools with accounting processes, AIS supports not only statutory compliance but also managerial planning and performance control (Zohry

& Al-Dhubaibi, 2024). Consequently, the effectiveness of AIS is increasingly viewed as a critical driver of financial information quality, particularly in small and medium-sized enterprises (SMEs), where information asymmetry and resource constraints are more pronounced (Alharasis & Alkhwaldi, 2024).

Despite the recognised benefits of AIS, empirical evidence consistently shows that AIS adoption and effective use remain uneven across developing economies, especially in Sub-Saharan Africa (Freddy Aliamutu & Vitalis Mkhize,

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2024; Onaolapo & Odetayo, 2013). SMEs in these contexts often rely on semi-manual or rudimentary accounting practices, limiting the accuracy and strategic value of financial information (Kalumendo et al., 2025). Recent studies emphasise that the impact of AIS on information quality is contingent upon multiple dimensions, including system performance, degree of automation, organisational integration, system structure, and user competencies (Al-Okaily et al., 2020; Azhari & Bouaziz, 2021). However, most existing research is concentrated in relatively stable emerging markets, leaving fragile and post-conflict economies underexplored.

The Democratic Republic of Congo (DRC) represents a particularly critical yet underexamined context (Kalumendo, 2022b). Although SMEs constitute the backbone of the Congolese economy, AIS adoption remains structurally low, especially outside major urban centres. Empirical and institutional reports indicate that a significant proportion of Congolese SMEs still depend on manual bookkeeping or basic spreadsheet-based systems, with limited integration of dedicated accounting software into managerial processes (Kalumendo, 2023b). This low level of AIS penetration is driven by persistent barriers, including inadequate ICT infrastructure, high acquisition and maintenance costs, limited access to skilled human capital, and weak institutional support for digital transformation (Kalumendo, 2022a). Moreover, frequent power outages, unstable internet connectivity, and cybersecurity concerns further exacerbate technology-related risks for SMEs (Benitez & Foster, 2011).

Beyond infrastructural constraints, organisational and human factors significantly hinder AIS adoption in the DRC. SME owners and managers often exhibit low digital literacy and limited awareness of the strategic value of AIS, leading to underinvestment in accounting technologies and staff training. Resistance to change, fear of data loss, and lack of trust in computerised systems remain prevalent, reinforcing the dominance of traditional accounting practices. These challenges align with technology adoption theories, suggesting that perceived usefulness, ease of use, and contextual readiness are decisive factors in information system diffusion within organisations (Venkatesh et al., 2012).

While recent studies in Africa suggest that digitalisation and accounting automation can substantially improve financial reporting quality and governance outcomes (François & José, n.d.; Wandji & Mimche, 2021), robust empirical evidence from the DRC remains scarce, particularly using advanced analytical methods such as Structural Equation Modelling (SEM). Existing research tends to focus either on ICT adoption in general or on descriptive assessments of accounting practices, without rigorously quantifying the causal relationships between AIS dimensions and accounting information quality.

This study seeks to address this gap by empirically examining the impact of key AIS dimensions—system performance, level of automation, system integration, structural design, and continuous staff training—on the quality of accounting information produced by SMEs in Butembo, eastern DRC. By employing a Partial Least Squares Structural Equation Modelling (PLS-SEM)

approach on data collected from 133 SMEs, this research provides methodologically robust evidence from a low-technology-adoption environment.

This study contributes to the Accounting Information Systems (AIS) literature in several important ways. Beyond providing empirical evidence from an underexplored context, it advances existing theoretical frameworks by demonstrating that the effectiveness of AIS is contingent upon the level of digital maturity within firms. Specifically, the findings suggest that in low-digitalisation environments, foundational system attributes—such as structural design and automation—play a more critical role in enhancing accounting information quality than higher-order capabilities such as organisational integration. By integrating insights from the Resource-Based View and Information Systems Success Theory, this study proposes a sequenced perspective of AIS development, in which value creation evolves from operational efficiency toward strategic integration. This perspective contributes to a more nuanced understanding of AIS effectiveness in resource-constrained and institutionally fragile contexts

2. Theoretical framework and hypotheses development

2.1. Theoretical foundations

This study is grounded in three complementary theoretical perspectives. First, the Resource-Based View (RBV) posits that organisational resources that are valuable, rare, and difficult to imitate—such as effective information systems and skilled human capital—can enhance organisational outcomes and information quality (Barney, 1991). Within this framework, an efficient Accounting Information System (AIS) constitutes a strategic resource that supports accurate and reliable financial reporting.

Second, Information Systems Success Theory, particularly the DeLone and McLean (DeLone & McLean, 2003) model, emphasises that system quality, information quality, and service quality jointly determine system effectiveness and user outcomes. AIS performance and structural design are therefore expected to directly influence the quality of accounting information generated.

Third, Technology Adoption and Use theories, including the Unified Theory of Acceptance and Use of Technology (UTAUT), highlight the role of perceived usefulness, facilitating conditions, and user competencies in determining effective system utilization (Venkatesh et al., 2012). In low-adoption environments such as the DRC, organisational readiness, automation level, and continuous training are particularly critical for translating AIS investments into tangible information quality improvements.

By integrating these perspectives, this study conceptualizes accounting information quality as an outcome of both technological capabilities and human-organizational factors embedded within the AIS.

2.2. AIS performance and accounting information quality

AIS performance reflects the system's ability to process transactions accurately, generate timely reports, and support users' information needs. High-performing AIS reduce processing errors, improve data consistency, and enhance reporting timeliness, all of which are essential attributes of high-quality accounting information. Empirical evidence suggests that AIS performance is positively associated with financial reporting quality and decision usefulness, particularly in SMEs where manual errors are more prevalent (Al-Okaily et al., 2020).

In contexts characterised by weak internal controls and limited supervision—such as many SMEs in the DRC—a performant AIS may substitute for missing governance mechanisms by standardising accounting procedures and ensuring data integrity.

H1: *AIS performance has a positive and significant effect on the quality of accounting information.*

2.3. Level of AIS automation and accounting information quality

Automation refers to the extent to which accounting processes are computerised and executed with minimal human intervention. Automated AIS enhance accounting information quality by reducing human error, improving transaction traceability, and accelerating financial reporting cycles. Recent studies emphasise that automation, including the use of digital accounting software and AI-based tools, significantly improves data accuracy and reporting reliability (Azhari Amine, 2024; Trigo et al., 2016).

However, in low-technology-adoption environments, automation remains limited due to financial and infrastructural constraints. Where implemented, even partial automation can generate substantial gains in accounting information quality by replacing informal and manual practices.

H2: *The level of AIS automation positively influences the quality of accounting information.*

2.4. AIS integration into organisational processes and accounting information quality

AIS integration refers to the extent to which the accounting system is embedded within broader organisational and managerial processes, including budgeting, planning, and performance evaluation. Theoretical and empirical research suggests that integrated systems enhance information relevance and coherence by linking accounting data with operational and strategic decision-making (Trigo et al., 2016; Urquía Grande et al., 2011).

Nevertheless, in SMEs operating in fragile institutional environments, AIS are often used primarily for compliance purposes rather than as strategic management tools.

This limited managerial appropriation may weaken the expected positive relationship between system integration and information quality.

H3: *The integration of AIS into organisational management processes positively affects the quality of accounting information.*

2.5. Continuous training and accounting information quality

Human capital plays a central role in the effective use of AIS. Continuous training enhances users' technical competencies, system understanding, and ability to interpret accounting outputs, thereby improving information quality. From an RBV perspective, skilled personnel complement technological resources and increase their value creation potential (Lemqeddem & Bouklata, 2020; Pyatt & Becker, 1966).

In the DRC, limited access to professional training and low digital literacy constitute major barriers to effective AIS use. Without continuous training, AIS functionalities may remain underutilised, leading to poor data quality despite technological investments.

H4: *Continuous staff training has a positive effect on the quality of accounting information.*

2.6. AIS structure and compliance with accounting standards

AIS structure refers to the formal organisation of accounting procedures, documentation flows, internal controls, and system architecture. A well-structured AIS enhances compliance with accounting standards by ensuring consistency, traceability, and auditability of financial data. Prior studies demonstrate that structured accounting systems are associated with higher conformity to regulatory frameworks and improved financial reporting quality (Younas, 2024).

In environments characterised by regulatory complexity and weak enforcement mechanisms, such as the OHADA context in the DRC, the AIS structure becomes particularly important for ensuring standardised financial reporting practices.

H5: *A well-structured AIS positively influences the quality and standards compliance of accounting information.*

2.6.1. Conceptual Model

Based on the above hypotheses, this study proposes a conceptual model in which AIS performance, automation level, system integration, structural design, and continuous training jointly influence accounting information quality. Figure 1 illustrates the conceptual model, where AIS performance, automation, integration, structure, and training are hypothesised to influence accounting information quality.

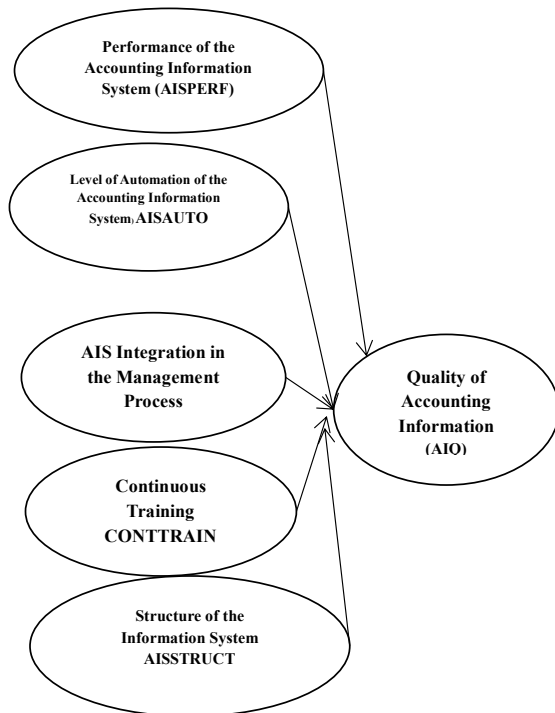


Figure 1: Conceptual model.

3. Methodology

3.1. Research design

This study adopts a quantitative, explanatory research design grounded in a hypothetico-deductive approach. The objective is to empirically examine the causal relationships between key dimensions of Accounting Information Systems (AIS) and the quality of accounting information in small and medium-sized enterprises (SMEs). Given the exploratory nature of AIS research in environments characterised by low technological penetration and the presence of latent constructs, a variance-based structural modelling approach is particularly suitable.

3.2. Study context

The empirical investigation was conducted in Butembo, a major commercial city in the eastern Democratic Republic of Congo (DRC). SMEs operating in this region face persistent structural challenges, including limited ICT infrastructure, unstable electricity supply, unreliable internet connectivity, low levels of accounting digitalisation, and significant financial and institutional constraints (Kalumendo, 2023a). As a result, the majority of SMEs continue to rely on manual or semi-manual accounting practices, and the integration of dedicated Accounting Information Systems remains relatively rare.

This context provides a relevant and underexplored setting for examining how AIS function and contribute to accounting information quality in low-adoption and

resource-constrained environments, thereby extending existing AIS literature beyond well-documented high-income and emerging markets.

3.3. Sampling strategy and sample characteristics

The study employs a non-probabilistic convenience sampling method, which is methodologically justified given the research context and objectives. In the DRC, and particularly in secondary urban centres such as Butembo, SMEs that have adopted or partially integrated AIS are not formally identified in official registries, making probability-based sampling impractical.

The sample, therefore, focuses on accessible SMEs that demonstrate at least a minimal level of AIS usage, including computerised or semi-computerised accounting systems. This targeted approach ensures that respondents possess direct experience with AIS functionalities, which is essential for meaningful empirical analysis.

A total of 133 SMEs were included in the final sample. Respondents consisted of financial managers, chief accountants, and owner-managers responsible for accounting and financial reporting. This sampling strategy is consistent with prior information systems research conducted in low-technology-adoption environments, where access to AIS-using firms is inherently limited.

3.4. Justification of sample size for PLS-SEM analysis

Although the sample size of 133 SMEs may appear modest, it is methodologically adequate and statistically appropriate for analysis using Partial Least Squares Structural Equation Modelling (PLS-SEM) (Kock & Hadaya, 2018).

First, PLS-SEM is specifically designed to accommodate small to medium sample sizes, particularly in exploratory and theory-building research contexts (Hair et al., 2022). According to the widely accepted 10-times rule, the minimum required sample size is ten times the maximum number of structural paths directed at any endogenous construct. In the present model, the dependent variable—accounting information quality—has five antecedent constructs, implying a minimum requirement of 50 observations, which is substantially exceeded.

Second, power-based recommendations indicate that for models with moderate effect sizes and a 5% significance level, a sample size between 100 and 150 observations is sufficient to achieve acceptable statistical power (Hair et al., 2021). The sample of 133 SMEs, therefore, falls well within this recommended range.

Third, empirical evidence demonstrates that PLS-SEM yields stable and reliable parameter estimates in samples below 200 observations when constructs are measured using reliable multi-item scales and model complexity remains moderate. These conditions are satisfied in the present study (Kock & Hadaya, 2018).

3.5. Data collection procedure

Primary data were collected using a structured questionnaire administered through face-to-face interactions. The questionnaire items were adapted from validated scales in prior AIS and information systems literature, (DeLone & McLean, 2003; Hair et al., 2021) and contextualised to reflect the SME environment in the DRC.

To enhance content validity and clarity, the questionnaire was pre-tested with a small group of accounting professionals and SME managers. Respondents were assured of anonymity and confidentiality to reduce social desirability bias and common method variance.

3.6. Measurement of constructs

All constructs were operationalised using reflective multi-item measurement scales and assessed on a five-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The use of multi-item measures is well established in behavioural and information systems research, as it allows for a more reliable and nuanced capture of latent constructs, thereby enhancing both measurement reliability and construct validity.

The study incorporates the following constructs. AIS performance reflects the system's ability to produce accurate, reliable, efficient, and timely accounting information. AIS automation captures the extent to which accounting processes are computerised and executed with minimal manual intervention. AIS integration into organisational processes refers to the degree to which accounting information generated by the AIS is used in planning, control, and managerial decision-making. AIS structure represents the formal organisation of accounting procedures, including documentation flows and internal control mechanisms. Continuous training measures the availability and frequency of accounting- and AIS-related training provided to staff. Finally, accounting information quality is assessed in terms of reliability, relevance, accuracy, comparability, and compliance with applicable accounting standards.

All constructs were specified as reflective latent variables, in line with established practices in prior Accounting Information Systems research, reflecting the assumption that the observed indicators are manifestations of the underlying theoretical concepts.

3.7. Data analysis technique

Data analysis was conducted using SmartPLS 4.1.1.8, which provides advanced functionalities for variance-based structural equation modelling (Hair et al., 2022). A two-stage analytical procedure was employed, consistent with established PLS-SEM guidelines (Hair et al., 2017; Sarstedt et al., 2017).

First, the measurement model was evaluated to ensure construct validity and reliability. Internal consistency reliability was assessed using Cronbach's alpha and composite reliability, both widely recognised indicators of

scale reliability (Hair et al., 2022; Nunnally & Bernstein, 1994). Convergent validity (Table 2) was examined through the Average Variance Extracted (AVE), with values above 0.50 considered acceptable (Fornell & Larcker, 1981). Discriminant validity was tested using the Fornell-Larcker criterion, which remains a standard approach in PLS-SEM applications (Henseler et al., 2015).

Second, the structural model was assessed by analysing path coefficients (β) and their statistical significance, determined through bootstrapping with 5,000 resamples. Bootstrapping is recommended in PLS-SEM to obtain robust standard errors and confidence intervals (Hair et al., 2017). The model's explanatory power was evaluated using the coefficients of determination (R^2), which indicate the proportion of variance explained in endogenous constructs (Chin, 1998). Path coefficients were considered statistically significant at $p < 0.05$, following conventional thresholds in SEM research.

The choice of PLS-SEM is justified by its methodological advantages. Unlike covariance-based SEM, PLS-SEM is particularly suitable for non-normal data distributions, moderate sample sizes, and prediction-oriented research in underexplored contexts (Hair & Alamer, 2022; Reinartz et al., 2009). These characteristics align with the present study's design, making PLS-SEM the most appropriate analytical technique.

4. Results and discussion

4.1. Measurement model assessment

In Partial Least Squares Structural Equation Modelling (PLS-SEM), the evaluation of the measurement model is a critical prerequisite before analysing the structural relationships. This stage ensures that latent constructs are measured with sufficient reliability and validity, thereby providing a robust foundation for hypothesis testing. Following established methodological guidelines, the measurement model assessment involves four key steps:

Indicator Reliability – Outer loadings of indicators on their respective constructs should be examined. Loadings above 0.70 are generally considered acceptable, although values between 0.40 and 0.70 may be retained if overall construct validity is not compromised (Hair & Alamer, 2022; Hulland, 1999).

Internal Consistency Reliability – The consistency of indicators measuring the same construct is assessed using Composite Reliability (CR). CR values between 0.70 and 0.95 indicate satisfactory reliability, with CR preferred over Cronbach's alpha due to its sensitivity to indicator loadings (Hair et al., 2019; Nunnally & Bernstein, 1994).

Convergent Validity – The Average Variance Extracted (AVE) is used to determine whether indicators converge to measure the same construct. An AVE value greater than 0.50 demonstrates adequate convergent validity (Fornell & Larcker, 1981; Hair & Alamer, 2022).

Discriminant Validity – Constructs must be empirically distinct from one another. This is typically assessed using the Fornell–Larcker criterion, cross-loadings, and the heterotrait–monotrait (HTMT) ratio of correlations. HTMT values below 0.85 (strict criterion) or 0.90 (lenient criterion) indicate sufficient discriminant validity (Henseler et al., 2015), (Hair et al., 2022).

This rigorous multi-stage evaluation ensures that the measurement model demonstrates both reliability and validity, thereby legitimising the interpretation of the structural model results (Hair et al., 2022; Mourre, n.d.).

4.1.1. Indicator reliability and internal consistency

Indicator reliability is assessed by examining outer loadings, which represent the extent to which each observed indicator reflects its underlying latent construct. Prior methodological research recommends that outer loadings should preferably exceed 0.70, as this threshold implies that the construct explains more than 50% of the indicator variance (Hair et al., 2019). However, loadings between 0.40 and 0.70 may be retained if their removal does not improve composite reliability or content validity, particularly in exploratory research settings (Hair et al., 2022).

In the present study, all retained indicators exhibit acceptable outer loading values, supporting the unidimensionality of the constructs and confirming that each set of indicators consistently measures a single latent concept (Tritah & Daoud, 2021).

Table 1: Outer loadings.

Indicator	Outer loadings
CONTTRAIN1	0.860
CONTTRAIN2	0.904
CONTTRAIN3	0.903
CONTTRAIN5	0.836
AISINTORG3	0.894
AISINTORG4	0.915
AISINTORG5	0.901
AISAUTO1	0.730
AISAUTO3	0.841
AISAUTO4	0.755
AISPERF1	0.845
AISPERF2	0.901
AISPERF3	0.891
AISPERF4	0.838
AISPERF5	0.804
AIQ1	0.760
AIQ10	0.804
AIQ11	0.787
AIQ12	0.719
AIQ3	0.807
AIQ4	0.809
AIQ6	0.893
AIQ7	0.841
AIQ8	0.738
AIQ9	0.717
AISSTRUCT1	0.882
AISSTRUCT2	0.766
AISSTRUCT4	0.795

Internal consistency reliability was evaluated using Cronbach's alpha and composite reliability (ρ_A). Cronbach's alpha values above 0.70 are generally considered acceptable in confirmatory research, while slightly lower values may be tolerated in exploratory contexts (Nunnally & Bernstein, 1994). Composite reliability values exceeding 0.60–0.70 indicate satisfactory internal consistency and are often preferred in PLS-SEM due to their robustness to unequal indicator loadings (Hair et al., 2019; Wong, 2013).

As shown in Table 1, most constructs display Cronbach's alpha and composite reliability values above the recommended thresholds. Although the constructs *AIS Automation (AISAUTO)* and *AIS Structure (AISSTRUCT)* present Cronbach's alpha values marginally below 0.70, their composite reliability values remain acceptable. This outcome is consistent with prior PLS-SEM studies conducted in emerging and low-technology-adoption environments, where measurement scales are often adapted to context-specific conditions (Hair et al., 2019).

4.1.2 Convergent Validity

Convergent validity assesses the degree to which multiple indicators of a construct converge to measure the same underlying concept. It is commonly evaluated using the Average Variance Extracted (AVE), which reflects the average proportion of variance captured by the construct from its indicators (Fornell & Larcker, 1981).

Methodological standards recommend an AVE value greater than 0.50, indicating that the construct explains more than half of the variance of its indicators (Hair et al., 2019; Hair et al., 2022). Values below this threshold suggest insufficient convergence among indicators.

The results reported in Table 1 indicate that all constructs achieve AVE values well above the minimum requirement. These findings confirm strong convergent validity, demonstrating that the indicators are highly representative of their respective latent constructs (Chan & Lay, 2018).

Table 2: Reliability and convergent validity indices.

	Cronbach's alpha	Composite reliability (ρ_a)	(AVE)
-	>0,7	>0,7	>0,5
CONTTRAIN	0,899	0,903	0.768
AISINTORG	0,887	0,891	0.815
AISAUTO	0,768	0,769	0.603
AISPERF	0,841	0,889	0.637
AIQ	0,890	0,895	0.507
AISSTRUCT	0,7645	0,752	0.561

CONTTRAIN: Continuous Training; AISINTORG: Integration of the Accounting Information System into Organisational, Management Processes; AISAUTO: Level of Accounting Information System Automation; AISPERF: Accounting Information System Performance; AIQ: Accounting Information Quality; AISSTRUCT: Accounting Information System Structure.

4.1.2. Discriminant validity

Discriminant validity reflects the extent to which a construct is empirically distinct from other constructs in the model. Establishing discriminant validity is essential

to ensure that latent variables capture unique theoretical concepts rather than overlapping phenomena (Hair et al., 2022).

In this study, discriminant validity was assessed using the Fornell–Larcker criterion (Hair et al., 2022). According to this criterion, the square root of the AVE of each construct should exceed its highest correlation with any other construct. This condition indicates that a construct shares more variance with its own indicators than with other constructs (Ab Hamid et al., 2017).

The results in Table 3 satisfy the Fornell–Larcker criterion for all constructs. Therefore, the measurement model demonstrates adequate discriminant validity, confirming that each construct measures a theoretically distinct concept (Kante et al., 2017).

In addition to the Fornell–Larcker criterion, discriminant validity was further assessed using the Heterotrait–Monotrait ratio (HTMT), as recommended in recent PLS-SEM literature. Table 4 reports the HTMT values for all construct pairs. The results show that all HTMT ratios are below the conservative threshold of 0.90, with most values also remaining under the stricter criterion of 0.85. The highest value observed is 0.82 (between CONTTRAIN and AIQ), which remains within acceptable limits. These findings provide additional and more stringent evidence that the constructs are empirically distinct. Therefore, the combined results from the Fornell–Larcker criterion and the HTMT analysis confirm that discriminant validity is adequately established in the measurement model.

Summary of Measurement Model Evaluation

Overall, the results of the measurement model assessment indicate that the constructs exhibit acceptable reliability and validity in accordance with established PLS-SEM standards. Indicator reliability, internal consistency, convergent validity, and discriminant validity are all supported by empirical evidence and methodological benchmarks. These findings provide a robust foundation for proceeding with the evaluation of the structural model and hypothesis testing.

4.2. Structural model assessment and hypotheses testing

After establishing the reliability and validity of the measurement model, the next step was to evaluate the structural model to test the hypothesised relationships between the dimensions of the Accounting Information System (AIS) and accounting information quality. In line with PLS-SEM methodological guidelines, this evaluation focused on assessing collinearity among predictor constructs, estimating path coefficients, testing their statistical significance, and examining the explanatory power of the model (Hair & Alamer, 2022).

4.2.1. Collinearity diagnostics

Before hypothesis testing, potential collinearity issues among the exogenous constructs were examined using the Variance Inflation Factor (VIF). High levels of multicollinearity may distort parameter estimates and weaken the interpretability of structural relationships. Following established recommendations, VIF values below 5.0, and preferably below 3.0, indicate the absence of problematic collinearity (Hair et al., 2019).

The results show that all VIF values fall within acceptable limits, suggesting that collinearity does not constitute a concern in the present model and that the estimated path coefficients can be interpreted reliably.

Table 5: Variance inflation factor

Predictor → AIQ	Inner VIF
CONTTRAIN → AIQ	2.84
AISINTORG → AIQ	2.67
AISAUTO → AIQ	1.69
AISPERF → AIQ	2.91
AISSTRUCT → AIQ	2.18

4.2.2. Hypothesis testing and path coefficients

The hypothesised relationships were tested using a bootstrapping procedure with 5000 resamples, which provides robust estimates of standard errors and

Table 3: Fornell-Lacker criterion.

CONSTRUCT	CONTTRAIN	AISINTORG	AISAUTO	AISPERF	AIQ	AISSTRUCT
CONTTRAIN	0.883*					
AISINTORG	0.71	0.906*				
AISAUTO	0.69	0.63	0.806*			
AISPERF	0.66	0.64	0.72	0.812*		
AIQ	0.74	0.6	0.68	0.65	0.787*	
AISSTRUCT	0.62	0.61	0.53	0.60	0.67	0.768*

Table 4: HTMT values.

Constructs	CONTTRAIN	AISINTORG	AISAUTO	AISPERF	AIQ	AISSTRUCT
CONTTRAIN	—					
AISINTORG	0.78	—				
AISAUTO	0.74	0.69	—			
AISPERF	0.71	0.7	0.81	—		
AIQ	0.82	0.68	0.76	0.73	—	
AISSTRUCT	0.7	0.72	0.61	0.69	0.75	—

Table 6: Hypotheses testing.

Path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Décision
CONTRAIN→ AIQ	0.16	0.164	0.076	2.105	0.036	Accepted
AISINTOR→ AIQ	-0.105	-0.103	0.1	-1.049	0.294	Rejected
AISAUT→ AIQ	0.351	0.351	0.17	2.063	0.039	Accepted
AISPERF→ AIQ	0.267	0.253	0.08	3.333	0.001	Accepted
AISSTRUCT→ AIQ	0.377	0.391	0.139	2.706	0.007	Accepted

significance levels in PLS-SEM (Hair & Alamer, 2022). The structural model explains 58.2% of the variance in accounting information quality ($R^2 = 0.582$), indicating a moderate to substantial level of explanatory power in the context of SME and information systems research (Chin, 1988).

The empirical results reveal several significant relationships. AIS performance has a positive and statistically significant effect on accounting information quality ($\beta = 0.267$, $p < 0.01$), supporting H1. This finding suggests that systems capable of producing timely, accurate, and reliable accounting outputs contribute meaningfully to improving information quality in SMEs.

Similarly, the level of AIS automation exhibits a positive and significant influence ($\beta = 0.351$, $p < 0.05$), confirming H2. This result underscores the importance of automation in reducing manual processing errors and enhancing the consistency of accounting data, particularly in environments where traditional bookkeeping practices remain dominant.

In contrast, the relationship between AIS integration into organisational processes and accounting information quality is not statistically significant ($p > 0.05$), leading to the rejection of H3. This outcome indicates that, within the studied SMEs, AIS are not yet sufficiently embedded in managerial decision-making and control processes to exert a direct impact on information quality.

The analysis further shows that continuous training has a positive and significant effect on accounting information quality ($\beta = 0.160$, $p < 0.05$), thereby supporting H4. This finding highlights the critical role of human capital in ensuring the effective use of accounting information systems, particularly in contexts characterised by low digital literacy.

Finally, AIS structure emerges as the strongest predictor of accounting information quality ($\beta = 0.377$, $p < 0.01$), confirming H5. Well-defined accounting procedures, internal controls, and system organisation appear to be essential for ensuring reliable and compliant financial information in SMEs operating under institutional and technological constraints.

4.2.3. Overall model interpretation

Taken together, the results demonstrate that accounting information quality in SMEs is primarily driven by technological robustness and structural organisation of AIS, complemented by user competencies developed through continuous training. The relatively stronger

effects of AIS structure and automation suggest that, in low-digitalisation environments such as the DRC, formalisation and standardisation of accounting processes yield greater benefits than managerial integration alone.

The non-significant role of AIS integration into organisational processes reflects the largely operational use of accounting systems in the studied context, where AIS are primarily employed for transaction recording and compliance rather than as strategic management tools. This finding aligns with evidence from other developing economies, where limited institutional pressure and resource constraints slow the strategic appropriation of information systems.

Overall, four out of the five hypotheses are supported. The findings confirm that AIS performance, automation, structural design, and continuous training significantly enhance accounting information quality, while AIS integration into management processes does not exhibit a direct effect in the current context.

4.2.4. Model explanatory and predictive assessment

The explanatory and predictive quality of the structural model was evaluated using a combination of R^2 , effect sizes (f^2), and predictive relevance (Q^2), in accordance with current PLS-SEM methodological guidelines (Hair et al., 2019, 2022).

The model explains a substantial proportion of variance in accounting information quality, with an R^2 value of 0.582, indicating moderate-to-high explanatory power in the context of organisational and information systems research (Chin, 1998). This result suggests that the selected Accounting Information System dimensions collectively provide a strong in-sample explanation of accounting information quality in SMEs operating under low levels of digitalisation.

Table 7: Coefficient of determination.

Construct	R-square	R-square adjusted
AIQ	0.598	0.582

To assess the relative contribution of each exogenous construct, Cohen's f^2 effect sizes were examined. The results show that AIS structure exhibits a moderate effect size ($f^2 = 0.210$), representing the strongest individual contributor to accounting information quality. AIS automation demonstrates a small-to-moderate effect ($f^2 = 0.124$), while AIS integration into organisational processes shows a small effect ($f^2 = 0.023$). In contrast, AIS performance and continuous training display

negligible effect sizes, suggesting that their explanatory contribution overlaps with other AIS dimensions rather than exerting strong incremental effects. These findings highlight the predominance of structural and technological attributes over organisational integration in the studied context.

Beyond in-sample explanatory power, the model's out-of-sample predictive relevance was evaluated using the Stone–Geisser Q^2 statistic, obtained through the blindfolding procedure. The results indicate a Q^2 value of 0.501 for accounting information quality, which substantially exceeds the recommended threshold of 0.35 and thus reflects strong predictive relevance (Geisser, 1974; Hair et al., 2019; Stone, 1974). This high Q^2 value confirms that the proposed model not only explains but also predicts accounting information quality effectively in SMEs operating in an institutionally constrained and low-digitalisation environment.

Taken together, the combined evidence from R^2 , f^2 , and Q^2 demonstrates that the structural model exhibits both substantial explanatory power and strong predictive capability, thereby supporting the robustness and practical relevance of the proposed AIS framework.

Table 8: Effect size.

Path	β	f^2	Interpretation
CONTRAIN → AIQ	0.16	0.03	small
AISINTORG → AIQ	-0.105	0.01	negligible
AISAUTO → AIQ	0.351	0.12	medium
AISPERF → AIQ	0.267	0.07	0.07 small
AISSTRUCT → AIQ	0.377	0.20	0.20 medium

Table 9: Predictive relevance.

Construct	Q^2
AIQ	0.501

5. Discussion and implications

5.1. Discussion of findings in relation to prior studies

This study examined the relationship between Accounting Information System (AIS) dimensions and accounting information quality in SMEs operating in a low-digitalisation environment. The findings reveal both convergences and divergences with prior AIS research, underscoring the importance of contextual factors in shaping AIS effectiveness.

First, the positive and significant effect of AIS performance on accounting information quality is consistent with a substantial body of literature conducted in both developed and emerging economies. Prior studies have shown that system reliability, processing speed, and accuracy enhance the relevance and credibility of accounting information (Al-Okaily et al., 2020; DeLone & McLean, 2003). Similar results have been reported in SME contexts in Jordan, Mali, and Tunisia (Alharasis & Alkhwalidi, 2024;

Alotaibi, 2024; Kante et al., 2017) where high-performing AIS were associated with improved reporting quality and decision usefulness. The present study extends these findings by demonstrating that AIS performance remains a critical determinant even in institutionally fragile and infrastructure-constrained contexts such as the DRC, where basic system functionality alone can generate significant informational gains.

Second, the strong influence of AIS automation aligns with empirical evidence emphasising the role of automation in reducing manual errors and improving data consistency (Azhari Amine, 2024; Trigo et al., 2016). However, unlike studies conducted in highly digitalised environments—where automation effects tend to be incremental—our results suggest that automation plays a transformational role in the DRC context. This divergence can be explained by the predominance of manual accounting practices among Congolese SMEs; as a result, even partial automation produces disproportionately large improvements in accounting information quality.

In contrast, the non-significant effect of AIS integration into organisational processes diverges from findings reported in studies conducted in advanced or digitally mature environments. Research in European and Asian SMEs generally reports a positive relationship between AIS integration and managerial decision-making quality (Trigo et al., 2016; Urquía Grande et al., 2011). However, our results are consistent with studies from Sub-Saharan Africa and other low-income economies, which indicate that AIS are often used primarily for compliance and transaction recording rather than for strategic management (Onaolapo & Odetayo, 2013). This comparison suggests that AIS integration is a later-stage outcome of digital maturity, contingent upon prior investments in system structure, automation, and managerial capabilities.

The positive relationship between continuous training and accounting information quality corroborates earlier studies emphasising the role of human capital in AIS success (Lemqeddem & Bouklata, 2020; Pyatt & Becker, 1966). Similar findings have been observed in SMEs in Morocco and Ghana, where user training significantly enhanced system utilisation and reporting accuracy. In comparison to contexts with higher digital literacy, the magnitude of the training effect observed in this study reflects the critical skills gap characterising SMEs in the DRC. This reinforces the argument that technology adoption without parallel capacity building yields limited informational benefits.

Finally, AIS structure emerges as the most influential determinant of accounting information quality. This finding is strongly aligned with research emphasising the importance of standardised procedures, internal controls, and formalised accounting processes in ensuring reliable financial reporting (Belkharroubi, n.d.; Fossung et al., 2020). Compared to studies conducted in environments with strong regulatory enforcement, where AIS structure plays a supporting role, the present findings indicate that in weak institutional settings, AIS structure becomes a substitute governance mechanism, compensating for regulatory and supervisory deficiencies.

5.2. Theoretical implications

By comparing the findings with prior studies, this research contributes to AIS theory in several ways. First, it demonstrates that the relative importance of AIS dimensions varies across stages of digital maturity. While integration into managerial processes is central in advanced contexts, structural design and automation are more decisive in early-stage adoption environments.

Second, the study refines the application of Information Systems Success Theory by showing that information quality relationships are moderated by institutional and infrastructural conditions. Third, from a Resource-Based View perspective, the findings confirm that AIS value creation in SMEs depends on the complementarity between structured systems and skilled users, rather than on technology alone.

5.3. Managerial implications

From a managerial standpoint, the comparative evidence suggests that SMEs in the DRC should adopt a sequenced approach to AIS implementation. Rather than replicating complex integration models observed in developed economies, managers should first focus on establishing structured accounting procedures and automating core accounting functions.

Additionally, consistent with evidence from comparable developing contexts, investments in AIS should be systematically accompanied by continuous training initiatives. This dual strategy enhances both system utilisation and information quality, thereby increasing the return on technology investments.

These findings can also be interpreted in light of emerging interdisciplinary research on data-driven and intelligent systems. Recent studies on digital twins (Karkadakattil, 2026b) and physics-informed modelling (Karkadakattil, 2026a) highlight the importance of integrating data quality, system performance, and predictive capabilities within adaptive frameworks. Although SMEs in the DRC operate in a significantly less advanced technological environment, the underlying principle remains consistent: system effectiveness depends on the alignment between data quality, system architecture, and user interaction. This perspective suggests that future evolution of AIS in developing contexts may progressively move toward more intelligent, predictive, and integrated systems as digital infrastructure improves.

5.4. Policy implications

The comparative insights also have important policy implications. Public policies promoting SME digitalisation should be context-sensitive, recognising that AIS integration into management is unlikely to succeed without prior investments in infrastructure, training, and system formalisation. Policymakers could draw lessons from successful AIS support programs implemented in other African and emerging economies by prioritising subsidised accounting software, professional training, and regulatory simplification.

6. Conclusion

This study investigated the impact of Accounting Information System (AIS) characteristics on the quality of accounting information in small and medium-sized enterprises operating in a low-digitalisation environment. Drawing on survey data from 133 SMEs in the Democratic Republic of Congo and employing a PLS-SEM approach, the study provides robust empirical evidence on how technological and human factors jointly shape accounting information quality under severe infrastructural and institutional constraints.

The findings demonstrate that AIS structure, automation, and system performance are the primary drivers of accounting information quality, while continuous training plays a complementary but significant role. In contrast, the integration of AIS into organisational management processes does not exhibit a direct effect, reflecting the early stage of digital maturity characterising most SMEs in the studied context. These results indicate that, in environments where accounting digitalisation remains limited, foundational system attributes and user capabilities matter more than advanced managerial integration.

From a theoretical perspective, this research extends AIS and information systems literature by providing evidence from an underexplored and institutionally fragile context. It shows that the effectiveness of AIS is highly contingent on the stage of technological adoption and the surrounding institutional environment, thereby refining the application of Information Systems Success Theory and the Resource-Based View to emerging economies.

Practically, the study suggests that SME digitalisation strategies should follow a sequenced approach, prioritising system structuring, automation of core accounting processes, and continuous capacity building before attempting deeper managerial integration. For policymakers, the findings underscore the importance of improving ICT infrastructure, facilitating access to affordable accounting technologies, and supporting professional training initiatives to enhance financial information quality and transparency among SMEs.

Limitations and Directions for Future Research

This study is subject to several limitations that should be acknowledged. First, the use of a non-probabilistic convenience sampling approach may limit the generalisability of the findings beyond the studied SMEs, as the sample may not fully represent the broader population of firms in the DRC. Second, the reliance on self-reported data introduces the possibility of response bias, including social desirability bias and subjective evaluation of system performance and information quality. Third, the cross-sectional nature of the data restricts the ability to capture dynamic changes in AIS adoption and usage over time. Additionally, measurement bias may arise from the adaptation of scales to a context characterised by low digitalisation and varying levels of accounting expertise. Future research is encouraged to employ longitudinal designs, probabilistic sampling

methods, and mixed-method approaches to further validate and extend the present findings evolves over time and across different institutional contexts.

Overall, the findings provide context-specific insights into the role of Accounting Information Systems in improving accounting information quality in SMEs operating under resource constraints. While the results highlight the importance of system structure, automation, and training, they should be interpreted within the limitations of the study context. The conclusions, therefore, remain bound to similar low-digitalisation environments and should not be overgeneralised to more technologically advanced settings.

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Author Contributions

All authors contributed to the study's conception and design. Rodrigue Kalumendo, Mumbere Kalupala Philemon, Mumbere Kisumano Georges, and Paluku Vagheni carried out material preparation, data collection, and analysis. The initial draft of the manuscript was prepared jointly by Mumbere Kalupala Philemon and Rodrigue Kalumendo. All authors critically reviewed earlier versions, provided substantive feedback, and approved the final manuscript for submission.

Conflict of Interests

The authors declare that they have no conflict of interests

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used Grammarly to assist with language editing, grammar correction, and improving the clarity of the manuscript. After using this tool, the authors carefully reviewed and edited the content as needed and take full responsibility for the content of the publication.

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