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INFLUENCE OF FUNCTIONAL MATURITY OF FINANCIAL MANAGEMENT INFORMATION SYSTEM AND INTERNAL AUDIT EFFECTIVENESS ON EXPENDITURE CONTROL: THE MEDIATING ROLE OF INFORMATION QUALITY IN VIETNAMESE LISTED COMPANIES

Abstract

In contemporary corporate governance, rigorous expenditure control is essential for financial stability and for mitigating agency costs. This article investigates the influence of financial management information system functional maturity and internal audit effectiveness on expenditure control efficiency and examines the mediating role of financial information quality in Vietnamese listed companies. A quantitative approach was employed using partial least squares structural equation modeling (PLS-SEM) to analyze data collected from 258 respondents, each representing a distinct listed enterprise during the first half of 2025. The results provide quantitative evidence supporting all hypotheses. Specifically, financial management information system maturity positively influences financial information quality ($\beta = 0.400$) and expenditure control efficiency ($\beta = 0.349$). Internal audit effectiveness also positively influences information quality ($\beta = 0.265$) and control efficiency ($\beta = 0.208$). Furthermore, financial information quality directly enhances control efficiency ($\beta = 0.399$) and significantly mediates the relationships between system maturity (indirect effect = 0.160) and internal audit effectiveness (indirect effect = 0.106) on expenditure control. The model explains 46.8% of the variance in expenditure control efficiency. These findings conclude that technological infrastructure and independent oversight optimize governance performance primarily through producing highly reliable financial data, offering vital insights for executives to standardize internal control protocols in volatile markets.

Keywords

financial system, internal audit, information quality, expenditure control, listed companies

JEL Classification

M41, M42, G32, G34

INTRODUCTION

In the contemporary governance environment, expenditure control stands as a decisive factor for financial stability and competitive advantage, particularly for listed firms, where it safeguards shareholder interests by mitigating agency costs and fraud. Ineffective control mechanisms can significantly diminish investor confidence and corporate transparency (Ashbaugh-Skaife et al., 2008; Doyle et al., 2007), making robust management tools an urgent necessity for corporate sustainability. Modern governance addresses this requirement through two fundamental components. First, technological infrastructure, primarily financial management information systems, automates regulatory enforcement. Second, independent monitoring



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Conflict of interest statement:

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via internal audit functions provides objective oversight of control protocols. However, a significant scientific problem remains unresolved: existing paradigms treat these two components as independent promoters of compliance, largely overlooking how they jointly influence actual expenditure control efficiency. More critically, this fragmented view ignores the indispensable mediating role of financial information quality. Without accurate, timely, and reliable data, neither sophisticated software nor rigorous human audits can effectively enforce budget limits or optimize resource allocation. In the specific context of Vietnam's rapidly expanding stock market, regulatory bodies have increasingly emphasized transparent financial reporting and rigorous internal controls to attract foreign investment. However, despite these regulatory pressures, information asymmetry persistently undermines financial discipline and leaves conventional governance frameworks incomplete in such developing economies.

1. LITERATURE REVIEW AND HYPOTHESES

A comprehensive understanding of expenditure control efficiency in listed companies necessitates the integration of two complementary theoretical perspectives: agency theory and information systems success theory. Agency theory posits that the separation of ownership and management generates information asymmetry, which requires rigorous monitoring mechanisms – such as internal auditing – to protect shareholder interests and deter opportunistic behaviors. Information systems success theory, on the other hand, provides a framework for understanding how technological system quality enhances information quality and, subsequently, organizational performance (DeLone & McLean, 2003; Petter et al., 2014; Urbach & Müller, 2011). When applied jointly to listed enterprises, these two theories suggest that combining advanced financial management information systems and an independent internal audit function not only mitigates information asymmetry but also strengthens the entire financial decision-making process.

The functional maturity of financial management information systems stands as a primary determinant of both information quality and control effectiveness. Highly mature systems are characterized by extensive integration of business processes and high levels of automation, which together reduce manual errors and enhance the consistency and reliability of output data (Binh et al., 2020, 2022; Dener et al., 2011; H. Nguyen & A. Nguyen, 2019; Nhan et al., 2023). Drawing on data quality theory, the ultimate value of financial information hinges on its timeliness, completeness, consistency, and relevance-attributes

that are indispensable for strengthening budgetary control (Dorotinsky & Watkins, 2013; Gorla et al., 2010; Hashim, 2014; Wang & Strong, 1996). Recent research further confirms that the quality of management accounting information systems positively influences management control, particularly where process automation is well-developed (Papiorek & Hiebl, 2023). Studies conducted in the Vietnamese context reinforce this finding, demonstrating that highly integrated accounting information systems directly improve data transparency and the success of investment decision-making (Tran, 2025; Vo et al., 2025). Beyond its indirect influence through data, the maturity of these systems directly shapes expenditure outcomes by embedding control rules – such as automated budget limit verification, commitment control, and system audit trails – into the software architecture. Such mechanisms shift monitoring to the pre-payment stage, thereby strengthening the capacity to detect and prevent irregularities early in the operating cycle (Hashim, 2014; Kanellou & Spathis, 2013; Morris, 2011; Nhan et al., 2025). The ability to collect and process comprehensive data through interconnected modules is therefore vital for effective expenditure oversight, promoting both transparency and accountability throughout the financial management process (Restrepo-Carmona et al., 2024; Uña, 2019).

Operating in parallel with technological controls, the internal audit function serves as an independent assurance mechanism that safeguards the integrity of reported financial information. Within listed companies, the scope of internal auditing extends beyond procedural compliance checks to encompass evaluations of the entire internal control system and the scrutiny of exceptional transactions. An effective internal audit department

is capable of identifying material misstatements, deterring management misconduct, and raising the overall quality of internal control (Ege, 2015; Madawaki et al., 2022; Oussii & Boulila Taktak, 2018). The capacity of this function to execute its mandate is directly linked to value creation and the reinforcement of the organizational control environment (Cohen & Sayag, 2010). Critical enabling factors include the depth of audit activities and the degree of support from executive management (Abdelrahim & Al-Malkawi, 2022; Mihret & Yismaw, 2007), while auditor independence and professional competence remain central to maintaining transparency and reliability in corporate disclosures (Alzeban & Gwilliam, 2014; Arena & Azzone, 2009; Prawitt et al., 2009). Internal auditing is therefore regarded as an indispensable mechanism for enhancing expenditure control, as it reinforces internal control systems and financial discipline. Robust financial management control systems ensure transaction legality, prevent resource misuse, and heighten organizational accountability (Anačkov, 2024; Ashbaugh-Skaife et al., 2008; Doyle et al., 2007). By providing objective assessments of control process adequacy, internal audit enables the timely detection of errors and potential risks in cash flow management (Budiandru, 2024). Empirical evidence from the Vietnamese market specifically confirms that auditor competence, independence, and management support significantly enhance internal audit effectiveness, which in turn fosters operational sustainability and optimizes resource utilization in listed non-financial firms (Ta & Doan, 2022; Tran & Ho, 2026).

Financial information quality occupies a critical mediating position in the relationship between governance mechanisms and expenditure control efficiency. From the standpoint of data quality theory, financial information is an essential input for control activities and managerial decisions. When information lacks timeliness or consistency, managers face substantial constraints in evaluating and approving expenditures. Conversely, high-quality information strengthens the quantitative foundation for control and reinforces accountability (Monteiro et al., 2022, 2024; Wang & Strong, 1996). In listed companies, superior accounting information quality has been shown to reduce information asymmetry and borrowing costs, thereby tighten-

ing financial discipline (Le et al., 2021). Consistent with information systems success theory, the present study argues that neither technological sophistication nor monitoring capability can independently generate management efficiency without corresponding improvements in information quality. Mature technological platforms eliminate process barriers and standardize input data, thereby producing information that is suitable for control purposes (Hashim, 2014). In this context, financial information quality acts as an intermediary mechanism that transforms technological advantages into actual expenditure control capacity. Similarly, grounded in agency theory, rigorous internal audit oversight ensures that transactions are recorded in accordance with established principles, preventing deviations and promoting faithful reporting. The high reliability of information thus becomes an absolute prerequisite for managers to enforce strict budgetary discipline.

In summary, the reviewed literature has extensively documented the independent impacts of financial management information systems and internal auditing on various dimensions of organizational performance. However, the interconnected and mutually reinforcing effects of these two governance mechanisms remain underexplored. Addressing this gap is essential to understanding how human monitoring and technological infrastructure can be unified to maximize financial governance effectiveness. Therefore, the purpose of this article is to investigate the influence of financial management information system functional maturity and internal audit effectiveness on expenditure control efficiency, with the mediating role of financial information quality in Vietnamese listed companies.

Based on the theoretical framework and identified literature gaps, the hypotheses are unambiguously formulated as follows:

- H1: The functional maturity of financial management information systems has a positive influence on financial information quality.*
- H2: The functional maturity of financial management information systems has a direct positive influence on expenditure control efficiency.*

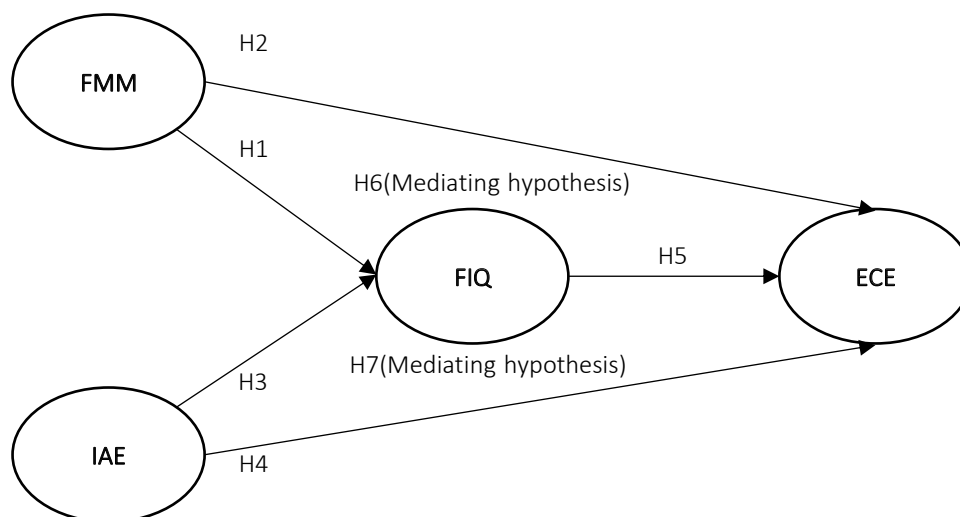


Figure 1. Research framework

H3: Effective internal auditing has a positive influence on financial information quality.

H4: Effective internal auditing has a direct positive influence on expenditure control efficiency.

H5: Financial information quality has a positive influence on expenditure control efficiency.

H6: Financial information quality mediates the relationship between the functional maturity of financial management information systems and expenditure control efficiency.

H7: Financial information quality mediates the relationship between effective internal auditing and expenditure control efficiency.

The research model proposed in Figure 1 illustrates these key determinants influencing expenditure control effectiveness.

2. RESEARCH METHODOLOGY

This study adopts a quantitative, cross-sectional design. Primary data were exclusively collected from enterprises listed on the Ho Chi Minh City Stock Exchange and the Hanoi Stock Exchange between January and June 2025. A purposive sampling technique was employed targeting key informants—specifically chief accountants, heads

of finance, internal auditors, and senior financial specialists—who possess in-depth knowledge of their firms' financial management information systems and internal control practices. Out of 350 distributed questionnaires, 258 valid observations were retained after a rigorous screening process to remove incomplete and unengaged responses, yielding a valid response rate of 73.7%. To ensure the independence of observations, a single-respondent-per-firm approach was adopted, meaning each of the 258 valid responses represents a unique listed company.

The data utilized in this study were drawn from a broader research project examining financial governance and information systems in Vietnamese listed companies. While the full survey instrument administered to participants contained additional scales pertaining to other research questions, the present investigation is theoretically grounded in agency theory and information systems success theory and, consequently, only employs the measures directly relevant to its hypotheses. Accordingly, the questionnaire items for financial management information system maturity, internal audit effectiveness, financial information quality, and expenditure control efficiency are detailed in Appendix B. Data on other constructs collected during the survey are analyzed in a separate, independent study with a distinct theoretical focus.

Regarding data availability, the full raw dataset cannot be deposited in a public open repository

Table 1. Descriptive statistics of the survey sample (N = 258)

Demographics	Frequency	Percentage (%)
Position		
Chief Accountant/Head of Finance	72	27.91
Internal Auditor	40	15.50
Senior Accountant/Financial Specialist	146	56.59
Work experience		
< 5 years	62	24.03
5 – < 10 years	117	45.35
≥ 10 years	79	30.62
Educational level		
Bachelor's degree	163	63.18
Master's degree or higher	95	36.82
Business sector		
Manufacturing	99	38.37
Services, Trade, and Retail	64	24.81
Real Estate and Construction	56	21.71
Finance, Banking, and Insurance	26	10.08
Others	13	5.04
Stock exchange listing		
Ho Chi Minh City Stock Exchange	167	64.73
Hanoi Stock Exchange	91	35.27

due to strict confidentiality agreements with participating firms and their internal security policies concerning financial control data. However, the aggregated data matrices and the analysis project files supporting the reported findings are available from the corresponding author upon reasonable request. The demographic profile of the respondents, presented in Table 1, confirms the sample's representativeness and professional credibility.

All latent constructs were measured using a five-point Likert scale (1 = strongly disagree, 5 = strongly agree), with measurement items adapted from validated international research to ensure content validity. The functional maturity of the financial management information system (seven items) and expenditure control efficiency (five items) were measured using scales initially informed by public financial management frameworks (Dener et al., 2011; Hashim, 2014; PEFA Secretariat, 2016; Pimenta & Seco, 2021). Because these sources were originally designed for government fiscal environments, the items were systematically adapted to the private sector context. This adaptation involved mapping the underlying principles of budget execution, commitment control, and financial data integration onto the operational realities of enterprise resource planning systems. Furthermore, the adapted items were cross-referenced with the COSO (2013) internal

control framework to ensure their construct validity and applicability to the corporate governance structures of listed companies. Financial information quality (five items) drew on the frameworks of Wang and Strong (1996), DeLone and McLean (2003), and Chalu (2019). Internal audit effectiveness (four items) was measured using items derived from Mihret and Yismaw (2007), Alzeban and Gwilliam (2014), Cohen and Sayag (2010), and COSO (2013). The complete survey questionnaire is provided in Appendix B, and a comprehensive codebook detailing all measurement items is presented in Appendix A. To address potential common method bias arising from the self-reported nature of the data, both procedural and statistical remedies were applied. Procedurally, respondent anonymity was guaranteed, and items were carefully worded to reduce ambiguity. Statistically, a full collinearity test was performed following Kock (2015). All variance inflation factors for the latent constructs were below the threshold of 3.3, confirming that common method bias does not distort the structural estimates.

Data analysis employed the partial least squares structural equation modeling (PLS-SEM) technique via SmartPLS software, strictly adhering to the two-stage analytical algorithm recommended by Hair et al. (2019). In the first stage, the measurement model was assessed to confirm con-

struct validity. Construct reliability was evaluated using Cronbach's alpha and composite reliability (Rho_A, Rho_C), with values above 0.70 considered satisfactory. Convergent validity was established through outer loadings greater than 0.708 and average variance extracted exceeding 0.50. Discriminant validity was rigorously verified using the Heterotrait-Monotrait ratio of correlations, with all values strictly below the conservative threshold of 0.85 (Henseler et al., 2015). Subsequently, the second stage involved estimating the structural model utilizing a bootstrapping procedure with 5,000 resamples to accurately calculate path coefficients, standard deviations, t-values, and p-values for both direct and mediating effects. The explanatory power of the model was comprehensively assessed via the coefficient of determination, effect sizes, and predictive relevance using the PLSpredict procedure (Shmueli et al., 2019). A mediating effect was considered statistically significant if the bootstrap confidence interval of the indirect effect did not include zero.

3. RESEARCH RESULTS

The empirical findings were obtained through the two-stage PLS-SEM procedure. The measurement model was assessed first, followed by the structural model.

The results of the measurement model assessment confirmed the reliability, convergent validity, and lack of collinearity for all constructs. As reported in Table 2, all indicator outer loadings exceeded the threshold of 0.708, with values between 0.730 and 0.856. To evaluate indicator collinearity, the outer variance inflation factor (VIF) values were examined. All VIF values ranged from 1.652 to 2.336, which are strictly below the conservative threshold of 3.0 recommended by Hair et al. (2019), indicating no problematic multicollinearity among the measurement items. Furthermore, Cronbach's

alpha and composite reliability (Rho_A and Rho_C) for each latent variable were above 0.840, indicating satisfactory internal consistency. The average variance extracted values ranged from 0.599 to 0.685, all above the 0.50 benchmark, thus supporting convergent validity.

Discriminant validity was evaluated using the Heterotrait-Monotrait ratio. The figures in Table 3 show that the highest HTMT value was 0.677, recorded between financial information quality and expenditure control efficiency. All HTMT values remained below the conservative cut-off of 0.85, suggesting that the constructs were empirically distinct.

Table 3. Discriminant validity results (HTMT)

Construct	ECE	FIQ	FMM	IAE
ECE				
FIQ	0.677			
FMM	0.556	0.438		
IAE	0.336	0.292	0.083	

Following the validation of the measurement model, the structural model was evaluated. Prior to hypothesis testing, a full collinearity assessment was conducted. The inner variance inflation factor (VIF) values for all structural paths ranged from 1.002 to 1.284, which are strictly below the 3.3 threshold recommended by Kock (2015). This finding confirms that neither multicollinearity nor common method bias distorts the structural estimates. Subsequently, the structural relationships were examined with a bootstrapping procedure using 5,000 resamples. The standardized path coefficients and the variance explained in the endogenous constructs are presented in Figure 2. The model accounted for 46.8 percent of the variance in expenditure control efficiency and 22.1 percent of the variance in financial information quality.

The direct effects were tested, and the results are summarized in Table 4. The path from financial management information system maturity to fi-

Table 2. Measurement model evaluation results

Latent Variable /Indicator	Outer Loading	VIF	Cronbach's Alpha	Rho_A	Rho_C	AVE
Expenditure Control Efficiency (ECE): ECE1-ECE5	0.785-0.843	1.850-2.195	0.873	0.874	0.908	0.664
Financial Information Quality (FIQ): FIQ1-FIQ5	0.763-0.812	1.652-1.926	0.853	0.855	0.895	0.630
Financial Management Information System Maturity (FMM): FMM1-FMM7	0.730-0.816	1.697-2.336	0.889	0.892	0.913	0.599
Internal Audit Effectiveness (IAE): IAE1-IAE4	0.800-0.856	1.852-2.023	0.847	0.855	0.897	0.685

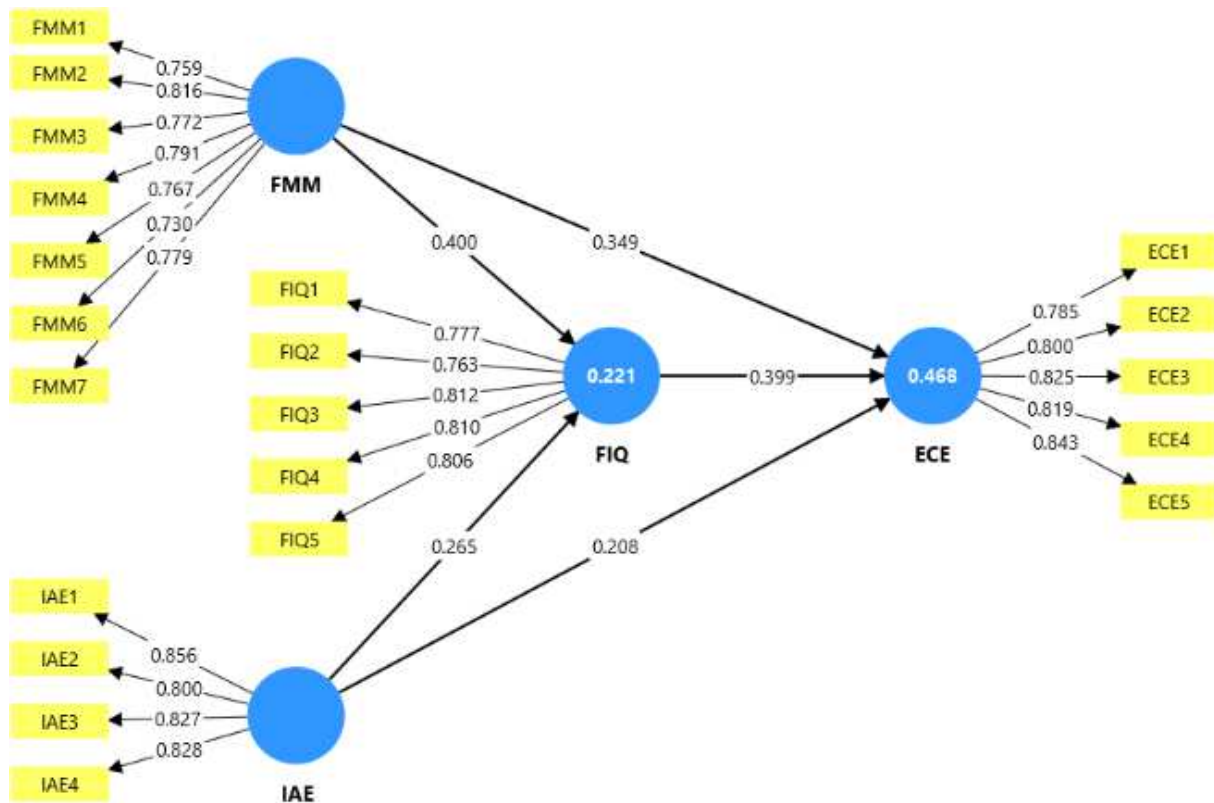


Figure 2. Results of the PLS-SEM structural equation model analysis

financial information quality was positive and statistically significant ($\beta = 0.400$, $t = 7.794$, $p < 0.001$). The direct path from system maturity to expenditure control efficiency was also significant ($\beta = 0.349$, $t = 8.571$, $p < 0.001$). Internal audit effectiveness had a positive effect on financial information quality ($\beta = 0.265$, $t = 4.642$, $p < 0.001$) and on expenditure control efficiency ($\beta = 0.208$, $t = 4.448$, $p < 0.001$). Furthermore, the path linking financial information quality to expenditure control efficiency was positive and significant ($\beta = 0.399$, $t = 8.266$, $p < 0.001$). These outcomes provide support for hypotheses *H1*, *H2*, *H3*, *H4*, and *H5*.

The indirect effect analysis, displayed in Table 5, indicated that the standardized indirect effect of

system maturity on expenditure control efficiency through financial information quality was 0.160, with a t -value of 5.707 ($p < 0.001$). The indirect effect of internal audit effectiveness on expenditure control efficiency through the same mediator was 0.106, with a t -value of 4.247 ($p < 0.001$). The bootstrap confidence intervals for both indirect effects excluded zero. These results support hypotheses *H6* and *H7*.

The effect sizes were computed to assess the practical significance of the independent variables. As shown in Table 6, the effect size of financial information quality on expenditure control efficiency was $f^2 = 0.233$, while system maturity had an f^2 of 0.189 on expenditure control efficiency and 0.205

Table 4. Results of direct influence hypothesis testing

Hypothesis	Relationship	Coefficient (β)	Standard Deviation	T-value	P-value	Conclusion
<i>H1</i>	FMM \rightarrow FIQ	0.400	0.051	7.794	0.000	Accepted
<i>H2</i>	FMM \rightarrow ECE	0.349	0.041	8.571	0.000	Accepted
<i>H3</i>	IAE \rightarrow FIQ	0.265	0.057	4.642	0.000	Accepted
<i>H4</i>	IAE \rightarrow ECE	0.208	0.047	4.448	0.000	Accepted
<i>H5</i>	FIQ \rightarrow ECE	0.399	0.048	8.266	0.000	Accepted

Table 5. Indirect effect analysis results

Hypothesis	Relationship	Effect Coefficient	Standard Deviation	T-value	P-value	Conclusion
H6	FMM → FIQ → ECE	0.160	0.028	5.707	0.000	Accepted
H7	IAE → FIQ → ECE	0.106	0.025	4.247	0.000	Accepted

Table 6. Effect size evaluation results (f^2)

Relationship	f^2 Value	Effect Magnitude
FIQ → ECE	0.233	Medium
FMM → FIQ	0.205	Medium
FMM → ECE	0.189	Medium
IAE → FIQ	0.090	Small
IAE → ECE	0.075	Small

Table 7. Predictive power evaluation results (PLSpredict)

Endogenous Variable	Q ² Predict	RMSE (PLS-SEM)	MAE (PLS-SEM)	Conclusion
Expenditure Control Efficiency (ECE)	0.330	0.824	0.668	High
Financial Information Quality (FIQ)	0.202	0.901	0.735	Medium

on financial information quality. The effect sizes for internal audit effectiveness were $f^2 = 0.090$ on financial information quality and $f^2 = 0.075$ on expenditure control efficiency.

Finally, the predictive relevance was examined using the PLSpredict procedure. The Q² predicted values, presented in Table 7, were 0.330 for expenditure control efficiency and 0.202 for financial information quality, both greater than zero. A comparison of the root mean squared error and mean absolute error values between the PLS-SEM model and a naïve benchmark confirmed that the structural model possessed out-of-sample predictive ability.

4. DISCUSSION

The results of this study clarify the mechanisms through which technological infrastructure and human oversight jointly determine the effectiveness of expenditure control in listed companies. Rather than operating as isolated factors, financial management information system maturity and internal audit effectiveness interact through the mediating role of financial information quality to influence budget discipline.

The finding that functional maturity of the financial management information system exerts a strong direct influence on both information qual-

ity and expenditure control efficiency carries important implications when compared with prior work. Earlier studies, predominantly conducted in developed economies, focused on the general operational benefits of enterprise resource planning systems, such as improved process efficiency and data integration (Ifinedo & Nahar, 2007; Morris, 2011). The present research extends this literature by quantifying the specific influence on expenditure outcomes within an emerging market context. In Vietnam, where manual control procedures are still common and institutional checks remain under development, the automation of budget verification and commitment controls appears to play a more critical role. This interpretation aligns with recent empirical observations that highly integrated accounting systems in Vietnamese firms significantly improve data transparency and decision-making success (H. Nguyen & A. Nguyen, 2019; Vo et al., 2025). The strong direct path from system maturity to expenditure control observed here suggests that, in volatile capital markets, technological integration does not merely support administrative efficiency; it serves as a key mechanism for preventing unauthorized resource allocation by embedding control rules directly into daily workflows.

Regarding the role of internal audit, the results confirm that auditor competence and independence contribute meaningfully to both information quality and expenditure discipline. This

finding is consistent with global evidence that effective internal audit functions deter managerial misconduct and improve internal control quality (Abdelrahim & Al-Malkawi, 2022; Ege, 2015). However, the present study moves beyond these general conclusions by juxtaposing the technological and human dimensions within a single model. The data indicate that while the financial management information system provides the automated infrastructure for control, the internal audit function serves as the independent evaluator of that infrastructure and of exceptional transactions. This complementary relationship is particularly evident in the Vietnamese market, where recent studies have demonstrated that auditor independence and management support directly enhance internal audit effectiveness and, in turn, optimize resource utilization (Ta & Doan, 2022; K. N. Tran & Ho, 2026). By examining the parallel paths, our research demonstrates that neither a mature system alone nor a strong audit department alone is sufficient; rather, it is the simultaneous presence of both that most effectively reduces agency costs and enforces financial discipline.

The most theoretically important contribution of this study lies in the empirical demonstration of

the mediating role of financial information quality. Previous research often treated technology, auditing, and control as directly connected or examined information quality as a mediator only for non-financial performance outcomes (Monteiro et al., 2022, 2024). In contrast, our results show that financial information quality serves as the primary intermediary factor through which both system maturity and audit effectiveness influence expenditure control. In fact, the indirect effects through information quality are substantial, indicating that investments in software or audit expansion are unlikely to produce meaningful improvements in budget compliance unless they successfully enhance the timeliness, accuracy, and relevance of financial data. This finding highlights information quality as a critical component of the governance framework. When financial data lack accuracy or timeliness, both automated control rules and audit recommendations become ineffective in preventing unauthorized expenditures. Thus, for listed firms in emerging economies, the managerial priority should shift from simply acquiring advanced systems or expanding audit teams to ensuring that these resources generate a tangible improvement in the data that managers use for daily spending decisions.

CONCLUSION

This study investigated the influence of financial management information system functional maturity and internal audit effectiveness on expenditure control efficiency, with the mediating role of financial information quality in Vietnamese listed companies. The empirical findings confirm that both system maturity and audit effectiveness contribute to tighter budget compliance, but their influence operates largely through a common pathway. Financial information quality emerged as the central intermediary factor; without accurate and timely data, the direct effects of automation and independent oversight on expenditure discipline remain limited.

From these outcomes, it is concluded that the success of governance tools in emerging markets depends on their capacity to improve the information environment in which managers make spending decisions. Enterprises should not view software upgrades and audit expansions as separate initiatives; instead, they must ensure that investments in technology and human oversight are synchronized to raise data reliability. Furthermore, regulatory agencies should enforce digital reporting standards that make information integrity a measurable component of corporate compliance, rather than a voluntary aspiration. While this study provides valuable insights, the cross-sectional design restricts the observation of how expenditure control evolves over time. Future studies employing longitudinal data would offer a more dynamic perspective. Additionally, incorporating organizational characteristics – such as ownership structure, board composition, or industry-specific regulatory pressures – as contextual factors could help explain variations in the effectiveness of internal governance mechanisms.

AUTHOR CONTRIBUTIONS

Conceptualization: Mai Phuong Dang.
 Data curation: Mai Phuong Dang.
 Formal analysis: Mai Phuong Dang.
 Funding acquisition: Mai Phuong Dang.
 Investigation: Mai Phuong Dang.
 Methodology: Mai Phuong Dang.
 Project administration: Mai Phuong Dang.
 Resources: Mai Phuong Dang.
 Software: Mai Phuong Dang.
 Supervision: Mai Phuong Dang.
 Validation: Mai Phuong Dang.
 Visualization: Mai Phuong Dang.
 Writing – original draft: Mai Phuong Dang.
 Writing – review & editing: Mai Phuong Dang.

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APPENDIX A

Table A1. Measurement scales and adapted sources

Variables/Measurement Items	Sources
Financial Management Information System Functional Maturity (FMM)	
FMM1: The financial management information system at my company adequately covers all necessary functions for core financial processes	Adapted from public financial management frameworks (Hashim, 2014; Dener et al., 2011; Pimenta & Seco, 2021) and cross-referenced with COSO (2013)
FMM2: The financial management information system at my company is well integrated across related financial modules and business processes	
FMM3: The financial management information system at my company significantly automates the processing, approval, and recording of financial transactions	
FMM4: The financial management information system at my company has builtin control mechanisms within the financial transaction workflow	
FMM5: The financial management information system at my company enables seamless data sharing and consistency across relevant departments	
FMM6: The financial management information system at my company supports the execution of financial processes in a standardized and consistent manner	
FMM7: Overall, the financial management information system at my company adequately meets current financial governance requirements in terms of functionality, control, and data processing	
Financial Information Quality (FIQ)	
FIQ1: Financial information from the system is available in a timely manner when needed for transaction processing and decisionmaking	Adapted from Wang and Strong (1996); DeLone and McLean (2003); Chalu (2019)
FIQ2: System data promptly reflects the latest budget status, expenditure commitments, and actual spending of the enterprise	
FIQ3: Financial data on the system is highly accurate and rarely requires adjustment after initial recording	
FIQ4: Figures across reports, modules, and data sources in the system are consistent and easy to reconcile	
FIQ5: Information from the system is complete and sufficiently detailed to support expenditure verification, approval, monitoring, and audit trail	
Expenditure Control Efficiency (ECE)	
ECE1: Expenditures that do not comply with authority, norms, and budget regulations are effectively controlled at my company	Adapted from public financial management and expenditure control frameworks (PEFA Secretariat, 2016; Hashim, 2014; Pimenta & Seco, 2021) and cross-referenced with COSO (2013)
ECE2: Deviations, exceptions, or risks in spending are detected early	
ECE3: The expenditure approval process at my company is consistently implemented, transparent, and auditable	
ECE4: Tracing, reviewing, and verifying expenditure transactions is easy and reliable	
ECE5: Expenditure control decisions are made promptly before deviations cause significant consequences	
Internal Audit Effectiveness (IAE)	
IAE1: Internal audit has independent access to data, reports, and transaction logs on the financial management information system	Adapted from Mihret and Yismaw (2007); Alzeban and Gwilliam (2014); Cohen and Sayag (2010); COSO (2013)
IAE2: Internal audit possesses sufficient professional competence and understanding of the financial management information system to evaluate financial processes	
IAE3: Internal audit performs periodic reviews of processes from budgeting, expenditure commitment, approval, to payment	
IAE4: Internal audit provides specific, feasible, and evidencebased recommendations derived from system data	

APPENDIX B

Survey Instrument for the Study on Financial Management Information System Maturity, Internal Audit Effectiveness, Financial Information Quality, and Expenditure Control Efficiency in Vietnamese Listed Companies

Note: This appendix contains the subset of questionnaire items administered to participants that are directly relevant to the present study. The original survey instrument also included additional scales pertaining to other research questions beyond the scope of the current theoretical framework. Those scales are excluded here but are described in the Data Collection section.

INTRODUCTION TO RESPONDENTS (ORIGINAL VIETNAMESE VERSION WAS USED IN ADMINISTRATION):

Dear Sir/Madam,

We are conducting an academic study to evaluate the impact of the functional maturity of financial management information systems on financial information quality and expenditure control efficiency in listed companies on the Vietnamese stock market. The information you provide will be used solely for academic research purposes. All responses will be kept confidential, aggregated, and analyzed statistically. There are no right or wrong answers. Please respond based on the actual situation at your enterprise. Thank you for your cooperation.

PART A. SCREENING QUESTIONS

A1. Is your company listed on the Vietnamese stock market?

- Yes
- No (If “No”, please discontinue the survey)

A2. On which exchange is your company listed?

- Ho Chi Minh City Stock Exchange (HOSE)
- Hanoi Stock Exchange (HNX)
- Other / Unknown

A3. Do you have significant involvement in or understanding of your company’s financial, accounting, expenditure control, internal control, or internal audit processes?

- Yes
- No (If “No”, please discontinue the survey)

PART B. RESPONDENT AND COMPANY INFORMATION

B1. Your current position

- Chief Accountant / Head of Finance
- Internal Auditor
- Senior Accountant / Financial Specialist
- Other:

B2. Years of experience in finance, accounting, auditing, or internal control

- Under 5 years
- 5 to under 10 years
- 10 years or above

B3. Highest educational level

- Bachelor’s degree
- Master’s degree or higher
- Other:

B4. Primary business sector of the enterprise

- Manufacturing
- Services, Trade, and Retail
- Real Estate and Construction
- Finance, Banking, and Insurance
- Other:

PART C. SURVEY CONTENT

Please indicate your level of agreement with each of the following statements by marking (X) in the appropriate box on the 5-point scale:

1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree

Code	Item	1	2	3	4	5
I. Financial Management Information System Functional Maturity (FMM)						
FMM1	The financial management information system at my company adequately covers all necessary functions for core financial processes					
FMM2	The financial management information system at my company is well integrated across related financial modules and business processes					
FMM3	The financial management information system at my company significantly automates the processing, approval, and recording of financial transactions					
FMM4	The financial management information system at my company has built-in control mechanisms within the financial transaction workflow					
FMM5	The financial management information system at my company enables seamless data sharing and consistency across relevant departments					
FMM6	The financial management information system at my company supports the execution of financial processes in a standardized and consistent manner					
FMM7	Overall, the financial management information system at my company adequately meets current financial governance requirements in terms of functionality, control, and data processing					
II. Financial Information Quality (FIQ)						
FIQ1	Financial information from the system is available in a timely manner when needed for transaction processing and decision-making					
FIQ2	System data promptly reflects the latest budget status, expenditure commitments, and actual spending of the enterprise					
FIQ3	Financial data on the system is highly accurate and rarely requires adjustment after initial recording					
FIQ4	Figures across reports, modules, and data sources in the system are consistent and easy to reconcile					
FIQ5	Information from the system is complete and sufficiently detailed to support expenditure verification, approval, monitoring, and audit trail					

Code	Item	1	2	3	4	5
III. Expenditure Control Efficiency (ECE)						
ECE1	Expenditures that do not comply with authority, norms, and budget regulations are effectively controlled at my company					
ECE2	Deviations, exceptions, or risks in spending are detected early					
ECE3	The expenditure approval process at my company is consistently implemented, transparent, and auditable					
ECE4	Tracing, reviewing, and verifying expenditure transactions is easy and reliable					
ECE5	Expenditure control decisions are made promptly before deviations cause significant consequences					
IV. Internal Audit Effectiveness (IAE)						
IAE1	Internal audit has independent access to data, reports, and transaction logs on the financial management information system					
IAE2	Internal audit possesses sufficient professional competence and understanding of the financial management information system to evaluate financial processes					
IAE3	Internal audit performs periodic reviews of processes from budgeting, expenditure commitment, approval, to payment					
IAE4	Internal audit provides specific, feasible, and evidence-based recommendations derived from system data					

PART D: ADDITIONAL COMMENTS

If you have any additional comments, suggestions, or observations concerning the financial management information system, internal audit activities, expenditure control practices, or the quality of financial information within your enterprise, please feel free to provide them in the space below:

We sincerely appreciate your time, cooperation, and valuable contribution to this research.