Journal of Strategic Innovation in Economics and Business
E-ISSN: 3110-4177
Volume 2 Issue 2, 2026, Pp. 25-47
DOI: https://doi.org/10.65101/sinebis.v2i2.458
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Top Management Commitment, Audit Communication, and Public Sector Internal Audit Effectiveness: A Dual-Pathway Mediation Analysis

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Received: 20-08-2026 Revised: 30-09-2026 Accepted: 31-10-2026

Abstract

Public sector internal auditing confronts a governance paradox in which high administrative follow-up completion coexists with recurring internal control weaknesses. Prior studies examine structural, technological, and behavioral determinants in silos without testing how technology utilization and auditee engagement mediate these relationships in public bureaucracies. Drawing on agency theory and organizational support theory, this study tests how structural-technological and communication-behavioral pathways simultaneously shape internal audit effectiveness. We surveyed 139 functional internal auditors at an Indonesian central government ministry between February and June 2026. The cross-sectional data were analyzed using partial least squares structural equation modeling and importance-performance map analysis. The results reveal a sharp divergence between the two pathways, accounting for 31.2 percent of the variance in internal audit effectiveness. Along the structural-technological pathway, top management commitment significantly increases information technology utilization (path coefficient of 0.298) and internal audit effectiveness (path coefficient of 0.269), while information technology utilization acts as the strongest direct predictor (path coefficient of 0.315) and a complementary partial mediator (indirect effect of 0.094). Conversely, audit communication significantly improves auditee engagement during fieldwork (path coefficient of 0.258), yet neither audit communication (path coefficient of 0.145) nor auditee engagement (path coefficient of 0.065) directly or indirectly increases internal audit effectiveness, placing both below average in total importance. These findings establish an institutional boundary condition showing that procedural fieldwork cooperation does not automatically produce post-audit control reform in compliance-oriented bureaucracies. Ministerial leaders should therefore prioritize executive follow-up enforcement and integrated digital audit analytics over routine communication procedures.

Keywords: Internal Audit Effectiveness, Top Management Commitment, Information Technology Utilization, Auditee Engagement, Agency Theory.

JEL Classification: D73, H83, M42, M48, O33.

Introduction

Contemporary public sector governance faces a persistent empirical anomaly in the execution of internal oversight: near-perfect administrative completion rates for audit recommendation follow-ups frequently coincide with the recurrence of identical internal control weaknesses year after year. The *Government at a Glance* and *Public Integrity Indicators* reports published by the Organisation for Economic Co-operation and Development (OECD, 2025) indicate that although most countries have formally established regulatory frameworks for internal control and public sector risk management, operational implementation gaps persist at the ministerial and agency levels. Similar conditions are documented in the *GovTech Maturity Index* report (World Bank, 2025) covering 197 economies, which shows that the modernization of core government systems has not been fully accompanied by the strengthening of digital monitoring capabilities and substantive compliance evaluation in developing nations. In Indonesia, this governance anomaly is evident in the Summary of Semester Examination Results (IHPS) reports by the Audit Board of the Republic of Indonesia (BPK RI, 2024, 2025). Although ministerial annual performance reports routinely record high administrative completion rates for audit follow-ups, state external audits continue to uncover thousands of cases of Internal Control System (SPI) weaknesses—particularly in accounting and reporting controls, budget execution, public procurement, and fixed asset management (BPK RI, 2024, 2025). This evidence indicates that the administrative closure of audit findings does not guarantee substantive control reform.

Within public administration and organizational governance literature, internal audit effectiveness reflects the extent to which an internal oversight unit fulfills its mandate to provide assurance on internal control reliability, support risk management, and strengthen institutional governance (Arena & Azzone, 2009; Christensen, 2022; The Institute of Internal Auditors [IIA], 2024). Aligned with strategic innovation and institutional transformation agendas, an effective audit function is required to move beyond routine regulatory compliance verification. Internal auditors are expected to provide operational value addition by diagnosing systemic risks, presenting objective evidence-based findings, preventing potential irregularities, and formulating recommendations that drive organizational learning and continuous improvement (Bonrath & Eulerich, 2024; Cantù et al., 2025; Lenz & Hahn, 2015). Within the Indonesian government, strengthening the Government Internal Supervisory Apparatus (APIP) is a strategic policy priority to safeguard state budget allocation accountability. However, despite regulations mandating internal auditors to serve as strategic

assurance providers and trusted advisors, many public sector audit units continue to operate under a narrow bureaucratic compliance orientation (Parker et al., 2018; Turetken et al., 2020).

A mapping of contemporary literature reveals an ongoing theoretical debate regarding the primary determinants that drive the effectiveness of this oversight function. The first group of studies emphasizes structural and organizational determinants, arguing that institutional legitimacy, resource allocation, reporting line independence, and top management support are primary prerequisites for audit outcome quality (Abdelrahim & Al-Malkawi, 2025; Alqudah et al., 2023; Jung, 2022; Oussii & Boulila Taktak, 2018). Concurrently with the acceleration of digital transformation, a second stream of literature focuses on information technology capabilities and audit process innovation. Several researchers indicate that the adoption of audit software, electronic data analytics, and testing automation can expand examination coverage and improve risk detection accuracy (Alzeban et al., 2026; Betti et al., 2021; Eulerich et al., 2023; Que et al., 2025). Conversely, other public sector studies note that technology investments often fail to generate value addition if they are not aligned with leadership strategy, infrastructure readiness, and adequate information technology governance (Lowry et al., 2025; Otia & Bracci, 2022). Meanwhile, a third group of studies highlights relational and behavioral dimensions, emphasizing that communication quality between auditors and auditees, message clarity, and collaboration during engagements play a significant role in mitigating organizational resistance to oversight (Brivot et al., 2024; Clor-Proell et al., 2023; Odilov, 2025; Proell, 2022; Umutoni, 2025).

Although prior studies have provided important conceptual foundations, three research gaps remain inadequately addressed in the public sector oversight literature. First, the majority of empirical research examines the drivers of internal audit effectiveness through a siloed approach, separating structural and technological factors from behavioral dynamics and predominantly testing direct relationships rather than structural mediation mechanisms (Lenz & Hahn, 2015; Oussii & Boulila Taktak, 2018). Second, government oversight literature has historically tended to position auditees as passive subjects of examination rather than active participants in the co-production of audit outcomes. Consequently, the mediating role of auditee engagement in bridging the effect of audit communication on internal audit effectiveness is rarely tested empirically within hierarchical government bureaucracies (Dela Cruz et al., 2025; Parker et al., 2021). Third, there is limited research specifically examining how information technology utilization mediates the effect of top management commitment on internal audit effectiveness in central government ministries of developing nations that manage

large-scale public service programs (Al Zobi & Jarah, 2023; Lowry et al., 2025; Otia & Bracci, 2022).

To address these literature gaps, this study integrates agency theory (Eisenhardt, 1989; Fama & Jensen, 1983; Jensen & Meckling, 1976) and organizational support theory (Eisenberger et al., 1986; Kurtessis et al., 2017; Rhoades & Eisenberger, 2002) into a single dual-pathway mediation structural model. Along the structural-technological pathway, agency theory views internal audit as a formal monitoring mechanism designed to mitigate information asymmetry and constrain agent opportunistic behavior within public bureaucracies (Eisenhardt, 1989; Jensen & Meckling, 1976). For this monitoring function to operate effectively, top management commitment is required to ensure institutional authority, adequate operational budgets, protection of auditor independence, and strict enforcement of recommendation follow-ups (Abdelrahim & Al-Malkawi, 2025; Alqudah et al., 2023; Jung, 2022; Memon et al., 2022). In complex public organizations, this executive support must also translate into the provision of adequate technological oversight instruments. When top management allocates resources to digital infrastructure, it facilitates more intensive information technology utilization—encompassing audit management software, electronic data analytics, and continuous monitoring—which subsequently broadens population testing coverage and sharpens the detection of control weaknesses (Alzeban et al., 2026; Betti et al., 2021; Eulerich, 2023; Que et al., 2025). Based on the causal logic of this first pathway, the study hypothesizes that top management commitment positively affects internal audit effectiveness (H1) and information technology utilization (H3), information technology utilization positively affects internal audit effectiveness (H4), and information technology utilization mediates the relationship between top management commitment and internal audit effectiveness (H7).

Along the communication-behavioral pathway, organizational support theory posits that oversight outcomes also depend on relational quality and the perception of organizational support formed during the audit engagement (Eisenberger et al., 1986; Kurtessis et al., 2017; Rhoades & Eisenberger, 2002). Constructive audit communication—characterized by scope clarity, timely information delivery, criteria transparency, and two-way dialogue—signals procedural fairness and reduces defensive attitudes among audited units (Brivot et al., 2024; Colbert, 2002; Odilov, 2025; Sarens & De Beelde, 2006). When audited units experience open and objective communication, they are more likely to exhibit active auditee engagement through fieldwork cooperation, timely document submission, and transparency in disclosing root control issues, which theoretically is expected to support substantive audit

recommendation implementation (Clor-Proell et al., 2023; Dela Cruz et al., 2025; Parker, 2021; Proell, 2022; Umutoni, 2025). Following the relational mechanisms of this second pathway, the study hypothesizes that audit communication positively affects internal audit effectiveness (H2) and auditee engagement (H5), auditee engagement positively affects internal audit effectiveness (H6), and auditee engagement mediates the relationship between audit communication and internal audit effectiveness (H8).

This study provides three primary contributions to the literature on governance, public management innovation, and internal oversight. First, theoretically, this study expands the testing framework for internal audit effectiveness by integrating agency theory and organizational support theory to simultaneously compare the explanatory power of the structural-technological pathway against the communication-behavioral pathway. Second, contextually, the research identifies institutional boundary conditions within central government bureaucracies of developing nations by examining why procedural compliance and administrative cooperation during audit fieldwork do not consistently transform into post-audit control improvements. Third, methodologically and managerially, this study combines variance-based structural equation modeling (Partial Least Squares Structural Equation Modeling or PLS-SEM) with Importance-Performance Map Analysis (IPMA) to map the gap between the causal importance level and actual performance achievements of each oversight determinant. The central argument maintained in this study is that within regulatory compliance-oriented public bureaucracies, substantive internal audit effectiveness is determined more by the enforcement of executive authority and information technology monitoring capabilities than by communication routines and procedural participation during fieldwork. The research problem is focused on how the structural-technological and communication-behavioral mediation pathways simultaneously shape internal audit effectiveness and which factors represent strategic priorities for oversight reform in Indonesian central government ministries. The remainder of this article presents the research method, empirical testing results and priority mapping analysis, a discussion of theoretical and managerial implications, and conclusions alongside the future research agenda.

Research Method

This study employed a quantitative explanatory design grounded in a positivist paradigm using a cross-sectional primary survey to estimate the proposed dual-pathway mediation model. A variance-based structural equation modeling identification strategy—specifically

Partial Least Squares Structural Equation Modeling (PLS-SEM) coupled with Importance-Performance Map Analysis (IPMA)—was selected because the research problem required testing simultaneous mediating mechanisms while evaluating out-of-sample predictive accuracy and managerial priority trade-offs across multiple latent constructs (Hair et al., 2022; Sarstedt et al., 2023; Sharma et al., 2024). Empirical data were collected between February and June 2026 at the Inspectorate General of an Indonesian central government ministry responsible for administering national public service programs and managing state budget allocations. In compliance with institutional research ethics and internal oversight confidentiality protocols, the specific name of the ministry was anonymized. The unit of analysis was the individual functional internal auditor. Functional auditors were selected as observation units because their operational mandate spans audit planning, fieldwork execution, auditee communication, information technology utilization, and recommendation follow-up monitoring, allowing them to observe leadership support, technological readiness, communication practices, and auditee behavior firsthand.

Primary data were obtained through a structured electronic questionnaire administered across the study population of all 214 active functional internal auditors ($N = 214$) assigned to the ministry's inspectorate units. Because the study examined construct relationships across the entire audit institution rather than comparing stratified subgroups, a census invitation approach combined with voluntary participation was implemented. Respondent inclusion criteria required participants to hold an active functional auditor appointment—spanning junior, middle, and senior functional auditor ranks—and to have completed at least one full internal audit assignment within the ministry, whereas non-auditing secretariat personnel and administrative staff were excluded. After formal institutional permission was obtained, electronic questionnaires were distributed through official inspectorate communication channels with explicit assurances of respondent anonymity to mitigate evaluation apprehension and social desirability bias (Podsakoff et al., 2024). Mandatory response validation was configured in the electronic survey instrument to prevent item-level missing values, and submitted records were screened for straight-lining patterns and extreme multivariate outliers prior to estimation (Ringle et al., 2023). Of the 214 functional auditors invited, 139 returned complete and valid responses ($n = 139$), resulting in a 64.95% response rate. An a priori statistical power analysis conducted in G*Power 3.1 for a fixed-effects linear multiple regression model (R^2 deviation from zero, $\alpha = 0.05$, statistical power $= 0.80$, medium effect size $f^2 = 0.15$, and four predictors) required at least 85 observations (Cohen, 1988; Faul et al.,

2009). The final sample of 139 auditors therefore exceeded the minimum sample requirement for PLS-SEM estimation (Hair et al., 2022; Ringle et al., 2023).

Each of the five latent constructs—one endogenous target variable, two exogenous variables, and two mediating variables—was modeled reflectively and measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Every construct comprised 10 statement items distributed across five conceptual indicators, yielding 50 measurement items adapted from prior studies to match Indonesian public sector auditing standards. The dependent construct, Internal Audit Effectiveness (IAE1–IAE10), captured finding quality, audit objective achievement, strategic value added, internal control improvement, and recommendation implementation (Gaosong & Leping, 2021). Along the structural-technological pathway, the exogenous construct Top Management Commitment (TMC1–TMC10) measured strategic support, resource allocation, protection of audit independence, follow-up enforcement, and control culture (Memon et al., 2022). The technological mediating construct, Information Technology Utilization (ITU1–ITU10), covered audit software usage, electronic data analytics, process automation, digital data access, and system security and reliability (Alzeban et al., 2026; Laudon et al., 2023; Tegeler et al., 2025). Along the communication-behavioral pathway, the exogenous construct Audit Communication (AC1–AC10) assessed message clarity, timeliness, information openness, two-way dialogue, and report quality (Colbert, 2002). The behavioral mediating construct, Auditee Engagement (AE1–AE10), measured active participation, fieldwork cooperation, readiness to provide data, positive attitude toward auditing, and honest disclosure of control weaknesses (Parker et al., 2021).

Data analysis was executed using SmartPLS 4 software following a two-stage assessment protocol (Guenther et al., 2023; Hair et al., 2022; Ringle et al., 2024). Prior to path estimation, Common Method Bias (CMB) was evaluated via the Full Collinearity Variance Inflation Factor (VIF ≤ 3.3), complementing ex-ante procedural separation of construct blocks in the questionnaire (Kock, 2015; Podsakoff et al., 2024). Following descriptive profiling, the reflective measurement model (outer model) was evaluated in the first stage for convergent validity (outer loadings ≥ 0.70 and Average Variance Extracted [AVE] ≥ 0.50), internal consistency reliability (Cronbach's alpha, Dijkstra-Henseler's ρ_A, and composite reliability $\rho_C \geq 0.70$), and discriminant validity using the Fornell-Larcker criterion, indicator cross-loadings, and the Heterotrait-Monotrait Ratio (HTMT < 0.85) (Fornell & Larcker, 1981; Guenther et al., 2023; Henseler et al., 2015). In the second stage, structural model (inner model)

quality was assessed through lateral collinearity (inner VIF ≤ 3.0), in-sample explanatory power (R^2), predictor effect size (f^2), and out-of-sample predictive relevance ($Q^2_{\text{predict}} > 0$) via the PLSpredict procedure (Sharma et al., 2024; Shmueli et al., 2019). Direct and mediating hypotheses were tested using 5,000-subsample non-parametric bootstrapping (two-tailed $\alpha = 0.05$, $t > 1.96$, $p < 0.05$) (Becker et al., 2023) and classified into mediation types according to Zhao et al. (2010). Finally, an Importance-Performance Map Analysis (IPMA) was conducted by contrasting unstandardized total effects (importance) with rescaled latent variable scores from 0 to 100 (performance) to identify priority areas for institutional improvement (Hauff et al., 2024; Ringle & Sarstedt, 2016).

Result

Demographic profiling of the 139 participating functional internal auditors indicated a balanced gender distribution comprising 52.52% female and 47.48% male respondents, with the majority of personnel (78.42%) aged between 23 and 42 years. In terms of formal academic qualifications, over 91% of the surveyed auditors held university degrees, distributed between Bachelor's (61.87%) and Master's (29.50%) credentials. Regarding institutional tenure, 57.55% of the participants reported more than 10 years of service within the ministry, confirming that the empirical observations reflected established operational familiarity with public sector internal oversight procedures, audit fieldwork execution, and ministerial governance structures.

Descriptive statistical analysis across the five latent constructs identified a systematic divergence between formal procedural compliance and substantive operational capability (Table 1). At the construct level, Top Management Commitment and Audit Communication recorded the highest mean perception scores, followed by Internal Audit Effectiveness and Auditee Engagement, whereas Information Technology Utilization registered the lowest overall mean adjacent to the scale midpoint of 3. Disaggregated item-level inspection further clarified this structural pattern. Within Top Management Commitment and Audit Communication, executive emphasis on regulatory compliance and clarity of audit scope alongside opportunities for clarification both recorded an identical peak item mean of 3.856. Conversely, auditors' perceived autonomy to report findings without leadership pressure recorded the lowest score within the commitment construct (M = 3.496), and timely audit report delivery scored lowest within communication (M = 3.173). A parallel distribution emerged within Internal Audit Effectiveness and Auditee Engagement: administrative indicators such as timely follow-up completion (M = 3.813) and logistical fieldwork cooperation (M = 3.835)

exceeded substantive indicators such as actual improvements in unit control procedures (M = 3.223) and auditees' willingness not to conceal control weaknesses (M = 3.072). Within Information Technology Utilization, three core digital capability items fell below the scale midpoint: audit process automation (M = 2.525), application integration (M = 2.604), and electronic data analytics (M = 2.712).

Evaluation of the reflective measurement model (outer model) confirmed that all cinco latent constructs satisfied established psychometric criteria for convergent validity and internal consistency reliability (Guenther et al., 2023; Hair et al., 2022; Sarstedt et al., 2024), as summarized in Table 1. Standardized outer loadings for all 50 measurement items exceeded the minimum 0.70 threshold, justifying the retention of the complete indicator set without item purification. Average Variance Extracted (AVE) values across all constructs surpassed the 0.50 benchmark, demonstrating that each latent variable accounted for more than half of the variance in its assigned indicators. Furthermore, internal consistency reliability was established across three complementary estimators, with Cronbach's alpha, Dijkstra-Henseler's rho_A, and composite reliability (rho_C) coefficients all exceeding the 0.70 criterion and remaining within the 0.92 to 0.96 range.

Table 1. Descriptive Statistics, Convergent Validity, and Construct Reliability Summary

Construct	Mean (*M*)	Outer Loading Range	AVE	Alpha / CR (rho_C)
Audit Communication (AC)	3.675	0.708 – 0.849	0.604	0.927 / 0.938
Auditee Engagement (AE)	3.506	0.704 – 0.839	0.589	0.925 / 0.935
Internal Audit Effectiveness (IAE)	3.588	0.747 – 0.817	0.614	0.930 / 0.941
Information Technology Utilization (ITU)	3.034	0.723 – 0.826	0.598	0.925 / 0.937
Top Management Commitment (TMC)	3.697	0.762 – 0.867	0.677	0.947 / 0.954

Source: Primary data processed with SmartPLS 4 (2026). Note: All ρ_A values also exceeded 0.70 (AC = 0.939, AE = 0.944, IAE = 0.932, ITU = 0.930, TMC = 0.948).

Discriminant validity was verified through three diagnostic procedures to ensure that each construct captured a distinct conceptual domain (Fornell & Larcker, 1981; Henseler et al., 2015), as reported in Table 2. First, under the Fornell-Larcker criterion, the square root of the AVE for each construct exceeded its bivariate correlations with all other constructs in the model. Second, indicator cross-loading matrices demonstrated that all items loaded highest on

their theoretically assigned constructs, maintaining a minimum cross-loading differential margin of 0.326 over alternative latent variables. Third, all Heterotrait-Monotrait Ratio (HTMT) values remained below the conservative 0.85 cutoff, confirming empirical distinctiveness across the structural-technological and communication-behavioral dimensions (Guenther et al., 2023; Henseler et al., 2015). In addition, Full Collinearity Variance Inflation Factor (VIF) values remained below the 3.3 threshold (Kock, 2015), indicating that common method variance did not bias the parameter estimates.

Table 2. Discriminant Validity (Fornell-Larcker and HTMT) and Full Collinearity VIF Results

Construct	**AC**	**AE**	**IAE**	**ITU**
Panel A: Fornell-Larcker Criterion (Diagonal = √AVE)				
Audit Communication (AC)	0.777			
Auditee Engagement (AE)	0.258	0.767		
Internal Audit Effectiveness (IAE)	0.324	0.202	0.783	
Information Technology Utilization (ITU)	0.213	0.162	0.437	0.773
Top Management Commitment (TMC)	0.353	0.182	0.426	0.298
Panel B: Heterotrait-Monotrait Ratio (HTMT < 0.85) & Full Collinearity VIF				
Audit Communication (Full VIF = 1.217)	-			
Auditee Engagement (Full VIF = 1.070)	0.241	-		
Internal Audit Effectiveness (Full VIF = 1.422)	0.339	0.194	-	
Information Technology Utilization (Full VIF = 1.250)	0.234	0.171	0.456	-
Top Management Commitment (Full VIF = 1.326)	0.373	0.186	0.450	0.316

Source: Primary data processed with SmartPLS 4 (Ringle et al., 2024). In Panel A, diagonal values for AC through ITU represent the square root of AVE, while the square root of AVE for TMC on the fifth diagonal is 0.823. In Panel B, off-diagonal values report pairwise HTMT ratios.

Structural model (inner model) quality metrics and Importance-Performance Map Analysis (IPMA) outputs are detailed in Table 3. Lateral collinearity assessment indicated that all inner VIF values remained below the 3.0 benchmark (Becker et al., 2023; Hair et al., 2022), confirming that multicollinearity did not distort the structural path coefficients. In terms of in-sample explanatory power, the four antecedent constructs jointly accounted for nearly one-third of the variance in Internal Audit Effectiveness, whereas single-predictor exogenous paths

explained a smaller proportion of variance in Information Technology Utilization and Auditee Engagement. Decomposition of predictor effect sizes (f2) demonstrated that Information Technology Utilization exerted the largest individual contribution to the R2 value of Internal Audit Effectiveness, followed by Top Management Commitment, whereas Audit Communication and Auditee Engagement yielded minimal effect sizes. Out-of-sample predictive assessment via the PLSpredict procedure yielded positive Q2predict statistics across all three endogenous constructs, confirming that the model outperformed naive indicator-mean benchmarks (Gudergan et al., 2025; Sharma et al., 2024; Shmueli et al., 2019).

Table 3. Structural Model Evaluation and IPMA Summary

Construct / Structural Path	Inner VIF	Effect Size (f^2)	R^2 / Adj. R^2	IPMA (Imp. / Perf.)
Top Management Commitment (TMC)	1.221 (→IAE)	0.086 (→IAE)	Exogenous	0.363 / 58.900
TMC → Information Technology Utilization	1.000 (→ITU)	0.098 (→ITU)	-	-
Information Technology Utilization (ITU)	1.123 (→IAE)	0.129 (→IAE)	0.089 / 0.082 (0.067)	0.315 / 50.110
Audit Communication (AC)	1.208 (→IAE)	0.025 (→IAE)	Exogenous	0.162 / 67.412
AC → Auditee Engagement	1.000 (→AE)	0.072 (→AE)	-	-
Auditee Engagement (AE)	1.092 (→IAE)	0.006 (→IAE)	0.067 / 0.060 (0.042)	0.065 / 62.749
Internal Audit Effectiveness (IAE)	-	-	0.312 / 0.292 (0.179)	Target Construct

Source: Primary data processed with SmartPLS 4 (Ringle et al., 2024). Out-of-sample predictive relevance (Q2predict) values were 0.179 for IAE, 0.067 for ITU, and 0.042 for AE. For the IPMA matrix, the sample mean importance threshold was 0.226 and the mean rescaled performance threshold was 59.792.

Non-parametric bootstrapping results (5,000 subsamples, two-tailed alpha = 0.05, critical t-statistic = 1.96) for the direct hypotheses (H1–H6) and mediating pathways (H7–H8) are presented in Table 4 and illustrated in Figure 1 (Becker et al., 2023; Zhao et al., 2010). Empirical estimates revealed a clear structural divergence between the two hypothesized pathways. Along the structural-technological pathway, all four hypotheses received statistical support. Top Management Commitment exerted a positive and statistically significant direct effect on Internal Audit Effectiveness (supporting H1) and on Information Technology Utilization (supporting H3). Information Technology Utilization operated as the primary direct

determinant of Internal Audit Effectiveness (supporting H4) and transmitted a positive, statistically significant indirect effect from Top Management Commitment to Internal Audit Effectiveness (supporting H7). Because both the direct path (H1) and the mediated path (H7) were positive and significant, Information Technology Utilization functioned as a complementary partial mediator (Zhao et al., 2010). Conversely, along the communication-behavioral pathway, Audit Communication exerted a positive and significant direct effect on Auditee Engagement (supporting H5). However, neither Audit Communication (rejecting H2) nor Auditee Engagement (rejecting H6) demonstrated a statistically significant direct effect on Internal Audit Effectiveness, and the indirect path through Auditee Engagement remained non-significant (rejecting H8, classified as no-effect nonmediation).

Table 4. Direct and Indirect (Mediation) Hypothesis Testing Results

Hypothesis & Structural Path	**Original Sample (*β*)**	**Sample Mean (*M*) / *SD***	***t*-Statistics (|O/*SD*|)**	***p*-Values (Decision)**
Panel A: Direct Effects				
H1: TMC → IAE	0.269	0.267 / 0.083	3.252	0.001 (Supported)
H2: AC → IAE	0.145	0.145 / 0.087	1.675	0.094 (Rejected)
H3: TMC → ITU	0.298	0.308 / 0.084	3.561	0.000 (Supported)
H4: ITU → IAE	0.315	0.320 / 0.078	4.061	0.000 (Supported)
H5: AC → AE	0.258	0.287 / 0.067	3.882	0.000 (Supported)
H6: AE → IAE	0.065	0.070 / 0.084	0.774	0.439 (Rejected)
Panel B: Indirect (Mediating) Effects				
H7: TMC → ITU → IAE	0.094	0.099 / 0.037	2.506	0.012 (Supported*)
H8: AC → AE → IAE	0.017	0.020 / 0.024	0.687	0.492 (Rejected**)

*Source: Primary data processed with SmartPLS 4 (Ringle et al., 2024). Note: *Complementary partial mediation; No-effect nonmediation based on the typology of Zhao et al. (2010).*

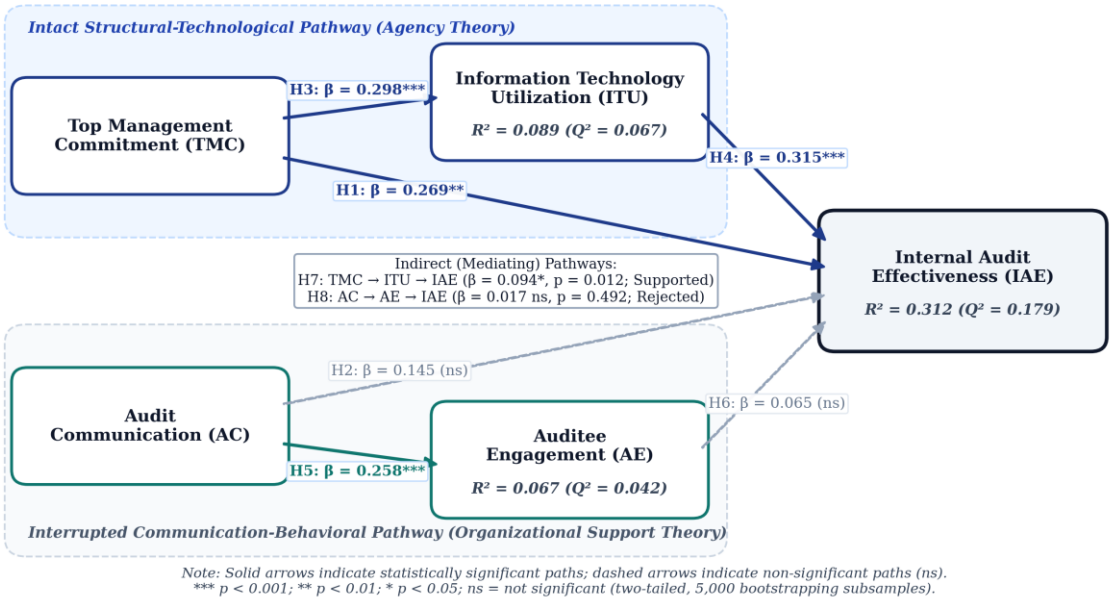


Figure 1. Estimated Dual-Pathway Structural Model with Path Coefficients and Explanatory Power

Source: Primary data processed with SmartPLS 4 (Ringle et al., 2024).

Complementing the structural path estimates, the IPMA priority matrix (Table 3 and Figure 2) evaluated unstandardized total effects (importance) against rescaled latent variable scores (performance) to guide resource allocation (Hauff et al., 2024; Ringle & Sarstedt, 2016). The distribution of constructs across the four quadrants demonstrated an inverse alignment between causal importance and perceived organizational performance. Top Management Commitment and Information Technology Utilization both exceeded the sample mean importance threshold yet registered performance scores below the sample mean, positioning both structural-technological drivers in Quadrant IV (Concentrate Here / Priority Zone). Conversely, Audit Communication and Auditee Engagement achieved above-average perceived performance scores while exhibiting below-average total importance toward Internal Audit Effectiveness, placing both communication-behavioral constructs in Quadrant II (Possible Overkill).

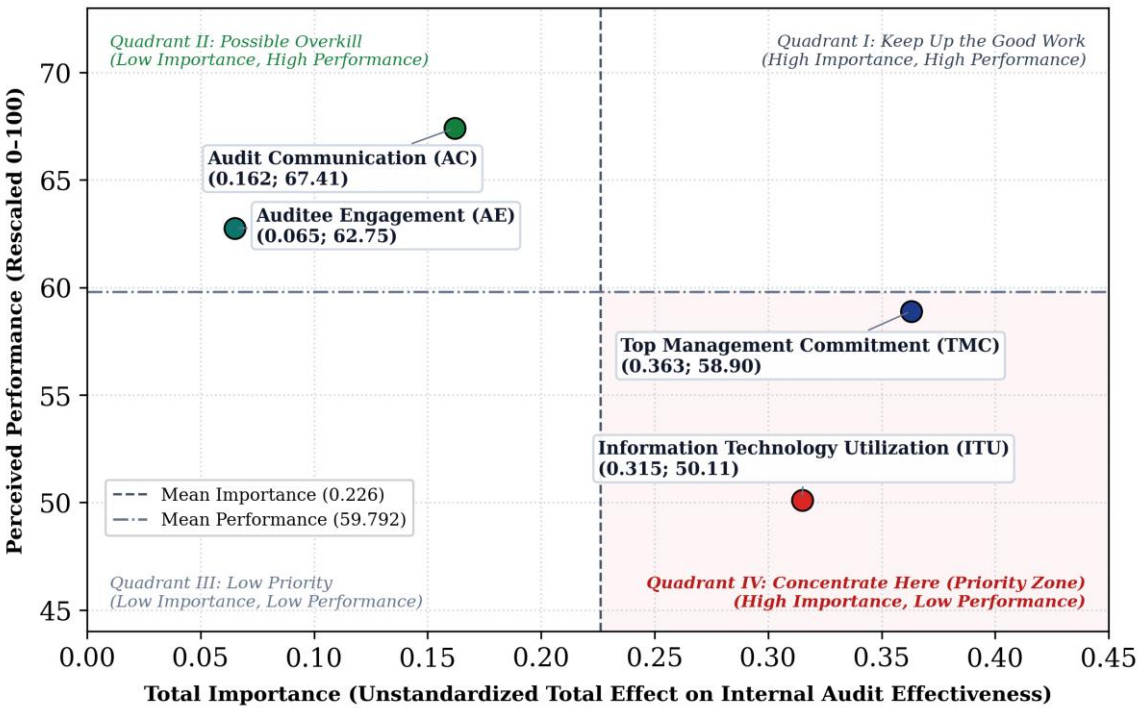


Figure 2. Importance-Performance Map Analysis (IPMA) Priority Matrix for Internal Audit Effectiveness

Source: Primary data processed with SmartPLS 4 (Ringle et al., 2024).

Discussion

The empirical findings indicate a structural divergence between the structural-technological pathway and the communication-behavioral pathway in accounting for internal audit effectiveness within an Indonesian central government ministerial inspectorate. The statistical support for H1 ($\beta = 0.269, t = 3.252, p = 0.001$) confirms that Top Management Commitment directly strengthens Internal Audit Effectiveness and registers the highest total importance (0.363) in the Importance-Performance Map Analysis (IPMA) model. From an agency theory perspective, senior leadership facilitates internal monitoring by granting formal institutional authority, allocating sufficient operational budgets and personnel, safeguarding auditor independence, and enforcing audit recommendation follow-ups to mitigate information asymmetry and constrain agent opportunism (Eisenhardt, 1989; Jensen & Meckling, 1976; Turetken et al., 2020). Organizational support theory provides a complementary explanation: visible commitment from top executives signals that the organization values auditors' professional contributions, which reinforces their dedication to rigorous assurance activities (Eisenberger et al., 1986; Kurtessis et al., 2017). These results align with prior empirical studies by Turetken et al. (2020), Jung (2022), Alqudah et al. (2023), and Abdelrahim and Al-Malkawi (2025), which demonstrate that executive backing enables internal audit units to transition from

routine regulatory verification toward strategic governance enhancement. Nevertheless, because auditors' perceived autonomy to report findings without leadership pressure recorded the lowest mean score among the commitment indicators ($M = 3.496$), executive involvement requires formal institutional safeguards to preserve auditor objectivity.

The empirical support for H3 ($\beta = 0.298, p = 0.000$), H4 ($\beta = 0.315, p = 0.000$), and H7 ($\beta = 0.094, p = 0.012$) establishes an intact structural-technological mediation pathway in which Information Technology Utilization partially channels the effect of Top Management Commitment into Internal Audit Effectiveness through complementary partial mediation (Zhao et al., 2010). Executive commitment significantly increases the deployment of digital audit instruments (H3), which subsequently functions as the strongest direct determinant of Internal Audit Effectiveness (H4) and transmits leadership support into audit performance outcomes (H7). Within the frameworks of agency theory and organizational support theory, executive commitment materializes as tangible instrumental support when ministerial leadership finances integrated audit management software, electronic data analytics, and automated testing workflows (Laudon et al., 2023; Rhoades & Eisenberger, 2002). These technological capabilities enable internal auditors to transition from limited sample-based inspections to full-population transaction analysis, continuous risk monitoring, fraud detection, and verifiable digital audit trails (Alzeban et al., 2026; Betti et al., 2021; Bonrath & Eulerich, 2024; Eulerich et al., 2023; Tegeler et al., 2025). Consistent with the findings of Otia and Bracci (2022), Al Zobi and Jarah (2023), Lowry et al. (2025), and Que et al. (2025), digital process innovation enhances internal oversight capacity. The modest variance explained in Information Technology Utilization ($R^2 = 0.089$) reflects the parsimonious model specification—in which technology utilization was predicted solely by executive commitment—suggesting that operational adoption also depends on broader institutional factors such as information technology infrastructure readiness and auditor digital competency. Because the IPMA matrix positions Information Technology Utilization in Quadrant IV (high importance $= 0.315$, low performance $= 50.110$), expanding audit digitalization represents the primary operational priority for inspectorate reform (Hauff et al., 2024; Ringle & Sarstedt, 2016).

Conversely, the communication-behavioral pathway exhibited a structural discontinuity at its second stage. The statistical support for H5 ($\beta = 0.258, t = 3.882, p = 0.000$) indicates that clear, transparent, and two-way Audit Communication significantly improves Auditee Engagement during fieldwork, which is consistent with organizational support theory and prior research by Colbert (2002), Proell (2022), Clor-Proell et al. (2023), and Brivot et al. (2024).

When internal auditors clarify audit objectives and provide opportunities for dialogue, audited units perceive procedural fairness and cooperate more readily during fieldwork engagements, although the modest explained variance in Auditee Engagement ($R^2 = 0.067$) suggests that unit-level bureaucratic routines and prior audit history also influence auditee behavior. However, the rejection of H2 ($\beta = 0.145, p = 0.094$), H6 ($\beta = 0.065, p = 0.439$), and H8 ($\beta = 0.017, p = 0.492$, no-effect nonmediation) demonstrates that neither Audit Communication nor Auditee Engagement directly or indirectly increases Internal Audit Effectiveness. Because an indirect causal sequence depends on the statistical integrity of both constituent links, the negligible effect size between Auditee Engagement and Internal Audit Effectiveness ($f^2 = 0.006$) attenuates the behavioral mediation pathway despite the positive association between communication and fieldwork cooperation.

Rather than representing an estimation anomaly, this interrupted behavioral pathway identifies an institutional boundary condition when contrasted with prior studies linking auditor-auditee communication and client participation to audit effectiveness (Christensen, 2022; Dela Cruz et al., 2025; Odilov, 2025; Parker et al., 2021; Sarens & De Beelde, 2006; Umutoni, 2025). Transmitting audit information during an engagement is analytically distinct from enforcing corrective action, just as procedural cooperation during fieldwork differs from substantive internal control reform after the audit report is issued. Within Indonesian central government ministries, formal communication stages—including entry briefings, written finding confirmations, and exit conferences—alongside auditee cooperation in supplying supporting documents operate as mandatory statutory routines under public sector auditing standards. In hierarchical, compliance-oriented bureaucracies, auditee participation frequently remains confined to formal administrative compliance rather than evolving into substantive co-production and candid self-correction (Cantù et al., 2025; Dela Cruz et al., 2025; Kiral & Karabacak, 2020). The item-level descriptive results corroborate this mechanism: audited units rated relatively high on facilitating fieldwork logistics ($M = 3.835$), but scored substantially lower on willingness not to conceal underlying control weaknesses ($M = 3.072$) and on actual improvements in unit control procedures ($M = 3.223$). Furthermore, post-audit control remediation requires formal structural authority, budget reallocations, and inter-unit coordination that interpersonal communication alone cannot secure.

The broader analytical contribution of this study lies in the convergence of three empirical layers that jointly explain the public sector governance paradox documented in national and international oversight reports (Badan Pemeriksa Keuangan Republik Indonesia

[BPK RI], 2024, 2025; Organisation for Economic Co-operation and Development [OECD], 2025; World Bank, 2025). First, at the perceptual layer, descriptive statistics indicate that internal auditors evaluate procedural compliance and logistical fieldwork cooperation favorably, but assign lower ratings to substantive control improvements and advanced digital audit utilization. Second, at the managerial priority layer, the IPMA matrix identifies a resource allocation mismatch: relational constructs register high perceived performance scores despite low causal importance (Quadrant II), whereas the structural and technological determinants with the largest total effects lag in performance (Quadrant IV). Third, at the causal layer, the PLS-SEM path estimates confirm that substantive internal audit effectiveness is driven and mediated exclusively by the structural-technological pathway. Taken together, these three layers clarify why near-perfect administrative follow-up completion rates coexist with recurring external audit findings in public procurement, budget execution, and asset management (BPK RI, 2024, 2025). The ministerial oversight system performs adequately on the administrative surface of statutory communication and document verification, while the executive enforcement mechanisms and digital monitoring infrastructure required to resolve systemic control weaknesses remain underutilized. Addressing this governance gap requires reorienting institutional incentives beyond administrative checklists by integrating continuous digital audit analytics, establishing psychological safety for transparent root-cause disclosure during fieldwork, and linking unit executives' performance appraisals directly to verified post-audit internal control improvements.

Conclusion

Addressing the dual-pathway research problem, this study concludes that substantive internal audit effectiveness within the examined Indonesian central government ministry is driven by the structural-technological pathway rather than the communication-behavioral pathway. Top management commitment directly strengthens internal audit effectiveness and facilitates information technology utilization, which functions as the primary direct determinant and a complementary partial mediator of executive support. Conversely, although constructive audit communication fosters auditee engagement during fieldwork, neither communication routines nor fieldwork cooperation directly or indirectly generates substantive post-audit internal control improvements. Resolving the public sector governance paradox between administrative follow-up completion and recurring audit findings therefore requires prioritizing executive enforcement authority and integrated digital audit infrastructure over routine procedural communication.

Required Statements

CRediT authorship contribution statement: H.H.: Conceptualization, Methodology, Software, Formal analysis, Investigation, Data curation, Writing – original draft. **M.N.:** Conceptualization, Methodology, Validation, Supervision, Writing – review and editing. **I.P.:** Methodology, Validation, Resources, Supervision, Project administration, Writing – review and editing.

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Declaration of competing interest: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability: Due to institutional oversight confidentiality protocols at the participating Indonesian central government ministry, the raw survey dataset cannot be shared publicly. The anonymized dataset and SmartPLS 4 estimation files that support the findings of this study are available from the corresponding author (hendrico156@gmail.com) upon reasonable request.

Ethics statement: Formal institutional permission for data collection was obtained from the Inspectorate General of the participating Indonesian central government ministry under the academic supervision of the Faculty of Economics and Business, State University of Jakarta. All participating internal auditors provided voluntary informed consent prior to completing the electronic questionnaire, and all responses were fully anonymized to protect respondent confidentiality.

Declaration of generative AI and AI-assisted technologies in the writing process: During the preparation of this work, the authors used generative AI tools to assist with academic language editing and readability refinement. After using these tools, the authors reviewed, verified, and edited the content as needed and take full responsibility for the integrity and content of the published article.

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