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Internal Audit Effectiveness in the Public Sector: Contrasting Mediation Pathways of Information Technology Utilization and Auditee Engagement

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Abstract: This study examines the determinants of internal audit effectiveness in a central government internal audit institution in Indonesia, integrating a structural-technological pathway and a behavioral-communication pathway within a single model. It tests the effects of top management commitment and audit communication on internal audit effectiveness, both directly and through the mediation of information technology utilization and auditee engagement. Using structural equation modeling with partial least squares (SEM-PLS) on 139 usable responses from 214 targeted auditors (a 64.95 percent response rate), the study finds that five of the eight hypotheses are supported. Top management commitment significantly affects both effectiveness and technology utilization; technology utilization is the strongest direct driver of effectiveness and significantly mediates the effect of top management commitment (complementary mediation). In contrast, audit communication has no direct effect on effectiveness, auditee engagement has no effect, and the mediation through auditee engagement is absent (no-effect nonmediation). Effectiveness is therefore driven by an intact structural-technological pathway rather than a broken behavioral-communication pathway. The findings empirically explain the paradox in which the high administrative completion of audit recommendations coexists with recurring findings, and contribute by demonstrating two parallel mediation pathways that yield opposite conclusions.

Keywords: internal audit effectiveness; top management commitment; information technology utilization; auditee engagement; SEM-PLS; public sector

BACKGROUND

The internal audit function holds a strategic role in safeguarding accountability, governance, and organizational improvement within the public sector. In the institution under study, a central government internal audit body in Indonesia, this function is carried out by a government internal supervisory body that reports to the leadership of the ministry it serves. The effectiveness of internal audit is measured not merely by procedural compliance but by the

extent to which auditing produces sustained governance improvement (Lenz & Hahn, 2015; Turetken et al., 2020).

The problem motivating this study stems from a concrete paradox. According to the institution, internal performance reports, the proportion of audit recommendations from the national external state auditor that were fully followed up reached 100 percent against a 95 percent target in both 2024 and 2025, equivalent to performance achievements of 105 percent in 2024 and 108.11 percent in 2025. Such high completion rates indicate that, administratively, audit recommendations have been fulfilled. Nevertheless, findings of a similar substance continue to recur from year to year, signaling a gap between the procedural completion of recommendations and substantive governance improvement. This paradox of being administratively compliant yet substantively recurring is the point of departure for this study, because it shows that internal audit effectiveness cannot be assessed merely from the quantitative achievement of follow-up.

Prior studies have examined the determinants of internal audit effectiveness extensively, yet two gaps remain. First, the structural-technological determinants and the behavioral-communication determinants have largely been studied in isolation rather than within a single integrative model that allows their relative contributions to be compared. Second, most studies test a single mediation mechanism, whereas the question of how two parallel mediating mechanisms behave when modeled simultaneously remains underexplored, particularly in public-sector settings that have been studied far less than the private sector. This study addresses both gaps by testing two parallel mediation pathways within one model and contrasting their outcomes.

Accordingly, this study builds an integrative model grounded in two theoretical perspectives. Agency theory explains internal audit as a monitoring mechanism that reduces information asymmetry and agency conflict between principal and agent (Jensen & Meckling, 1976; Eisenhardt, 1989), thereby positioning the structural support of leadership and supervisory capability as determinants of effectiveness. Organizational support theory explains that perceptions of organizational support shape members' attitudes and behavior (Eisenberger et al., 1986; Rhoades & Eisenberger, 2002), thereby positioning communication quality and engagement as a behavioral pathway. Integrating the two enables the simultaneous testing of a structural-technological pathway, represented by top management commitment and

information technology utilization, and a behavioral-communication pathway, represented by audit communication and auditee engagement.

Based on this framework, the study proposes eight hypotheses spanning the two pathways, whose detailed theoretical development is presented in the next section. The novelty of this study lies in revealing that these two structurally symmetric mediation pathways, modeled in parallel, can produce diametrically opposite conclusions, offering an empirical explanation of the administrative-versus-substantive paradox in a public-sector audit setting.

THEORETICAL FRAMEWORK

This study rests on the integration of agency theory and organizational support theory. Agency theory frames the relationship between the principal and the agent, in which the delegation of authority creates information asymmetry and the potential for goal divergence (Jensen & Meckling, 1976; Eisenhardt, 1989). Internal audit operates as a monitoring mechanism that mitigates these problems by providing assurance and evidence-based recommendations. From this perspective, top management commitment represents the principal's structural support, providing legitimacy, independence, resources, and the enforcement of follow-up, while information technology strengthens the monitoring capacity by enabling more comprehensive and timely oversight (Turetken et al., 2020; Eulerich, 2023).

Organizational support theory complements this view by explaining the behavioral mechanism. When members of an organization perceive genuine organizational support, they reciprocate with greater engagement and professional responsibility (Eisenberger et al., 1986; Rhoades & Eisenberger, 2002). Within the audit context, the quality of audit communication reflects relational support that fosters auditee engagement, which in turn is theorized to channel that support into substantive follow-up. The two theories jointly motivate a model in which effectiveness is shaped through both a structural-technological pathway and a behavioral-communication pathway, allowing this study to test which pathway actually drives effectiveness in a public-sector bureaucracy.

Internal audit effectiveness in this study is conceptualized as the extent to which auditing produces accurate findings, assurance and consulting value, improvements in internal control, and the substantive implementation of recommendations, rather than the mere procedural completion of audit activities. This conceptualization is central to interpreting the results, because it distinguishes the quality of audit processes from the capacity to enforce substantive change.

From these perspectives, the study develops its hypotheses along two pathways. On the structural-technological pathway, top management commitment is expected to strengthen internal audit effectiveness directly, because leadership support supplies the legitimacy, resources, and enforcement that internal audit requires to function (Alzeban & Gwilliam, 2014; Turetken et al., 2020) (H1), and to strengthen information technology utilization, since the adoption of audit technology depends on leadership investment and digitalization policy (Garcia-Ortega et al., 2021; Lowry et al., 2025) (H3). Information technology utilization is in turn expected to raise effectiveness by enabling more comprehensive, timely, and risk-based oversight (Eulerich, 2023; Que et al., 2025) (H4), and is therefore hypothesized to mediate the effect of top management commitment on effectiveness (H7).

On the behavioral-communication pathway, audit communication is expected to enhance effectiveness directly by reducing information asymmetry and ensuring that auditees understand findings and recommendations (Sarens & De Beelde, 2006; Oussii & Boulila Taktak, 2018) (H2), and to foster auditee engagement by signaling procedural fairness and relational support (Umutoni & Umutoni, 2025) (H5). Auditee engagement is in turn expected to raise effectiveness on the assumption that engaged auditees implement recommendations substantively (Parker, 2021; Christensen, 2022) (H6), and is therefore hypothesized to mediate the effect of audit communication on effectiveness (H8). The empirical fate of these two symmetric sets of expectations forms the core of the analysis that follows.

METHOD

This study adopts a quantitative approach with an explanatory research design aimed at testing causal relationships among variables. The method is a survey using a structured questionnaire, and the unit of analysis is the individual internal auditor. The research site is a central government internal audit institution in Indonesia, with data collected from February to June 2026.

The population comprised all 214 internal auditors at the institution. A total sampling technique was used, designating the entire population as the research target (Etikan & Bala, 2017). Of the 214 auditors targeted, 139 provided complete and usable responses, yielding a response rate of 64.95 percent. Sample adequacy was evaluated through an a priori power analysis using G*Power with a significance level of 0.05, statistical power of 0.80, a medium effect size of 0.15, and four predictors (Cohen, 1988; Faul et al., 2007, 2009). The resulting

minimum sample requirement was 85 respondents, so the actual sample of 139 exceeded the threshold and was deemed adequate for SEM-PLS estimation.

All variables were measured using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree), with each variable measured through ten indicators adapted from prior literature and contextualized to the research setting. Internal audit effectiveness indicators capture the quality and accuracy of findings, assurance and consulting, organizational benefit, internal-control improvement, and follow-up of recommendations; top management commitment captures leadership commitment, resource provision, auditor independence, follow-up assurance, and a culture of transparency; audit communication captures clarity, timeliness, transparency, two-way dialogue, and report quality; information technology utilization captures the use of audit software, application integration, electronic data analytics, automation, digital access, and system reliability; and auditee engagement captures participation, cooperation, provision of access and documents, timeliness, acceptance, and substantive openness.

Data were analyzed using SEM-PLS with SmartPLS 4. The analysis comprised the evaluation of the measurement model (outer model) through convergent validity, discriminant validity, and construct reliability; the evaluation of the structural model (inner model) through the variance inflation factor, the coefficient of determination, effect size, and predictive relevance; and hypothesis testing through a bootstrapping procedure with 5,000 subsamples at a five percent significance level. As supplementary analysis, an importance-performance map analysis (IPMA) was conducted with internal audit effectiveness as the target construct.

RESULT

Respondent Characteristics and Descriptive Statistics

The respondents comprised 139 internal auditors with a relatively balanced gender composition (52.52 percent female and 47.48 percent male), predominantly of productive age below 43 years, with more than 90 percent holding higher education at the undergraduate level or above, and a majority having more than ten years of work experience. These characteristics indicate that the assessments derive from competent and experienced respondents in internal audit practice.

Descriptive analysis of the five variables reveals a pattern consistent with the research background. Against an overall indicator mean of 3.500, top management commitment recorded the highest mean (3.697), followed by audit communication (3.675), internal audit

effectiveness (3.588), auditee engagement (3.506), and information technology utilization, which was the lowest (3.034). Information technology utilization not only had the lowest mean but also had all indicators with a median of 3 (undecided), with three indicators on the most advanced dimensions (automation, application integration, and data analytics) falling below the scale midpoint. Moreover, within internal audit effectiveness and auditee engagement, procedural indicators tended to be perceived more favorably than substantive indicators.

Measurement and Structural Model Assessment

All 50 indicators had outer loadings above 0.70 (ranging from 0.704 to 0.867), and all five constructs had average variance extracted above 0.50 (ranging from 0.589 to 0.677), so convergent validity was met. Discriminant validity was satisfied through three criteria: the square root of AVE on the Fornell-Larcker diagonal exceeded all inter-construct correlations (the highest correlation being 0.437 between internal audit effectiveness and information technology utilization); each indicator loaded highest on its parent construct (cross loading); and all heterotrait-monotrait ratios were below 0.85 (ranging from 0.171 to 0.456). Construct reliability was met through composite reliability (0.935 to 0.954), Cronbach's alpha (0.925 to 0.947), and rho_A (0.930 to 0.948), all above 0.70.

In the structural model, all variance inflation factor values fell within 1.000 to 1.221, well below the ideal threshold of 3, so the model is free from collinearity. The coefficient of determination shows that the four determinants jointly explain 31.2 percent of the variance in internal audit effectiveness (R-squared = 0.312), while information technology utilization (R-squared = 0.089) and auditee engagement (R-squared = 0.067) obtained lower values. These values are weak but consistent with the parsimonious model design and the complexity of organizational behavior in the public sector. The largest effect size belongs to the path from information technology utilization to effectiveness (f-squared = 0.129) and the smallest to the path from auditee engagement to effectiveness (f-squared = 0.006). All endogenous constructs showed positive predictive relevance (Q-squared predict of 0.179, 0.067, and 0.042), so the model retains predictive relevance despite its limited explanatory power.

Hypothesis Testing

The results of the direct and indirect effect testing are presented in Table 1, and the estimated structural model is visualized in Figure 1.

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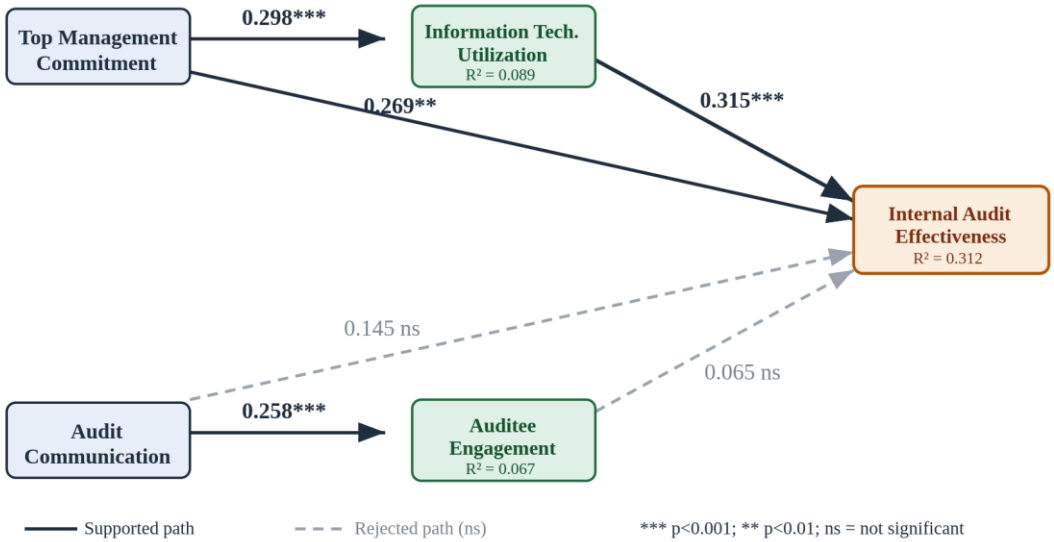


Figure 1. Structural Model with Path Coefficients

Table 1. Hypothesis Testing Results

Hyp.	Path	Coeff.	t-stat	p-value	Decision
H1	TMC → IAE	0.269	3.252	0.001	Supported
H2	AC → IAE	0.145	1.675	0.094	Rejected
H3	TMC → ITU	0.298	3.561	0.000	Supported
H4	ITU → IAE	0.315	4.061	0.000	Supported
H5	AC → AE	0.258	3.882	0.000	Supported
H6	AE → IAE	0.065	0.774	0.439	Rejected
H7	TMC → ITU → IAE	0.094	2.506	0.012	Supported
H8	AC → AE → IAE	0.017	0.687	0.492	Rejected

Note: TMC = top management commitment; AC = audit communication; ITU = information technology utilization; AE = auditee engagement; IAE = internal audit effectiveness.

Of the eight hypotheses, five were supported (H1, H3, H4, H5, H7) and three were rejected (H2, H6, H8). On the direct paths, top management commitment significantly and positively affected internal audit effectiveness (0.269) and information technology utilization (0.298), while information technology utilization was the strongest direct driver of effectiveness (0.315). Audit communication significantly affected auditee engagement (0.258) but not internal audit effectiveness directly (0.145; $p = 0.094$), and auditee engagement did not significantly affect effectiveness (0.065; $p = 0.439$). On the mediation paths, information technology utilization significantly mediated the effect of top management commitment on

effectiveness (0.094; p = 0.012) with a complementary mediation pattern, whereas auditee engagement did not mediate the effect of audit communication on effectiveness (0.017; p = 0.492), reflecting a no-effect nonmediation pattern (Zhao et al., 2010). Taken together, these supported and rejected hypotheses begin to trace two distinct patterns: every path involving top management commitment and information technology utilization is consistently supported, whereas the paths that place audit communication and auditee engagement as direct or mediating drivers of effectiveness are consistently not, a contrast examined in depth in the following section.

Importance-Performance Map Analysis

The IPMA results with internal audit effectiveness as the target are presented in Table 2.

Table 2. Importance-Performance Map Analysis Results

Construct	Importance	Performance
Top Management Commitment	0.363	58.900
Information Technology Utilization	0.315	50.110
Audit Communication	0.162	67.412
Auditee Engagement	0.065	62.749
Mean	**0.226**	**59.792**

Table 2 reveals a systematic misalignment: the ordering of constructs on the relative-importance dimension is almost the reverse of their ordering on the performance dimension. Top management commitment and information technology utilization, which have the highest relative importance, have below-average performance, with information technology utilization recording the lowest performance (50.110) and the widest gap in the model. Conversely, audit communication and auditee engagement, which have the best performance, have the lowest relative importance. This configuration positions the first two constructs as improvement priorities, since they are the areas most decisive for effectiveness yet least realized in practice.

DISCUSSION

The overall results reveal a sharp division between two pathways that produced opposite outcomes. The structural-technological pathway, formed by top management commitment as structural support and information technology utilization as technological capability, worked as an intact and unbroken mechanism: leadership commitment shaped effectiveness both directly and by strengthening technology utilization, which in turn emerged as the strongest direct driver of effectiveness. This pattern is consistent with the literature positioning

management support and technology utilization as determinants of internal audit effectiveness (Turetken et al., 2020; Eulerich, 2023; Que et al., 2025), and with studies finding technology to be the channel that transmits management support into audit performance (Al Zobi & Jarah, 2023; Oussii & Boulila Taktak, 2018).

The behavioral-communication pathway, by contrast, broke precisely at its decisive link. Audit communication successfully fostered auditee engagement, yet that engagement did not carry forward into effectiveness, so a pathway active on the surface failed to reach the final audit outcome. This rejection is not a statistical artifact: the paths involved are free of collinearity, their effect sizes approach zero, and they fall well short of the significance threshold rather than narrowly missing it, so the absence of effect is stable and substantive. The most fundamental explanation lies in the distinction between conveying information and enforcing action, and between perceived and transformative engagement. Communication ensures that auditees understand findings, but understanding is not corrective action; the engagement captured here reflects procedural cooperation rather than substantive commitment to improvement. It should be stated transparently that this procedural-versus-substantive reading is a reasoned interpretation grounded in the character of the indicators rather than a separately measured dimension; nonetheless, it is consistent with the data and with studies cautioning that auditee engagement in hierarchical bureaucracies risks being reduced to formal compliance (Kiral & Karabacak, 2020). Because a mediation chain is only as strong as its weakest link, the collapse of this final link nullifies the entire behavioral mediation despite a robust first link. This null result stands in apparent tension with studies that report audit communication and auditee engagement as significant drivers of effectiveness (Sarens & De Beelde, 2006; Parker, 2021; Christensen, 2022); the divergence, however, is better read as a boundary condition than a contradiction, since those effects tend to emerge where engagement grows from a learning-oriented culture, whereas in a compliance-driven public-sector bureaucracy engagement is more likely to remain procedural.

The strength of these findings lies less in any single result than in the convergence of three independent layers of evidence. The perceptual layer shows procedural aspects perceived more favorably than substantive ones and technology perceived the lowest; the importance-performance layer shows a systematic misalignment in which the most decisive factors have the lowest realized performance; and the causal layer explains that misalignment, namely that the lagging pathway is the one that actually drives effectiveness while the well-performing

pathway does not. Three layers drawn from different analytical sources yet pointing to a single conclusion make the inference difficult to refute.

This convergence answers the paradox that motivated the study. The high administrative completion of follow-up, which even exceeded its target, is intelligible because the best-performing dimensions, audit communication and auditee engagement, are procedural dimensions that proved not to determine substantive effectiveness. The organization has succeeded in precisely the aspects most easily fulfilled in form, yet that success does not reach the roots that determine improvement, while the dimensions that genuinely drive effectiveness, leadership enforcement and supervisory technology, remain the least realized. This is the empirical explanation for being administratively compliant yet substantively recurring: completion that exceeded the target occurred at the procedural level, whereas the substantive governance improvement that truly matters has not been attained.

Theoretically, the study both supports and sharpens the integrated agency and organizational support framework. The structural dimension gains strong support, as leadership support works directly and through technological capability as a monitoring mechanism. The behavioral dimension, however, meets the limits of its applicability in this public-sector bureaucracy, since the engagement expected to channel organizational support did not function as theorized. The distinguishing contribution is the simultaneous test of two mediation pathways that are symmetric in structure yet opposite in outcome, technological mediation operating while behavioral mediation does not, a contrast rarely surfaced in studies that examine only a single mediator. This demonstrates that the behavioral mechanism is contingent on the depth of engagement and the character of the organization, refining a framework largely validated in private-sector settings.

CONCLUSION

This study concludes that internal audit effectiveness in the studied institution is determined not by how well audits are communicated or how cooperatively auditees are engaged, but by how strongly leadership drives oversight and how far technology is utilized. Of the eight hypotheses, five were supported and three were rejected, with a pattern affirming that the structural-technological pathway works intact while the behavioral-communication pathway breaks at the decisive link. This pattern explains the paradox of the high administrative completion of audit recommendations coexisting with persistently recurring findings, since the

success achieved occurs at the level of procedural fulfillment and has not reached substantive enforcement.

Practically, the findings redirect improvement priorities toward the structural and technological foundations of audit. Strengthening leadership commitment in the substantive enforcement of follow-up and accelerating the use of audit technology in its more advanced dimensions promise the greatest impact, because these areas combine the highest importance with the lowest performance; conversely, further polishing communication and engagement, whose performance is already high, offers only marginal returns. The central message for practitioners is therefore to shift effort away from the visibly well-run procedural surface and toward the less-developed foundations that actually determine substantive results. Theoretically, this boundary condition invites future scholarship to treat the behavioral mediation of audit outcomes as context-dependent rather than universal, especially in hierarchical public-sector bureaucracies.

This study has several limitations. The research object is limited to a single institution, so the results cannot be directly generalized to other public-sector audit institutions. Being deliberately parsimonious, the model is restricted to four determinants and therefore leaves most of the variance in effectiveness to factors beyond its scope. The cross-sectional design and the reliance on perception-based data from a single instrument raise the possibility of common method bias; although the uniformly low collinearity statistics, with all variance inflation factors below 3.3, provide some assurance against its severe presence, it cannot be entirely ruled out. The 64.95 percent response rate likewise leaves some potential for nonresponse bias. Future research is encouraged to broaden the determinants and research objects, to use multi-source data or objective performance measures, and to adopt qualitative or longitudinal approaches to probe more deeply why the behavioral-communication pathway does not function as theorized.

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