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Risk Management and Auditor Competence Associated with Risk-Based Internal Audit Effectiveness: Audit Quality as Moderator in an Indonesian SOE

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ABSTRACT

This study examines the associations between risk management and auditor competence with risk-based internal audit (RBIA) effectiveness and tests whether audit quality moderates these relationships in an Indonesian state-owned enterprise (SOE) subholding operating in port and maritime services. A sequential explanatory mixed-methods design was used. Quantitative data were collected from 50 internal auditors and risk management personnel and analyzed using multiple linear and moderated regression analyses. In-depth interviews with 12 informants were conducted to explain these statistical results. The findings show that risk management (β = 0.453, p < 0.001) and auditor competence (β = 0.409, p = 0.001) are positively associated with RBIA effectiveness, while audit quality is not significant direct association. However, audit quality significantly strengthens the relationship between risk management and RBIA effectiveness (B = 0.224, p = 0.041) and between auditor competence and RBIA effectiveness (B = 0.193, p = 0.023). The moderation model increased the explained variance from 42.5% to 55.4%. Qualitative evidence indicates that effective risk governance supports audit prioritization, auditor competence remains critical for interpreting business and risk conditions, and audit quality converts these resources into value-adding outcomes through root cause analysis, realistic recommendations, and active follow-up. This study contributes to the literature by positioning audit quality as a moderator rather than an independent determinant of RBIA effectiveness, while highlighting the need to strengthen risk governance, auditor capability, and audit execution quality in SOE environments.

Keywords: Auditor competence; Audit quality; Internal audit effectiveness; Risk-based internal audit; Risk management;

1. INTRODUCTION

Companies operating in port and maritime services face complex operations and a wide range of risks, including operational, financial, compliance, and strategic ones. This complexity is reflected in the breadth of business processes, the involvement of multiple work units, and several issues requiring attention, such as limitations in integrated risk monitoring, risk assessments that do not fully cover operational and strategic objectives, and risks related to the management of accrued income and overdue receivables. These conditions may result in high-risk areas being insufficiently identified and prioritized during the audit. Therefore, companies need an effective internal audit function capable of comprehensively evaluating risk management, internal control systems, and corporate governance.

Internal audits play a vital role in helping companies achieve their objectives by evaluating risk management, internal control systems, and corporate governance, while also helping ensure that internal controls function properly and that financial reporting is reliable (Kotb et al., 2020). Effective internal audits support the achievement of operational and strategic objectives (Erasmus & Coetzee, 2018) and can be defined as a condition in which the objectives underlying the internal audit function are achieved (Turetken et al., 2020). An effective internal audit function

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continually seeks to fulfill its core purpose of increasing organizational value and performance (Brender et al. 2015).

Internal audit practices have evolved alongside changes in the business environment. Technological developments, accounting scandals, shifts in management perspectives, and changes in business regulations have substantially changed internal audit approaches. In response, risk-based auditing emerged with a focus on identifying business risks and evaluating risk management (Görener, 2017), partly in response to business failures associated with companies' inability to identify risks arising from their strategic initiatives (Grant & Visconti, 2006). The adoption of risk-based internal audits broadens the scope of audit activities to include the integrated monitoring of business processes. At its core, the RBIA strengthens the oversight role of the Internal Audit Unit and extends audit coverage (Görener, 2017).

From a Resource-Based View (RBV) perspective, organizational performance is influenced by a company's ability to develop and utilize strategic resources, including knowledge, experience, and capability (Gerhart & Feng, 2021). Applied to risk-based internal audits, auditor competence represents a strategic resource, while risk management represents an organizational capability that supports risk identification, assessment, and control. Both can contribute to RBIA effectiveness when applied through a high-quality audit process (Khanam 2024).

RBIA effectiveness is influenced by auditor competence, professional development, and risk management system implementation. Louis et al. (2022) and Hegazy et al. (2022) show that talent management and continuous training programs affect audit effectiveness and efficiency positively. Kurniawan et al. (2023), Turetken et al. (2020), and Lois et al. (2020) show that professional training and auditor competence significantly affect RBIA effectiveness. These findings are consistent with competency theory, which suggests that competence enables knowledge and skills to be translated into efficient, effective, and accountable performances (Spencer & Spencer, 1993).

Abidin (2017), Turetken et al. (2020), and Lois et al. (2020) find that risk management implementation significantly affects RBIA effectiveness. In the cybersecurity audit context, Islam et al. (2018) show that the quality of risk management performed by internal audit or risk management functions positively affects cybersecurity audit performance. Callahan and Soileau (2017) found that companies with greater risk management maturity demonstrate higher operating performance than their industry peers. This is consistent with Coetzee and Lubbe (2014), who emphasize that risk-based auditing requires the identification of risks inherent in strategic plans and testing and reporting on the effectiveness of risk-mitigation procedures.

Internal audits also play an important role in evaluating risk management functions and supporting their effectiveness and efficiency through recommendations (Tamimi, 2021). Consequently, internal auditors' knowledge and capabilities in risk management require continuous development (Weekes-Marshall, 2020), while restricting internal audit's role in risk management may become a barrier to corporate sustainability (Abdullatif & Kawuq, 2015).

The relationship between risk management, auditor competence, and RBIA effectiveness may depend on how effectively these factors are applied throughout the audit process, including audit planning, data collection, evidence analysis, development of findings and recommendations, and follow-up monitoring. High audit quality can help translate risk information and auditor competence into relevant, reliable, timely, and value-adding audit outputs. Conversely, low audit quality may reduce the contributions of risk management and auditor competence to audit effectiveness. This argument is consistent with Turetken et al. (2020), Thiéry et al. (2023), and Khulsum et al. (2025), who demonstrate the importance of auditor competence, audit execution, human resources, and audit quality in shaping the audit outcomes. Khulsum et al. (2025) document the moderating role of audit quality in the relationships between competence, time-budget pressure, complexity, and motivation on audit performance.

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Prior research on RBIA effectiveness has generally examined the direct effects of risk management, auditor competence, and audit quality on internal audit effectiveness (IAE). However, studies that consider audit quality as a moderating variable are limited. In addition, quantitative findings alone may not fully explain why and under what conditions the relationships between variables become stronger or weaker. This study addresses both gaps by examining risk management and auditor competence as direct determinants of RBIA effectiveness, and by specifically testing audit quality as a moderator of both relationships. The quantitative analysis is complemented by qualitative analysis through in-depth interviews and document reviews to explore the underlying processes, organizational context, and auditors' experiences in greater depth (Power & Gendron, 2015).

This study was conducted within an Indonesian SOE holding classified as Systemic A. Under this classification, a Systemic A SOE comprises a parent company and its subsidiaries and is characterized by high business complexity. SOEs are required to implement a three-lines-of-defense risk-governance model and integrated governance, develop a risk taxonomy in accordance with ministerial direction, and implement risk management supported by an adequately controlled internal system.

Based on the foregoing, this study aims to examine the relationship between risk management and auditor competence with RBIA effectiveness, test whether audit quality moderates these relationships, and explain why and how these variables are associated with RBIA effectiveness within a Systemic A SOE subholding operating in port and maritime services.

1.1. Hypothesis Development

The existence of risk management within a company reflects management's commitment to adequate structures and procedures for managing risk; implementing risk management increases risk awareness within the company (Coetzee & Lubbe, 2014), and a more advanced risk management system provides a strong foundation for implementing risk-based audit procedures (Abidin, 2017). An effective internal control system aligns management's actions and decisions with stakeholders' interests and supports control and risk assessment and performance monitoring; strong control awareness helps internal audit advise management on risk ownership, the use of control procedures as part of risk mitigation, and the achievement of targets (Woods, 2007).

H1. Risk management is significantly associated with the effectiveness of RBIA.

Auditor competence is related to an individual's knowledge, skills, and traits. Traits are a core, less visible aspect of personality that is difficult to develop through training, whereas skills and knowledge are more readily developed through training (Salman et al., 2020; Spencer and Spencer, 1993). Kurniawan et al. (2023), Turetken et al. (2020), and Lois et al. (2020) show that auditor competence and training programs significantly affect RBIA effectiveness, consistent with the same competency theory reasoning: well-developed knowledge and skills translate into more efficient, effective, and accountable audit performance (Spencer & Spencer, 1993).

H2. Auditor competence is significantly associated with the effectiveness of RBIA.

Audit quality refers to planning and supervision, fieldwork, recording, findings, recommendations, and monitoring of follow-up on audit findings in accordance with applicable audit procedures and standards. Internal auditors are expected to maintain a quality assurance program that covers all aspects of internal audit activity (Francis, 2011; Rajgopal et al., 2021). Prior studies show that audit quality plays a varied role: Turetken et al. (2020) find that audit quality significantly affects RBIA effectiveness; Halim et al. (2014), Aprilia and Hidayah (2023), and Susanto et al. (2020) show that audit quality is shaped by competence; Doloksaribu and Firdaus (2023) and Anon et al. (2020) show that audit quality is shaped by risk management; Samagaio and Felício (2023) identify organizational and individual factors as determinants of internal audit quality specifically; and in other research, audit quality also plays a moderating role

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in the relationship between competence, time-budget pressure, complexity, and motivation on the one hand and audit performance on the other (Khulsum et al., 2025). Given the diversity of roles reported for audit quality in prior research, the following hypothesis is proposed:

H3. Audit quality moderates the association between risk management and auditor competence and RBIA effectiveness.

2. METHOD

2.1 Research Design

This study used a mixed-methods design with a sequential explanatory strategy (Creswell, 2017), which is commonly used when a study emphasizes the quantitative process. First, a quantitative analysis was conducted, followed by a qualitative stage intended to explain the quantitative results in greater detail.

2.2 Population and Sample

The population of this study consists of all internal auditors employed at the subsidiaries of an Indonesian SOE subholding operating in port and maritime services, together with internal auditors and risk management personnel at the subholding company itself, totaling 120 individuals. The population was divided into strata by company, and 2–3 representative internal auditors were purposively selected from the subholding company and each subsidiary, for a total sample of 50 individuals.

Risk management personnel were included alongside internal auditors because, within the three lines of defense structure described in Section 3.5, the risk management function operates as the second line in direct and ongoing collaboration with internal audit as the third line. Risk management officers routinely review the risk-related findings and recommendations of internal audits as part of this coordination. Their inclusion reflects the counterpart perspective on RBIA effectiveness rather than relying solely on self-assessment by internal auditors.

2.3 Data Collection

Primary data were collected directly from the respondents. Quantitative data were collected using a questionnaire adapted from Abidin (2017) and Ta and Doan (2022) following standard survey research procedures (Sekaran & Bougie, 2016).

The questionnaire was adapted from previously published and validated instruments (Abidin, 2017; Ta & Doan, 2022), which have been used to measure comparable constructs in similar organizational settings. Documentation of the specific adaptation procedure, including whether a formal back-translation was performed, whether the instrument was piloted, and how missing responses (if any) were handled, was recorded in the original project files. These files were subsequently lost due to a device failure at the corresponding author's workplace before a backup was made and have not been recovered. Therefore, we are unable to report these procedural details with certainty and discuss them further in the limitations section (Section 4).

2.4 Operational Definitions and Measurement

RBIA effectiveness is the dependent variable, with indicators adopted from Ta and Đoan (2022). Risk management and competence are the independent variables, and audit quality is tested as a moderating variable. The indicators for these variables were adopted from Ta and Doan (2022) and Abidin (2017). Each indicator was measured on a 1–5 Likert scale.

The competence construct combines two personal capability items (experience, X2.1; knowledge and skills, X2.2) with two organizational practice items (existence of a training policy, X2.3; participation in ongoing training, X2.4). These are treated as reflective indicators of a single underlying competence construct on the reasoning that, consistent with competency theory (Spencer & Spencer, 1993), individual competence is both demonstrated through personal

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capability and continuously developed and sustained through organizational training. Therefore, an auditor's competence is expected to be jointly reflected in what the auditor currently knows and does and in the organizational practices that build and maintain that knowledge over time. Empirically, all four items showed uniformly high item-total correlations (0.910–0.949; Table 2), supporting their retention as indicators of one construct, despite their differing surface content.

Table 1 presents the variables, indicators, and sources used to measure each construct in this study.

Table 1. Measurement

Variable	Indicator	Source
RBIA Effectiveness (Y)	Y1. Audit results are delivered to management in a timely manner Y2. Audit recommendations for improving business processes are accurate Y3. Follow-up on internal audit findings is conducted	Ta and Doan (2022)
Risk Management (X1)	X1.1. Existence of clear risk management procedures X1.2. Existence of clear roles, functions, and responsibilities related to risk management X1.3. Risk management implementer's understanding of the Company's strategic objectives X1.4. Existence of risk management addressing risks inherent in business processes and strategic objectives X1.5. Existence of regular and timely risk management reporting	Ta and Doan (2022); Abidin (2017)
Competence (X2)	X2.1. Auditor's sufficient experience to understand and evaluate the company's systems X2.2. Auditor's sufficient knowledge and skills regarding the company's business X2.3. Existence of a policy related to internal auditor training X2.4. Participation in ongoing training	Ta and Doan (2022); Abidin (2017)
Audit Quality (Z) – moderator	Z1. Compliance with audit standards and applicable laws and regulations Z2. Review of operational effectiveness and efficiency by internal auditors Z3. Review of financial reporting reliability and integrity by internal auditors Z4. Evaluation of fraud risk and fraud risk management efforts Z5. Evaluation of risk management effectiveness by internal auditors Z6. Evaluation of internal control effectiveness by internal auditors	Ta and Doan (2022); Abidin (2017)

2.5 Quantitative Data Analysis

The hypotheses were tested using multiple linear regression, estimated by ordinary least squares in IBM SPSS. The associations between risk management and competence with RBIA effectiveness were estimated using the following model:

$$Y = \beta_0 + \beta_1 X1 + \beta_2 X2 + \beta_3 Z + \varepsilon$$

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Item validity was assessed using the Pearson correlation between each item's score and its construct's total score (item-total correlation), and reliability was assessed using Cronbach's alpha, with a minimum threshold of 0.70 (Hair et al., 2010). Before hypothesis testing, classical assumption tests were conducted: normality (Kolmogorov–Smirnov and Shapiro–Wilk tests on the regression residuals), multicollinearity (tolerance and VIF), heteroskedasticity (Glejser test), and autocorrelation (Durbin–Watson).

Each construct's score was computed as the respondent-level mean of its indicator items. For example, the five risk management items were averaged into a single risk management score per respondent, yielding a composite on the original 1–5 Likert scale for use in the regression equations. This description reflects our best reconstruction based on the methodological documentation of the thesis, which refers to mean-centering "the variable's average value," and on the magnitude of the reported coefficients and intercepts, which are interpretable only on a 1–5 scale rather than a summed 5–25-type scale. The original item-level dataset was subsequently lost (see Section 4), and the description could not be independently reverified against the raw data.

The moderating role of audit quality (H3) is tested using moderated regression analysis (MRA). Risk management, competence, and audit quality were mean-centered, and two interaction terms were formed: (risk management × audit quality) and (competence × audit quality). These were entered together with the mean-centered main effects in the following equation:

$$\mathbf{Y = \beta_0 + \beta_1 X1c + \beta_2 X2c + \beta_3 Zc + \beta_4 (X1cZc) + \beta_5 (X2cZc) + \varepsilon}$$

Audit quality moderates a given association when the corresponding interaction term coefficient is statistically significant ($p < 0.05$). A significant interaction coefficient indicates whether the association becomes stronger or weaker as audit quality increases. A hypothesis was considered supported when the t-statistic exceeded 1.96, or $p < 0.05$.

Sample size adequacy for moderated regression was assessed post hoc using two common heuristics for multiple regression. Green's (1991) formula for testing individual predictors, $N \geq 104 + m$ (m = number of predictors), recommends a minimum of $N = 109$ for the five-term moderated model ($m = 5$), exceeding the achieved sample size of 50. A more lenient rule of thumb of 10–15 observations per predictor suggests a minimum of 50–75, placing the achieved sample at or just below the lower bound, even under this less conservative standard. Therefore, the sample is better regarded as adequate for detecting the model's overall explanatory power, which was itself statistically significant, $F(5,44) = 10.919$, $p < .001$, than as fully powered for precisely estimating each individual interaction coefficient. This constraint is acknowledged explicitly in the Limitations section, and the interaction effects (H3a, H3b), in particular, should be interpreted with corresponding caution pending replication in a larger sample.

2.6 Qualitative Method

Twelve informants were purposively selected from among the survey respondents, comprising directors and senior managers as risk owners, the risk-management function, and the Internal Audit Unit (SPI), across the subholding company and a subsidiary, to explore leadership experience, audit planning and execution, follow-up monitoring, and challenges encountered. Table 7 presents the 12 informants, identified by initials consistent with the thesis's anonymization, together with their positions, companies, tenure, and relevant certifications.

Data were gathered through in-depth interviews conducted in December 2025 at the subholding's head office and document review, including risk registers, risk-management policies and SOPs, knowledge mapping records, audit charters and SOPs, sample audit programs and reports, and follow-up monitoring records.

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The interviews were semi-structured, guided by an interview protocol organized around three domains corresponding to the study's constructs: risk management practice and governance structure, auditor competence development, and audit quality and RBIA outcomes. The informants were asked to describe their roles, relevant experiences, and concrete examples within each domain. The precise interview duration and recording method used could not be confirmed for this revision, as the corresponding records were lost along with the other project files described in Section 4. The interviews were documented in sufficient detail to support the verbatim excerpts reported in Section 3.5.

Qualitative data analysis followed Creswell (2017): transcription of interview recordings; repeated review of transcripts to build familiarity with the data; coding of transcript segments relevant to the research topic; thematic analysis organizing codes into broader, defined themes and examining patterns and relationships among them; and interpretation, connecting each theme's meaning to the hypothesis-testing results and relevant theory.

Coding and thematic analysis were conducted by the researcher; no second coder or formal inter-coder reliability check was used, which is noted as a limitation. Credibility was supported through data triangulation across two independent sources: interview accounts and internal company documents (risk registers, policies, audit programs, and follow-up records), rather than relying solely on interview data. Convergence between what the informants described and what the reviewed documents showed was treated as corroborating evidence for each theme. No member checking, involving the return of transcripts or themes to informants for confirmation, was conducted.

3. RESULTS AND DISCUSSION

3.1 Validity and Reliability

Item validity was tested using Pearson's correlation between each item's score and its construct's total score. With 50 respondents, all items showed positive correlations ($p < 0.001$) (Hair et al., 2010). Table 2 presents the item-total correlation results for all the indicators.

Table 2. Validity (Item-Total Correlation)

Variable	Indicator	Pearson Correlation	Sig.	Conclusion
Risk Management (X1)	X1.1	0.932	0.000	Valid
	X1.2	0.908	0.000	Valid
	X1.3	0.864	0.000	Valid
	X1.4	0.912	0.000	Valid
	X1.5	0.886	0.000	Valid
Competence (X2)	X2.1	0.949	0.000	Valid
	X2.2	0.940	0.000	Valid
	X2.3	0.915	0.000	Valid
	X2.4	0.910	0.000	Valid
Audit Quality (Z)	Z1	0.911	0.000	Valid
	Z2	0.892	0.000	Valid
	Z3	0.853	0.000	Valid
	Z4	0.885	0.000	Valid
	Z5	0.876	0.000	Valid
	Z6	0.931	0.000	Valid
RBIA Effectiveness (Y)	Y1	0.931	0.000	Valid
	Y2	0.935	0.000	Valid
	Y3	0.922	0.000	Valid

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The item-total correlations ranged from 0.864 to 0.932 for risk management, 0.910 to 0.949 for auditor competence, 0.853 to 0.931 for audit quality, and 0.922 to 0.935 for RBIA effectiveness, indicating a strong relationship between each item and its construct. Therefore, all items were valid and retained for further analysis.

Table 3 presents the reliability results for the four constructs.

Table 3. Reliability (Cronbach's Alpha)

Variable	Number of Items	Cronbach's Alpha	Threshold	Conclusion
Risk Management (X1)	5	0.942	0.70	Reliable
Competence (X2)	4	0.946	0.70	Reliable
Audit Quality (Z)	6	0.948	0.70	Reliable
RBIA Effectiveness (Y)	3	0.921	0.70	Reliable

All constructs exceeded the 0.70 threshold, indicating good internal consistency across all study variables.

3.2 Classical Assumption Tests

Table 4 summarizes the results of the classical assumption tests conducted prior to the regression analysis.

Table 4. Classical Assumption Test Results

Test	Result	Criterion	Conclusion
Kolmogorov–Smirnov (normality)	Sig. = 0.200	Sig. > 0.05	Residuals normally distributed
Shapiro–Wilk (normality)	Sig. = 0.115	Sig. > 0.05	Residuals normally distributed
Multicollinearity	VIF = 1.031–1.060	VIF < 10	No multicollinearity
Heteroskedasticity (Glejser)	Sig. > 0.05 (model Sig. = 0.962)	Sig. > 0.05	No heteroskedasticity
Autocorrelation (Durbin–Watson)	DW = 1.921	Close to 2	No indication of autocorrelation

The regression model satisfies the classical assumptions required for ordinary least squares estimation: residuals are normally distributed, predictors are free of problematic multicollinearity, residual variance is homoskedastic, and there is no indication of autocorrelation.

3.3 Direct-Association Regression Results (H1, H2)

The regression model, in which risk management, auditor competence, and audit quality were regressed on RBIA effectiveness, was statistically significant overall ($R = 0.652$, $R^2 = 0.425$, Adjusted $R^2 = 0.387$; $F(3, 46) = 11.318$, $p < 0.001$), explaining 42.5% of the variance in RBIA effectiveness. Table 5 presents the regression results for H1 and H2, along with the association of audit quality with RBIA effectiveness included for comparison.

Table 5. Direct-Effect Regression Results (Dependent Variable: RBIA Effectiveness)

Predictor	B	SE	Beta	t	Sig.	95% CI	Tol.	VIF	Decision
Constant	0.659	0.498	–	1.323	0.192	[-0.343, 1.661]	–	–	–
Risk Management (H1)	0.448	0.114	0.453	3.951	0.000	[0.220, 0.677]	0.953	1.049	Supported

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Competence (H2)	0.360	0.100	0.409	3.598	0.001	[0.159, 0.562]	0.970	1.031	Supported
Audit Quality (direct)	0.031	0.111	0.032	0.277	0.783	[-0.193, 0.254]	0.944	1.060	Not significant

Risk management (H1) and auditor competence (H2) are each positively and significantly associated with RBIA effectiveness; therefore, both hypotheses are supported. Audit quality, included as a third predictor for comparison, was not significantly associated with RBIA effectiveness (β = 0.032, t = 0.277, p = 0.783). Its moderating role is examined in the following section.

3.4 Moderated Regression Results (H3)

Adding the two mean-centered interaction terms (risk management × audit quality and competence × audit quality) increased the explained variance from 42.5% to 55.4%. The moderated model produced R = 0.744, R^2 = 0.554, and Adjusted R^2 = 0.503, with the overall model statistically significant, F(5, 44) = 10.919, p < 0.001. The resulting increase in R^2 was 0.129. Table 6 presents the moderated regression results, including both interaction terms used to test H3.

Table 6. Moderated Regression Results (Dependent Variable: RBIA Effectiveness)

Predictor (mean-centered)	B	SE	Beta	t	Sig.	95% CI	Tol.	VIF	Decision
Constant	3.133	0.112	–	27.969	0.000	[2.907, 3.359]	–	–	–
Risk Management	0.464	0.102	0.468	4.533	0.000	[0.258, 0.670]	0.951	1.052	–
Competence	0.371	0.090	0.421	4.116	0.000	[0.190, 0.553]	0.969	1.032	–
Audit Quality	0.051	0.100	0.052	0.506	0.616	[-0.151, 0.252]	0.941	1.063	–
Risk Mgmt × Audit Quality (H3a)	0.224	0.107	0.218	2.102	0.041	[0.009, 0.439]	0.946	1.057	Supported
Competence × Audit Quality (H3b)	0.193	0.082	0.244	2.357	0.023	[0.028, 0.357]	0.949	1.054	Supported

Both interaction terms are statistically significant and positive. The risk management × audit quality interaction is significant (B = 0.224, t = 2.102, p = 0.041), indicating that the positive association between risk management and RBIA effectiveness is stronger at higher audit quality levels. Similarly, the competence × audit quality interaction is significant (B = 0.193, t = 2.357, p = 0.023), indicating that the positive association between auditor competence and RBIA effectiveness is stronger at higher audit quality levels. Therefore, H3 is supported. Consistent with Section 3.3, audit quality's main association remains non-significant within the moderated model (p = 0.616), whereas the significant interaction terms support its role as a moderator.

Figure 1 summarizes our full model. Risk management and auditor competence are significantly associated with RBIA effectiveness, while audit quality has no significant independent association with RBIA effectiveness but significantly moderates both relationships.

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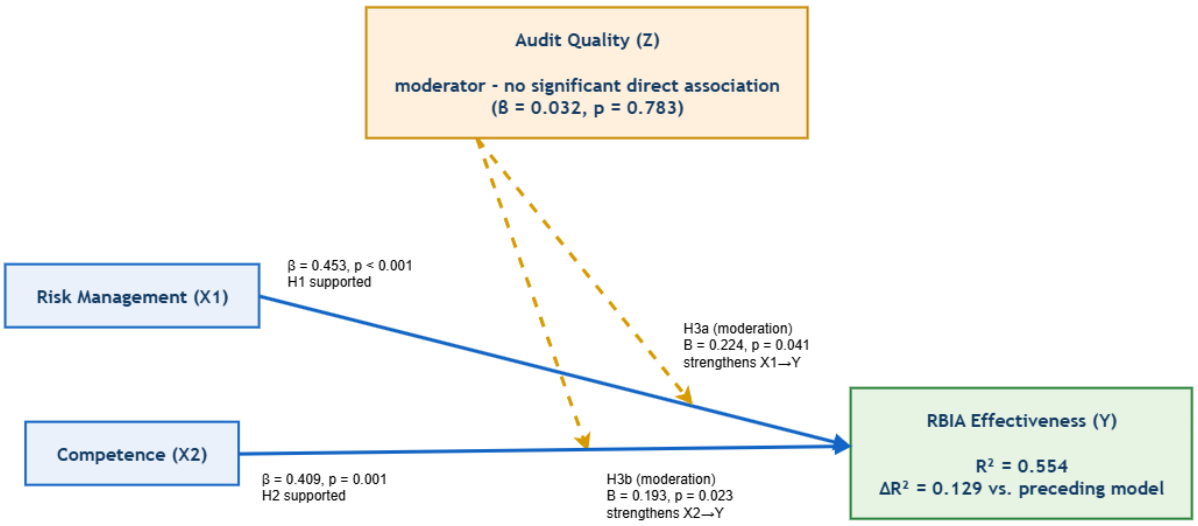

Figure 1. Structural Model of Direct Associations and Audit Quality Moderation

3.5 Qualitative Findings

Interviews were conducted in December 2025 at the subholding's head office in Surabaya with 12 informants. Table 7 presents the informants' positions, organizational affiliations, tenures, and relevant certifications.

Table 7. Research Informants

Code	Position	Company	Tenure (yrs)	Certification
AWD	Director of Finance, HR, and Risk Management	Subholding ("PT P")	20	CA; QCRO
DK	Head of Internal Audit Unit (SPI)	Subholding ("PT P")	19	PIA; Head of SPI training (BNSP)
CB	Senior Manager, Logistics	Subsidiary ("PT X")	11	PIA
NY	Senior Manager, HR and IT	Subsidiary ("PT X")	16	K3 Expert; OHS Mgmt System Auditor
DW	Senior Manager, Operations	Subsidiary ("PT X")	15	–
ND	Senior Manager, Projects	Subsidiary ("PT X")	15	–
MSD	Senior Manager, Finance and Risk Management	Subsidiary ("PT X")	17	CA; QRMO
AH	Manager, Risk Management	Subsidiary ("PT X")	12	CA; QRMO
NM	Coordinator, Internal Audit Unit (SPI)	Subsidiary ("PT X")	5	PIA
BA	Risk Management Officer	Subsidiary ("PT X")	5	Certified Risk Mgmt Officer
AHA	Internal Audit Support Staff	Subsidiary ("PT X")	8	Junior Auditor (BNSP); Certified Risk Mgmt Officer
JP	Head of Internal Audit Unit (SPI)	Subholding ("PT P")	20	PIA

Several themes emerged from the interviews and document reviews. These themes are presented below according to their relevance to H1–H3.

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Theme 1: Three-Lines-of-Defense Risk Governance (supports H1)

Informants described a risk-management structure organized around the three-lines-of-defense model: risk owners in each business unit, a Risk Management Function (RMF) acting as a coordinator and facilitator, and the Internal Audit Unit (SPI) serving as the third line and providing independent assurance.

> "The party responsible for carrying out risk management is the risk owner and the Risk Management Function, and the party accountable for final risk-management decisions is likewise the risk owner and the RMF."

Risk Management Manager (translated from Bahasa Indonesia)

> "Risk-based auditing really depends a lot on the quality of the company's risk management. The clearer the risk mapping, the easier it is for auditors to decide where to focus their efforts. We do not audit every area equally; we focus more on areas where the risk is high and the impact would be significant. When risk management isn't working well or the data is incomplete, auditors find it hard to set audit priorities, and the audit ends up being more administrative in nature."

Head of Internal Audit Unit, subholding company ("JP") (translated from Bahasa Indonesia)

Risk owners prepare the company's risk register based on corporate KPIs and the annual work plan, with monthly monitoring throughout the year. An annual audit plan (Program Kerja Pemeriksaan Terpadu) is then developed using this risk mapping, allowing auditors to concentrate testing on areas identified as having higher risk and greater potential impact.

The risk management process follows an ERM-oriented cycle comprising risk identification, assessment, mitigation, and continuous monitoring and review. Identification is conducted by each risk owner and linked to corporate KPIs and the annual work plan. Risk assessment considers probability and impact using quantitative and qualitative information, with impact criteria referring to the Ministry of SOE guidelines. Mitigation measures are assigned to the relevant risk owners and coordinated by the Risk Management Function. Informants also described continuous monitoring and review throughout the year, including monthly tracking and root cause analysis used to update risk assessments and mitigation plans.

Informants described the company's risk profile as covering five categories: strategic risk, including market loss and regulatory change; financial risk, including liquidity, cash flow, and receivables collection; operational risk, including port loading and unloading equipment availability, inventory, and procurement; legal and compliance risk, including fraud, bribery, and contract violations; and project risk, including budget-realization gaps and weak control over project progress. Risk appetite and risk tolerance are set quantitatively at 10% and 15% of the Net Working Capital, respectively. Key Risk Indicators, including receivable collectability, liquidity ratios, net cash flow, equipment availability rates, and procurement lead times, are also monitored and used in budgeting and audit planning decisions.

These accounts indicate that the company's risk infrastructure provides information used by internal audits to prioritize testing in areas with higher risk and impact. This qualitative evidence is consistent with the significant positive association between risk management and RBIA effectiveness reported in Section 3.3.

Theme 2: Auditor Competence, Relevant but Still Developing (supports H2)

Informants described auditors as generally well-qualified, supported by relevant educational backgrounds, ongoing training and certification, and a formal knowledge mapping system linking auditor competence to organizational needs. The areas covered include audit planning fundamentals, fraud examination, financial statement analysis, data analytics, and communication skills.

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> "In terms of competence, the internal auditors here are actually already quite good. Most have relevant educational backgrounds in accounting, management, or auditing. They also regularly participate in training and certification related to audit and risk management. The company also has a knowledge mapping system, so each auditor's competence is mapped against what the company needs."

Head of Internal Audit Unit, subsidiary company (translated from Bahasa Indonesia)

> "Internal auditors are not just expected to understand auditing; they also need to understand the company's business processes, because risk-based auditing means being able to see risk in day-to-day operations. The company has supported this through training, workshops, and certification, and competence is mapped through knowledge-mapping. But technology is moving fast, so auditors still need to build up their capabilities in IT audit and risk analysis to be better prepared for new kinds of risk."

Head of Internal Audit Unit, subholding company ("JP") (translated from Bahasa Indonesia)

These findings are consistent with the significant positive association between auditor competence and RBIA effectiveness reported in Section 3.3 above. Simultaneously, the informants specifically identified IT auditing and strategic risk analysis as areas requiring further capability development.

Theme 3: Audit Quality as a Conditioning Factor in Effective Audit Outcomes (explains H3, the moderation result)

Informants described audit quality less in terms of identifying exceptions and more in terms of root cause analysis, realistic recommendations, and active follow-up monitoring. These findings are consistent with the quantitative finding that audit quality plays a moderating role, whereas its independent association with RBIA effectiveness is not statistically significant.

> "When we do an audit, it is not just about finding errors or exceptions. What matters most is finding the root cause of why something happened in the first place. We traced the process from the start and examined how the controls work, all the way down to the main cause, because if we only look at the symptoms, the same problem can happen again. That's why we focus on root cause, so the recommendations we give can genuinely help improve things going forward."

Internal Audit Practitioner, subsidiary company (translated from Bahasa Indonesia)

> "When we give audit recommendations, we try to avoid those that are too theoretical or hard to carry out; they have to be realistic and something the relevant unit can actually implement. We also continue to monitor follow-up on audit results; it does not just end with the report. The goal is for internal audit to genuinely add value and help improve both work processes and corporate governance."

Head of Internal Audit Unit, subholding company ("JP") (translated from Bahasa Indonesia)

These accounts provide a plausible qualitative explanation for the quantitative patterns reported in Sections 3.3 and 3.4. Audit quality was not significantly associated with RBIA effectiveness. However, the significant interaction terms indicate that the associations between risk management and auditor competence with RBIA effectiveness differ according to the level of audit quality. Qualitative evidence is consistent with this conditioning role, particularly through the emphasis placed on root cause analysis, realistic recommendations, evidence quality, and follow-up monitoring.

3.6 Discussion

3.6.1. Risk Management and RBIA Effectiveness (H1)

Risk management is positively and significantly associated with RBIA effectiveness ($\beta = 0.453$, $t = 3.951$, $p < 0.001$), representing the stronger of the two significant associations examined in H1 and H2, supporting H1. Because RBIA places risk at the center of audit prioritization, the

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availability and quality of risk management information are closely related to auditors' ability to identify higher-risk and higher-impact areas and direct audit attention accordingly.

The qualitative findings provide additional context for this association. Risk management at the subholding and its subsidiary follows a three-lines-of-defense structure, with clearly assigned risk owners, a coordinating Risk Management Function, and an Internal Audit Unit providing independent assurance. This structure is supported by risk registers, risk appetite and tolerance statements, and Key Risk Indicators that are reviewed regularly. Informants across organizational roles described a broadly consistent understanding of these responsibilities, indicating that the risk governance framework is reflected in operational practice rather than existing only as a formal arrangement.

These findings are consistent with Lois et al. (2020) and Callahan and Soileau (2017), as well as Enterprise Risk Management theory and the three-lines-of-defense model more broadly (COSO, 2017; IIA, 2020; Jankensgård, 2019). Together, these perspectives emphasize the importance of an integrated risk governance structure in supporting the assurance role of internal audits and providing relevant risk information for audit planning and prioritization.

3.6.2. Competence and RBIA Effectiveness (H2)

Auditor competence is positively and significantly associated with RBIA effectiveness ($\beta = 0.409$, $t = 3.598$, $p = 0.001$), thus supporting H2. This result is consistent with those of Kurniawan et al. (2023), Turetken et al. (2020), Lois et al. (2020), and Hegazy et al. (2022).

Qualitative evidence indicates that auditors at the subholding and its subsidiary have relevant educational backgrounds and are supported by ongoing training, certification, and a structured knowledge mapping system. These practices provide a basis for developing the knowledge and skills required to understand business processes and evaluate risk within the RBIA process. Simultaneously, informants consistently identified IT auditing and strategic risk analysis as areas requiring further development in response to an increasingly complex and technology-driven risk environment. The quantitative and qualitative findings therefore point in the same direction: auditor competence is significantly associated with RBIA effectiveness, while continued competence development remains relevant to emerging audit requirements.

3.6.3. Audit Quality as a Moderator (H3)

Audit quality had no significant independent association with RBIA effectiveness ($\beta = 0.032$, $t = 0.277$, $p = 0.783$). However, the interactions between risk management and audit quality ($B = 0.224$, $t = 2.102$, $p = 0.041$) and auditor competence and audit quality ($B = 0.193$, $t = 2.357$, $p = 0.023$) are positive and statistically significant. The moderated model also explains a greater proportion of variance in RBIA effectiveness than the preceding regression model ($R^2 = 0.554$ vs. 0.425). Therefore, H3 is supported.

This pattern is consistent with the moderating role. Specifically, the positive association between risk management and RBIA effectiveness is stronger at higher levels of audit quality, and the same pattern is observed for the association between auditor competence and RBIA effectiveness. Therefore, the findings suggest that audit quality is relevant not primarily through a significant independent association with RBIA effectiveness but through its interaction with risk management and auditor competence.

Qualitative evidence supports this interpretation. Informants described audit quality in terms of root cause analysis, evidence-based findings, realistic and applicable recommendations, and active follow-up monitoring. These practices help explain why similar levels of risk management capability or auditor competence may be associated with different levels of RBIA effectiveness, depending on the quality of audit activities.

This interpretation is consistent with that of Turetken et al. (2020), Thiéry et al. (2023), Khulsum et al. (2025), and Wang and Liang (2025). This study extends the literature by directly testing

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audit quality as a moderator of the relationship between risk management, auditor competence, and RBIA effectiveness, rather than treating audit quality solely as a parallel predictor.

3.6.4Interpretive Note on Causal Language

Because this study relied on cross-sectional, self-reported survey data, the relationships reported in this study should be interpreted as statistical associations rather than confirmed causal effects. Accordingly, the significant regression coefficients indicate relationships among the variables within the observed sample but do not establish that changes in one variable cause changes in the other. Similarly, the significant interaction terms indicate that the associations between risk management and auditor competence with RBIA effectiveness vary across audit quality levels; they should not be interpreted as establishing that audit quality causally changes these relationships.

4. CONCLUSIONS AND SUGGESTION

This study finds that risk management and auditor competence are positively and significantly associated with risk-based internal audit (RBIA) effectiveness, while audit quality does not show a significant independent association with it. However, the significant interaction terms indicate that the associations between risk management and auditor competence with RBIA effectiveness are stronger at higher levels of audit quality. The qualitative findings support this interpretation by highlighting the importance of structured risk governance, auditor capability, root cause analysis, realistic recommendations, and active follow-up monitoring. These findings are consistent with the Resource-Based View, Enterprise Risk Management, and the three-lines-of-defense model, while also extending prior RBIA research by specifically positioning audit quality as a moderator rather than solely as a parallel predictor.

The findings should be interpreted cautiously because the study uses a relatively small sample (n = 50), a single SOE subholding and one subsidiary, a cross-sectional design, and self-reported measures, while the loss of the original item-level dataset prevented a formal common method bias diagnostic. Future studies should use larger multi-organization samples, longitudinal or multi-source designs, and power-based sample size justification while examining additional factors such as organizational culture, auditor independence, top-management support, audit-technology adoption, and governance maturity. In practice, organizations should continue strengthening risk management implementation, auditor competence, and audit execution quality, particularly through closer risk-audit integration, capability development in IT audit and data analytics, stronger audit evidence, root-cause analysis, practical recommendations, and systematic follow-up monitoring.

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