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Research paper

A Conceptual Framework Linking Continuous Audit and Risk-Based Audit to The Effectiveness of The Internal Audit Function: The Moderating Roles of Business Process Complexity and Technological Infrastructure Readiness

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Abstract

The advancement of information technology has driven a transformation in the internal audit function, particularly through the implementation of Continuous Audit (CA) and Risk-Based Audit (RBA). These approaches are believed to enhance the effectiveness of the Internal Audit Function (IAF) in monitoring risk management and supporting organizational objectives. This conceptual paper proposes a framework that establishes a link between CA and RBA, incorporating the effectiveness of the IAF, and moderating factors of Business Process Complexity (BPC) and Technological Infrastructure Readiness (TIR). The present study draws upon Internal Control Theory, Continuity Theory, and the Technology Acceptance Model. By integrating these perspectives, the study aims to explain how modern audit methodologies can enhance internal audit effectiveness under varying organizational conditions. The framework makes a significant contribution to the field of internal audit literature by offering a theoretical model for future empirical validation and practical guidance for organizations transitioning toward technology-driven audit systems.

Keywords: *Internal Audit Function; Continuous Audit; Risk-Based Audit.*

1. Introduction

The rapid advancement of information technology and the growing demand for transparency, accountability, and effective risk management have transformed the role of internal auditing in modern organizations. Internal audit functions are increasingly expected to go beyond traditional assurance roles by providing proactive insights and strategic value to corporate governance. (The Institute of Internal Auditors, 2017). However, traditional periodic audits have become insufficient in today's dynamic business environment, where organizations face complex operations, rapidly changing risks, and heightened regulatory expectations. (Dung, 2024). In response to these challenges, the adoption of CA and RBA has emerged as a strategic solution to enhance the effectiveness of the internal audit function. CA enables auditors to perform real-time, automated, and ongoing evaluations of organizational processes. (Vasarhelyi & Halper, 1991), while RBA directs audit focus toward high-risk areas to improve efficiency and assurance quality (Coetzee & Lubbe, 2014). Studies have shown that large global corporations such as Siemens have successfully implemented CA systems integrated with enterprise transactions, enabling continuous monitoring and timely risk detection. (Teeter et al., 2010). Despite these advancements, CA and RBA implementation in developing countries like Indonesia remains limited, indicating a gap between conceptual frameworks and practical adoption.

Empirical evidence from Indonesia further highlights the urgency of strengthening internal control and audit practices. The Audit Board of the Republic of Indonesia – BPK in 2024 reported that 42.7% of audit findings stemmed from weaknesses in internal control systems, including poor documentation, insufficient task segregation, and suboptimal audit oversight. Similarly, (Association of Certified Fraud Examiners (ACFE) Indonesia Chapter #111, 2025) identified weak internal controls as a leading cause of occupational fraud, despite the presence of internal audit units. These findings underscore the need for more robust, technology-enabled, and risk-oriented internal audit mechanisms. Two contextual factors may determine the effectiveness of CA and RBA in improving the internal audit function: BPC and TIR. High business complexity can increase monitoring challenges and demand flexible, responsive audit systems (Yaqin et al., 2020). Meanwhile, sufficient technological infrastructure is essential for the real-time and data-driven nature of CA and RBA (Federicco & Tandiono, 2023). The interplay between these moderating variables and audit methodologies remains underexplored in existing literature, particularly in emerging markets. This research contributes to the literature by integrating technology- and risk-based perspectives of internal auditing and by extending empirical evidence from a developing country context. Practically, the study offers valuable insights for

organizations seeking to design adaptive, technology-enabled internal audit strategies that align with increasing business complexity and technological transformation.

2. Literature Review and Hypothesis

2.1. Theoretical foundation

This study adopts an integrative theoretical perspective to explain how modern audit approaches enhance the effectiveness of IAF under varying organizational conditions. The proposed framework is grounded in three complementary frameworks: internal control and contingency theory. The integration of these theoretical frameworks provides a comprehensive explanation of the mechanisms through which audit mechanisms fortify control systems, the role of contextual factors in shaping audit effectiveness, and the influence of technology adoption on the successful implementation of digital audit practices. The internal control framework provides the foundational logic that effective monitoring and control mechanisms are essential for achieving organizational objectives. Contingency Theory explains why the effectiveness of audit approaches depends on organizational characteristics such as process complexity and technological readiness. The integration of these theories enables a comprehensive understanding of how CA and RBA jointly enhance IAF effectiveness.

2.2. Internal control

The internal control, as defined by the framework of COSO (The Committee of Sponsoring Organizations of the Treadway Commission (COSO), 2013), is an integrated process designed to provide reasonable assurance regarding operational efficiency, reliable reporting, and regulatory compliance. The five interrelated components, control environment, risk assessment, control activities, information and communication, and monitoring, require continuous evaluation to remain effective in dynamic business environments. Preliminary research has demonstrated that strong internal control systems are positively associated with operational efficiency, risk mitigation, and firm performance. Within this context, CA and RBA function as advanced monitoring and assessment mechanisms that reinforce the monitoring and risk assessment components of internal control. CA is designed to facilitate continuous evaluation of transactions and control, while RBA ensures that audit resources are directed toward areas of highest risk exposure, and they will enhance operational efficiency and firm value. (Wang et al., 2023). Accordingly, the internal control framework provides a clear rationale for expecting these audit approaches to improve IAF effectiveness.

2.3. Contingency theory

Contingency theory asserts that the effectiveness of an organization is contingent upon the alignment between managerial practices and contextual conditions. (Reams, 2023). In the context of auditing research, this approach implies that the efficacy of audit methodologies is contingent upon organizational characteristics, including complexity, uncertainty, and technological capability. (Gordon et al., 2009). Preliminary research suggests that variations in organizational structure and process complexity have a substantial impact on audit planning, execution, and outcomes. In this study, BPC and TIR are conceptualized as key contextual moderators. Increases in process complexity result in elevated monitoring challenges and necessitate more adaptive and technologically supported audit approaches. Furthermore, the existence of adequate technological infrastructure facilitates automation, data integration and real-time analysis. From a contingency perspective, the effectiveness of CA and RBA is therefore expected to vary depending on these organizational conditions.

2.4. Internal audit function (IAF)

IAF is an independent and objective assurance and consulting activity designed to add value and improve an organization's operations (The Institute of Internal Auditors, 2017). The IAF supports governance, risk management, and control processes by providing timely and relevant assurance. Studies have shown that effective internal audit practices enhance fraud prevention, corporate governance, and decision-making quality. (Dzikrullah et al., 2020). With the increasing complexity of business and digital transformation (Vadasi et al., 2020), beyond traditional compliance roles, contemporary internal auditing emphasizes proactive risk management, governance support, and strategic insight (Lois et al., 2020). In the current business environment, characterized by increasing operational complexity and digital transformation, the IAF has evolved toward technology-enabled and risk-oriented methodologies. CA and RBA represent key instruments in this transformation, enabling internal auditors to provide timely, relevant, and risk-focused assurance.

2.5. Continuous audit (CA)

CA is an audit methodology that enables continuous or near real-time evaluation of business processes through automated audit procedures embedded in organizational systems. Prior research highlights several advantages of CA, including improved timeliness, broader data coverage, and enhanced anomaly detection. Empirical evidence indicates that CA adoption improves audit efficiency and responsiveness, particularly in dynamic and data-intensive environments. (Vasarhelyi & Halper, 1991). CA improves transparency and responsiveness in internal audit activities, especially under dynamic conditions such as those experienced during the COVID-19 pandemic. (Singh & Best, 2023). CA offers several advantages over traditional audits, including enhanced timeliness, broader data coverage, and early fraud detection. (Federicco & Tandiono, 2023). Nonetheless, its adoption faces challenges such as limited IT competence, high implementation costs, and resistance to organizational change. (Andrade et al., 2023). These challenges are especially pronounced in emerging economies, where resource constraints and digital maturity vary widely. Consequently, the effectiveness of CA depends not only on its technical design but also on the organizational context.

2.6. Risk-based audit (RBA)

RBA is an audit approach that prioritizes audit activities based on an organization's risk profile, aligning audit planning with strategic objectives and risk exposure (Coetzee & Lubbe, 2014). By focusing on high-risk areas, RBA enhances audit efficiency, resource allocation, and oversight governance (Mujalli, 2024). Prior empirical studies demonstrate that RBA is positively associated with audit quality and internal audit effectiveness (Alzeban, 2020). RBA significantly improves internal audit quality and governance effectiveness (Abidin,

2017). However, (Anon et al., 2020) the success of RBA depends on management support, auditor competence, and integration with enterprise risk management systems. Without these conditions, RBA may become a procedural exercise rather than a strategic audit tool. These findings highlight the importance of contextual factors in shaping RBA effectiveness.

Although CA and RBA represent a proactive approach to modern auditing, enabling continuous, risk-focused monitoring of organizational activities (Eulerich et al., 2020). CA provides continuous data-driven monitoring, while RBA ensures strategic focus on critical risk areas. When integrated, these approaches enable more adaptive and responsive internal audit functions. (The Institute of Internal Auditors, 2017). This study extends prior literature by proposing an integrated conceptual framework that links CA and RBA to IAF effectiveness while explicitly incorporating BPC and TIR as moderating variables. By combining control-based, contingency-based, and technology adoption perspectives, the framework advances existing conceptual models and provides a foundation for future empirical research, particularly in emerging market contexts.

2.7. BPC and TIR as moderate

BPC reflects the degree of interdependence, variability, and structural intricacy embedded in organizational processes (Zhou et al., 2023). Higher levels of process complexity increase audit challenges by expanding transaction volumes, data heterogeneity, and control interdependencies, thereby requiring greater auditor expertise and more sophisticated technological support. (Vidgof, 2024) and technological capability to handle diverse data flows and transaction patterns (Ardianingsih et al., 2024). From a contingency perspective, BPC alters the alignment between audit methodologies and organizational conditions. While CA and RBA are designed to enhance audit effectiveness, their impact may vary depending on the extent to which complex processes can be adequately monitored and integrated within existing control systems. Accordingly, BPC is expected to moderate the relationship between CA and RBA implementation and IAF effectiveness.

TIR refers to an organization's capacity to provide adequate hardware, software, network systems, and skilled personnel to support digital audit processes (Ali et al., 2024). Strong technological infrastructure facilitates automation, data integration, and timely access to audit-relevant information, thereby improving audit efficiency and decision-making quality. (Webster & Gardner, 2019), enhances data access and improves real-time decision-making (Alma'aitah et al., 2024). Empirical evidence suggests that higher levels of TIR enhance audit quality and internal control effectiveness by enabling the effective adoption of CA and other technology-enabled audit tools. (Ali et al., 2024). Consistent with contingency theory, TIR is therefore expected to strengthen the relationship between CA and RBA and IAF effectiveness, amplifying their positive effects under conditions of high technological readiness.

2.8. Research gap and conceptual integration

Although prior studies have explored CA and RBA independently (Tronto & Killingsworth, 2021)Limited empirical research has examined their joint effects on the internal audit function, particularly within developing countries. Additionally, the moderating roles of business process complexity and technological readiness remain underexplored. This study addresses these gaps by integrating Internal Control Theory, Contingency Theory, and Technology Acceptance Model to develop a comprehensive framework that explains how CA and RBA improve internal audit effectiveness under varying levels of process complexity and technological readiness. This theoretical synthesis contributes to the growing body of knowledge on risk-based and technology-driven internal auditing in emerging markets.

3. Hypothesis Conceptual Framework Development

3.1. Hypothesis and framework

Building upon the theoretical foundations discussed in the previous section, this study develops a series of hypotheses to examine the relationships between CA, RBA, and the effectiveness of the IAF, as well as the moderating roles of BPC and TIR. The development of these hypotheses is grounded in the integration of Internal Control Theory and Contingency Theory. These frameworks collectively explain how risk-oriented and technology-enabled audit approaches can enhance internal audit performance under varying organizational conditions. Each hypothesis is derived logically from the theoretical rationale and supported by prior empirical findings.

The advancement of information technology has transformed the internal auditing profession, encouraging auditors to adopt automated systems that enable real-time monitoring of business operations. CA facilitates ongoing evaluation of internal controls and risk indicators by integrating audit procedures directly into enterprise systems. (Williams et al., 2010). Through automation and data analytics, CA allows auditors to detect anomalies promptly and provide assurance information in a more timely and reliable manner. (Alles et al., 2006). Empirical studies confirm that the adoption of CA enhances audit efficiency. (Eulerich et al., 2020), audit quality, and the overall effectiveness of the internal audit function (Federicco & Tandiono, 2023). By enabling continuous risk monitoring, CA strengthens internal control oversight and supports better managerial decision-making. Therefore, it is hypothesized that:

Hypothesis 1. CA has a positive effect on the effectiveness of the Internal Audit Function.

Organizations today operate in dynamic and uncertain environments where risk exposure continuously evolves due to economic volatility, regulatory changes, and technological disruption. In such conditions, the RBA approach allows internal auditors to align audit activities with the organization's risk profile, prioritizing areas of highest potential impact. (The Institute of Internal Auditors, 2017). RBA contributes to audit effectiveness by optimizing resource allocation, enhancing communication between auditors and management, and reinforcing accountability in governance and risk management processes (Kurniawan et al., 2023). Empirical evidence further demonstrates that RBA improves stakeholder confidence in governance quality and strengthens risk oversight. (Moschidis et al., 2024). Therefore, the following hypothesis is proposed:

Hypothesis 2. RBA has a positive effect on the effectiveness of the Internal Audit Function.

BPC reflects the degree of interdependence (Zhou et al., 2023), diversity, and structural intricacy in organizational operations (Batocchio et al., 2016). High process complexity presents challenges for auditors in monitoring control systems, managing risk, and maintaining audit efficiency. As business processes become more intricate, internal auditors must devote additional resources. (Kahyaoglu & Aksoy, 2021), utilize advanced analytics, and adapt audit strategies to ensure adequate coverage (Sarens & Abdolmohammadi, 2011). According to Contingency Theory, organizational context, such as process complexity, can alter the effectiveness of audit methodologies. While CA and RBA enhance audit performance, their benefits may diminish under highly complex business environments where system integration and data consistency are limited. Thus, the following hypotheses are formulated:

Hypothesis 3. BPC weakens the positive effect of Continuous Audit on the effectiveness of the Internal Audit Function.

Hypothesis 4. BPC weakens the positive effect of Risk-Based Audit on the effectiveness of the Internal Audit Function.
TIR represents the organization's capability to provide adequate technology hardware, software, and networks (Ali et al., 2024) and skilled personnel to support digital auditing processes (Duong et al., 2023). Robust IT infrastructure facilitates automation, data integration, and analytical accuracy, thereby enhancing the effectiveness of audit technologies such as CA and RBA. (Chen et al., 2015). Empirical findings suggest that firms with higher technology readiness exhibit stronger audit performance, improved reliability, and greater responsiveness to emerging risks. (Mahzan & Lymer, 2014) and (Ojewale et al., 2025). In line with this argument, technological readiness is expected to strengthen the relationship between technology-based audit approaches and internal audit effectiveness. Hence, the following hypotheses are proposed:
Hypothesis 5. TIR strengthens the positive effect of CA on the effectiveness of the IAF.
Hypothesis 6. TIR strengthens the positive effect of the RBA on the effectiveness of the IAF.

This study adopts a conceptual research design by synthesizing prior literature to develop an integrative framework linking CA and RBA to IAF effectiveness, incorporating BPC and TIR as contextual moderators, and the proposed framework is intended to guide future empirical testing. The framework development process followed three main stages. A comprehensive review of the relevant literature was conducted to identify key constructs and establish relationships relevant to IAF effectiveness. The literature review covered the following areas: internal auditing, risk-based auditing, continuous auditing, and digital auditing. This review placed particular emphasis on recent studies and professional standards to ensure conceptual relevance in technology-driven audit environments. Secondly, insights from internal control frameworks and contingency theory were integrated to explain both the direct effects of CA, RBA, and contextual conditions under which these effects may vary. The theoretical foundation for alignment of audit approaches with control effectiveness is explained by internal control frameworks. Contingency theory elaborates on moderating influences of BPC and TIR to support the role of technology readiness in facilitating the adoption of digital audit practices. Subsequently, a series of logically derived hypotheses was formulated to describe the anticipated relationships among the constructs. CA and RBA are proposed as key drivers of IAF effectiveness, while BPC and TIR are incorporated as moderating variables that may weaken or strengthen these relationships depending on organizational context. The resulting conceptual framework illustrates how risk-oriented and technology-enabled audit approaches interact with organizational complexity and technological readiness to shape internal audit outcomes.
The proposed framework is intended to serve as a foundation for future empirical research. Subsequent studies may operationalize the constructs and test the hypothesized relationships using quantitative methods. The impact of CA and RBA on IAF effectiveness can be better understood by looking at how contextual conditions are influenced by moderating variables. (Logman, 2024). The proposed research design is illustrated in the following diagram:

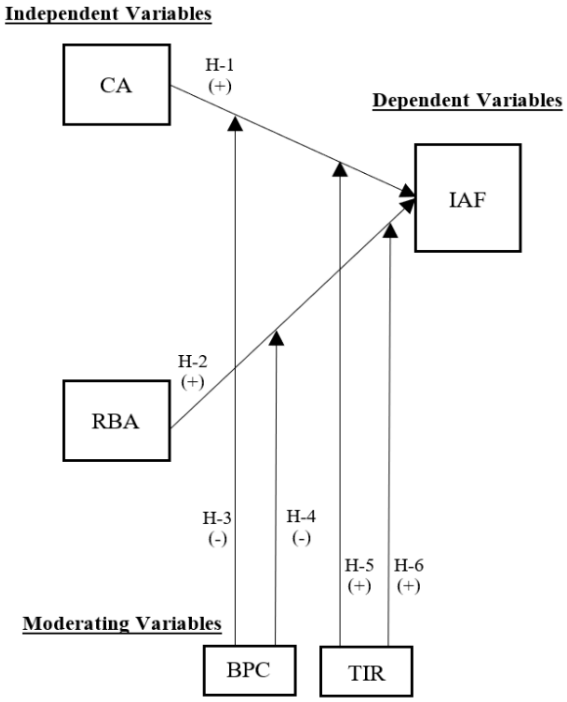

Fig. 1: Proposed Research Design.

3.2. Operationalization of variables

The model comprises five latent variables with two independent variables (CA and RBA), one dependent variable (IAF), and two moderating variables (BPC and TIR). To ensure consistency in the statistical measurements employed in this study to describe the operational definitions of each variable and its indicators, the researcher developed the following variable operationalizations:

Table 1: Operationalization of Research Variables

Variable	Indicator	Measurement	Source
IAF	Improved Decision	Using CA helps me identify anomalies.	(Mailoor & Tjhin, 2025)
	Audit Effectiveness	Using CA improves the quality of my audit results.	(Mailoor & Tjhin, 2025)
	Audit Efficiency	Using CA helps speed up the data analysis process in my audit assignments.	(Mailoor & Tjhin, 2025)
	Reduced Anomalies	With CA, the frequency of anomalies found in auditees has decreased.	(Mailoor & Tjhin, 2025)

Variable	Indicator	Measurement	Source
CA	Nature of use	I use Continuous Audit (CA) to perform data analysis in my internal audit assignments.	(Mailoor & Tjhin, 2025)
		The use of Continuous Audit (CA) improves the quality of my audit results.	(Mailoor & Tjhin, 2025)
		The use of Continuous Audit (CA) helps speed up the data analysis process in my audit assignments.	(Mailoor & Tjhin, 2025)
	Frequency of use	I always use Continuous Audit (CA) in every internal audit assignment.	(Mailoor & Tjhin, 2025)
		With the use of Continuous Audit (CA), the frequency of irregularities found in the auditee has decreased.	(Mailoor & Tjhin, 2025)
	Extent of Use	I use more than one use case in Continuous Audit (CA) for various internal audit tasks.	(Mailoor & Tjhin, 2025)
		The use of Continuous Audit (CA) helps me identify irregularities (anomalies).	(Mailoor & Tjhin, 2025)
RBA	Implementation of RBA	Application of RBA to identify and evaluate business risks	(Le et al., 2022)
		Application of RBA to identify and evaluate risks to material information presentation	(Le et al., 2022)
		Application of RBA to respond to risks to the material information presentation that have been evaluated	(Le et al., 2022)
		Application of RBA to provide an opinion after addressing risks to the material information presentation that have been evaluated	(Le et al., 2022)
BPC	Number of businesses	How many business segments are currently operating in your company?	(Manik et al., 2021)
	Firm Size	Classification of the company's annual revenue	(Manik et al., 2021)
	Workflow	Complexity of extended control flow, extended cyclomatic metrics (complexity) in the workflow network, and structural level.	(Ojewale et al., 2025)
	Business Process Modeling Notation (BPMN)	Ease of understanding and modification.	(Ojewale et al., 2025)
	Business Model Innovation Organizational Complexity	Over the past year, your organization has made changes to its business model that have not been implemented by competitors before.	(Rodríguez et al., 2020)
TIR	Technological readiness	Adequate technology investment for RBA	(Alma'aitah et al., 2024)
		Audit team's technological knowledge and skills for RBA	(Alma'aitah et al., 2024)
		Effective use of technology improves audit results.	(Alma'aitah et al., 2024)
		Protocols for maintaining data security and confidentiality.	(Alma'aitah et al., 2024)
		Network strength and stability.	(Alma'aitah et al., 2024)

4. Conclusions, Future Research Directions, and Practical Implications

This conceptual paper presents an integrated theoretical framework linking CA and RBA to IAF effectiveness. The framework emphasizes that the relationship between CA and RBA, and IAF effectiveness, depends on BPC and TIR. Drawing from internal control theory, contingency theory, and the technology acceptance model, the study highlights how risk-oriented and technology-enabled auditing approaches enhance audit quality, efficiency, and responsiveness collectively. From a practical and policy perspective, the proposed framework aligns with international professional internal auditing standards, such as those issued by (The Institute of Internal Auditors, 2017), which emphasizes risk-based planning, continuous assurance, and the effective use of technology in internal audit activities. The framework provides guidance for internal audit practitioners in designing audit approaches that integrate continuous monitoring and risk-based prioritization. Moreover, it offers important implications for governance and audit regulation in emerging economies, where regulatory frameworks and internal control maturity remain uneven. By supporting technology-enabled and risk-oriented internal auditing practices, the framework can inform regulators and professional bodies in developing policies and guidelines that strengthen governance, enhance transparency, and improve organizational accountability.

However, their success is not uniform; contextual variables, such as business complexity and technology readiness, can amplify or constrain their impact on internal audit effectiveness. Future research should empirically validate the proposed conceptual model by employing quantitative approaches, such as partial least squares structural equation modeling (PLS-SEM), to test the hypothesized relationships. Researchers are encouraged to gather data across multiple industries and organizational sizes to assess the model's robustness and generalizability. Additionally, longitudinal research could explore the evolution of CA and RBA practices as organizations advance in their digital transformation journeys.

Further studies may integrate additional variables, such as organizational culture, auditor competence, digital maturity, and management commitment, to expand the conceptual framework. From a practical standpoint, the conceptual framework provides internal audit practitioners with guidance on how to enhance their effectiveness in an increasingly digitalized environment. Organizations are advised to invest in technological infrastructure and digital audit tools that facilitate continuous monitoring and risk-based prioritization. Internal audit leaders should provide auditors with proper training to improve their technological competence and analytical capability. Additionally, aligning CA and RBA practices with enterprise risk management and governance mechanisms strengthens audit assurance and value creation. This conceptual framework can serve as a reference for regulatory bodies and professional associations to develop policies and guidelines that support digital transformation within the internal audit profession, especially in emerging economies.

References

[1] Abidin, N.H.Z. (2017) "Factors influencing the implementation of risk-based auditing," *Asian Review of Accounting*, 25(3), pp. 361–375. Available at: https://doi.org/10.1108/ARA-10-2016-0118.

[2] Ali, M.A.S. *et al.* (2024) "The Role of Technological Readiness in Enhancing the Quality of Audit Work: Evidence from an Emerging Market," *Journal of Risk and Financial Management*, 17(11). Available at: https://doi.org/10.3390/jrfm17110489.

[3] Alles, M. *et al.* (2006) "Continuous monitoring of business process controls: A pilot implementation of a continuous auditing system at Siemens," *International Journal of Accounting Information Systems*, 7(2), pp. 137–161. Available at: https://doi.org/10.1016/j.accinf.2005.10.004.

[4] Alma'aitah, R.T. *et al.* (2024) "The impact of remote auditing on audit quality: the moderating role of technology readiness," *Managerial Auditing Journal*, 39(6), pp. 624–647. Available at: https://doi.org/10.1108/MAJ-02-2024-4210.

[5] Alzeban, A. (2020) "The relationship between the audit committee, internal audit and firm performance," *Journal of Applied Accounting Research*, 21(3), pp. 437–454. Available at: https://doi.org/10.1108/JAAR-03-2019-0054.

[6] Andrade, A. *et al.* (2023) "The adoption of technological tools in continuous audit projects," *Revista de Administração da UFSM*, 16, p. e5. Available at: https://doi.org/10.5902/1983465971587.

[7] Anon, E. *et al.* (2020) "The Role Of Risk-Based Internal Audit In Improving Audit Quality," *International Journal Of Management*, 11. Available at: https://doi.org/10.34218/IJM.11.12.2020.029.

[8] Ardianingsih, A. *et al.* (2024) "THE DETERMINANT OF THE EFFECTIVENESS OF RISK-BASED INTERNAL AUDIT," *Risk Governance and Control: Financial Markets and Institutions*, 14(3), pp. 39–46. Available at: https://doi.org/10.22495/rgcv14i3p4.

[9] Association of Certified Fraud Examiners (ACFE) Indonesia Chapter #111 (2025) *Key Findings Survei Fraud Indonesia tahun 2025*. Available at: https://acfe-indonesia.or.id/survey-fraud-indonesia-2025/ (Accessed: September 24, 2025).

[10] Batocchio, A., Ghezzi, A. and Rangone, A. (2016) "A method for evaluating business models implementation process," *Business Process Management Journal*, 22(4), pp. 712–735. Available at: https://doi.org/10.1108/BPMJ-08-2015-0117.

[11] Chen, D.Q., Preston, D.S. and Swink, M. (2015) "How the use of big data analytics affects value creation in supply chain management," *Journal of Management Information Systems*, 32(4), pp. 4–39. Available at: https://doi.org/10.1080/07421222.2015.1138364.

[12] Coetzee, P. and Lubbe, D. (2014) "Improving the efficiency and effectiveness of risk-based internal audit engagements," *International Journal of Auditing*, 18(2), pp. 115–125. Available at: https://doi.org/10.1111/ijau.12016.

[13] Dung, N.N.K. (2024) "Factors Affecting Risk-Based Audit and Quality Audit," *Emerging Science Journal*, 8(3), pp. 957–971. Available at: https://doi.org/10.28991/ESJ-2024-08-03-010.

[14] Duong, C.T. *et al.* (2023) "From scattered sources to comprehensive technology landscape: A recommendation-based retrieval approach," *World Patent Information*, 73. Available at: https://doi.org/10.1016/j.wpi.2023.102198.

[15] Dzikrullah, A.D., Harymawan, I., and Ratri, M.C. (2020) "Internal audit functions and audit outcomes: Evidence from Indonesia," *Cogent Business and Management*, 7(1). Available at: https://doi.org/10.1080/23311975.2020.1750331.

[16] Eulerich, M., Georgi, C. and Schmidt, A. (2020) "Continuous Auditing and Risk-Based Audit Planning—An Empirical Analysis," *Journal of Emerging Technologies in Accounting*, 17(2), pp. 141–155. Available at: https://doi.org/10.2308/JETA-2020-004.

[17] Federicco, T.Y. and Tandiono, R. (2023) "An Exploratory Study of the Familiarity and the Perceptions of Continuous Auditing Technology in Indonesia," in *E3S Web of Conferences*. EDP Sciences. Available at: https://doi.org/10.1051/e3sconf/202338803005.

[18] Gordon, L.A., Loeb, M.P. and Tseng, C.Y. (2009) "Enterprise risk management and firm performance: A contingency perspective," *Journal of Accounting and Public Policy*, 28(4), pp. 301–327. Available at: https://doi.org/10.1016/j.jaccpubpol.2009.06.006.

[19] Hair, J. *et al.* (2022) *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. https://doi.org/10.1007/978-3-030-80519-7.

[20] Kahyaoglu, S.B. and Aksoy, T. (2021) "Artificial Intelligence in Internal Audit and Risk Assessment," in. Springer Nature, pp. 179–192. Available at: https://doi.org/10.1007/978-3-030-72624-9_8.

[21] Kurniawan, T., Bukit, R.B. and Erwin, K. (2023) "The Factors Influencing the Risk Based Internal Audit in Improving the Effectiveness of Internal Audit," *International Journal of Social Science and Business*, 7(4), pp. 1030–1041. Available at: https://doi.org/10.23887/ijssb.v7i4.51371.

[22] Le, T.T. *et al.* (2022) "Risk-based approach and quality of independent audit using structure equation modeling – Evidence from Vietnam," *European Research on Management and Business Economics*, 28(3). Available at: https://doi.org/10.1016/j.iedeen.2022.100196.

[23] Logman, M. (2024) "Managerial relevance of moderating and mediating variables/effects in management research," *Management Decision* [Preprint]. Available at: https://doi.org/10.1108/MD-10-2023-1744.

[24] Lois, P. *et al.* (2020) "Internal audits in the digital era: opportunities risks and challenges," *EuroMed Journal of Business*, 15(2), pp. 205–217. Available at: https://doi.org/10.1108/EMJB-07-2019-0097.

[25] Mahzan, N. and Lymer, A. (2014) "Examining the adoption of computer-assisted audit tools and techniques: Cases of generalized audit software use by internal auditors," *Managerial Auditing Journal*, 29(4), pp. 327–349. Available at: https://doi.org/10.1108/MAJ-05-2013-0877.

[26] Mailoor, M.P.A. and Tjhin, V.U. (2025) "Evaluating key factors for successful continuous auditing implementation: Insights from an energy and electricity company," *International Journal of Digital Accounting Research*, 25, pp. 1–33. Available at: https://doi.org/10.4192/1577-8517-v25_1.

[27] Manik, T., Rossieta, H. and Gani, L. (2021) "Business Complexity, Business Strategy: Sustainable Business Performance Analysis," in. European Alliance for Innovation n.o. Available at: https://doi.org/10.4108/eai.24-9-2021.2314675.

[28] Moschidis, S. *et al.* (2024) "An investigation of risk-based auditing (RBA) relationships from the stakeholders' perspective using PLS-SEM," *EuroMed Journal of Business*, ahead-of-print(ahead-of-print). Available at: https://doi.org/10.1108/EMJB-12-2022-0211.

[29] Mujalli, A. (2024) "Factors Affecting the Implementation of Risk-Based Internal Auditing," *Journal of Risk and Financial Management*, 17(5). Available at: https://doi.org/10.3390/jrfm17050196.

[30] Ojewale, V. *et al.* (2025) "Towards AI Accountability Infrastructure: Gaps and Opportunities in AI Audit Tooling," in *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems*. New York, NY, USA: ACM, pp. 1–29. Available at: https://doi.org/10.1145/3706598.3713301.

[31] Reams, L. (2023) "Fred Fiedler's contingency model revisited: 30 years later," *Filosofiya osvity. Philosophy of Education*, 29, pp. 111–124. Available at: https://doi.org/10.31874/2309-1606-2023-29-1-6.

[32] Rodríguez, R., Molina-Castillo, F.J. and Svensson, G. (2020) "The mediating role of organizational complexity between enterprise resource planning and business model innovation," *Industrial Marketing Management*, 84, pp. 328–341. Available at: https://doi.org/10.1016/j.indmarman.2019.09.007.

[33] Rungson, C. (2010) "Quality of Psychology Test Between Likert Scale 5 and 6 Points," *Journal of Social Sciences*, 6(3), pp. 399–403. Available at: https://doi.org/10.3844/jssp.2010.399.403.

[34] Sarens, G. and Abdolmohammadi, M.J. (2011) "Monitoring effects of the internal audit function: Agency theory versus other explanatory variables," *International Journal of Auditing*, 15(1), pp. 1–20. Available at: https://doi.org/10.1111/j.1099-1123.2010.00419.x.

[35] Singh, K. and Best, P. (2023) "Auditing during a pandemic – can continuous controls monitoring (CCM) address challenges facing internal audit departments?" *Pacific Accounting Review*, 35(5), pp. 727–745. Available at: https://doi.org/10.1108/PAR-07-2022-0103.

[36] Teeter, R.A., Alles, M.G. and Vasarhelyi, M.A. (2010) "The remote audit," *Journal of Emerging Technologies in Accounting*, 7(1), pp. 73–88. Available at: https://doi.org/10.2308/jeta.2010.7.1.73.

[37] The Committee of Sponsoring Organizations of the Treadway Commission (COSO) (2013) *Internal Control-Integrated Framework Executive Summary Committee of Sponsoring Organizations of the Treadway Commission*. he Committee of Sponsoring Organizations of the Treadway Commission (COSO). Available at: https://www.theiia.org/en/products/bookstore/coso---internal-control--integrated-framework-2013-framework/ (Accessed: June 8, 2025).

[38] The Institute of Internal Auditors (2017) *INTERNATIONAL STANDARDS FOR THE PROFESSIONAL PRACTICE OF INTERNAL AUDITING (STANDARDS)*. Available at: www.globaliia.org.

[39] Tronto, S. and Killingsworth, B.L. (2021) "How internal audit can champion continuous monitoring in a business operation via visual reporting and overcome barriers to success," *The International Journal of Digital Accounting Research*, 21, pp. 23–59. Available at: https://doi.org/10.4192/1577-8517-v21_2.

[40] Vadasi, C., Bekiaris, M. and Andrikopoulos, A. (2020) "Corporate governance and internal audit: an institutional theory perspective," *Corporate Governance (Bingley)*, 20(1), pp. 175–190. Available at: https://doi.org/10.1108/CG-07-2019-0215.

[41] Vasarhelyi, M. and Halper, F. (1991) "The Continuous Audit of Online Systems," *Auditing: A Journal of Practice & Theory*, 10.

[42] Vidgof, M. (2024) *Measuring, Analyzing and Managing Process Complexity (Extended Abstract)*. Available at: https://complex.wu.ac.at/nm/vidgof.

[43] Wang, K. *et al.* (2023) "Internal Control, Environmental Uncertainty and Total Factor Productivity of Firms—Evidence from Chinese Capital Market," *Sustainability (Switzerland)*, 15(1). Available at: https://doi.org/10.3390/su15010736.

[44] Webster, A. and Gardner, J. (2019) "Aligning technology and institutional readiness: the adoption of innovation," *Technology Analysis and Strategic Management*, 31(10), pp. 1229–1241. Available at: https://doi.org/10.1080/09537325.2019.1601694.
[45] Williams, K., Alles, M. and Vasarhelyi, M. (2010) *Continuous assurance for the now economy*. The Institute of Chartered Accountants in Australia.
[46] Yaqin, M., Sarno, R. and Rochimah, S. (2020) "Measuring Scalable Business Process Model Complexity Based on Basic Control Structure," *International Journal of Intelligent Engineering and Systems*, 13(6), pp. 52–65. Available at: https://doi.org/10.22266/ijies2020.1231.06.
[47] Zhou, C. *et al.* (2023) "Business Process Complexity Measurement: A Systematic Literature Review," *IEEE Access*. Institute of Electrical and Electronics Engineers Inc., pp. 47940–47955. Available at: https://doi.org/10.1109/ACCESS.2023.3275764.