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ORGANIZATIONAL ADOPTION OF COMPUTER-ASSISTED AUDIT TOOLS AND TECHNIQUES IN INTERNAL AUDITING: A LITERATURE REVIEW

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ABSTRACT

Despite the recognized importance of Computer-Assisted Audit Tools and Techniques (CAATTs) in enhancing the efficiency of internal auditing, there is a lack of a critical literature review analyzing the organizational factors influencing their adoption. This research was necessitated by the lack of substantial literature relating to this narrowly focused topic. The objective of this research is to analyze the literature concerning the theoretical foundations of the organizational adoption of CAATTs in internal auditing. This study applies a literature review of scientific studies on organizational adoption of CAATTs in internal auditing and offers a comprehensive synthesis of existing findings, identifies gaps in current knowledge, and outlines the theories that have been used. Despite their potential, the adoption of CAATTs in internal auditing within organizations remains inconsistent and is influenced by a variety of technological, organizational, and environmental factors. Findings highlight that the existing literature largely neglects the role of moderating variables in the adoption process. The Technology-Organization-Environment framework has been identified as the most commonly used theoretical framework for adopting CAATTs at the organizational level. The results reveal a notable discrepancy where CAATT's adoption levels are higher than actual usage rates, suggesting that organizational integration has not yet resulted in full operational utilization. The findings indicate that factors across different theoretical frameworks do not influence the organizational adoption of CAATTs equally, with organizational and environmental drivers often outweighing technological readiness.

KEYWORDS: *Computer-Assisted Audit Tools and Techniques, CAATTs, internal auditing, organizational technology adoption, Technology-Organization-Environment framework, TOE framework*

New technologies are integral to decision-making and task performance. However, the effective use of Information and Communication Technologies (ICT) depends on available technological infrastructure and technical expertise. Computer-Assisted Audit Tools and Techniques (CAATTs) are technological tools that assist auditors in completing the audit process (Rosli et al., 2013; Tetteh et al., 2025). ICT integration significantly reshapes internal audit methodologies, improving information flow and strategic decision-making (Thottoli & Ahmed, 2019). Organizations adopting ICT face several challenges, including high costs, resistance to change, data privacy concerns, and cybersecurity threats. Both employees and management may resist new technologies due to a fear of the unknown or potential job losses (AlBar & Hoque, 2019). The adoption

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of advanced technologies requires large initial investments and ongoing maintenance costs, which can be an obstacle for small and medium-sized organizations compared to larger ones (Bradac Hojnik & Huđek, 2023). Security issues related to data protection and cybersecurity can hinder the implementation of new technologies (Eze et al., 2018). Consequently, the organizational adoption of ICT in internal auditing is crucial for long-term success, enabling organizations to remain competitive in a rapidly changing marketplace. However, this adoption process requires careful planning, effective change management, and the active engagement of all organizational stakeholders (Xie & Wu, 2021).

This paper provides a theoretical overview of the organizational adoption of CAATTs in internal auditing, driven by several key factors. First, rapidly evolving audit technologies necessitate updated insights into current practices. Second, although the audit profession strongly advocates for the use of CAATTs, acceptance and adoption rates in practice remain low (Awuah et al., 2022; Daoud et al., 2021). Therefore, consolidating knowledge on CAATTs adoption is essential. This review synthesizes various interconnected factors into a coherent theoretical framework. The general objective of this literature review is to explore the organizational adoption of CAATTs in internal auditing by addressing the following research questions (RQs):

RQ1 What theoretical frameworks are most commonly used in the literature to explain the process of organizational adoption of CAATTs in internal auditing?

RQ2 What are the main factors influencing organizational adoption of CAATTs in internal auditing?

RQ3 What are the most common barriers and challenges that organizations face in organizational adoption of CAATTs in internal auditing?

The rest of the paper is structured as follows: Section 2 provides an analytical overview of internal auditing; Section 3 defines CAATTs; Section 4 outlines the theoretical foundations of organizational technology adoption; Section 5 describes the methodology; Section 6 presents the results of the content analysis; Section 7 provides the discussion; and Section 8 concludes the study.

1. INTERNAL AUDITING

In an era of rapid technological advancement and digital transformation, internal auditing has evolved from a traditional oversight function into a proactive pillar of effective corporate governance. To navigate increasing regulatory complexity, the profession is shifting from a reactive stance toward a strategic, forward-thinking approach. According to the Global Internal Audit Standards (2024), internal auditing is defined as "independent, objective assurance and consulting activity designed to add value and improve an organization's operations. It helps an organization accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes" (The Institute of Internal Auditors, 2024). Internal auditing ensures organizational stability through effective risk management and ethical business practices. By facilitating the achievement of organizational goals and bolstering governance processes, it strengthens both decision-making and institutional reputation. The Global Internal Audit Standards provide the foundation for professional practice and the enhancement of audit quality. Through 15 guiding principles supported by specific requirements and evidence, these standards ensure the fulfillment of the purpose internal auditing. However, the modern audit environment requires more than just adherence to definitions; it demands agility. This necessity for agility stems from the inadequacy of traditional, rigid audit cycles to keep pace with volatile digital risks. To effectively address disruptions, internal auditing must remain agile and responsive (Attaf, 2025). Agile internal auditing is characterized by shortened lifecycles, spanning from assessment to reporting, which enable auditors to share timely insights regarding the organization's most urgent risks and ensure a nimble response to disruptions (DeRoche, 2022). By integrating agile methodologies, internal auditing can robustly protect and enhance organizational value, thereby increasing productivity while eliminating process "waste" (El Massaoudii et al., 2025). Through a focus on flexibility and transparent collaboration, agile internal auditing enables faster reactions and more robust management of uncertainty.

A critical analytical tension in this evolution lies in the convergence of efficiency and effectiveness. While efficiency - the optimization of resources - is an operational prerequisite for creating analytical capacity, effectiveness remains the ultimate goal, focusing on the strategic impact and achievement of audit objectives. While the Global Internal Audit Standards (2024) place significant emphasis on both, they serve different strategic purposes that often compete for organizational resources. This tension arises because an overemphasis on operational efficiency - often measured by strict adherence to budgeted hours and cycle times - can inadvertently constrain the cognitive space required for the critical thinking and professional skepticism es-

TABLE 1: Comparative Analysis of Efficiency and Effectiveness through CAATTs Integration in Internal Auditing

Dimension of Analysis	Focus (Efficiency)	Outcome (Effectiveness)	The Role of CAATTs
Primary Objective	Resource and time optimization ("Doing things right").	Achievement of strategic goals ("Doing the right things").	Automating routine data access, collection, and processing.
Key Performance Indicators (KPIs)	Staff utilization, cycle times, actual vs. budgeted hours.	Implementation rate of recommendations, quality of findings, stakeholder satisfaction.	Transforming KPIs from quantitative (volume) to qualitative (predictive insight).
Agile Approach	Eliminating process "waste"; shortening assessment-to-reporting cycles.	Providing timely insights to manage critical and urgent risks.	Enabling real-time monitoring and rapid response to disruptions.
Strategic Role	Operational prerequisite: Efficient data handling creates the necessary space for analysis.	Ultimate goal: Adding value, protecting reputation, and supporting decision-making.	Serving as a bridge that frees up auditors' cognitive capacity for advisory roles.

SOURCE: Author

sential for audit effectiveness. In this context, CAATTs and Artificial Intelligence (AI) serve as the technological bridge between these two dimensions. The strategic value of these tools lies in their ability to automate routine data handling, thereby freeing the auditor's capacity to transition from a "retrospective checker" to a "proactive advisor". This multidimensional relationship is synthesized in Table 1.

The transition illustrated in Table 1 suggests that CAATTs act as a catalyst for professional de-routinization. By automating the "waste" in data collection (efficiency), auditors can reallocate their cognitive resources toward the qualitative interpretation of complex risks (effectiveness). Thus, the strategic importance of CAATTs lies not in the speed of testing, but in the expanded capacity for institutional advisory roles. Ultimately, the integration of CAATTs is not merely a technical upgrade but a strategic necessity for maintaining institutional reputation in a changing risk landscape. By prioritizing flexibility and transparent collaboration, agile internal auditing - supported by robust technological tools - allows for faster reactions and more effective management of uncertainty.

2. COMPUTER-ASSISTED AUDIT TOOLS AND TECHNIQUES IN INTERNAL AUDITING

Computer-Assisted Audit Tools and Techniques represent specialized software solutions that support internal auditors in accessing, collecting, analyzing, and interpreting data, thereby facilitating the formulation of audit opinions within the internal audit process. The adoption of CAATTs in internal auditing can provide several benefits, including increased efficiency, improved audit accuracy, and enhanced audit quality (Ahmi et al., 2014; Serpeninova et al., 2020; Smidt et al., 2019). CAATTs ensure competitiveness in dynamic markets by providing vital tools for analyzing extensive datasets and reaching reliable conclusions. While traditional auditing examines data correctness, modern internal auditing focuses on risk management, a shift increasingly driven by AI's ability to provide predictive insights. Modern auditing adds value by providing management with superior decision-making information (Tušek & Pokrovac, 2009). To meet rising regulatory demands and improve productivity, new technologies are now imperative (Eu-Gene et al., 2020). They facilitate rapid processing of large datasets and ensure greater transparency (Thottoli & Ahmed, 2019).

CAATTs automate data extraction and verification, improving audit accuracy. They facilitate advanced analytics and risk-based sampling over random selection. By enabling real-time monitoring and automated reporting, these tools allow auditors to efficiently and consistently target high-risk areas. Advanced CAATTs identify fraudulent patterns and transactions (Al Natour et al., 2025), reducing audit time and costs. Automating manual tests enables full population testing, significantly increasing the reliability of conclusions compared to traditional sampling (Ghani et al., 2017). Auditors must therefore continuously update their technological skills to ensure compliance with evolving standards. The transition towards AI in the au-

diting landscape signals a departure from traditional, retrospective analysis toward a model of persistent oversight. While conventional CAATTs operate within a framework of established parameters, AI-enhanced methodologies leverage adaptive learning to identify irregularities dynamically and forecast vulnerabilities, thereby shifting the audit function from detection to prevention. AI-driven methods utilize probabilistic models to identify patterns and discover unknown anomalies across both structured and unstructured data (Dambe et al., 2023). This transition fundamentally alters the auditor's role from one of high intervention - where queries must be manually designed - to a supervisory capacity centered on validating AI outputs and refining models through feedback loops (Topolko Herceg, 2026). Furthermore, AI offers superior scalability, enabling real-time continuous auditing, whereas traditional CAATTs remain limited by static dataset sizes and limited processing power (Hasan, 2022).

3. A THEORETICAL FOUNDATIONS ON ORGANIZATIONAL TECHNOLOGY ADOPTION

Organizational adoption of ICT has received less research attention than individual adoption (Al-Okaily et al., 2024; Li, 2020). Organizational adoption is more complex, as it is influenced by a broader range of technological, organizational, and environmental factors. Consequently, academic researchers have applied various theoretical frameworks to explain the complexity of this process across different national and organizational contexts. Prominent models used in this field include the Diffusion of Innovation (DOI) theory, the Technology-Organization-Environment (TOE) framework, Institutional Theory, and the Iacovou et al. model.

3.1. Diffusion of innovations theory

The Diffusion of Innovations (DOI) theory, developed by Everett Rogers in 1962, remains one of the oldest and most influential frameworks for understanding innovation adoption. The theory explains how, why, and at what rate new ideas and technologies spread through societies or organizations. Specifically, DOI theory outlines certain attributes of innovations that significantly influence the adoption decision (Rogers, 2003). As a sociological theory, it is used to clarify the patterns and processes underlying the successful adoption of new technology (Shahadat et al., 2023). Diffusion occurs when organizations, groups, individuals, or subsystems accept and adopt innovative ideas, such as new technologies (Horani et al., 2023). Rogers (2003) defines diffusion as the process by which an innovation is communicated over time through specific channels among members of a social system. In this context, "communication" refers to the process in which participants create and share information to achieve mutual understanding; thus, diffusion is a specialized type of communication where the message conveys a new idea (Buć, 2018). Rogers (2003) defines an innovation as "an idea, process, or object that is new to the potential adopter", noting that it is irrelevant whether the idea is objectively new in terms of time since its discovery. Rather, the perception of novelty is key: an individual may be aware of an idea, but until a decision to adopt or reject it is made, it remains an innovation to them (Buć, 2018). Furthermore, organizations adopt innovations either in response to external pressures or to capitalize on emerging environmental opportunities (Hameed & Counsell, 2012). Rogers (2003) posits that innovation is a fundamental process inherent to all organizational structures, defining an organization as "a stable system of individuals working together to achieve common goals through a hierarchical structure and division of labor". The DOI theory focuses on adoption processes where organizational factors significantly influence the decision-making unit - the mental process from initial knowledge to final confirmation (Buć, 2018). Ultimately, DOI models provide a dynamic perspective on the evolution of technology adoption within organizations over time (Li, 2020).

The theory conceptualizes adoption as a voluntary process wherein individuals engage in information-seeking and processing activities to reduce uncertainty concerning the potential benefits and limitations of an innovation (Li, 2020). Furthermore, the theory delineates five technological attributes that drive adoption: trialability (the ability to test an innovation on a limited scale), observability (the visibility of an innovation's benefits to potential users), complexity (the perceived difficulty of understanding or using the tool), relative advantage (the degree to which it surpasses existing solutions), and compatibility (the alignment of the innovation with the adopter's existing values and needs) (Lutfi & Alqudah, 2023; Rogers, 2003). Despite its influence, scholars have argued that Rogers' model should be integrated with additional contextual factors to achieve a more comprehensive understanding of the adoption process (Hoti, 2015). A notable limitation of DOI theory is its exclusion of the external environment from the adoption framework (Horani et al., 2023; Sayginer & Ercan, 2020).

3.2. The Technology-Organization-Environment framework

The Technology-Organization-Environment (TOE) framework, developed by Tornatzky and Fleischer in 1990, was designed to analyze the adoption of emerging information technologies (IT) at the organizational level (Alkhater et al., 2015; Baker, 2012). This framework is widely used in the information and accounting systems literature to analyze IT adoption factors across various contexts (Al-Okaily et al., 2024). A key strength of the TOE framework lies in its ability to clarify both internal and external factors within a single paradigm (Nguyen et al., 2022). Specifically, the TOE framework specifies three types of factors that influence the adoption of new technologies: the technological, organizational, and environmental contexts (Hoti, 2015). The technological context encompasses equipment and processes that enhance productivity. The organizational context involves resources and characteristics such as size, structure, and human qualifications. Finally, the environmental context concerns the industry landscape and interactions with partners, competitors, and government entities. It encompasses the organization's external stakeholders, the macroeconomic environment, and the regulatory framework (Baker, 2012; Hoti, 2015). Technological moderators, like compatibility and ease of use, influence the integration of CAATTs. Organizationally, firm size and top management support catalyze the speed and extent of adoption. Finally, environmental elements, such as regulations and external pressure, compel organizations to align auditing practices with industry standards.

The TOE framework is consistent with DOI theory but extends it by incorporating the environmental context (AlBar & Hoque, 2019). Due to the absence of environmental considerations in DOI, the TOE framework offers a more robust explanation of intra-firm technology adoption (Hoti, 2015). Specifically, the environmental context highlights both the limitations and opportunities inherent in technological innovation (Oliveira & Martins, 2011). The TOE framework and DOI theory share significant similarities, with notable overlaps between their technological and organizational dimensions. Specifically, DOI's innovation and organizational characteristics align closely with TOE's technological and organizational contexts. Adoption predictors within DOI, such as internal organizational structure, are considered comparable to the organizational context component of the TOE framework. Similarly, the DOI theory's external organizational characteristics align with the environmental context defined in the TOE framework (Baker, 2012). However, significant differences exist. For instance, the TOE framework does not incorporate individual factors, unlike DOI theory. Additionally, DOI does not address the influence of environmental factors, which remains a key element of the TOE framework (Ilin et al., 2017). Given the strong similarities between these theories, the TOE framework is typically not modified to incorporate DOI elements; instead, researchers emphasize their close relationship and conceptual alignment (Baker, 2012).

The TOE framework has been extensively applied in information systems research to examine how IT contributes to adding value and gaining a competitive advantage for organizations (Alsheibani et al., 2019). It proves to be an effective analytical tool for examining the adoption of modern technologies, as it incorporates both technological and environmental-social factors (Horani et al., 2023). This framework is grounded in solid theory, validated through empirical studies, and adaptable to various domains within information systems - notwithstanding variations in the specific factors identified within its technological, organizational, and environmental dimensions across different studies (Oliveira & Martins, 2011). While the TOE framework effectively outlines the internal and external drivers of organizational IT adoption, it fails to establish a clear cause-and-effect relationship among its three core contexts. While the framework is well-suited for identifying the primary drivers of organizational change, it is less effective at explaining the underlying processes of transformation (Kos Tušek, 2023).

The TOE framework has inherent constraints. Its static nature excels at identifying determinants but fails to address the actual implementation process. By treating the organization as a singular unit, it obscures internal micro-politics and user resistance. Furthermore, the broad categories of the framework often lead to classification inconsistencies. For instance, factors like "vendor support" are categorized differently across studies, making it difficult to compare research results. Finally, unlike user-centric models, TOE operates strictly at the organizational level, ignoring individual attitudes. Ultimately, the TOE framework functions as a descriptive taxonomy for retrospective analysis rather than a predictive engine (Mu'min et al., 2025). For instance, it lacks the causal precision to mathematically define the amount of environmental pressure required to offset a specific deficit in technological readiness.

3.3. Institutional theory

Institutional theory is the most frequently utilized theory after DOI theory and the TOE framework (Ahmad et al., 2020). Institutional theory posits that organizational behavior is shaped by institutionalized rules, practices, and structures rather than just rational efficiency. It suggests that decisions are driven by social

forces, cultural norms, and concerns about legitimacy. The theory argues that organizations become increasingly similar over time, as competition and customer pressure motivate them to emulate industry leaders (Ahmad et al., 2020; Sun et al., 2016). Philip Selznick laid the foundations of institutional theory in his 1957 work, "Leadership in Administration", exploring how organizations become institutionalized by adopting norms and values that transcend their own goals. He posited that an institution is an adaptive organism that responds to social needs and pressures (Terry, 1993). Selznick introduced "institutionalization" as a process through which an organization adopts socially expected behavioral patterns. A major theoretical breakthrough occurred in 1977 with the publication of John W. Meyer and Brian Rowan's paper, "Institutionalized Organizations: Formal Structure as Myth and Ceremony". In this work, they emphasized that organizations often adopt formal structures primarily to gain legitimacy, even when such structures do not enhance technical efficiency (Krajnović, 2018). In 1983, Paul DiMaggio and Walter Powell introduced the concept of institutional isomorphism - the mechanisms through which organizations within the same field become increasingly similar (Oliveira & Martins, 2011; Sun et al., 2016). These environmental constraints compel organizations to adopt practices similar to those of their peers operating under comparable conditions. DiMaggio and Powell (1983) identified three types of isomorphism: coercive, normative, and mimetic. Coercive pressure stems from organizations that control essential resources. Normative pressure involves adherence to professional standards established through education and networks. Mimetic pressure occurs when organizations imitate or copy successful leaders in response to strategic uncertainty. Since the 1990s, this framework has expanded into information systems research, and since 2000, it has shifted toward examining dynamic changes in digital transformation and modern technology adoption.

Institutional theory emphasizes the influence of the institutional environment on organizational behavior, providing a valuable framework for analyzing the dynamics of institutional transformation (Sun et al., 2016). It stresses the impact of the external environment, highlighting how environmental conditions exert a formative influence on organizational actions and decisions (Krajnović, 2018). The adoption process is significantly shaped by external pressures, suggesting that institutional decisions stem not only from internal objectives but also from exogenous social forces, including political and societal pressures (Sun et al., 2016). Consequently, organizational decisions are the product of a complex reciprocity between rational efficiency goals and the social, cultural, and legitimacy concerns that organizations navigate within their institutional fields (Buć, 2018).

3.4. Iacovou et al. model (The Iacovou, Benbasat, and Dexter model)

The Iacovou et al. model provides a framework for investigating how diverse organizational factors influence the decision to adopt new technologies. Developed in 1995 by Christopher Iacovou, Izak Benbasat, and Andrew Dexter, the model was initially tailored for studying the adoption of Electronic Data Interchange (EDI) in business organizations, but has since been extended to the broader area of new technology adoption. The model has become a key framework for understanding organizational decisions, especially in the context of connectivity with business partners and the integration of business processes. It places significant emphasis on the interaction between organizational goals and external factors, such as political and social pressures; this implies that technological decisions are not purely rational, but are also driven by social and cultural factors. The framework is operationalized through three key contextual factors: perceived benefits, representing the extent to which an innovation improves performance; organizational readiness, encompassing the availability of technological and financial resources; and external pressure, reflecting the influence of the competitive environment and business partners. The Iacovou et al. model defines external pressure as the influence exerted by external entities, such as trading partners, competitors, or regulatory bodies. The model identifies two distinct types of external pressure: competitive pressure and pressure from trading partners. Alomar (2019) describes competitive pressure as the potential competitive advantage gained by using technology within a relevant industry, which effectively compels a company to adopt it. While larger organizations adopt technologies more easily due to superior resource management, Alomar (2019) emphasizes that pressure from dominant trading partners has a decisive impact on smaller organizations. Small organizations can hardly resist the technological solutions imposed by major partners, making the adoption of such technologies more of a necessity than a strategic choice (Alomar, 2019; Iacovou et al., 1995). Larger organizations leverage better resources for easier technology adoption. Although complexity drives automation, system compatibility remains a key constraint. Therefore, technologies requiring extensive adaptation are approached with caution due to higher integration risks.

4. METHODOLOGY

This study uses a literature review to synthesize research on the organizational adoption of CAATTs in internal auditing. This transparent and reproducible methodology ensures methodological rigor in assessing current studies while consolidating fragmented knowledge to provide a foundation for future research. The search was conducted in the relevant scientific databases: Scopus, Web of Science, EBSCOhost, ScienceDirect, Springer, and Google Scholar. This paper identified a set of relevant keywords to facilitate the retrieval of literature published between 2013 and 2025, employing the Boolean operators AND and OR to optimize the comprehensiveness and precision of the search strategy. These are, in order, ("Computer-Assisted Audit Tools" OR "CAATTs" OR "Audit Technology") AND ("Internal Auditing" OR "Internal Audit" OR "Internal Auditor") AND ("Organizational Adoption" OR "Technology Adoption" OR "Innovation Adoption") AND ("Implementation" OR "Use" OR "Utilization"). This paper provides a summary of studies identified according to predefined inclusion and exclusion criteria. The research included peer-reviewed scientific papers published between 2013 and 2025. A notable upturn in academic interest regarding Big Data analytics occurred in 2013, shifting the focus from traditional spreadsheets toward sophisticated CAATTs. By incorporating literature from 2020 to the present, this study offers a forward-looking perspective on audit effectiveness. Selected papers focused specifically on the organizational adoption of CAATTs in internal auditing and were accessible in either English or Croatian. Studies were excluded if they lacked empirical or theoretical contributions, focused exclusively on external auditing or individual acceptance, were duplicates, contained incomplete data, or were unavailable in the required languages. To ensure the quality and thematic relevance of the literature, a rigorous manual screening process was employed. After the initial database search, the author manually evaluated titles, abstracts, and full texts. This manual intervention was crucial for identifying nuanced organizational factors in CAATTs adoption that automated keyword filters might overlook, thereby enhancing the transparency and replicability of the selection criteria. The study selection process followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure transparency and replicability of the results.

The selection process began with the identification of 412 records through the databases. After removing duplicates, 339 titles and abstracts underwent initial screening, of which 284 were excluded for not matching the thematic focus. Following a detailed evaluation of the full texts, another 47 sources were excluded as they did not meet the research criteria, resulting in a final sample of 8 key publications for analysis. These selected papers were analyzed qualitatively, focusing on identified factors influencing the organizational adoption of CAATTs in internal auditing, theoretical models and frameworks used, key challenges and implementation limitations, and identified research gaps. The final selection of eight studies is a direct result of applying stringent quality and relevance criteria, focusing exclusively on empirical studies on organization-level CAATTs adoption. Rather than providing a broad but superficial overview, this review prioritizes depth over breadth. This small but highly specialized sample reflects the current state of literature in this niche area.

5. RESULTS

This section provides a critical overview of relevant scientific studies examining the organizational adoption of CAATTs in internal auditing, highlighting theoretical approaches and key findings. Through a critical analysis of existing literature, this review aims to synthesize empirical evidence on adoption models, identify research gaps, and evaluate the applicability of existing frameworks within this field. The synthesis of these studies serves as a foundation for future research to support the effective integration of CAATTs into internal auditing processes. Table 2 provides an overview of the aforementioned research.

TABLE 2. Overview of scientific studies on organizational adoption of CAATTs in internal auditing

Author (Year)	Scientific Paper	Theory	Key Findings	Gap / Limitations	Factors
Tetteh, L.A., Simpson, S.N.Y., Nyabey, E.P., Kubaje, T.A., Togormey, R., & Tagoe, F. (2025)	Utilising the Technology -Organisation - Environment Framework in Understanding the Adoption and Usage of Computer-Assisted Audit Tools and Techniques: A Qualitative Insight	TOE & Institutional Theory	This qualitative study shows that not all TOE factors equally influence CAATTs adoption. Specifically, it finds that mimetic pressure is not a key factor for internal audit units in Ghana, which challenges previous research that emphasized competitive pressure as an important environmental driver. The findings contribute rich, qualitative understanding to the theory and practice of CAATT implementation in developing countries.	Lack of Mixed Methods - limited qualitative findings; focuses exclusively on companies in Ghana; SMEs and public sector adoption of CAATTs remain under-researched	Relative advantage, Compatibility, Complexity, Management support, Staff competence, Firm size, Competitive isomorphic pressure, Regulatory isomorphic pressure, Normative isomorphic pressure
Wijerathna, J. M. K. G. T. G. (2024)	The Impact of Organizational Factors and Environmental Factors on the Adoption of Computer Assisted Audit Tools and Techniques (CAATTs) by SME in Sri Lanka	TOE	The findings suggest that organizational factors such as Accounting Information Systems (AIS) complexity and Perceived support from professionals play a significant role in CAATTs adoption among small audit firms. In conclusion, the study highlights the importance of considering organizational factors, such as in promoting CAATTs adoption.	Focuses exclusively on small audit firms in Sri Lanka; relatively small sample; mono-theoretical approach	Client AIS complexity, Firm size, Perceived level of professional accounting body support, Top management commitment
Lutfi, A., & Alqudah, H. (2023)	The Influence of Technological Factors on the Computer-Assisted Audit Tools and Techniques Usage during COVID-19	DOI	The findings indicate that, with the exception of complexity, all other factors have a positive and significant influence on the utilization of CAATTs. Auditors' IT knowledge positively moderates the relationship between CAATTs usage and internal audit effectiveness.	Examines only technological characteristics from the DOI theory; lack of qualitative data; no comparative analysis with private sector	Relative advantage, Trialability, Compatibility, Observability, Complexity, IT knowledge
Al-Okaily, M., Alqudah, H., Al-Qudah, A., & Alkhwaldi, A. (2024)	Examining the critical factors of computer-assisted audit tools and techniques adoption in the post-COVID-19 period: Internal auditors' perspective	TOE & DOI	Entity size moderates the influence of top management support on the CAATTs adoption in the public sector. The study extends the TOE framework by incorporating government regulations, support from audit institutions, and audit task complexity as key environmental factors influencing the adoption of CAATTs in the public sector context. Professional body support did not show a significant effect on the CAATTs adoption.	Focuses on CAATTs adoption in the public sector; some factors identified as significant in previous studies did not show significance in this study, which may reflect unique local characteristics	Relative advantage, Compatibility relative, Complexity, Top management support, Organizational Readiness, IT competency, Entity size, Government regulations, Professional body support, Audit task complexity

Author (Year)	Scientific Paper	Theory	Key Findings	Gap / Limitations	Factors
Awuah, B., Onumah, J. M., & Duho, K. C. T. (2022)	Determinants of Adoption of Computer-Assisted Audit Tools and Techniques among Internal Audit Units in Ghana	TOE	While adoption levels are relatively high, actual usage in key audit tasks remains low. The extended TOE framework reveals that technological, organizational, and environmental readiness significantly influence the intention to adopt CAATTs. The study suggests that training, IT infrastructure, and data expertise can enhance CAATTs adoption and use, offering practical insights for audit leaders and policymakers. CAATTs are mostly applied in risk assessment and fraud detection. Behavioral intention significantly influences actual adoption and it is shaped by technological, organizational, and environmental readiness. Compatibility does not affect the technology adoption.	Focused on Ghanaian internal audit units; insufficient exploration of auditor competence and training impacts; the study captured general adoption and use but did not deeply quantify levels of usage for different types of CAATTs or compare outcomes between tools	Relative advantage, Simplicity, Compatibility, Technological competence, Management support, External pressure, Standards
Mujalli, A, & Almgrashi, A. A (2020)	Conceptual Framework for Generalised Audit Software Adoption in Saudi Arabia by Government Internal Auditing Departments using an Integrated Institutional Theory-TOE Model	TOE & Institutional Theory	The adoption of Generalised Audit Software in Saudi Arabia's public sector is shaped by interaction of technological, organizational, environmental, and institutional factors. The proposed conceptual model offers a holistic understanding of these interconnected influences. The study emphasizes the role of coercive (regulatory), mimetic (competitive), and normative (professional) pressures in shaping the adoption decisions.	Focus on government sector only; gap in linking audit software adoption with risk-based auditing practices; need for broader quantitative testing	Relative advantage, Complexity, Compatibility, Management support, Technological readiness, Training and education, Normative pressure, Coercive pressure, Mimetic pressure
Ahmi, A., Saidin, S.Z., & Abdullah, A. (2014)	IT Adoption by Internal Auditors in Public Sector: A Conceptual Study	TOE	This paper underscores the importance of CAATTs in supporting a wide range of IT-related audit tasks. It aims to guide future research on IT adoption in Malaysia's public sector. The paper also emphasizes the role of IT in improving audit effectiveness, efficiency, and overall productivity, which can positively impact the broader economy.	Primarily conceptual and does not provide empirical data or quantitative testing to validate the proposed framework; organizational and environmental factors are underexplored	Availability of technology, audit experts, IT infrastructure, Readiness of technology, Budget, Characteristics and Features of technology, Ease of use, Cost, Compatibility, Flexibility, Organizational support, Size, Client's characteristics, Government regulation

Author (Year)	Scientific Paper	Theory	Key Findings	Gap / Limitations	Factors
Rosli, M. H., Yeow, P. H. P., & Siew, E. G. (2013)	Adoption of Audit Technology in Audit Firms	TOE & DOI & Institutional Theory	The paper enhances the original TOE framework by adding client's AIS complexity and professional accounting body support to develop a more complete model for CAATTs adoption. Audit technology should be included in higher education to raise awareness among accounting students, while professional bodies should enforce stricter requirements and offer support to promote its adoption in audit firms.	Limited sample size and scope; does not deeply investigate socio-cultural influences or regulatory environments	Technology cost-benefit, Compatibility, Complexity, Top management commitment, Human Resource IT competency, Readiness, Client's AIS complexity, Competitive pressure, Professional Accounting Body, Vendor service

SOURCE: Authors.

The findings outlined below suggest that the organizational adoption of CAATTs in internal auditing is influenced by a combination of factors within the technological, organizational, and environmental contexts. Table 3 provides an overview of the primary factors identified in the reviewed literature.

TABLE 3. Overview of factors influencing organizational adoption of CAATTs in internal auditing

Theory	Context	Factors	References
TOE, DOI	*Technological*	Relative advantage	(Al-Okaily et al., 2024; Awuah et al., 2022; Lutfi & Alqudah, 2023; Mujalli & Almgrashi, 2020; Tetteh et al., 2025)
TOE, DOI	*Technological*	Complexity	(Al-Okaily et al., 2024; Lutfi & Alqudah, 2023; Mujalli & Almgrashi, 2020; Rosli et al., 2013; Tetteh et al., 2025)
TOE, DOI	*Technological*	Compatibility	(Ahmi et al., 2014; Al-Okaily et al., 2024; Awuah et al., 2022; Lutfi & Alqudah, 2023; Mujalli & Almgrashi, 2020; Rosli et al., 2013; Tetteh et al., 2025)
DOI	*Technological*	Trialability	(Lutfi & Alqudah, 2023)
DOI	*Technological*	Observability	(Lutfi & Alqudah, 2023)
TOE	*Technological*	Simplicity	(Awuah et al., 2022)
TOE	*Technological*	Availability of technology	(Ahmi et al., 2014)
TOE	*Technological*	Availability of audit experts	(Ahmi et al., 2014)
TOE	*Technological*	Availability of IT infrastructure	(Ahmi et al., 2014)
TOE	*Technological*	Readiness of technology	(Ahmi et al., 2014)
TOE	*Technological*	Availability of the budget	(Ahmi et al., 2014)
TOE	*Technological*	Characteristics of technology	(Ahmi et al., 2014)
TOE	*Technological*	Features of technology	(Ahmi et al., 2014)
TOE	*Technological*	Ease of use of technology	(Ahmi et al., 2014)
TOE	*Technological*	Cost of technology	(Ahmi et al., 2014; Rosli et al., 2013)
TOE	*Technological*	Flexibility of technology	(Ahmi et al., 2014)

Theory	Context	Factors	References
TOE	*Organizational*	Staff competence	(Tetteh et al., 2025)
TOE	*Organizational*	Firm size / Entity size	(Ahmi et al., 2014; Al-Okaily et al., 2024; Tetteh et al., 2025; Wijerathna, 2024)
TOE	*Organizational*	Client AIS complexity	(Rosli et al., 2013; Wijerathna, 2024)
TOE	*Organizational*	(Top) management support	(Ahmi et al., 2014; Al-Okaily et al., 2024; Awuah et al., 2022; Mujalli & Almgrashi, 2020; Tetteh et al., 2025)
TOE	*Organizational*	Top management commitment	(Rosli et al., 2013; Wijerathna, 2024)
TOE	*Organizational*	Organizational Readiness	(Al-Okaily et al., 2024; Rosli et al., 2013)
TOE	*Organizational*	IT competency	(Al-Okaily et al., 2024; Rosli et al., 2013)
TOE	*Organizational*	Technological competence	(Awuah et al., 2022)
TOE	*Organizational*	Technological readiness	(Mujalli & Almgrashi, 2020)
TOE	*Organizational*	Training and education	(Mujalli & Almgrashi, 2020)
TOE	*Organizational*	Organizational support	(Ahmi et al., 2014)
TOE	*Environmental*	Professional accounting body support	(Al-Okaily et al., 2024; Rosli et al., 2013; Wijerathna, 2024)
TOE	*Environmental*	Government regulations	(Ahmi et al., 2014; Al-Okaily et al., 2024)
TOE	*Environmental*	Audit task complexity	(Al-Okaily et al., 2024)
TOE	*Environmental*	External pressure	(Awuah et al., 2022)
TOE	*Environmental*	Standards	(Awuah et al., 2022)
TOE	*Environmental*	Client's characteristics	(Ahmi et al., 2014)
TOE	*Environmental*	Vendor service	(Rosli et al., 2013)
Institutional	*Environmental*	Competitive isomorphic pressure	(Rosli et al., 2013; Tetteh et al., 2025)
Institutional	*Environmental*	Regulatory isomorphic pressure	(Tetteh et al., 2025)
Institutional	*Environmental*	Normative isomorphic pressure	(Mujalli & Almgrashi, 2020; Tetteh et al., 2025)
Institutional	*Environmental*	Coercive pressure	(Mujalli & Almgrashi, 2020)
Institutional	*Environmental*	Mimetic pressure	(Mujalli & Almgrashi, 2020)

SOURCE: Authors.

There are multiple well-documented barriers and challenges that organizations often encounter when adopting CAATTs in internal auditing. The analysis of the literature reveals integration challenges due to system incompatibility, technological complexity, and concerns regarding data security and privacy. Additionally, organizations face a lack of IT skills, technical expertise, and competencies, alongside low digital literacy or technological readiness. Other significant barriers include resistance to change, limited top management support, a lack of support from professional accounting bodies and a lack of regulatory clarity coupled with stringent compliance pressures.

6. DISCUSSION

Most previous research has primarily examined individual acceptance of CAATTs rather than organizational-level adoption (Tetteh et al., 2025). As organizations face increasing pressure to improve audit efficiency, data quality, and regulatory compliance, CAATTs offer a promising solution through automation, data analytics, and real-time reporting. Consequently, researchers have sought to explore the specific factors influencing this organizational adoption. The reviewed literature demonstrates a strong current interest in understanding how these tools are integrated into internal auditing, emphasizing various influencing factors. Existing studies rely on established theoretical frameworks to provide a multidimensional perspective and a struc-

tured direction for the research process. Among these, the TOE framework stands out as the most frequently used due to its flexibility and broad applicability, proving particularly effective and receiving strong empirical support across diverse contexts. However, existing research lacks integration across frameworks and diverse organizational contexts, a gap that becomes even more critical with the emergence of AI-driven tools. This indicates a need for comprehensive, comparative studies to support both theoretical development and the organizational adoption of CAATTs in internal auditing.

The value of this paper lies in its exclusive focus on the organizational adoption of CAATTs in internal auditing. This process represents a key step toward modernizing audit functions, providing the foundational infrastructure required for future AI-driven enhancements. Successful implementation depends not only on the availability of technological infrastructure, but also on organizational readiness - especially management support and a culture open to innovation. In this context, CAATTs serve as a critical precursor to AI-driven analytics, as organizations must master automated data handling before transitioning to autonomous auditing tools. The theoretical frameworks reviewed in this study provide valuable insights into these adoption processes, highlighting both internal drivers and external pressures.

7. CONCLUSION

Addressing organizational adoption challenges through continuous professional development, stronger leadership, and infrastructure investment is crucial for maximizing the strategic benefits of CAATTs. In light of the results, the research questions are answered as follows. The TOE framework is the most commonly used model to explain the organizational adoption of CAATTs in internal auditing (RQ1). The most researched factors influencing this process include relative advantage, complexity, and compatibility (technological context); organizational size and management support (organizational context); and professional accounting body support (environmental context) (RQ2). Finally, the most common barriers organizations face are technological complexity, resistance to change, limited top management support, and a lack of support from professional accounting bodies (RQ3).

This review provides both theoretical and methodological contributions by identifying research gaps and synthesizing scientific evidence on the organizational adoption of CAATTs. It provides a basis for future empirical studies while helping students understand technology acceptance theory. For Chief Audit Executives (CAEs) and Chief Executive Officers (CEOs), the study clarifies factors influencing organizational CAATTs adoption and identifies reasons for failure. In an era of rapid AI integration, these insights are vital for ensuring foundational technologies are implemented before transitioning to advanced autonomous tools. Consequently, it helps organizations avoid pitfalls and leverage best practices within internal audit functions.

This interpretive qualitative synthesis relies on purposive sampling. Its limitations include restricted access to certain full-text papers and the manual selection and screening process. Regarding practical implications, several strategies are proposed. Organizations should implement upskilling programs focused on AI-driven analytics, ensuring employees can manage the shift from CAATTs to advanced technological solutions. To mitigate resistance, management should foster technological transparency, clearly communicate the benefits of AI-driven analytics, and involve auditors early in the tool selection process. Finally, organizations must prioritize budgets not only for software but also for robust data governance frameworks to address cybersecurity and privacy concerns.

The findings of this study suggest that the successful implementation of CAATTs is a critical prerequisite for the transition to advanced AI-based solutions. While CAATTs provide structure and rule automation, AI delivers predictive analytics and real-time anomaly detection; thus, adopting CAATTs is not the end goal, but rather an evolutionary step towards AI-driven auditing. This transition from reactive data analytics (CAATTs) to proactive monitoring (AI) depends on the solid foundation laid within existing organizational technology adoption frameworks. Ultimately, the integration of AI upgrades CAATTs by transforming them from static testing tools into intelligent risk prediction systems, ensuring long-term agility for internal auditing. Future studies should aim to bridge theoretical gaps, expand empirical evidence across diverse industries and regions, and explore practical implications to guide internal auditing in leveraging CAATTs effectively. Additionally, research ought to develop extended models for the organizational adoption of CAATTs in internal auditing by incorporating new moderating factors to improve existing frameworks. Furthermore, investigations should expand into different organizational contexts and include longitudinal studies of post-adoption usage, with a particular focus on how the integration of AI redefines these traditional adoption models.

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ORGANIZACIJSKO PRIHVAĆANJE RAČUNALNO POTPOMOGNUTIH REVIZIJSKIH ALATA I TEHNIKA U INTERNOJ REVIZIJI: PREGLED LITERATURE

SAŽETAK

Unatoč prepoznatoj važnosti računalno potpomognutih revizijskih alata i tehnika (CAATT) u poboljšanju učinkovitosti interne revizije, nedostaje kritički pregled literature koji analizira organizacijske čimbenike koji utječu na njihovo prihvaćanje. Istraživanje je potaknuto nedostatkom relevantne literature povezane s ovom usko usmjerenom temom. Cilj ovog istraživanja je analizirati literaturu koja se odnosi na teorijske temelje organizacijskoga prihvaćanja CAATT-a u internoj reviziji. U radu se koristi metoda pregleda znanstvene literature o organizacijskom prihvaćanju CAATT-a u internoj reviziji kako bi se ponudila sveobuhvatna sinteza postojećih spoznaja, identificirale praznine u postojećem znanju i dao prikaz korištenih teorija. Unatoč njihovom potencijalu, prihvaćanje CAATT-a u internoj reviziji unutar organizacija i dalje je nedosljedno te je pod utjecajem raznih tehnoloških i organizacijskih čimbenika te čimbenika okruženja. Nalazi naglašavaju da postojeća literatura uvelike zanemaruje ulogu moderirajućih varijabli u procesu prihvaćanja. Okvir Tehnologija-Organizacija-Okruženje identificiran je kao najčešće korišteni teorijski okvir za prihvaćanje CAATT-a na organizacijskoj razini. Rezultati otkrivaju značajan nesrazmjer u kojem su razine prihvaćanja CAATT-a više od stopa njihova stvarnog korištenja, što sugerira da organizacijska integracija još nije rezultirala punom operativnom primjenom. Nalazi ukazuju na to da čimbenici unutar različitih teorijskih okvira ne utječu podjednako na organizacijsko prihvaćanje CAATT-a, pri čemu organizacijski pokretači i pokretači iz okruženja često nadmašuju tehnološku spremnost.

KLJUČNE RIJEČI: *računalno potpomognuti revizijski alati i tehnike, CAATT, interna revizija, organizacijsko prihvaćanje tehnologije, okvir Tehnologija-Organizacija-Okruženje, TOE okvir*