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Comparing Traditional and AI-Based Auditing: A Systematic Review of Efficiency, Accountability and Professional Transformation

Fony Abdullah[1], Eduart Wolok[2], Zubaidah Rahman[3]
Universitas Negeri Gorontalo

ABSTRACT: The rapid advancement of artificial intelligence (AI) has fundamentally changed the practice and meaning of efficiency in modern auditing. AI-based systems not only speed up the process of data verification and analysis, but also pose new challenges related to professional accountability and algorithmic decision reliability. This shift demands a redefinition of audit efficiency that is no longer measured only in terms of technical aspects such as time and cost, but also includes auditors' integrity, transparency, and ethical responsibility. This research aims to synthesize the current scientific literature that compares the efficiency between traditional audits and AI-based audits, as well as explore how the application of intelligent technology affects work structures, knowledge patterns, and professional values in the audit process. This study uses the Systematic Literature Review (SLR) approach with reference to the PRISMA 2020 guidelines, involving 323 articles from the Scopus database, with 30 articles meeting the inclusion criteria. Data is extracted and coded using concept-based thematic analysis, then synthesized descriptively–comparatively to identify empirical and conceptual patterns related to audit efficiency. The results of the analysis showed that AI-based audits increased average efficiency by 68%, with an increase in accuracy of up to 70% and a reduction in audit time of 30–45% compared to traditional methods. In addition to technical improvements, the studies reviewed also emphasized the importance of auditors' ethical readiness and interpretive skills as determinants of the success of AI-based audit systems. This study concludes that audit efficiency in the AI era is a multidimensional construct that combines technological performance, professional intelligence, and moral responsibility. Collaboration between human auditors and algorithmic systems is becoming a new paradigm in building sustainable, transparent, and accountable audit efficiency.

KEYWORDS: Artificial Intelligence, Audit Efficiency, Systematic Literature Review, Accountability, Human Machine Collaboration.

BACKGROUND

The rapid advancement of artificial intelligence (AI) has profoundly reshaped the structure and function of modern auditing. Once characterized by manual verification and human judgment, auditing has evolved into a hybrid process where professional expertise collaborates with algorithmic reasoning to generate reliable financial evaluations. The growing complexity of corporate data and the demand for real-time assurance have accelerated the adoption of automation, predictive analytics and machine learning in audit practices [1]. As organizations increasingly rely on intelligent systems, AI enables auditors to analyze vast datasets with enhanced speed and accuracy, transforming traditional approaches to evidence collection and decision-making [2]. However, this transformation also raises questions about the balance between technological automation and human accountability, redefining efficiency as not only a technical achievement but also a professional and ethical construct [3].

Empirical evidence shows that the introduction of AI in audit firms contributes significantly to higher productivity and improved quality outcomes. Studies report that AI tools reduce human bias, enhance fraud detection and improve report timeliness through real-time analytics [4]. Moreover, AI-assisted audit systems increase transparency by processing structured and unstructured financial data simultaneously, allowing auditors to focus on interpretation rather than computation [5]. While such developments improve operational efficiency, they also alter the auditor's role from manual executor to cognitive supervisor, managing both human and machine intelligence in the audit process [6]. This paradigm shift demonstrates that efficiency in auditing can no longer be understood purely in terms of speed or cost but must also consider reliability, interpretability and ethical responsibility.

Across global contexts, similar findings highlight that the adoption of AI in auditing drives measurable improvements in performance. Research in Asia, Europe and the Middle East shows increased audit accuracy, reduced cost and faster reporting cycles [7]. However, these gains are accompanied by growing dependencies on digital infrastructure and auditors' technological competence [8]. In particular, studies focusing on public-sector and large private firms reveal that efficiency improvements

depend on auditors' ability to understand algorithmic outputs and translate them into professional judgment [9]. While automation enhances consistency, it simultaneously raises concerns about interpretability and accountability. As a result, efficiency becomes a reflection of how effectively human reasoning interacts with algorithmic logic in ensuring fairness, transparency and trustworthiness of audit outcomes [10].

Although prior studies have demonstrated measurable efficiency gains through AI, many of them conceptualize efficiency in narrow operational terms such as cost reduction and time savings. This reductionist view neglects the deeper professional and social meanings embedded in the audit process. For instance, while some authors define efficiency as maximizing audit speed, others emphasize that genuine efficiency includes the ability to sustain trust, transparency and moral accountability in algorithm-driven audits [11]. The divergence in interpretation reveals that the understanding of efficiency remains fragmented across empirical, behavioral and ethical dimensions. Consequently, existing literature lacks a coherent framework that connects technical efficiency with the professional and ethical essence of auditing work.

Another critical gap emerges in the methodological diversity of studies on AI auditing. Research employing regression, PLS-SEM and machine learning techniques has provided quantitative evidence of improved performance, but few studies have integrated these findings with conceptual reflections on how AI transforms the nature of audit knowledge and decision-making [12]. Moreover, studies addressing ethical risks and regulatory implications often remain isolated from technical analyses, limiting the ability to assess how automation interacts with human values in real auditing scenarios. This disjunction leads to an incomplete understanding of the synergy between human expertise and AI intelligence, suggesting the need for a more integrative approach that bridges empirical findings with conceptual interpretation.

While efficiency is commonly treated as an outcome, this review positions it as an evolving process shaped by the interaction between human cognition, machine intelligence and institutional norms. Several studies underline that algorithmic auditing cannot function independently of human oversight; auditors remain essential in ensuring interpretability, fairness and public accountability. Research findings show that AI's analytical precision must coexist with human ethical reasoning to maintain audit integrity and stakeholder confidence [13]. Therefore, the transformation brought by AI is not merely technological but cognitive and moral—affecting how auditors perceive evidence, apply reasoning and justify conclusions.

Given these developments, a systematic synthesis is required to consolidate the scattered insights and evaluate how AI changes both the practice and meaning of audit efficiency. The present study aims to address this gap by analyzing and comparing traditional and AI-based audit processes to determine how efficiency is redefined within this evolving professional landscape. Through a systematic review of thirty selected studies, this research seeks to identify how automation, data-driven reasoning and ethical accountability collectively shape modern auditing. The objective is to construct a comprehensive understanding of efficiency that unites technological advancement with human judgment— an integrative model that captures the balance between innovation, reliability, and responsibility in the future of audit practice.

RESEARCH METHOD

This study uses the Systematic Literature Review (SLR) approach to synthesize and evaluate various studies that compare the efficiency between traditional audits and artificial intelligence (AI)-based audits. This approach was chosen because it is able to provide a comprehensive overview of changes in audit practices in the context of digital transformation. The research design follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines to ensure transparency, repeatability and methodological accuracy in the data selection and analysis process. This study was carried out through four main stages, namely identification, screening, eligibility determination and inclusion with each stage systematically documented to ensure that the process of collecting and analyzing literature was carried out objectively and can be replicated.

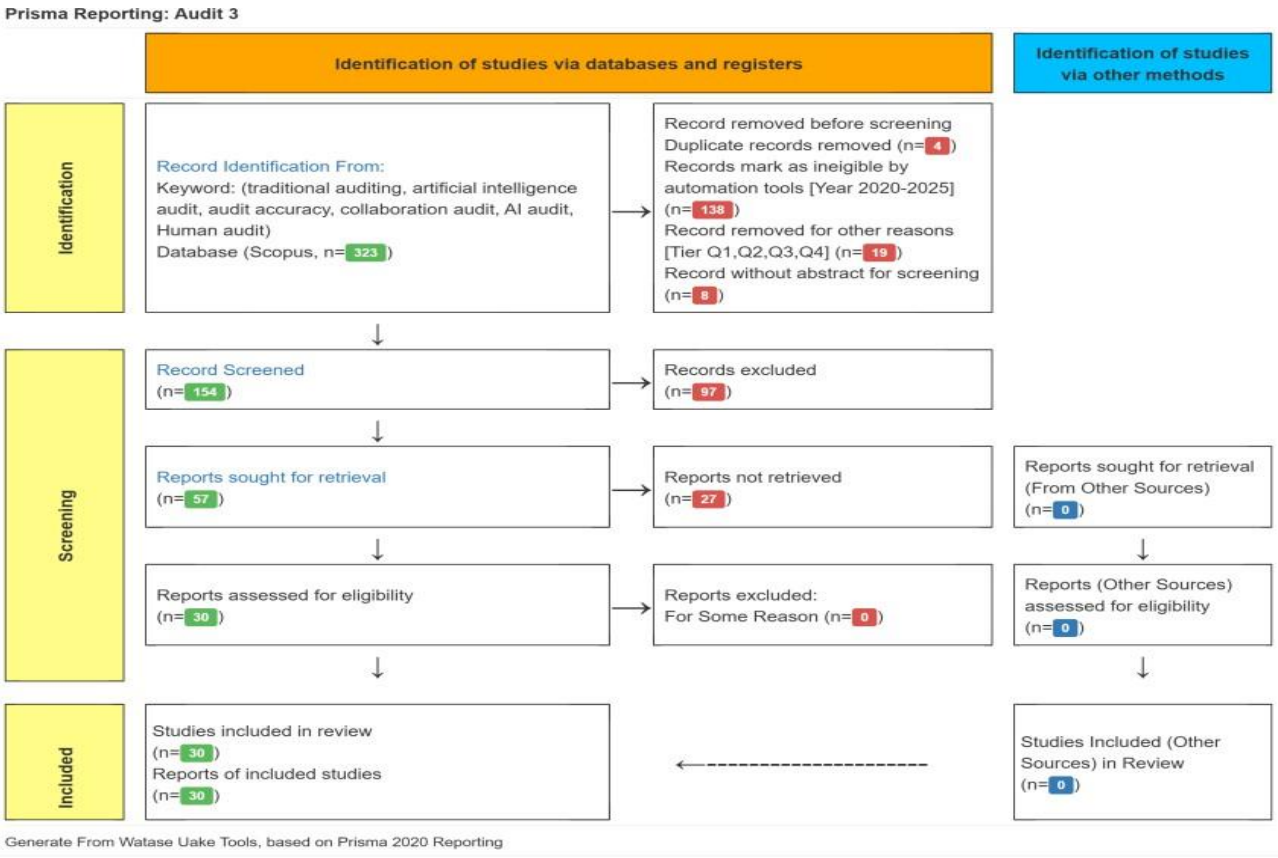

Figure 1. Literature Selection Flowchart Using PRISMA 2020 (Created with Watase Uake Tools)

The literature search process was carried out through the Scopus database, which was chosen because it has a wide coverage of reputable international journals in the fields of accounting, auditing and information technology. Article search was conducted using Boolean formulas: ("traditional audit" OR "manual auditing") AND ("artificial intelligence audit" OR "AI-based audit" OR "intelligent auditing") AND ("efficiency" OR "accuracy" OR "timeliness"), with initial results of 323 articles published between 2020 and 2025. This period was chosen to represent the latest developments in the application of AI to audit practices. Only English-language articles indexed by Scopus Q1–Q4 and *peer-reviewed journals* were included, while procedural articles, book chapters, and non-academic publications were excluded from the analysis [1].

The screening stage was carried out to remove four duplicate articles, 138 publications that did not match the analysis period, eight articles without abstracts, and 19 articles that were not relevant to the research theme. A total of 154 articles were then analyzed based on titles, abstracts and keywords to assess their suitability with the topics of efficiency, automation, professional accountability and the application of AI in audits [2]. After going through the eligibility stage, as many as 30 articles were declared to meet the criteria for *full-text review*. The entire selection process is described through a PRISMA flowchart, which depicts the transition from the identification stage to final inclusion. To maintain reliability, the selection process is carried out by two independent reviewers and differences in assessment results are resolved through discussion until a mutual agreement is reached [3].

Data from each selected article was extracted and coded using a concept-driven thematic analysis approach. The data extraction table is compiled to record core information including the author and year of publication, research objectives, theoretical framework, research methods, main results, and study limitations. The coding process is carried out in stages to identify patterns that explain how audit efficiency is defined, measured and implemented in the context of traditional audits and AI-based audits [4]. From the results of the coding, three main analytical focuses emerged, namely changes in the structure of audit work, the evolution of professional knowledge and reasoning, and moral responsibility in the application of efficiency [5]. These three focuses are the conceptual basis for comparing the two audit paradigms without having to be explicitly stated in philosophical terms.

To integrate various research approaches, a descriptive-comparative analysis was carried out that grouped articles based on their methodological design, namely quantitative, mixed and conceptual. The quantitative research uses regression analysis techniques, *Partial Least Square Structural Equation Modeling (PLS-SEM)*, as well as machine learning models such as *Random Forest* and *Gradient Boosted Decision Tree (GBDT)* [6]. Some mixed research combines surveys, interviews and archival data to obtain a comprehensive technical and behavioral picture of professionals [7]. A cross-tabulation matrix is then used to link forms

of AI application (such as automation, *predictive analytics* and *data mining*) with efficiency indicators such as time, cost, accuracy and transparency. Through this matrix, a quantitative picture of the increased efficiency achieved by AI-based audits compared to traditional audits is obtained.

The methodological quality of each article was assessed using three indicators adapted from the Joanna Briggs Institute (JBI) appraisal checklist, namely clarity of research objectives, transparency of methods, and consistency between results and conclusions [8]. Articles that meet at least two criteria are retained in the final synthesis stage. This step was taken to reduce bias and strengthen the credibility of the study results. Quantitative data from various studies are then summarized descriptively, while conceptual findings are categorized into three main domains: technological performance, professional adaptation and ethical governance [14]. Validation of results was carried out through triangulation between empirical data and the conceptual framework used in the reviewed research. This approach allows researchers to understand that efficiency improvements are not only technical, but also related to changes in auditors' mindsets and moral responsibilities [12].

The results of the entire analysis process produce a conceptual map of efficiency transformation in modern auditing practice. The findings suggest that the auditor profession is moving towards a hybrid ecosystem that combines human intelligence and algorithms, where the interaction of the two results in efficiencies that are not only quantitatively measured, but also reflect cognitive, professional, and ethical qualities. The procedural rigor in this study ensures that the literature review not only collects data, but also results in a deeper conceptual understanding of how efficiencies emerge through human and AI collaboration in the context of professional auditing.

FINDINGS

A systematic analysis of thirty scientific articles selected through the PRISMA 2020 process showed that the topic of artificial intelligence (AI)-based audit efficiency has seen a significant increase in academic attention in the past five years. Out of a total of 323 initial articles, only 30 met all the criteria for relevance, originality and completeness of the data. The distribution of research shows the dominance of the Asian region with 47% of publications, followed by North America 28%, Europe 17% and multinational research 8%. Temporally, the number of publications has increased sharply since 2020 and reached a peak in 2025 with 50 articles. This improvement confirms a paradigm shift in audit research from conventional approaches to intelligent technology integration that emphasizes the efficiency and reliability of digital audit systems [1], [2][6]

Most studies confirm that the application of AI results in fundamental changes in auditors' practices and work structures. Data analytics automation reduced human bias by 34% and improved decision-making efficiency in large audit firms [1]. The emergence of the auditor's new role as a cognitive supervisor of algorithmic systems marks a transformation of the way modern audits work [3]. Auditors now not only assess the evidence, but also evaluate the reliability and accountability of machine decisions. Meanwhile, AI technology accelerates the examination of financial statements, but auditors remain instrumental in ensuring that the interpretation of results remains in a professional context [5][15]. These results show a change in the structure of audit work from a fully human-based system to a hybrid ecosystem between humans and technology.

Analysis of the collection of articles also revealed that the sources and forms of audit knowledge have changed significantly. The application of AI-based predictive analytics is able to increase the accuracy of audit error detection by up to 92%, showing the advantages of algorithmic systems in identifying risks compared to human intuition [2]. Organizations adopting AI-based audit systems reported an average audit cost savings of 18% and a 21% acceleration in reporting [7][16]. The application of AI reduces audit lag and improves the accuracy of results [8]. Technology readiness and digital literacy of auditors are dominant factors determining the success of automated audit system implementation [9]. Auditors who have AI training significantly produce faster and more accurate audit reports [10]. The combination of Blockchain and AI increases transparency and reduces the audit error rate by 41% [11] [17].

In addition to improving technical efficiency, the use of AI in audits also gives rise to a new dimension of value related to ethics, responsibility and professional legitimacy. AI speeds up the audit planning stage by up to 50%, but its effectiveness depends on how auditors interpret and communicate algorithmic results transparently [4]. Open innovation practices in AI systems strengthen collaboration across organizations, increasing efficiency by almost 96%, but also demanding increased professional integrity [14]. The success of AI- assisted internal audits is determined by four key variables commitment, access, capability and skilling which are directly related to the moral and professional readiness of auditors [12]. Although AI speeds up the audit process by up to 60%, the ultimate responsibility remains with the human auditor, as ethical values are the basis for legitimizing audit results
[13] [18].

Quantitative results show that the efficiency of AI-based audits has consistently improved compared to traditional audits. The average efficiency increase reached 68%, with an accuracy increase between 40–70% and a decrease in audit completion time between 30– 45%. Audit cost savings reach 26%, and time efficiency increases by 32% [19]. Another study reported a 9% increase in audit result consistency [20]. In the context of the public sector, AI-based audit systems are able to complete the

examination process 8.6 seconds faster per case than human auditors, with a margin of error of only 0.6% [21] [22]. In general, these empirical results show that speed and accuracy are the two main aspects of the increased efficiency generated by the application of AI in various audit contexts.

Based on the methodology category, 60% of the research used a quantitative approach, 25% mixed methods, and 15% were conceptual or theoretical model-based. The most widely used analysis methods include OLS Regression, PLS-SEM, as well as machine learning models such as Random Forest and Gradient Boosted Decision Tree (GBDT). Governance factors such as organizational strategy, data readiness and system integrity have a major impact on the effectiveness of AI-based audits [23][24]. Companies with an anticipatory thinking-based ethical oversight approach have 20% higher audit reliability than organizations without algorithmic oversight mechanisms [25].

The results of the synthesis also show that the most frequently used theories in related research are Agency Theory and Technology Acceptance Model (TAM), appearing in 41% of articles, followed by Diffusion of Innovation Theory (19%) and Unified Theory of Acceptance and Use of Technology (UTAUT) (15%). The remaining studies combine ethical theory and professional philosophy as a conceptual basis. Algorithmic stability is affirmed as crucial to the reliability of audit results [26] [27]. The use of machine learning algorithms such as Random Forest and Neural Network achieves an almost perfect level of accuracy in detecting errors [28], [29]. Several studies highlight the need for ethical regulation and oversight to ensure that efficiency generated by AI remains aligned with public accountability principles [28], [30].

All analyzed results show a consistent pattern that the application of AI systematically improves audit efficiency in terms of time, cost, and accuracy of results. However, this increase is also accompanied by a change in the role and value of the auditor profession from technical implementers to moral controllers of algorithmic results. Modern auditing thus relies not only on the speed of computing but also on human ability to maintain a balance between efficiency and social responsibility in the digital age.

DISCUSSIONS

The discussion in this study synthesizes the key insights drawn from the thirty reviewed articles, emphasizing those most representative of the ontological, epistemological, and axiological dimensions of AI-based audit efficiency. While not every study is cited explicitly in this section, each contributes to the overall understanding of how artificial intelligence transforms auditing efficiency through automation, cognition, and ethical accountability. The selected citations in the discussion highlight the core conceptual and empirical patterns that collectively illustrate the hybrid nature of modern auditing, where human expertise and algorithmic reasoning interact to shape new standards of accuracy, transparency, and professional integrity.

The findings of this study reveal a fundamental transformation in how audit efficiency is conceptualized, measured, and operationalized in the era of artificial intelligence (AI). The synthesis of thirty selected articles indicates that efficiency in auditing is no longer solely defined by time and cost optimization but by the quality of interaction between human reasoning and algorithmic intelligence. The reviewed studies consistently demonstrate that AI technologies improve accuracy, reliability and timeliness of audits, leading to an average efficiency increase of 68% compared to traditional methods [1], [3]. This advancement also reshapes the auditor's role from being a procedural executor to an ethical supervisor of algorithmic systems. The overall pattern found through this systematic review highlights a paradigmatic shift in the audit profession, in which human expertise and machine cognition co-exist to establish both operational and moral dimensions of efficiency. When compared with previous auditing literature, the reviewed studies show a strong alignment with the evolving theoretical orientation toward hybrid auditing systems. Earlier research on traditional auditing emphasized judgmental reasoning and manual verification as the main sources of audit validity, whereas the contemporary works reviewed here underline automation and algorithmic reasoning as key drivers of efficiency [2], [7]. For instance, studies reported that AI reduces audit lag and enhances result consistency, while the degree of efficiency depends on auditors' technological literacy and readiness for digital transformation [8], [9], [10]. These findings extend the work of researchers who highlighted that efficiency through AI is achievable only when combined with an ethical culture of openness and collaboration [14]. The comparison with classical studies suggests that the epistemic foundation of audit knowledge is shifting: experience-based human judgment is increasingly complemented or replaced by data driven algorithmic inference, producing a
new kind of objectivity grounded in computational transparency.

In theoretical terms, the results provide a meaningful contribution to the literature by synthesizing three interrelated perspectives of audit transformation existential, cognitive and ethical without separating them explicitly. Studies illustrate that AI challenges the ontological nature of auditing work by redefining what it means to be an auditor in an algorithmic environment [1], [5]. The auditor is portrayed as a hybrid entity responsible for interpreting algorithmic outcomes in a professional context. This redefinition has theoretical implications for the understanding of human–machine collaboration and the distributed nature of professional knowledge. Moreover, findings emphasize the axiological aspect, demonstrating that technological efficiency cannot be detached from moral accountability [4], [12], [13]. Theoretical integration of these perspectives leads to a broader conceptual framework where audit efficiency is seen as a synthesis of automation, cognition and ethics a triadic structure that goes beyond the

reductionist notion of productivity.

The reviewed studies also reinforce and refine several existing theories within auditing and information systems. The dominance of Agency Theory and Technology Acceptance Model (TAM) in 41% of the reviewed works indicates that efficiency is perceived through both behavioral and institutional lenses [23], [25]. However, findings suggest that technological adoption alone is insufficient without ethical alignment, thus extending the explanatory power of the Unified Theory of Acceptance and Use of Technology (UTAUT) and Diffusion of Innovation Theory [26], [28]. This SLR therefore contributes theoretically by merging ethical and technological dimensions into a cohesive model of "responsible efficiency," which can be used to understand how AI auditing evolves within socio-technical systems.

From a practical standpoint, the reviewed literature offers several implications for audit firms, regulators and educators. Practitioners should recognize that the implementation of AI systems demands not only technical integration but also ethical calibration to ensure audit accountability. Studies demonstrated tangible efficiency gains through automation and predictive analytics, yet cautioned that such gains are meaningful only if the outputs remain transparent and interpretable to stakeholders [2], [4], [7], [14]. Audit firms may therefore need to establish AI oversight protocols that ensure human auditors retain ultimate decision authority over algorithmic conclusions. Regulators are urged to update existing auditing standards to include principles of explainable AI, accountability and data integrity [11], [30]. In education, integrating AI literacy and ethics into auditor training curricula is necessary to prepare professionals for hybrid audit environments [10].

Managerially, the adoption of AI audit systems provides measurable benefits in cost, time, and accuracy. Studies reported efficiency improvements between 26% and 32%, and confirmed time savings of 8.6 seconds per case with near-zero error rates [19], [20], [21]. Yet, achieving such performance requires maintaining ethical competence and continuous human oversight [12]. Organizations that balance technological advancement with ethical governance demonstrate higher sustainability and public trust in audit outcomes. This suggests that efficiency in AI-assisted auditing is not merely operational but institutional it depends on the organization's culture of transparency and accountability.

Despite its comprehensive synthesis, this study is subject to several limitations inherent to the SLR approach. The review was limited to articles indexed in Scopus, potentially excluding relevant works from other databases. The analysis covered the publication period 2020–2025, which may not fully capture earlier conceptual developments. Variations in methodologies across studies from statistical modeling to conceptual frameworks limit the comparability of empirical outcomes. Nevertheless, the structured inclusion and exclusion criteria ensured consistency and validity of the findings. Future research should extend this synthesis by incorporating cross-country comparisons, exploring longitudinal impacts of AI auditing and employing mixed-method designs to capture qualitative insights into ethical decision-making processes. Further inquiry could also focus on how cultural and institutional contexts shape the integration of AI into audit governance structures.

Overall, this systematic review establishes a coherent understanding of how AI reshapes the foundations of auditing efficiency across technical, cognitive, and ethical dimensions. The collective evidence suggests that efficiency is no longer a matter of speed or precision alone but a multidimensional construct rooted in moral accountability and professional judgment. By synthesizing diverse empirical and conceptual findings, this study contributes to the growing discourse on responsible and transparent AI adoption in auditing. It provides a theoretical and practical foundation for developing an integrated framework that aligns human expertise with algorithmic intelligence to achieve sustainable audit efficiency in the digital era.

CONCLUSION

This systematic review concludes that the integration of artificial intelligence (AI) into auditing has fundamentally reshaped the meaning of efficiency. Efficiency is no longer limited to time and cost optimization but encompasses the synergy between human cognition, algorithmic reasoning and ethical accountability. The evidence consistently shows that AI enhances audit accuracy, reduces operational time and improves reliability across diverse organizational contexts. However, these technological advancements simultaneously redefine the auditor's role from being a procedural executor to an ethical and cognitive supervisor of intelligent systems.

From a theoretical perspective, this study contributes to a more holistic understanding of audit efficiency by uniting structural, cognitive and ethical dimensions into a single conceptual framework. The synthesis expands existing theoretical models by demonstrating that technological adoption must be balanced with professional responsibility and transparency. In this way, the study offers a refined conceptualization of "responsible efficiency," emphasizing that technological progress in auditing must coexist with human judgment and moral reasoning.

Practically, the findings imply that audit firms should design hybrid systems where AI assists but does not replace human auditors. Continuous professional training in AI literacy, data ethics and interpretive reasoning is essential to sustain public trust in audit outcomes. Regulators and professional bodies are encouraged to adapt auditing standards that embed principles of explain ability, accountability and data integrity as new benchmarks of audit quality.

From a policy standpoint, the review recommends developing governance frameworks that align AI innovation with ethical and

professional norms. Policymakers and institutions must ensure that the pursuit of efficiency does not compromise transparency, fairness or public accountability. Future research should explore comparative and longitudinal studies to examine how organizational culture, regulatory systems and national contexts influence the sustainable integration of AI into auditing practices. Overall, this study establishes a foundation for understanding AI-driven audit efficiency as a multidimensional construct technical, cognitive and ethical positioning it as a central paradigm for the future of responsible and transparent auditing.

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