

Audit Quality in the Digital Era: A Systematic Analysis of the Use of AI and Data Analytics in Auditing

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Abstract

This study reviews the development and application of Artificial Intelligence (AI) and Data Analytics in auditing and their impact on audit quality in the digital era. Using a Systematic Literature Review (SLR) based on the PRISMA framework, 45 peer-reviewed articles published between 2019 and 2025 were analyzed thematically. The findings show that AI and Data Analytics enhance audit quality by improving fraud detection, increasing efficiency through automation, and strengthening audit evidence reliability. However, effective adoption depends on auditors' technological competence, digital infrastructure readiness, and robust governance frameworks. The review also identifies research gaps, including limited longitudinal studies, insufficient evidence in the Indonesian context, and a lack of focus on ethical governance and return on investment. This study provides insights for auditors, audit firms, and regulators to support accountable and sustainable audit digitalization.

Keywords: audit quality, artificial intelligence, AI, data analytics, digital audit, systematic literature review

INTRODUCTION

In today's digital era, the audit profession faces a major transformation as a result of technological advances, particularly artificial intelligence (AI) and data analytics. This technological development not only changes auditors' working methods but also challenges the traditional paradigm of assessing audit quality, which has long relied on manual procedures and sample-based testing (Meitasari & Audrey, 2025). Along with the increasing volume, velocity, and complexity of financial data (big data), auditors are now required to be able to utilize AI technology to explore anomaly patterns, detect risks of irregularities, and significantly accelerate the audit process without compromising the quality of the examination (Parahyangan, 2025).

The use of AI in auditing makes a major contribution to the automation of various routine tasks, such as large-scale data examination, analysis of recurring transactions, and identification of fraud patterns that are difficult to handle effectively through manual methods. Machine learning and advanced data analytics technologies enable auditors to conduct full population testing, thereby increasing the level of accuracy, examination coverage, and overall audit efficiency (Fadilla et al., 2025). Various studies also show that AI can strengthen auditors' ability to detect risks and potential errors that were previously hidden within millions of financial transaction records (Hasanuddin University, 2025). In this context, AI is no longer seen merely as a technical support tool, but as an analytical partner that enriches auditors' professional decision-making process (Azizah et al., 2025).

In Indonesia, the adaptation of AI in audit practice is beginning to show progress, although it is still at an early and uneven stage. Research conducted by Fachriyah and Anggraeni (2024) found that several large public accounting firms (KAP) in Indonesia have begun integrating AI into the audit process, while small and medium-sized KAPs still face various obstacles, such as limited resources, low auditor technological competence, and the absence of regulations that specifically govern AI-based auditing. Furthermore, Sari and Wahyuda (2025) reported that auditors'

perceptions of AI vary widely, particularly regarding differences in AI system types (assisted, augmented, and autonomous) in terms of ease of use, level of trust, and their impact on auditors' professional judgment. These findings confirm that audit transformation through technology is not merely a technical issue, but also concerns human aspects, professional attitudes, and auditor competence as the key holder of the role in maintaining audit quality.

In addition to AI, other technological developments such as blockchain and big data analytics also enrich the modern audit landscape. Research by Ruslaini, Permana, and Amelia (2025) shows that the evaluation of audit evidence has undergone modernization through the use of AI, big data, and blockchain, enabling auditors to assess audit evidence in a more efficient, transparent, and accurate manner. Nevertheless, the great potential of this technology is also accompanied by various challenges, particularly in ethical aspects. Issues such as algorithmic bias, data privacy protection, lack of model transparency (black box), and the tendency toward overreliance on technology have become serious concerns because they have the potential to undermine audit integrity and independence if not managed adequately (Widyakusuma, Luneto, & Djuri, 2025).

From a regulatory perspective, the development of AI-based auditing has also begun to attract attention from various stakeholders, including auditors, KAPs, and regulators. Standardization of AI-based auditing needs to be considered carefully so that the benefits of technology are not compromised by the risk of declining audit quality and professional accountability (Manheim et al., 2024). However, at the academic level, the literature shows an imbalance in research focus. Most studies still emphasize the technical potential and efficiency of AI, while studies on human integration, ethical frameworks, governance, and local context—particularly Indonesia—remain relatively limited. Systematic studies in local journals show that although AI has a positive impact on audit efficiency and accuracy, empirical evidence specifically discussing audit practice in Indonesia is still very scarce (Fadilla et al., 2025).

Given this dynamic, it is very important to conduct a Systematic Literature Review (SLR) that comprehensively discusses how AI and data analytics affect audit quality, in terms of efficiency, effectiveness, audit risk, and professional governance. The SLR approach allows for mapping existing research, identifying research gaps, and formulating policy recommendations and professional practices based on scientific evidence (Hermawan & Septiani, 2023).

Based on this research background, the problem statement of this study focuses on several main aspects, namely the extent to which Artificial Intelligence (AI) and data analytics have been adopted in the audit process based on academic literature during the 2019–2025 period. In addition, this study also examines the influence of AI and data analytics usage on audit quality, particularly related to audit evidence reliability, fraud detection, audit risk, audit efficiency, and auditors' professional judgment. This study further identifies the main challenges in implementing AI in audit practice as reported in the literature, from technical, ethical, regulatory, and auditor competency perspectives. Governance and accountability aspects in the use of AI in the audit process are also analyzed to understand how the literature discusses control and responsibility over the utilization of this technology. Finally, this study aims to identify research gaps in previous studies, particularly those related to the context of auditing in Indonesia, and to provide direction for the development of future research.

This study aims to systematically identify and analyze the development and adoption patterns of Artificial Intelligence (AI) and data analytics in the audit process based on academic literature published during the 2019–2025 period. Furthermore, this study aims to evaluate the impact of AI and data analytics usage on audit quality, particularly on aspects of audit efficiency, fraud detection capability, audit risk, and the reliability and accuracy of audit evidence. This study also aims to identify the main challenges in implementing AI in audit practice reported in the literature, including technical, ethical, regulatory, and auditor competency challenges. In addition, this study aims to examine how governance and accountability aspects of AI use are discussed in the audit literature. Ultimately, this study aims to identify remaining research gaps, particularly in the context of auditing in Indonesia, and to provide recommendations for future research,

auditors' professional practice, and the formulation of more mature and responsible digital audit policy.

METHOD

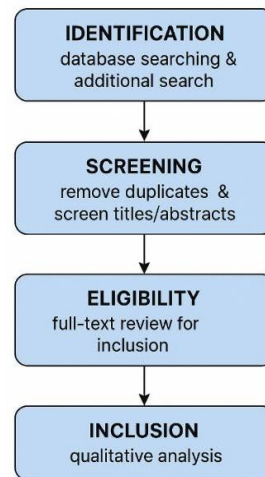


Figure 1. Research Flow

Source: Literature search results, processed 2025

This research method uses a Systematic Literature Review (SLR) approach following PRISMA guidelines to ensure transparency and reproducibility of literature selection. The literature search was conducted in relevant international and national databases, including Scopus, Web of Science, ScienceDirect, Google Scholar, and national repositories (Garuda, University Journal Portal) for the 2019–2025 publication period, with a specific focus on empirical studies and reviews discussing the use of Artificial Intelligence (AI), machine learning, natural language processing, robotic process automation, and data analytics in audit practice and their implications for audit quality. The combined keywords used include: “artificial intelligence” OR “machine learning” AND “audit” OR “audit quality” OR “data analytics” OR “fraud detection” OR “audit evidence”; the search also applied wildcards and term variations to capture local/translated terms (e.g., “kecerdasan buatan” [artificial intelligence], “analitik data” [data analytics], “audit kualitas” [audit quality]).

The inclusion criteria in this study cover peer-reviewed scientific articles discussing the application of AI and data analytics in the audit process or audit quality, published during the 2019–2025 period, and available in full text in English or Indonesian. The exclusion criteria include opinion pieces without methodology, technical studies unrelated to auditing, and publications without empirical evidence or adequate conceptual discussion. The study selection process followed the PRISMA stages, starting from identification, title and abstract screening, eligibility assessment through full-text review, to the determination of final studies. Methodological quality assessment was carried out by two independent reviewers using relevant instruments, such as CASP and MMAT, with disagreements resolved through discussion. Data were extracted systematically and analyzed using a thematic synthesis approach to group key findings, identify research trends, and determine research gaps. The reliability of the results was maintained through second-reviewer validation, and the entire process was documented in summary tables, quality matrices, and PRISMA diagrams.

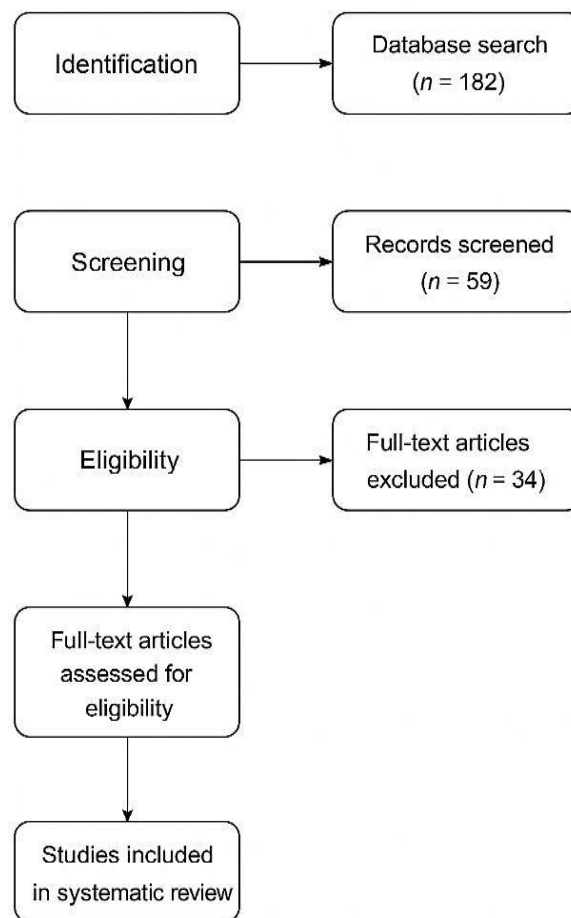


Figure 2. Research PRISMA Diagram

Source: Literature search results, processed 2025

RESULTS AND DISCUSSION

This study uses a Systematic Literature Review (SLR) approach to identify, classify, and synthesize scientific findings related to the application of Artificial Intelligence (AI) and data analytics in auditing and their impact on audit quality. The articles analyzed came from reputable national and international journals published during the 2019–2025 period, with a focus on the context of public and private sector auditing. After the selection process based on the inclusion and exclusion criteria, the selected articles were analyzed using thematic analysis. The analysis process was carried out through several systematic stages, namely open coding to identify initial concepts from each article, axial coding to group related concepts, and selective coding to unify the patterns of findings into more abstract and meaningful themes. Through this coding process, the study identified five main themes that consistently appeared in the literature and represent the main dimensions of the influence of AI and data analytics on audit quality. Thus, these five themes were not determined a priori, but are the result of empirical synthesis of findings patterns across studies.

These five main themes include: (1) efficiency and automation of audit routines, (2) fraud detection and audit risk management, (3) accuracy and reliability of audit evidence, (4) ethics and governance of AI use in auditing, and (5) auditor competence and perception of AI. These themes provide a comprehensive picture of how AI is changing audit practice, from technical, professional, and institutional perspectives.

The first and most dominant theme to emerge from the coding process is the increase in audit efficiency through AI-based automation. Most of the articles analyzed highlight that AI is

used to automate routine and repetitive audit tasks, such as analyzing large volumes of transactions, examining accounting journals, reconciling data, and initial screening of potentially irregular transactions. Rosmiati (2024) shows that the application of AI significantly reduces audit completion time and improves the consistency of analysis results compared to manual methods.

Meitasari and Audrey (2025) confirm that the integration of AI and big data analytics has revolutionized the traditional audit working model. Auditors no longer rely entirely on sampling techniques, but can perform full population testing. The resulting efficiency allows auditors to allocate more time to activities that require professional judgment, such as risk evaluation and discussing audit findings with management. In addition, several studies note that AI-based automation also contributes to audit cost control. In a business environment that demands high efficiency, AI is seen as a solution to maintain audit quality without significantly increasing costs. Thus, efficiency is not only an operational advantage but also an integral part of the overall improvement in audit quality.

The second theme that consistently emerges is the role of AI in improving auditors' ability to detect fraud and manage audit risk. Natali, Rely, and Sari (2025), in the context of Indonesia's Supreme Audit Board (BPK RI), found that the use of e-audit, AI audit, and big data analytics simultaneously has a positive and significant effect on the effectiveness of fraud detection. These findings indicate that AI functions not only as an efficiency tool but also as an instrument for strengthening the oversight function. AI-based data analytics enables auditors to identify unusual transaction patterns, hidden relationships between accounts, and indications of financial statement manipulation that are difficult to detect using traditional audit approaches. Several studies also highlight AI's ability to perform predictive analysis, allowing auditors to identify high-risk areas from the audit planning stage. These results show that AI directly contributes to improving audit quality from a risk mitigation perspective. With stronger fraud detection capabilities, AI-based auditing has the potential to increase stakeholder trust in the integrity of financial statements.

The third theme identified through thematic analysis is the improvement of the accuracy and reliability of audit evidence. Fadilla et al. (2023/2024) show that AI, machine learning, and blockchain technologies enable auditors to evaluate audit evidence more accurately and objectively. The use of analytical algorithms reduces reliance on subjective judgment at the initial stage, making audit results more consistent. Widyakusuma, Luneto, and Djuri (2025) add that AI-based classification and prediction models help auditors prioritize high-risk transactions. Thus, the audit evidence collected becomes more relevant and supports more accurate risk assessment. However, the literature also emphasizes that the reliability of audit evidence is highly dependent on the quality of input data and auditors' understanding of the logic of the AI model.

Although the technical benefits of AI are very prominent, the analysis results also show that ethical and governance issues are a crucial theme. Widyakusuma et al. (2025) identify major challenges in the form of algorithmic bias, lack of model transparency (the black box problem), and the risk of data privacy violations. These issues have the potential to weaken audit accountability if not balanced with an adequate governance framework. Rosmiati (2024) emphasizes that auditors must remain the main decision-makers, not merely technology operators. Therefore, the literature encourages the development of algorithmic audit trails, internal KAP policies, and clear ethical standards to ensure that the use of AI does not diminish audit integrity.

The final theme relates to auditors' readiness and perceptions of AI. Sari and Wahyuda (2025) found that auditors in Indonesia have diverse perceptions of AI, ranging from optimism about efficiency benefits to concerns about the loss of auditors' professional role. These perceptions influence the level of adoption and effectiveness of AI use in audit practice. Susanto et al. (2025) show that auditor competence, particularly technological and data analytics literacy, is a key factor in mediating the influence of AI on audit quality. Auditors with high competence are

able to use AI critically, while auditors with low competence tend to depend passively on system output.

Table 1. Summary of Key Studies in the SLR on AI and Audit Quality

Author	Year	Country	Method	AI Technology	Audit Quality Aspect
Rosmiati	2024	Indonesia	SLR	AI, Data Analytics	Efficiency, Ethics
Fadilla et al.	2023	Indonesia	SLR	ML, Blockchain	Audit Evidence, Accuracy
Meitasari & Audrey	/2024	Indonesia	SLR	ML, Blockchain	Audit Evidence, Accuracy
Natali et al.	2025	Indonesia	Qualitative	Big Data, AI	Efficiency, Auditor's Role
Widyakusuma et al.	2025	Indonesia	Quantitative	AI, Big Data	Fraud Detection
Sari & Wahyuda	2025	Indonesia	Conceptual	Predictive AI	Ethics, Governance
Susanto et al.	2025	Indonesia	Survey	AI Assisted/Autonomous	Auditor Perception
			Quantitative	Data Analytics	Auditor Competence

Source: Literature search results, processed 2025

The results of this Systematic Literature Review (SLR) show that the application of Artificial Intelligence (AI) and data analytics has brought significant changes to audit quality in the digital era. Through the coding-based thematic analysis process, this study identifies five main themes representing the dimensions of AI's influence on audit quality, namely efficiency and automation, fraud detection and audit risk, accuracy and reliability of audit evidence, ethics and governance, and auditor competence and perception. These findings confirm that AI is not merely a technical support tool, but an integral part of the transformation of the modern audit paradigm that simultaneously affects procedural, professional, and institutional aspects.

Compared with previous SLRs, such as that conducted by Rosmiati (2024), the results of this study are consistent in confirming that AI contributes significantly to improving audit efficiency through the automation of routine tasks. However, this study extends these findings by showing that efficiency is not the ultimate goal of AI adoption, but rather the foundation that enables a more comprehensive improvement in audit quality. The efficiency generated by AI opens up space for auditors to focus more on professional judgment, risk analysis, and strategic discussions with management, so that audit quality improves not only in terms of speed but also in the depth of analysis. Compared with the SLR by Fadilla et al. (2025), which emphasizes the improvement of audit quality from technical aspects such as evidence accuracy and audit procedure effectiveness, this study provides a more holistic perspective. This article emphasizes that the improvement in the accuracy and reliability of audit evidence through AI is highly dependent on auditors' readiness to understand and interpret system output. Thus, this study corrects the technocentric tendency in the literature by asserting that AI-based audit quality cannot be separated from human factors, particularly auditor competence and professional attitude.

Findings related to improved fraud detection and audit risk management reinforce the argument that AI has strategic value in maintaining the integrity of financial reporting. Large-scale data analytics and predictive models enable auditors to identify anomaly patterns and risks earlier and more comprehensively compared to traditional sampling-based audit approaches. This is consistent with the findings of Natali et al. (2025), but this study adds the understanding that superior fraud detection capability will only have an optimal impact if supported by a clear governance framework and adequate professional oversight. Without this, there is a risk of

excessive dependence on AI systems, which could actually weaken auditors' professional skepticism.

Ethical and governance issues emerge as one of the important contributions of this study. Unlike much of the literature that only touches on ethical aspects conceptually, this study positions ethics and governance as key dimensions of AI-based audit quality. The risks of algorithmic bias, lack of model transparency, and data privacy issues are not merely technical problems, but also concern the accountability of the audit profession. Therefore, this study asserts that the development of an AI governance framework, including algorithmic audit trails and professional ethical standards, is an important prerequisite so that the benefits of AI do not compromise audit credibility. Auditor competence and perception aspects are also a key differentiator of this study compared to similar SLRs. The findings show that variations in auditors' perceptions of AI greatly influence the effectiveness of technology implementation. Auditors with adequate technological and data analytics literacy tend to use AI critically and reflectively, while auditors with low competence risk treating AI as a "black box." This reinforces the argument that digital audit transformation must be accompanied by human resource development transformation through continuous education and training.

In addition to reinforcing previous literature findings, this study also explicitly identifies significant remaining research gaps. The scarcity of longitudinal studies means that the long-term impact of AI on audit quality is not yet fully understood. In addition, the Indonesian context remains relatively underexplored, particularly for small and medium-sized KAPs that have limited resources and technological infrastructure. Another aspect rarely discussed is the analysis of return on investment (ROI) of AI implementation in auditing, even though cost-benefit considerations are important factors in audit organizations' decision-making.

Overall, this discussion confirms that the main contribution of this study lies in presenting a more integrative and contextual literature synthesis. By combining technical, human, and governance dimensions, this study not only confirms the benefits of AI in auditing but also provides a more critical understanding of the prerequisites and limitations of its implementation. Thus, this study enriches the digital audit literature and provides a strong conceptual foundation for further research, regulatory development, and audit professional practice in the era of artificial intelligence.

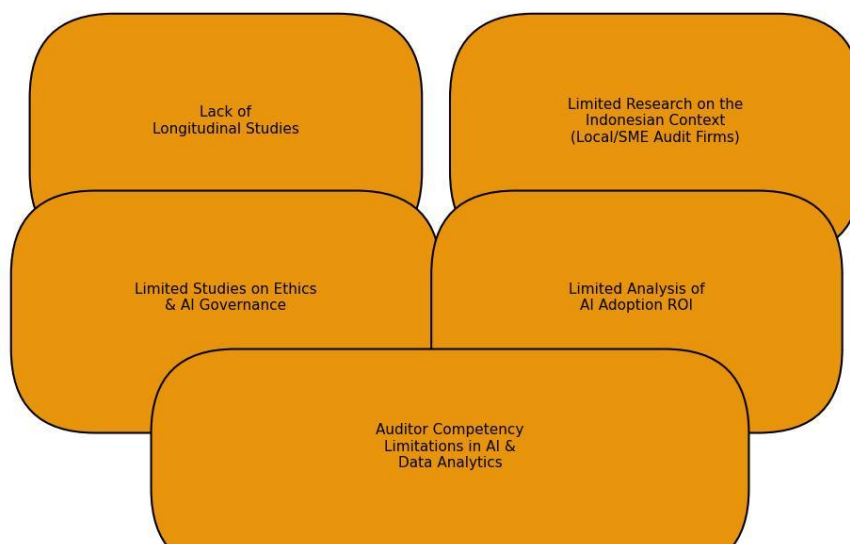


Figure 3. Research Gap Diagram

Source: Secondary data, processed 2025

The research gap diagram shows that research on the use of AI and data analytics in auditing still faces a number of important gaps. First, the lack of longitudinal studies means that a long-term understanding of AI's impact on audit quality is not yet comprehensive. Most research

only captures a momentary condition, so it has not been able to describe the dynamics of auditor adaptation and the stability of technology performance. Second, the Indonesian context remains minimally explored, even though the characteristics of small and medium-sized public accounting firms (KAP), technological infrastructure, and local work culture greatly influence the success of AI adoption. Third, issues of AI ethics and governance are under-researched, even though the risks of bias, algorithmic transparency, and accountability are very important in auditing. In addition, financial aspects such as ROI analysis of AI implementation are also rarely discussed. Finally, auditors' low competence in data analytics is a major obstacle in the application of modern audit technology. These gaps confirm the importance of more in-depth and contextual research.

CONCLUSION

This study concludes that the use of Artificial Intelligence (AI) and data analytics has great potential to improve audit quality by increasing the effectiveness of anomaly detection, the efficiency of audit procedures, and the accuracy and reliability of audit evidence. However, the effectiveness of implementing this technology is strongly influenced by several key factors, particularly organizational readiness, auditor competence, and the existence of adequate governance and regulation. The results of the Systematic Literature Review (SLR) show that previous research is still dominated by short-term studies, global contexts, and a focus on technical aspects, so it has not fully reflected the complexity and challenges of implementing AI in audit practice in Indonesia. In addition, aspects of ethics, algorithmic transparency, and accountability in the use of AI have received relatively little attention in the literature.

Based on these findings, future research needs to be directed toward more in-depth and contextual empirical studies, including analysis of return on investment (ROI) of AI implementation in auditing, longitudinal evaluation of auditor competency development, and exploration of AI implementation in small and medium-sized public accounting firms (KAP). From a practical standpoint, the results of this study imply the need to design auditor training programs integrated with AI and data analytics literacy, the preparation of ethical guidelines and AI audit governance by professional associations and regulators, and encouragement for the implementation of pilot projects on AI adoption in small and medium-sized KAPs as an initial step toward a responsible and sustainable digital audit transformation.

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