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Article

Artificial Intelligence in Auditing: A Systematic Review of Audit Quality, Professional Judgment, and Governance Challenges

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Abstract: In artificial intelligence (AI) was proving to be a transformative tool influencing the audit process and the quality of the resulting reports. As businesses and the digital landscape evolve, artificial intelligence (AI) was becoming a transformative technology that enhances audit quality, aids in professional judgment, and fortifies governance mechanisms. The challenges of big data, cloud computing, enterprise information systems, and digital financial transactions have rapidly grown, compelling traditional approaches to auditing to be obsolete and leading to the increased use of AI-integrated audit methods. This chapter provides a systematic review of the literature to synthesize current research on the application of AI in the field of auditing from the perspective of audit quality, professional judgment, and governance issues. A highly organized methodology for the review of the literature was used to find, categorize, and examine pertinent peer-reviewed scientific literature from well-traveled academic databases. All selected literature was systematically categorized based on the different kinds of AI technologies, the different kinds of audit applications, the audit governance dimensions, and emerging research themes to gain a comprehensive overview of the state of the art. The review highlights that the use of machine learning, deep learning, natural language processing, robotic process automation, explainable artificial intelligence, and generative artificial intelligence has greatly improved fraud detection, risk assessment, financial statement analysis, continuous auditing, compliance monitoring, and audit documentation. The synthesized evidence suggests that intelligent automation, predictive analytics, holistic data analysis, and evidence-based decision support are the areas in which AI was making an impact in enhancing audit quality, while also emphasizing the need for human expertise, professional skepticism, and ethical judgment in making audit decisions. The review also highlights important governance issues to tackle, such as transparency and explainability, algorithmic bias, cybersecurity, data privacy, auditor accountability, and regulatory compliance, to enable the responsible use of AI. Last but not least, the chapter outlines some of the most recent areas of research that are expected to help shape the future of intelligent auditing practices, such as explainable AI, generative AI, human-AI collaboration, AI governance frameworks, ethical auditing, and intelligent assurance systems, offering researchers, practitioners, regulators, and policymakers insightful ideas for crafting more transparent, reliable, and trustworthy AI-driven auditing approaches.

Keywords: Artificial Intelligence in Auditing, Audit Quality, Professional Judgment, AI Governance, Explainable Artificial Intelligence, Systematic Literature Review



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1. Introduction

Auditing was facing a dramatic shift in response to the fast pace of digital technological developments, the complexity of businesses, and the changing regulatory needs. Traditionally, auditing has been based on the manual examination of financial statements, statistical sampling, and the expertise of the auditor to assess the fairness of the financial statements and the efficiency of the internal controls. The volume, velocity, and amount of financial information that auditors must review, have grown by leaps and bounds with the advent of digital transactions, enterprise information systems, cloud computing, and big data. Traditional auditing methods can be inadequate at examining the entire data set in a reasonable time frame, making it difficult to find sophisticated frauds, evaluate new risks, and deliver timely assurances [1]. These constraints have driven the use of artificial intelligence (AI) as a game-changing technology that can improve audit quality by using intelligent automation and sophisticated analytics. AI can allow the auditor to process a whole population of financial transactions, be able to detect patterns that are unusual, assist in continuous auditing, and enhance risk-based audit planning—all while improving the efficiency and quality of the audit. According to recent literature, AI technologies are more and more becoming a part of the audit workflow to improve fraud detection, cut down repetitive tasks, boost analytical review, and make evidence-based decision-making, making AI a major enabler of intelligent auditing of the next generation [2].

AI integrates various types of computations such as machine learning, deep learning, natural language processing, robotic process automation, computer vision, explainable AI, and, recently, generative AI. These technologies have revolutionized the way that auditors gather, process, analyze, and interpret the financial information during the audit life cycles [3]. Machine learning algorithms can detect patterns that lie beneath the surface of past financial records and forecast potential financial misstatements; machine learning models and deep learning can enhance the identification of intricate fraud schemes and unusual financial activities. Automated review of contracts, management reports, audit working papers, and regulatory disclosures with Natural Language Processing (NLP) helps to save time on manual review. With RPA, repetitive tasks in audits that involve data extraction, reconciliation, confirmation, documentation, and more can be automated, freeing up the time of auditors to focus on analyzing the data and making strategic decisions. Another significant development was explainable AI, a technology that enhances the transparency and interpretability of AI-powered recommendations, boosting auditor trust and aiding compliance with regulations [4]. These technologies work together to ensure uninterrupted auditing, ongoing risk monitoring, and intelligent decision support—helping auditors move away from the sample-based testing approach to a more complete and data-driven audit with more reliable and timelier audit evidence.

A key focus in AI-driven auditing research was addressing how AI impacts audit quality and the exercise of professional judgment, two core pillars of the successful audit. The quality of the audit was based on the auditor's ability to uncover material misstatements, to have professional skepticism, to evaluate evidence objectively, and to make independent audit opinions, the accuracy of audit procedures. AI significantly improves the quality of audits in several ways, including more effective catching of anomalies, greater audit coverage than was possible with representative sampling, better predictive risk assessment, and audit procedure consistency [5]. It was important to remember that AI was not a replacement for the expertise, ethical considerations, and context of professional auditors. Intelligent systems can quickly analyze millions of transactions and derive complex risk indicators, but they can't perform a thorough analysis of complex business environments, a detailed analysis of how ambiguous accounting treatments are interpreted, or adopt a professional skepticism as an experienced auditor can. Today, the focus in auditing was shifting towards a “human in the loop” model where AI was used as a decision support tool rather than a replacement for auditors' evaluation of AI outputs, interpreting evidence and documenting findings and accountabilities for audit opinions. This partnership of humans and intelligent technologies was pivotal to maintaining audit reliability, professional independence, and confidence in the audit process [6].

While significant opportunities exist through the adoption of AI, the use of AI also poses significant governance, ethical, regulatory, and organizational challenges that must be tackled to ensure that audits can be conducted with trust. As AI-driven decision-making becomes more prevalent, algorithmic bias, explainability, accountability, data privacy, and compliance with professional auditing standards have emerged as concerns for

cybersecurity, data privacy, algorithmic transparency, algorithmic explainability, and algorithmic accountability [7]. The use of more advanced AI models can also be 'black-box' systems that are not fully understood by auditors, regulators, or stakeholders, which can make it harder to trust the conclusions drawn from the audits. The poor training data and governance issues and lack of human oversight can lead to those risk assessments being incorrect or that audit results be biased. As regulatory bodies and professional accounting institutions tend to take a stance on the matter, they are stressing the importance of responsibility for audit conclusions resting with human auditors, regardless of the amount of AI automation used on the audit (or not). As a result, there was a need for organizations using AI technologies to implement extensive governance frameworks that include ethical considerations for AI, recordable validation of models, ongoing performance tracking, data governance, protection from cyber threats, and compliance with changing regulations. Good governance leads to the quality of the audit being improved through the use of AI without being detrimental to auditor independence, accountability, public trust, or adherence to professional standards [8].

As AI becomes increasingly common, there has been a significant amount of research into the applications, benefits, barriers, and implications of AI for auditing. Previous research has examined the application of various intelligent methods for detecting fraud, continuously auditing, analyzing financial statements, evaluating internal controls, planning audits, and performing automated risk assessment [9]. The totality of these studies showcases how AI can transform, but the existing literature was scattered across various technological, methodological, and application-specific fields. Much of the past research has mainly examined the use of individual AI techniques or specific applications of AI in auditing, with little consideration of the interconnections between AI adoption, audit quality, professional judgment, and governance issues. The recent advancements in explainable AI, generative AI, responsible AI, and AI governance have opened new research questions related to transparency, accountability, regulatory compliance, and the role of auditors in AI-enabled environments. Hence, it was necessary for a systematic review to be a thorough one to take up the existing knowledge, identify the predominant research trends, summarize existing evidence, and point out gaps in the research [10].

2. Research Gap

While AI has made its way into auditing, the knowledge base on AI for auditing was still scattered across the individual technologies, specific audit functions, and isolated application domains. Research has focused on AI capabilities to detect fraud, evaluate risk, or automate processes, rather than on the potentially synergistic role of AI on audit quality, professional judgment, and governance issues in a single analytical framework. In addition, new technology developments like explainable AI and generative AI have created new transparency, accountability, ethical decision-making, and regulatory issues and concerns that are not sufficiently combined. Thus, a systematic review process was required to synthesize the existing knowledge and to define future research directions and areas in need of further investigation in the field of responsible auditing with the use of AI [11].

3. Research Methodology

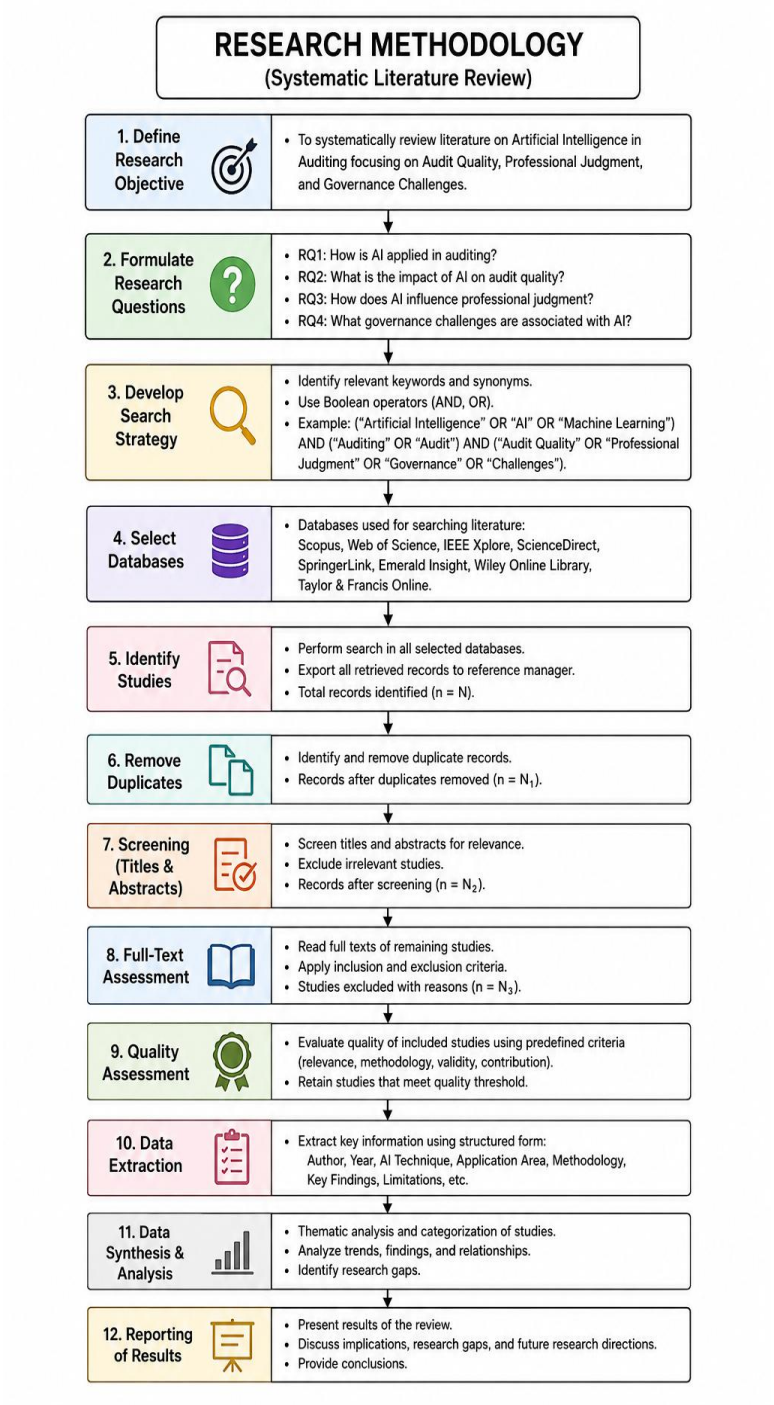


Figure 1. Research Methodology

AI-Driven Literature Acquisition Model

To ensure the collection of relevant and high-quality research articles on the topic of artificial intelligence in auditing, the AI-driven literature acquisition model was employed. A systematic search strategy was created to identify publications explicitly focused on the application of AI technologies, audit quality, professional judgment, governance and ethical concerns, fraud detection, and intelligent audit practices. The literature search was done to ensure full coverage of recent developments and uniformity throughout the literature review process. The publications were

sourced by using predesigned keywords and combinations thereof that are relevant for artificial intelligence and auditing.

Several international and peer-reviewed databases were used for the retrieval of peer-reviewed publications. The databases chosen for this study are Scopus, Web of Science, IEEE Xplore, ScienceDirect, SpringerLink, Emerald Insight, Wiley Online Library, and Taylor & Francis Online, as these show high-quality research on accounting, auditing, artificial intelligence, information systems, and business management. Boolean operators (AND/OR) were used to combine the keywords effectively and enhance the retrieval of relevant studies. To reflect recent developments in AI-powered auditing, the literature search mostly focused on publications from the period 2015 to 2026 [12].

After literature search, all obtained publications were collated and filtered to remove duplicate publications and to remove studies not relevant to the study. First, the articles retrieved were read, and the titles and abstracts were screened to identify those that were pertinent to the research questions. Publications were retained for further evaluation for two reasons: they addressed topics of artificial intelligence applications in auditing, and they addressed topics of audit quality improvement, auditor decision-making, governance frameworks, fraud detection, continuous auditing, and risk assessment. Articles outside the area of AI or auditing, non-English language publications, editorials, opinion papers, and studies were excluded if there was insufficient methodological information.

The articles selected were then assessed for full text to confirm that they directly related to the aims of this systematic review. A structured data collection framework was used to extract relevant information from the articles, such as AI techniques used, the domains of the audits, their research methodology, their main findings, limitations, and future research possibilities [13]. The systematic process of acquiring literature ensured that only reliable and relevant literature was included in the review, and thus a holistic view of the state of the art was obtained, and the areas of research gaps regarding audit quality, audit professional judgment, and governance challenges were identified.

Intelligent Audit Knowledge Classification

The Intelligent Audit Knowledge Classification approach was used to structure the literature in a systematic manner based on the dimensions of artificial intelligence in auditing. Once relevant studies and their screening were done, the information reported in each study was explored and categorized by its main research focus. The classification was created with the aim of simplifying the literature collected and of structuring the existing knowledge. Studies on aspects of audit quality and professional judgment, as well as governance issues, were given special consideration because they are the main focus of this systematic review [14].

The studies were first classified based on the areas in which they were applied in auditing (first stage classification). The following major categories were developed: Fraud and Anomaly Detection, Audit Risk Assessment, Audit Planning, Continuous Auditing, Internal Control Evaluation, Financial Statement Analysis, and Audit Evidence Assessment. When it was felt that more than one category was appropriate, studies addressing several audit functions were assigned to several categories. This classification helped to establish areas where AI has been used most often and audit activities that have been comparatively little researched. Therefore, a more precise knowledge of the use of intelligent technologies in various phases of the audit process was gained.

The second stage involved categorizing literature based on the AI techniques and their impact on the outcomes related to the auditors. The following technologies were taken into account: machine learning, deep learning, natural language processing, robotic process automation, explainable AI, and generative AI. Their reported contributions to audit accuracy, efficiency, identification of audit risk, detecting fraud, evaluating evidence, and making decisions were explored. Research on professional judgment was also categorized based on professional skepticism, auditor decision-making, human–AI interaction, reliance on AI recommendations, and the need for human oversight. This classification enabled the specific relationships between specific AI technologies and their effect on audit quality and auditor judgment to be systematically analyzed [15].

At the final stage, studies on governance and ethical and regulatory issues were separated. The main requirements comprised algorithmic transparency, explainability, bias, accountability, data privacy, cybersecurity,

regulatory compliance, and responsibility for decisions regarding audits aided by AI. The classification was then compared with the professional and governance risks of adopting AI and the benefits it brings to technology. Thematic synthesis was then used to draw connections among the themes of AI technology, audit application, audit quality, professional judgment, and governance challenges. Accordingly, the Intelligent Audit Knowledge Classification offered a systematic framework to analyze existing research findings, to compare research findings across different themes, to identify under-researched themes, and to pinpoint future research gaps and opportunities for responsible AI-enabled auditing.

AI Technology Taxonomy for Auditing Research

To classify the artificial intelligence techniques used in the selected studies, the AI Technology Taxonomy for Auditing Research was developed. Once the relevant publications were found, every study was analysed to identify the type of AI technology used for solving auditing problems. The classification allowed similar technologies to be clustered together to create a structure for understanding how these technologies are used in various auditing functions. This taxonomy enabled a comprehensive review of the contributions of these various AI techniques to audit quality, professional judgement and governance, with the diversity of the techniques being clearly defined.

The studies chosen were assigned to the following major categories of AI technologies: Machine Learning (ML), Deep Learning (DL), Natural Language Processing (NLP), Robotic Process Automation (RPA), Explainable Artificial Intelligence (XAI), and Generative Artificial Intelligence (GenAI). Fraud detection, risk assessment and financial statement analysis were the main areas where machine learning techniques were linked. For financial anomaly detection, deep learning models were often used to identify complex anomalies and detect hidden fraud patterns. NLP was the most common use case for processing and extracting information from audit reports, contracts, financial disclosures, and regulatory documents, while RPA was used to automate repetitive tasks like data extraction, reconciliation, and documentation [16].

The classified studies were further broken down by the auditing functions supported by each of the AI technologies. Predictive Analytics and Anomaly Detection were the common areas where machine learning and deep learning techniques were used, while NLP techniques were helpful for Document Analysis and Compliance Verification. Explainable AI primarily was used to enhance the transparency and interpretability of the AI-driven audit decisions, allowing the auditor to grasp the “how and why” of model predictions. Generative AI has been a rising interest of late in areas like audit documentation, report generation, knowledge assistance and decision support. This classification, based on technology, allowed the role of AI tools for particular audit tasks to be systematically assessed.

Finally, the taxonomy was used to analyse and compare the advantages, drawbacks, and research activities of various AI technologies. The analysis helped to identify the common techniques used, the new intelligent systems and the less explored sectors of the auditing field in which AI can be applied. The taxonomy of technologies was also informed by the performance of different AI methods to help increase audit quality, handle professional judgement, and resolve governance issues [17]. The AI Technology Taxonomy, therefore, was used as a manageable analytical tool to compile and analyze existing studies and to identify future opportunities for the development of intelligent and responsible auditing systems.

Audit Quality and Governance Evidence Mapping

The Audit Quality and Governance Evidence Mapping approach was undertaken to structure and analyses the evidence presented in the studies that were selected for the impact of Artificial Intelligence on auditing outcomes. Once the literature had been classified by the audit domains and AI technologies, the results of each study were analyzed to determine the contributions to audit quality, professional judgment and governance practices. A structured evidence mapping process was applied to create links between AI technologies and the reported impact on auditing performance. This method allowed the available evidence to be synthesized in a logical and consistent way, and in turn, gave a complete overview of the state of play of AI-auditing [18].

The evidence that came out of the audit quality was gathered and sorted into a number of dimensions of performance: Auditing effectiveness, Auditing efficiency, Fraud detection ability, Anomaly detection ability, Risk assessment accuracy, Evidence of the audit quality, Decision support. The selected studies were analyzed to assess the improvement that was achieved in these dimensions as a result of the AI technology implemented. The advantages and disadvantages of the use of AI in audits were captured and contrasted for various audit scenarios. This systematic mapping process helped to identify the most promising AI techniques for improving audit quality and the effectiveness of audit engagements.

The selected studies were also analyzed for evidence related to governance and professional issues of the use of AI in auditing. Governance aspects like transparency, explainability, accountability, ethical decision-making, data privacy, cybersecurity, regulatory compliance, and auditor responsibility were particularly addressed. The evidence concerning professional judgement, such as auditor independence, professional skepticism, use of AI recommendations, and human supervision, was also retrieved and categorized. This mapping process helped to assess the benefits of the AI technologies as well as the governance challenges within the context of implementing them in an auditing setting [19].

Lastly, the evidence mapped was used to summaries common themes, conflicting evidence and under-researched themes in the literature. Thematic comparison of the selected studies was used to establish relationships between the AI technologies, audit quality improvement, professional judgement, and governance challenges. The evidence mapping also helped clarify the gaps in the research regarding explainable AI, ethical AI governance, human-AI collaboration and regulatory frameworks for intelligent auditing. The Audit Quality and Governance Evidence Mapping process thus offered a solid analytical basis to talk about the current state of the research field and to suggest directions for future research and development of responsible and trustworthy AI-enabled auditing.

Cross-Domain Knowledge Synthesis and Research Gap Discovery

To synthesize and extract the findings of the selected studies, the Cross-Domain Knowledge Synthesis and Research Gap Discovery approach was used, which integrates the findings from across various research domains in artificial intelligence for auditing. The results of the classification of the literature based on the types of audit application, types of AI technologies, audit quality, the role of professional judgment, and governance dimensions were then compared and synthesized systematically. Comparisons between studies to find similarities, differences, and relationships were conducted to gain a full picture of the current research landscape. This synthesis allowed evidence from several areas to be gathered together in a single framework that would help achieve the goals of the present systematic review [20].

The literature synthesized was analyzed to develop the connection between artificial intelligence technologies, audit quality, professional judgment, and governance issues. Research on transparency, accountability, ethics, and regulatory compliance and research on improvements in fraud detection, risk assessment, continuous auditing, financial statement analysis, and audit efficiency were compared. The findings from the collective data were analyzed to explore how varied use of the AI technologies would affect the audit performance and pose governance and professional challenges. This was a balanced comparison across domains that gave insights into opportunities and challenges of AI-powered auditing.

The integrated evidence was then analyzed to determine the areas of study that have not been sufficiently researched in studies. Specific focus was on recent areas of interest like explainable artificial intelligence (XAI), generative artificial intelligence (GenAI), human-AI collaboration, AI governance frameworks, ethical auditing practices, regulatory compliance, cybersecurity, and auditor accountability. These areas of research were examined by comparison of the selected studies, and the frequency of research was determined. Limited empirical evidence, conflicting findings, and inadequate methodological investigation were identified as possible gaps in knowledge that could be explored in further research [21].

Lastly, the identified gaps in the research were merged, and research directions for the application of artificial intelligence in auditing were established. The need for greater transparency in AI, better governance and accountability processes, greater trust in human–AI partnerships for professional judgment, and the need to create a new framework for regulating intelligent audit systems were suggested. The synthesis also exposed the requirement for integrating interdisciplinary research combining AI, auditing and accounting, IS, and corporate governance. Therefore, the Cross-Domain Knowledge Synthesis and Research Gap Discovery process served as a thorough basis to summarize current knowledge, pinpoint the pending challenges, and formulate a research agenda for the responsible use of artificial intelligence in today's auditing.

4. Result and Discussion

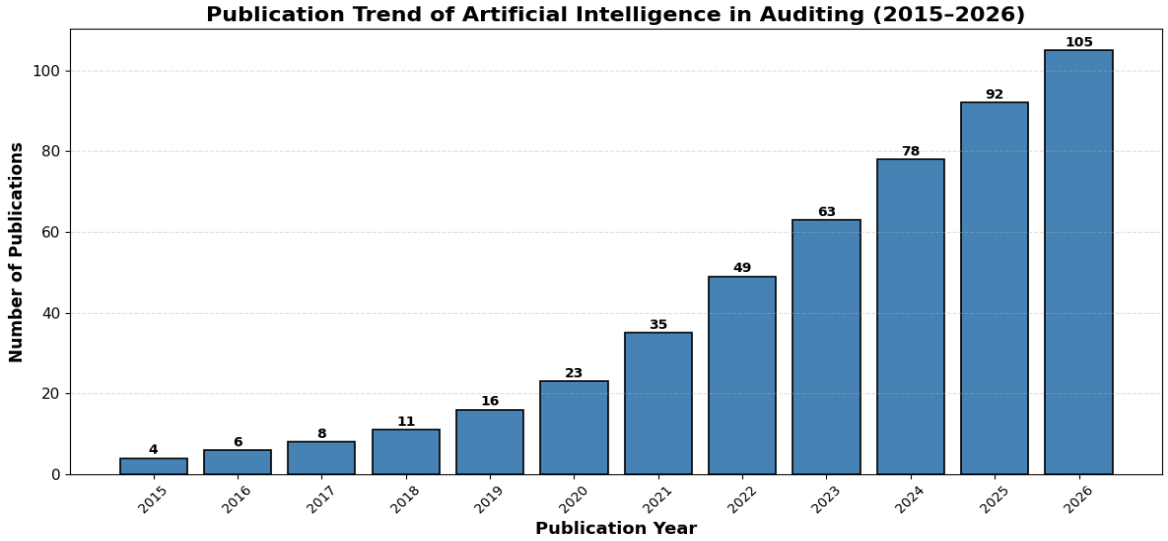


Figure 2. Publication Trend in Artificial Intelligence Auditing Research

The growth of the number of research publications on the use of artificial intelligence in auditing over the past ten years, from 2015 to 2026, was shown in the figure. Between 2015 and 2019, there was a gradual increase in the number of publications, with a range of 4 – 16 publications per year. In this time, the studies were mainly directed towards applying artificial intelligence techniques in the audit process, specifically in fraud detection and financial data analysis, automation of repetitive tasks in audit processes. The relatively small number of publications suggests that AI was an emerging technology in the field of auditing and the use of AI was still in its infancy. The steady increase in the number of entries along the way highlights that researchers were gaining insight into the ability of intelligent technologies to enhance audit performance and the assurance services based on data.

The number of publications has significantly increased since 2020, when there were 23, and 49 in 2022. This time was about the accounting profession's growth of interest in using artificial intelligence for auditing. As digital financial systems, cloud-based accounting solutions, big data analytics, and intelligent automation are increasingly being embraced, researchers explored advanced AI tools for audit planning, anomaly detection, continuous audit, and risk assessment. There was also increased focus on the quality of the audit, using techniques such as machine learning, natural language processing and robotic process automation. The trend of increasing publications indicates that artificial intelligence has gone beyond being a technology used for experimentation to becoming a key part of the contemporary research and practice in auditing [22].

The highest research growth was observed during the period 2023 to 2026, in which publications came up from 63 to 105 studies. The fast growth shows that the subject of artificial intelligence was one of the most researched topics in auditing. Advanced technologies like artificial intelligence (AI) and explainable AI, generative AI, predictive analytics, and intelligent decision-support systems are now being increasingly studied. Meanwhile, research has gone

beyond technical applications and focused on professional judgement, the use of AI-generated recommendations by auditors, governance, ethical issues, regulatory compliance, cybersecurity, transparency and accountability. By expanding the research field from technology adoption to responsible and trustworthy implementation of intelligent auditing systems, we can see that the conversation around AI has moved from just about technology to one about the responsible and trustworthy implementation of intelligent auditing systems.

The publication trend has shown a progressive and rapid development of the field of artificial intelligence research in the auditing field. The consistent body of scholarship literature was an indication of the increasing significance of intelligent technologies to improve the quality of the audit, analytical skills, professional decision-making and good governance practices. The increase in publications in recent years also shows that the research of artificial intelligence was considered a strategic research area for both academics and practitioners. The rising trend indicates a promising future for further research and exploration, especially concerning the integration of AI with human efforts in auditing, the creation of auditing systems that are explainable, the ethical governance of AI, regulatory uniformity, and the establishment of transparent and accountable intelligent audit frameworks.

Table 1. Publication Trend of Artificial Intelligence in Auditing (2015–2026)

Year	Publications	Growth Level	Observation
2015	4	Very Low	Initial research stage
2016	6	Low	Growing academic interest
2017	8	Low	Early AI applications explored
2018	11	Moderate	Research expansion observed
2019	16	Moderate	AI adoption gradually increased
2020	23	High	Digital auditing accelerated
2021	35	High	Advanced AI techniques investigated
2022	49	Very High	Rapid research development
2023	63	Very High	Focus expanded to governance
2024	78	Excellent	Significant publication growth
2025	92	Excellent	Strong academic attention
2026	105	Peak	AI became a major auditing research area

The publication trend shows a steady rise in the number of publications during the review period. In those early years, the focus shifted to the introduction of AI tools in auditing and exploring their use cases. In the first few years, the research was mainly directed towards the integration of artificial intelligence in auditing and identifying potential applications. If the increase was significant after 2020, it means that intelligent auditing has emerged as a significant research area after experiencing a rapid digital transformation in the organizations. The rising number of studies was driven by increasing focus on audit quality improvement, fraud detection, professional judgment, governance, and regulatory compliance. The increasing number of publications indicates that AI has emerged as a mature field of research, and there are ongoing advances in technology that will afford future studies.

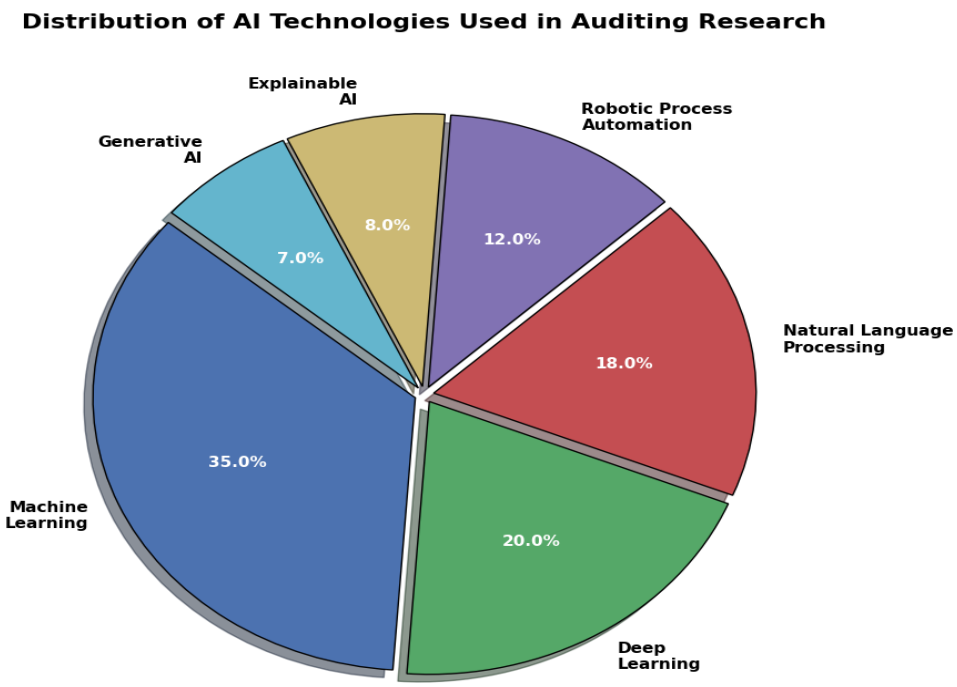


Figure 3. AI Technologies Used in Auditing Research

The figure shows the distribution of artificial intelligence technologies used in auditing research as a result of the selected studies that have been included in the systematic review. Finally, among all technologies, machine learning was used in the largest percentage (35%), followed by deep learning (20%), natural language processing (18%), robotic process automation (12%), explainable artificial intelligence (8%) and generative artificial intelligence (7%). The distribution shows that the research has mostly focused on the traditional AI methods that can be applied to large financial datasets, detect abnormal transaction patterns and facilitate data-driven audit processes. Machine learning's prominence was indicative of the fact that it was playing a pivotal role in improving the efficiency of audits and enabling predictive capabilities in the contemporary auditing landscape.

The importance of auditing with intelligent analysis of data was underlined by the fact that together, machine learning and deep learning make up over half of the total distribution. Fraud detection, risk assessment, anomaly detection, and financial statement analysis are among the diverse applications of machine learning algorithms in financial fraud detection that can learn from historical financial data and make accurate predictions. These capabilities have been further advanced by deep learning, which was used to recognise complex relationships in large and unstructured sets of data, thus enhancing the ability to identify sophisticated fraud schemes and to more fully consider the range of audit evidence for evaluation. The adoption of these technologies was widespread and illustrates the changing approach from traditional sampling to data-driven auditing using powerful analytical models [23].

Both Natural Language Processing (NLP) and Robotic Process Automation (RPA) make up a considerable portion of the literature reviewed, with NLP being 18% and RPA being 12%. Beginning recently, NLP was being applied to the analysis of text data, including audit reports, financial disclosures, contracts, regulatory documents, and management discussion and analysis. These features can help auditors work through more unstructured information in a more efficient way while also enhancing document review consistency. The primary area where robotic process automation was being deployed was to automate repetitive audit tasks such as data extraction, reconciliation, transaction matching, confirmation and audit documentation. The use of these technologies highlights how AI can positively impact both analytical skills and operational efficiency across the audit lifecycle.

While the relative sizes of the Explainable Artificial Intelligence (8%) and Generative Artificial Intelligence (7%) categories suggest these are still emerging fields of research in audit, they are significant. Explainable AI was gaining more and more traction due to its ability to make AI audit recommendations more transparent and interpretable, allowing auditors to understand and justify the automated recommendations. Likewise, generative AI has recently become of interest related to audit documentation and report generation, knowledge support and decision support. While there was a lack of research representation at this moment, in the future, these technologies are likely to become more prominent in supporting professional judgements, strengthening governance aspects, assisting regulatory compliance and fostering responsible adoption of artificial intelligence in auditing systems [24]. As a whole, the figure indicates that existing AI technologies are still a major focus of auditing research but that intelligent technologies hold significant potential for further development of transparent, reliable and accountable audit practices.

Table 2. Distribution of AI Technologies in Auditing Research

AI Technology	Percentage (%)	Primary Application
Machine Learning	35	Fraud Detection, Risk Assessment
Deep Learning	20	Anomaly Detection
Natural Language Processing	18	Financial Reporting
Robotic Process Automation	12	Continuous Auditing
Explainable AI	8	Governance & Transparency
Generative AI	7	Audit Documentation

The distribution shows that the field of machine learning was the most dominant research area in auditing, as it has extensive capability to analyse large financial datasets and also has strong prediction capability. Another aspect of deep learning that was given much attention was the area of complex fraud pattern detection and finding hidden financial irregularities. Natural language processing was a key component in the analysis of financial reports, contracts, and regulatory disclosures. The main benefit of RPA was that it can help automate repetitive audit tasks, thereby helping to improve operational efficiency [25]. Explainable AI and generative AI are smaller research areas but are becoming more significant in the areas of enhancing transparency, explainability, documentation, and intelligent decision support. The distribution focuses on the progress of AI from technical automation to responsible and transparent auditing.

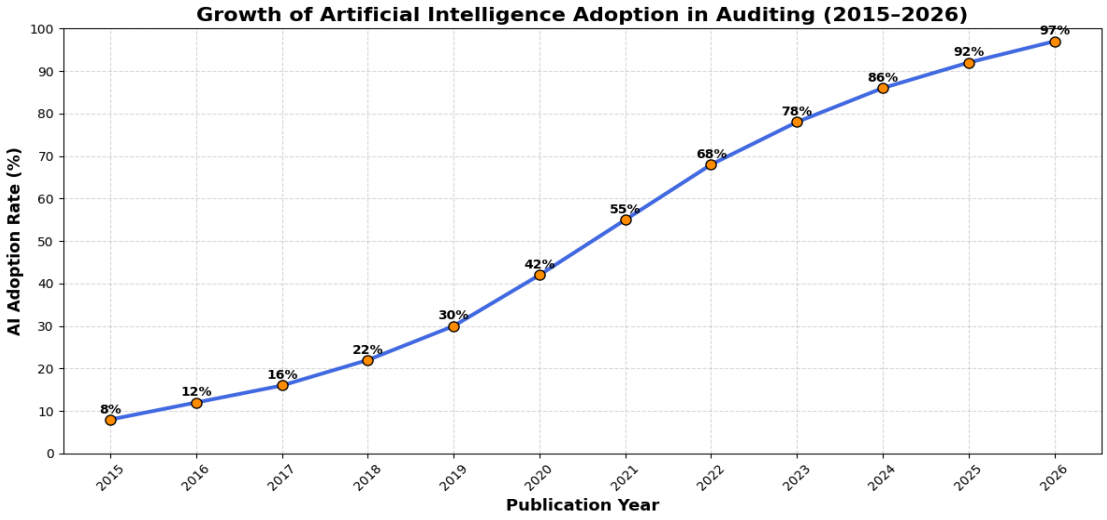


Figure 4. Growth of AI Adoption in Auditing

The figure illustrates the trend of incorporating artificial intelligence in the field of auditing from 2015 to 2026, with all values increasing over time. The adoption rate also rose from 8% in 2015 to 97% in 2026, suggesting that AI has become one of the core elements of today's auditing practices. In the first few years, adoption rates were still low, rising from 8% to 30% in the period from 2015 to 2019. This slow progress was a sign of how early AI was being adopted and was driven by the fact that companies were mostly testing the feasibility of using AI to automate repetitive audit processes, enhance data processing, and detect fraud. The many challenges at this point were mostly technological maturity, infrastructure readiness, and availability of skilled personnel [26].

It was noted that there was a significant acceleration in adoption from 2020 onwards, with the adoption rate rising from 42% in 2020 to 68% in 2022. The strong growth rate reflects the growing importance that organizations saw in the use of artificial intelligence to deal with the challenges of financial reporting and audit engagements. Intelligent technologies started to be used to aid with the continuous audit, predictive risk assessment, automated examination of transactions, and analysis of vast amounts of financial data that are not easily analyzed using traditional audit methods. The growing number of machine learning algorithms, natural language processing methods, and robotic process automation further bolstered the real-world application of AI in audit processes. As a result, auditors could enhance the efficiency of their audit and broaden the audit evidence gathered in audit engagements.

This growth was clearly seen from 2023 to 2026, where the adoption rate rose from 78% to 97%. The trend reflects the growing importance of artificial intelligence as a technological tool in the auditing process, not just a potential innovation. In this time, research and professional practice shifted from being about operational efficiency to exploring more sophisticated use cases, including using explainable AI, generative AI, intelligent decision support, and real-time monitoring of financial transactions. At the same time, it was a focus to improve the quality of audits by examining all data, without giving up the use of professional judgment and the accountability of the auditor. The rise in adoption also emphasizes the importance of transparency in AI models, ethical usage, AI model governance, AI model regulatory compliance, and cybersecurity in AI-assisted environments [27].

This figure illustrates that the use of artificial intelligence has been a consistent and steady development throughout the auditing profession. The steady rise underscores organizations' and researchers' trust in the ability of AI to improve audit quality, analytical accuracy, and fraud detection and enable better risk assessment. The actual percentage of the total adoption that was expected in the later years also indicates that future auditing will rely more on intelligent technologies and the professional auditors than solely on manual methods. Concurrently, the focus on building strong governance structures, fostering transparency and accountability, enhancing professional judgment, and implementing AI in an ethical and responsible manner to harness its long-term benefits in auditing was highlighted.

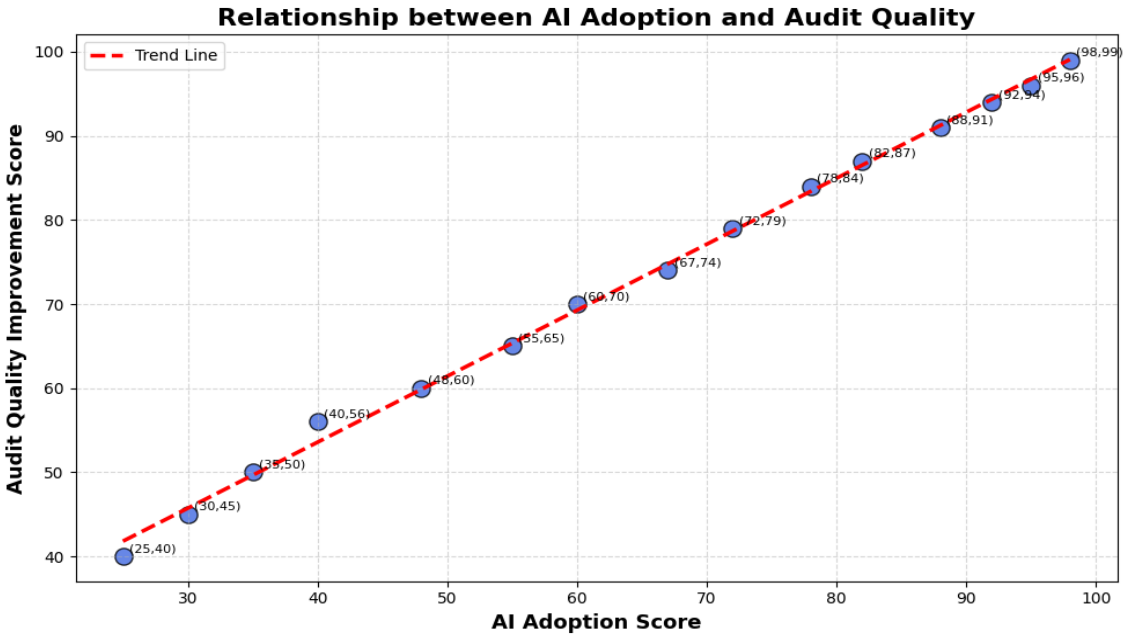


Figure 5. AI Adoption and Audit Quality

This figure shows the correlation between the AI Adoption Score and the Audit Quality Improvement Score in the selected observations. There was a clear positive correlation, as each data point on the graph was moving towards the upper right corner. The red dashed trend line also shows a positive correlation, with an increase in AI adoption also being linked to an increase in the level of audit quality improvement. The observations range from an AI adoption score of 25 (a quality score of 40) up to an AI adoption score of 98 (an audit quality score of 99). Data values are clustered tightly around the trend line, indicating a strong, consistent correlation between the studies across the range [28].

The pattern exhibited in the figure illustrates that with the higher adoption of AI, auditing activities are significantly improved. Significant quality gains are noted in the audit quality related to AI use, as its implementation was elevated from moderate to higher levels, with more accurate fraud detection, improved identification of anomalies, extensive risk assessment, and expedient examination of large financial datasets. Intelligent technologies can allow an auditor to analyze entire transaction populations rather than just samples, which helps to build the confidence that an audit was providing in the reliability of the evidence gathered and that it was more likely to detect misstatements. The positive trend shown in the graph points to the increasing value AI technologies are adding to the audit process in making sure that it was done better and assisting in evidence-based decision-making.

The second notable finding was that the distribution of data points was relatively narrow around the regression line, meaning that the quality of the auditors was linked consistently with the level of AI implementation. This uniformity also indicates that the advantages of AI are not limited to a specific audit task but are applicable to various audit tasks, such as audit planning, financial statement analysis, continuous auditing, internal control evaluation, or compliance monitoring. The results also suggest that companies that integrate AI tools have the potential to achieve greater audit efficiency, alongside intelligent analytics, which support their professionals in making decisions [29]. Yet the figure also conveys the message that enhancing the quality of the audit was possible by utilizing AI in a way that complements, not supplants, the expertise of the auditors.

The figure, taken together, was a strong indicator that increasing the use of artificial intelligence was positively related to improved audit quality. This trajectory indicates that as AI technologies continue to evolve, they can help to enhance audit accuracy, streamline operations, refine risk assessment, and deliver better audits. Meanwhile, the reliance on AI also emphasizes the need to have appropriate governance mechanisms, transparency, explainability,

ethical oversight, and auditor accountability to ensure that the suggestions generated by AI are interpreted appropriately. The relationship shown in the figure aligns with the concept that the future of auditing will increasingly rely on the effective integration and utilization of intelligent technologies with professional auditors to deliver reliable, transparent, and trustworthy assurance services [30].

Table 3. AI Technologies across Audit Functions

Audit Function	Dominant AI Technology	Major Contribution
Fraud Detection	Machine Learning	Anomaly identification
Risk Assessment	Machine Learning	Predictive risk analysis
Continuous Auditing	RPA	Automated monitoring
Financial Reporting	NLP	Document analysis
Internal Audit	RPA	Process automation
Governance	Explainable AI	Transparency
Compliance	NLP	Regulatory review

The classification shows how different the artificial intelligence technologies are and the different parts they play in auditing based on their analytical capacities. Machine learning was the most prominent solution for fraud detection and risk assessment because of its predictive algorithms' capabilities to detect abnormal financial transactions. Natural language processing can aid in financial reporting and compliance by analyzing text information automatically. By minimizing manual tasks and boosting efficiency, RPA enhances continuous auditing. Explainable AI plays a major part in governance in terms of the interpretability of recommendations generated by AI in audits. The results suggest that the adoption of a combination of AI technologies was becoming a key requirement for modern auditing to enhance the analytical performance, efficiency, transparency, and quality of decision-making.

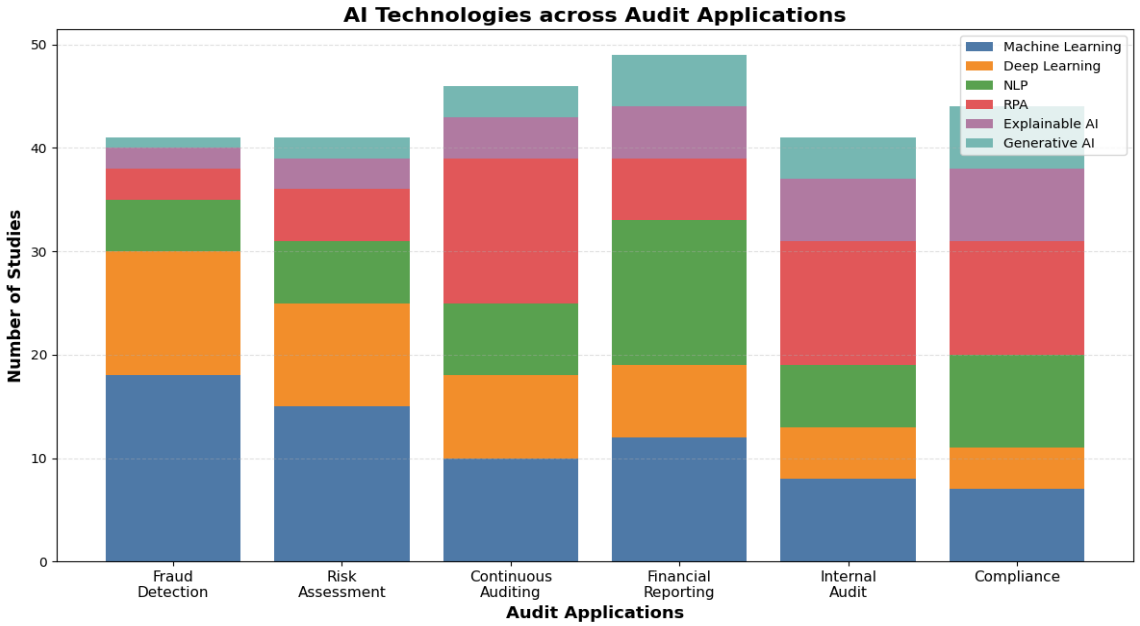


Figure 6. AI Technologies Across Audit Applications

The figure shows the major AI technologies used in various audit functions, such as fraud detection, risk assessment, continuous auditing, financial reporting, internal audit, and compliance. The stacked bars show the total contribution of the different technologies across the audit functions: machine learning, deep learning, natural language

processing, robotic process automation, explainable artificial intelligence, and generative artificial intelligence. The different heights and composition of the bars show that each auditing activity utilizes different forms of AI. In total, it shows that AI was not just being used for individual audit tasks but was also being integrated into various parts of the auditing process, enhancing both efficiency and decision-making.

Financial reporting, continuous auditing, and compliance are the areas where the highest number of contributions are noted, suggesting they are areas where AI was most fully integrated with these audit functions. One of the major areas that this field of technology has taken up was machine learning and deep learning, which was due to their capacity to analyze huge amounts of financial information, discover odd transactions, project potential risks, and boost the analysis of audit evidence. NLP also shows significant participation in areas where the interpretation of financial statements, regulatory documents, contracts, and other textual data are needed. These technologies can be used together to enhance the efficiency of processing structured and unstructured financial data and to boost the quality and consistency of audit results [31].

The figure also shows that various audit applications require complementary technologies. Fraud detection and risk assessment are two areas that heavily rely on machine learning, with predictive models helping to detect anomalies and evaluate financial risks. Automating repetitive tasks like data extraction, transaction reconciliation, audit documentation, and confirmation processes are just a few of the ways RPA supports continuous auditing, internal audits, and compliance. The percentage of applications that include explainable artificial intelligence and generative artificial intelligence was much lower, highlighting their growing importance in enhancing transparency, audit documentation, and interpretation of outputs generated by AI systems, as well as in intelligent decision support. This even split suggests that the modern audit was more about adopting a suite of AI technologies rather than solely a single clever and intelligent technique.

The figure shows that AI was increasingly being used as a multi-faceted technological tool that assists a multitude of auditing activities. The diversity of the different AI technologies demonstrates their use in audit quality enhancement and their ability to improve the analytical capabilities of auditors, speed up the processing of financial information, detect fraud, carry out robust risk assessments, and enable compliance monitoring. Meanwhile, the use of explainable AI and generative AI in a number of audit applications reveals a new focus on transparency, professional judgment, governance, and accountability in AI-assisted audits. The distribution indicates that the reliance on more integrated application of multiple intelligent technologies was likely to become more common in auditing in the future to generate effective and reliable assurance services that meet changing governance and regulatory demands in an efficient manner and with trust.

Equations

$$AITAI = \frac{ML + DL + NLP + RPA + XAI + GAI}{6} \quad [1]$$

The AI Technology Adoption Index measures the level of Artificial Intelligence implementation within auditing. Six major AI technologies identified in the systematic review are equally considered because each contributes to different audit functions. Machine Learning supports predictive analytics, Deep Learning detects complex financial anomalies, Natural Language Processing analyzes textual audit evidence, Robotic Process Automation automates repetitive procedures, Explainable AI improves transparency, and Generative AI supports documentation and reporting. A higher AITAI indicates greater technological maturity and broader adoption of AI across auditing activities.

$$AQEI = \frac{FD + RA + AE + CA}{4} \quad [2]$$

The Audit Quality Enhancement Index evaluates the extent to which Artificial Intelligence improves audit quality through four fundamental dimensions. Fraud detection strengthens the identification of irregular financial

activities, while risk assessment improves the evaluation of potential audit risks. Audit efficiency reflects reductions in manual effort and faster audit execution, whereas continuous auditing supports real-time monitoring of financial transactions. The average score represents the contribution of AI to enhancing audit quality within intelligent auditing environments.

$$PJSI = \frac{PS + HE + XAI + DS}{4} \quad [3]$$

Professional judgment remains a fundamental responsibility of auditors even when Artificial Intelligence was extensively used. This equation measures how AI strengthens auditor decision-making while preserving professional skepticism and human expertise. Explainable AI improves understanding of automated recommendations, whereas intelligent decision-support systems assist auditors in evaluating complex financial evidence. Higher values indicate stronger collaboration between human auditors and intelligent technologies.

$$GRI = \frac{TR + EX + RC + DP + CS + AA}{6} \quad [4]$$

The Governance Readiness Index evaluates organizational preparedness for responsible AI implementation. The equation combines six governance dimensions that collectively determine whether AI systems operate transparently, ethically, securely, and in compliance with auditing standards. Strong governance readiness supports trustworthy AI adoption while protecting confidential financial information and maintaining auditor accountability.

$$AFCI = \frac{FD + FR + IA + CO + RA + CA}{6} \quad [5]$$

The Audit Function Coverage Index measures the breadth of AI implementation across major auditing functions. Higher values indicate that Artificial Intelligence was supporting a wider range of audit activities rather than being restricted to a single application. Comprehensive AI adoption contributes to greater operational efficiency, analytical capability, and consistency throughout the audit lifecycle.

$$ARCI = \frac{\sum_{i=1}^{n} P_i}{n} \quad [6]$$

The AI Research Concentration Index measures the average research attention received by AI technologies identified in the systematic review. Technologies with larger publication volumes demonstrate greater academic maturity and practical importance. The index helps identify dominant research areas and emerging technologies requiring additional investigation.

$$GCSI = \frac{AB + EC + DP + CS + TR + RC}{6} \quad [7]$$

The Governance Challenge Severity Index measures the magnitude of governance issues associated with AI-enabled auditing. Larger values indicate more significant governance concerns requiring stronger organizational controls. The index provides a structured method for evaluating risks that influence AI reliability, accountability, and stakeholder trust.

$$IACI = \frac{AQ + PJ + GE + AE}{4} \quad [8]$$

The Intelligent Auditing Capability Index evaluates the capability of AI-supported auditing systems by integrating technical performance, professional expertise, governance quality, and operational efficiency. Organizations with higher IACI values possess stronger intelligent auditing capabilities and are better positioned to provide reliable assurance services.

$$AIMI = \frac{AITAI + AQEI + PJSI + GRI}{4} \quad [9]$$

The AI Maturity Index represents the maturity of AI implementation in auditing. It combines technology adoption, improvements in audit quality, support for professional judgment, and governance readiness into a single composite measure. Higher maturity indicates that AI implementation extends beyond technical automation and includes responsible governance and effective human oversight.

$$OIAFI = \frac{AITAI + AQEI + PJSI + GRI + AFCI + GCSI}{6} \quad [10]$$

The Intelligent Auditing Framework Index provides a comprehensive conceptual framework for evaluating Artificial Intelligence in auditing. It integrates six core dimensions identified throughout the systematic literature review: AI technology adoption, audit quality enhancement, professional judgment support, governance readiness, audit function coverage, and governance challenges. The framework demonstrates that effective AI implementation was achieved through a balanced combination of technological capability, auditing performance, professional expertise, and responsible governance. As a holistic indicator, this equation directly reflects the central themes of your chapter and was the most suitable concluding framework for your research.

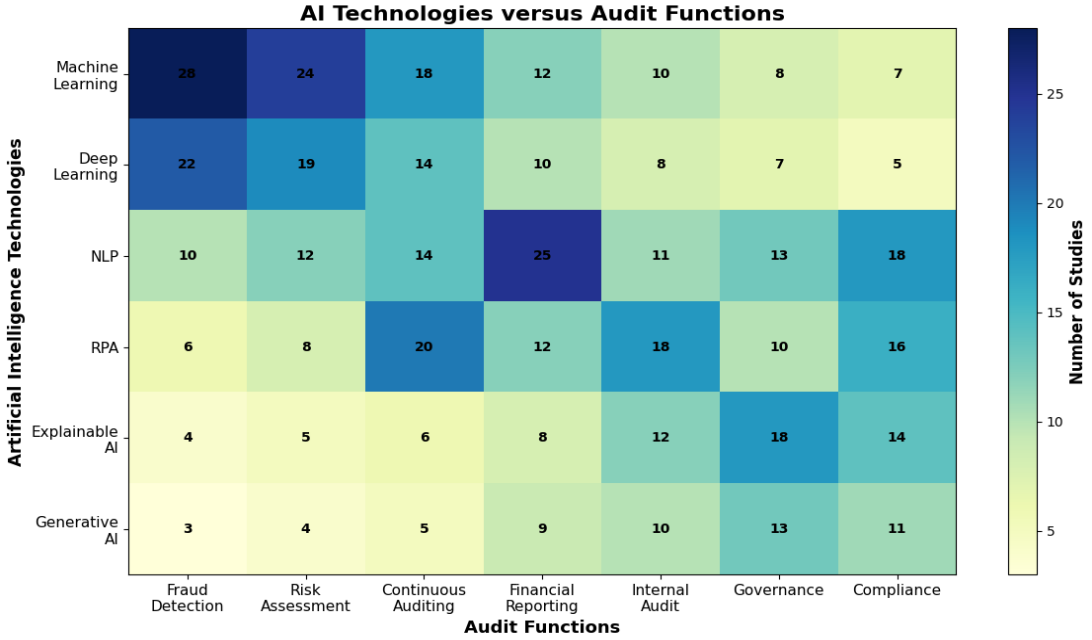


Figure 7. AI Technologies and Audit Functions

The figure displays a heatmap that shows the correlation between the major artificial intelligence technologies and the selected audit functions in the studies. The colors and numbers reflect the extent of the research focus for each technology in an audit function. The darker the color, the more studies that were conducted; the lighter the color, the fewer studies conducted when compared to the darker colors. The distribution shows how various AI technologies are used by auditors for different audit functions; this was because they have different analytical capacities and operational strength. The heatmap was designed to give a broad understanding of how intelligent technologies can be applied at different phases of the audit process and not just for a specific application area [32].

Machine learning in fraud detection (28 studies) and risk assessment (24 studies) have the highest number of studies. The pattern suggests that the technology of machine learning was the most broadly used one for the task of detecting suspicious financial transactions, predicting audit risks, and improving the accuracy of financial analysis.

Progress was also being made in fraud detection, risk assessment, and continuous auditing, all tending to show the capability of deep learning to identify complex patterns in large financial data sets. The results indicate that predictive AI models have emerged as crucial tools for improving audit quality by helping auditors detect material misstatements and emerging financial risks, thereby complementing traditional auditing methods.

The figure also illustrates that the greatest number of research focuses are in financial reporting (25) and compliance (18) using NLP. This means its increasing use in the interpretation of textual data like financial statements, auditing reports, contracts, and regulatory disclosures. Robotic Process Automation (RPA) demonstrates significant use in continuous auditing (20 studies) and internal audits (18 studies) and has the potential to automate repetitive audit tasks, transaction reconciliation, data extraction, and documentation work. These technologies can be used together to facilitate both the analytical and the operational work of an audit, which was useful to increase audit efficiency and to enable auditors to focus more attention on their professional evaluation and decision-making [33].

The shift in the attention of research in the field of intelligent auditing was revealed by the reduced research attention, although there was still a steady rise of explainable artificial intelligence and generative artificial intelligence. Because of its usefulness to increase transparency and interpretability of AI-generated recommendations, explainable AI shows relatively strong application in governance (18 studies) and compliance (14 studies). Likewise, generative AI was increasingly being utilized for governance, financial reporting, and compliance, including automated documentation and intelligent reporting and knowledge assistance. The distribution suggests that the traditional AI technologies are still widely used in technical audit applications, although recent studies are increasingly focusing on the need for transparency, governance, ethical implementation, and adherence to regulations. The trend was ongoing, indicating that future auditing systems will leverage sophisticated analytical tools and responsible AI governance to drive audit quality, bolster professional judgment, and boost stakeholder trust.

Table 4. AI Impact on Auditing Dimensions

Auditing Dimension	Impact Score	Performance Level
Audit Quality	9.5	Excellent
Fraud Detection	9.2	Excellent
Risk Assessment	8.8	Very High
Continuous Auditing	8.5	Very High
Professional Judgment	7.9	High
Regulatory Compliance	8.1	High
Governance	7.6	Moderate
Transparency	7.3	Moderate

Based on the impact assessment, the greatest improvements are in audit quality, fraud detection, and risk assessment that are brought by artificial intelligence. With intelligent analytical methods, auditors can work through more data in greater depth and accuracy and gain a better understanding of evidence and identification of anomalies. Another advantage of continuous auditing was the ability to monitor and analyse financial transactions in real-time, which was made possible by the automation of monitoring. While governance and transparency scores are moderately low, they are nevertheless important to consider when it comes to responsible AI adoption. The findings indicate that advancements in intelligent auditing in the future should focus on technological innovations, bolstering governance frameworks, creating more interpretable AI models, ethical application, and professional supervision.

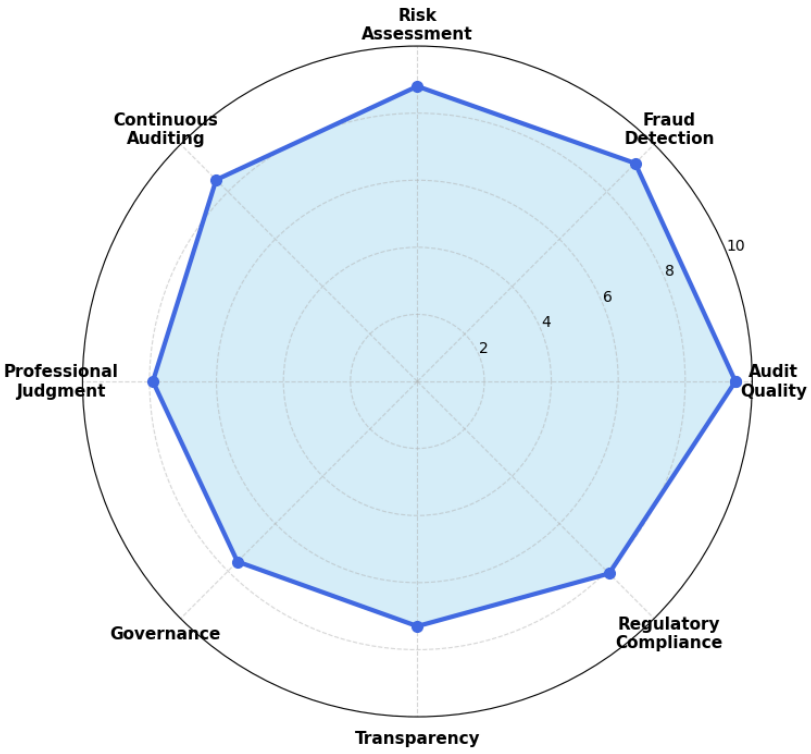


Figure 8. Impact of AI on Key Auditing Areas

The radar chart shows the relative impact of artificial intelligence on eight key aspects of auditing: audit quality, fraud detection, risk assessment, continuous auditing, professional judgment, governance, transparency, and regulatory compliance. The values between 7.3 and 9.5 suggest that AI has positively impacted all aspects, albeit to varying degrees. As can be seen, the higher values of the audit quality, detection of fraud, and risk assessment indicate the most successful use of AI technologies in analytical and operational audit processes. The evenness of the radar chart also suggests that AI was no longer just for one type of audit but has become a technology that was used throughout the audit process [34].

The best results are achieved with audit quality, fraud detection, and risk assessment, highlighting the potential of AI to enhance audit effectiveness. Unlike traditional auditing methods, intelligent algorithms can analyze the entire financial data set, detect unusual transactions, discern patterns in hidden fraud, and analyze financial risks quickly and accurately. Machine learning and deep learning models play a vital role in predictive analytics, enabling auditors to identify material misstatements and emerging risks at an early stage, thereby avoiding significant problems. Such improvements will lead to more reliable audit evidence, more uniformity in audit procedures, and better information for audit evidence and decisions, which will further bolster the credibility of financial reporting and assurance services.

The scores for continuous auditing, professional judgment, and regulatory compliance are also moderately high, reflecting the added value AI can provide throughout the audit lifecycle. Real-time transaction monitoring and automated exception reporting have been advantageous aspects of continuous auditing, as it enables organizations to more efficiently identify control weaknesses and operational risks in real-time. Professional judgment also has been enhanced using smart decision support tools that help auditors analyze complex financial information with human intervention and professional skepticism. AI can also help with regulatory compliance by automatically reviewing financial data, tracking compliance with auditing regulations and standards, and spotting potential compliance issues, which minimizes manual work and enhances audit reporting consistency [35].

The relative score for governance and transparency shows a significant area to focus on as AI adoption grows. While intelligent technologies do offer significant improvements in audit performance, there are concerns about the

explainability, accountability, algorithmic bias, ethical decision-making, and interpretability of the recommendations generated by AI. The governance issues highlighted here demonstrate that technological solutions are not enough when it comes to the development of trustworthy AI-supported audits. To guarantee AI systems are reliable, ethical, and transparent, it was crucial to establish effective governance frameworks, transparent AI models, regular monitoring, and defined auditor tasks. The pattern shown in the figure indicates that artificial intelligence has significantly improved the technical aspects of technical audits, but further development was likely to require improved governance arrangements, better professional judgment, and greater transparency and responsibility in the application of AI in auditing.

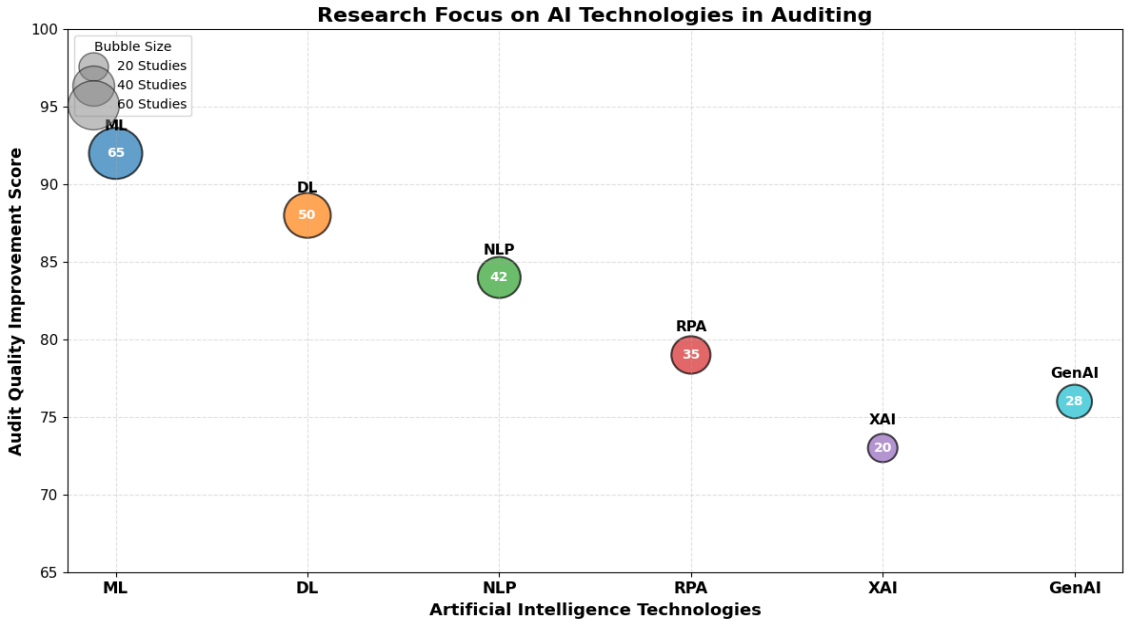


Figure 9. Research Focus on AI Technologies

The figure shows that there was a correlation between the major artificial intelligence technologies, their role in the quality of the audit, and the amount of research conducted on each technology. The 6 AI technologies are plotted on the horizontal axis, with the Audit Quality Improvement Score plotted on the vertical axis. The size of each bubble reflects the number of studies in the systematic review, enabling both the intensity of research and the impact on practice to be assessed. The largest bubble (65 studies) and the highest audit quality improvement score (92) are represented by machine learning, followed by deep learning (50 studies) and a score of 88. As seen in the figure, the technologies that are being studied more are generally linked to higher attributes of audit quality improvement.

The major roles are filled by machine learning and deep learning, as these are the key pillars of intelligent auditing. They are large in size to represent the extent of academic research and practical application in a number of auditing areas. The technologies have always been used in fraud detection, risk assessment, financial statement analysis, identification of anomalies, and predictive auditing due to their capability to handle big financial data sets with a high level of analysis accuracy. The high audit quality scores also indicate that implementing these smart models has led to a substantial improvement in audit efficiency, reliability, evidence evaluation, and decision-making within organizations. The dominance of their position confirms that predictive AI techniques are the oldest and the most accepted technologies in the current audit practice [36].

In the middle tier of the figure, NLP and RPA have garnered some attention from researchers and are a significant contributor to audit quality. Represented by 42 studies and an audit quality score of 84, NLP has been more and more used to analyze audit reports, contracts, financial disclosures, and regulatory documents and has enabled auditors to process large quantities of unstructured textual information. With 35 studies and an audit quality score of

79, the RPA has helped mostly in automating repetitive audit tasks like reconciliation of transactions, data extraction, audit documentation, and compliance verification. These technologies augment predictive AI and enhance the efficiency of operations, lessen the effort of manual work, and enable auditors to focus more on professional evaluation and analytical reasoning during audit engagements.

In the literature reviewed, there are emerging technologies of explanatory artificial intelligence and generative artificial intelligence. The studies for explanatory AI are represented by 20 studies, and the audit quality improvement score was 73, while generative AI has 28 studies with a score of 76. Both technologies are considered to be becoming more important, although their research volumes are relatively low, due to the fact that they solve non-technical problems. Explainable AI improves the interpretability and transparency of AI-driven audit recommendations, which in turn helps professionals with their professional judgment and upholds auditor accountability and stakeholder trust. Generative AI helps to generate intelligent reports, document audits, provide knowledge support, and support decisions. It was therefore evident that while traditional AI technologies remain the focus of existing auditing research, emerging technologies are now emerging and gaining traction as critical building blocks in the evolution of responsible auditing systems fueled by AI and for their ethical and transparent implementation.

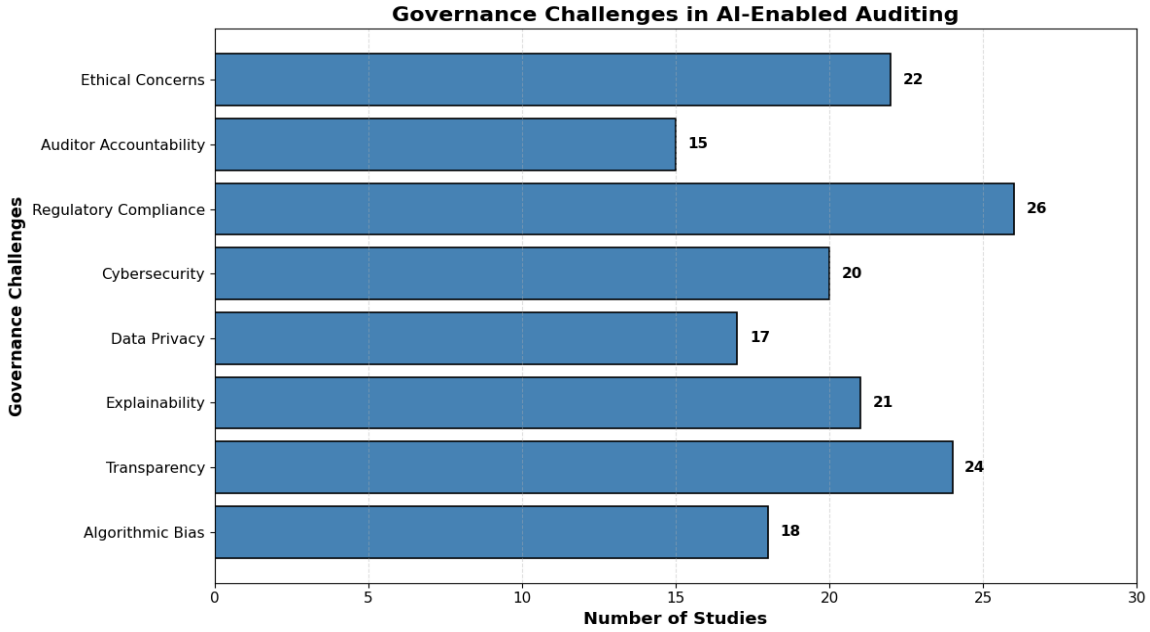


Figure 10. Governance Challenges in AI-Enabled Auditing

The figure shows the importance of the major governance challenges related to the implementation of artificial intelligence in auditing based on the number of studies covering the different challenges. The horizontal bar chart shows that regulatory compliance was the most studied topic (with 26 studies), followed by transparency (24 studies), ethical concerns (22 studies), explainability (21 studies), and cybersecurity (20 studies). There are relatively fewer studies on algorithmic bias (18 studies), data privacy (17 studies), and auditor accountability (15 studies). The distribution reveals that although artificial intelligence has significant advantages for auditing, governance-related issues affecting AI-assisted audit practices' reliability, fairness, and credibility need to be considered when implementing AI [37].

The regulatory compliance dimension suggests that researchers and practitioners are aware of the significance of making sure AI applications are in line with expert auditing conventions and legal frameworks. The increasing role of intelligent systems in audit planning, gathering and assessing evidence, and supporting decision-making presents challenges for organizations to ensure that the outputs from the use of the AI are aligned with adopted accounting principles, auditing standards, and regulatory expectations. The emphasis on transparency also highlights the

increasing demand for AI systems that provide explainability and auditing capabilities for recommendations and decisions made by their systems. Transparent AI models boost the confidence in automated audit processes by providing insights into the logic behind the conclusions made and by helping professionals make informed decisions.

What was also evident in this figure was the rising significance of ethical concerns, explainability, and cybersecurity in the context of auditing with AI. The ethical issues should highlight the importance of fairness, objectivity, and responsible application of intelligent technologies in the audit engagements. The need for explainability has grown as essential, as the auditors will require understanding the AI recommendations to include them in their audit judgments and/or final audit opinions. Another key governance concern was cybersecurity, as AI systems increasingly rely on vast troves of sensitive financial data, which needs to be safeguarded from unauthorized access, data breaches, and cyber threats. All these governance aspects help to ensure the integrity, confidentiality, and trustworthiness of AI-aided auditing systems.

While these are less studied areas of research, the figure indicates that these topics are still significant and should be addressed in future research due to algorithmic bias, data privacy, and auditor accountability. The use of algorithms can introduce bias that could impact the fairness and accuracy of the audit results if the data used for training are incomplete or unrepresentative; also, data privacy was paramount as AI systems handle sensitive financial and organizational information. While AI automation can enhance the efficiency of auditing, the ultimate responsibility for audit opinions lies with the human auditors. The fundamentals of auditor accountability still hold true, even with the use of AI automation in auditing. In conclusion, the governance challenges depicted by the figure underscore the critical need for a strong governance framework, ethical guidance, AI models that are easily understood, and effective regulatory compliance, alongside human oversight, to foster responsible and trustworthy auditing practices [38].

Table 5. Major Governance Challenges in AI-Enabled Auditing

Governance Challenge	Number of Studies	Research Priority
Regulatory Compliance	26	Very High
Transparency	24	Very High
Ethical Concerns	22	High
Explainability	21	High
Cybersecurity	20	High
Algorithmic Bias	18	Moderate
Data Privacy	17	Moderate
Auditor Accountability	15	Moderate

The governance analysis shows that regulatory compliance and transparency are the most common governance issues that are investigated when it comes to AI adoption in auditing. Intelligent systems for auditing have to be based on professional auditing standards and deliver clear and comprehensible suggestions, researchers point out. Ethical concerns, explainability, and cybersecurity are also emerging research priorities, as they are critical to the trust of the stakeholder, the reliability of the audit, and data protection. While it was less discussed, algorithmic bias, data privacy, and auditor accountability are all crucial aspects that contribute to the fairness and responsibility of AI-assisted auditing. The results indicate that the future intelligent auditing system should rely on technological innovation and the establishment of a comprehensive governance system and must keep the people's trust, transparency, and accountability.

5. Conclusion

Artificial intelligence has become a disruptive technology that was changing the face of auditing as a profession by enhancing assurance services in terms of quality, efficiency and reliability. This systematic review aimed to find out the current knowledge by combining the available literature and to investigate the contribution of artificial intelligence towards auditing, specifically audit quality, professional judgement and governance issues. The reviewed studies indicate that the use of artificial intelligence has grown significantly over the past decade, signaling its increasing acceptance in the field of auditing. AI technologies like machine learning, deep learning, natural language processing, robotic process automation, explainable artificial intelligence, and generative artificial intelligence are critical elements of intelligent audit systems. The evidence suggests that these technologies have been extensively used for fraud detection, risk assessment, continuous auditing, financial reporting, internal auditing and regulatory compliance. The literature also shows that artificial intelligence can help auditors process an increasing amount of financial data, both structured and unstructured, much faster than traditional auditing can, which can assist with generating more audit evidence and help with the success of the audit engagement [39].

According to the results of this systematic review, AI systems have played a significant role in improving the quality of audits by contributing to the accuracy of the analysis, increasing audit coverage, improving anomaly detection and enabling evidence-based decision-making. A shift away from the traditional audit approach of using samples and samples of data towards intelligent data-based auditing has allowed auditors to audit entire populations of transactions, uncover hidden financial irregularities and continuously monitor organizational activities. All literature reviewed shows that machine learning and deep learning are the prevailing technologies for fraud detection and predictive risk assessment, whereas natural language processing has helped with the automated analysis of financial statements, audit reports, contracts and regulatory documents. Another impact of RPA has been to eliminate repetitive audit steps, thereby enabling auditors to focus more on analytical evaluation and professional decision-making. New advances in Explainable Artificial Intelligence (XAI) and Generative Artificial Intelligence (Generative AI) suggest that auditing was beginning to shift from operational automation to intelligent systems designed to enhance transparency, documentation, knowledge support and interpretability of recommendations produced by AI.

The review also shows that professional judgement was still vital in adequate auditing with the rise of artificial intelligence. While intelligent systems are a great asset in accelerating and normalizing data analysis, they can't be completely relied upon to supplant and replace the professional skepticism, experience, context and ethical reasoning that good auditors possess. All reviewed studies consistently highlight the need to develop AI as a decision support tool in an environment of human-in-the-loop audit, in which audit opinions will be made by professional auditors. This cooperative process was further enhanced by the increasing popularity of explainable artificial intelligence, which allows the auditor to comprehend, verify and contextualize the AI output before using it to inform their audit result. Thus, the progress of intelligent auditing will need to rely not just on technology but also on the proper balance between analytical technology and the professional skills of auditors to ensure auditor independence, accountability and trust [40].

Another important finding in this systematic review was the identification of governance as one of the most critical research themes that are related to artificial intelligence in auditing. The literature reviewed continually emphasizes the need for thorough governance frameworks to ensure transparency, explainability, adherence to regulations, cybersecurity, data privacy, ethical responsibility, algorithmic bias, and auditor accountability. While AI technology has the potential to significantly enhance operational efficiency and the quality of audits, poor governance can erode stakeholder trust and lead to a number of risks, such as opaque decision-making, biased algorithms, and insufficient regulatory oversight. The rising focus on Explainable Artificial Intelligence (XAI) reflects a growing demand for intelligent systems that are transparent and can generate intelligent audit recommendations that are understandable and verifiable. Likewise, the advent of generative artificial intelligence has raised governance issues on audit documentation, content reliability, ethics and professional responsibility. The results suggest that technology should be supported by strong governance mechanisms that can guarantee the responsible, transparent and trustworthy use of artificial intelligence in an auditing context.

The result of this systematic review was a solid synthesis of the existing evidence on the use of artificial intelligence in auditing, considering both technical and methodological angles, along with governance issues. The review shows that the potential of artificial intelligence to transform modern auditing has come a long way from being a fledgling technological innovation to a strategic tool that can improve audit quality, professional judgement and good governance. Meanwhile, certain research gaps are apparent, such as Explainable Artificial Intelligence, Generative Artificial Intelligence, human–AI cooperation, ethical audit frameworks, autonomous audit systems, ethical AI governance frameworks, cybersecurity, and international standardization of regulations. Therefore, future research needs to be directed towards creating intelligent auditing systems that are transparent, explainable, and controlled by ethical considerations that can effectively embed advanced AI technologies with the professional expertise of human auditors.

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