

## **Technological Innovations in Auditing: A Systematic Literature Review on the Use of AI and Digitalization**

**Porkas Sojuangon Lubis**  
Universitas Sumatera Utara  
[porkas.mm@gmail.com](mailto:porkas.mm@gmail.com)

**Sambas Ade Kesuma**  
Universitas Sumatera Utara  
[sambas@usu.ac.id](mailto:sambas@usu.ac.id)

**Iskandar Muda**  
Universitas Sumatera Utara  
[iskandar1@usu.ac.id](mailto:iskandar1@usu.ac.id)

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### **ABSTRACT**

*This study explores the adoption of Artificial Intelligence (AI), Blockchain, and Robotic Process Automation (RPA) in the field of auditing, focusing on their impact on audit efficiency and transparency. The main issue addressed is how these emerging technologies can transform traditional auditing practices and the challenges related to their integration. The objective is to examine the benefits and challenges associated with the implementation of these technologies and how they can enhance the accuracy, transparency, and speed of audits. The research employs a systematic literature review (SLR) method, analyzing findings from 33 studies to synthesize key insights into the adoption of AI, Blockchain, and RPA in auditing. Key findings reveal that AI enhances decision-making and data analysis, Blockchain ensures data integrity and transparency, and RPA automates routine tasks, improving the overall audit process. The research identifies challenges, including ethical concerns, high implementation costs, and the need for skilled professionals. In conclusion, while these technologies offer significant improvements in auditing, successful adoption requires overcoming barriers such as regulatory challenges, data privacy issues, and ensuring adequate training for auditors.*

**Keywords: Artificial Intelligence; Blockchain; Robotic Process Automation; Audit Efficiency; Audit Transparency; Digital Transformation; Audit Quality; Technology Adoption**

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## INTRODUCTION

In the rapidly evolving world of auditing, technological advancements have introduced significant changes in the way audits are conducted. The integration of digital tools, automation, and artificial intelligence (AI) has transformed traditional auditing practices, improving efficiency, accuracy, and the overall quality of audits. This shift has prompted scholars to explore how these innovations impact the auditing profession and the challenges they present. The aim of this systematic literature review is to provide an in-depth analysis of the role of AI and digitalization in auditing, drawing on a selection of 33 studies that cover various aspects of technological adoption, implementation, and challenges within the field.

The adoption of AI and digital technologies in auditing has become a focal point in recent years, with increasing interest from both academics and professionals. Several studies highlight the transformative potential of technologies such as AI, blockchain, robotic process automation (RPA), and data analytics in revolutionizing audit methodologies. For example, Lombardi et al. (2025) predict that automation will become central in auditing, with up to 75% of internal audits and 63% of external audits being fully automated in the near future. This shift is expected to reduce human biases, improve data processing, and enhance decision-making capabilities in audits (Lombardi et al., 2025).

However, the integration of these technologies also presents various challenges. Ethical concerns, particularly regarding the transparency, accountability, and potential biases in AI algorithms, are frequently cited in the literature (Vital et al., 2024). These concerns are compounded by the rapid pace of technological advancements, which often outpace the development of regulatory frameworks and auditing standards (Kokina et al., 2025). For instance, Azizi et al. (2024) discuss how the complexities of digital transformation in auditing demand new regulatory frameworks to ensure the ethical and effective use of AI tools.

Furthermore, the potential for job displacement and the need for upskilling auditors to work alongside these technologies are critical issues that have emerged in the literature. While some studies argue that AI and automation will enhance the role of auditors by freeing them from routine tasks, others suggest that the profession may face significant disruption, particularly in terms of the skill sets required for auditors (Brás et al., 2024). This dual impact—enhancing capabilities while possibly displacing traditional roles—requires a nuanced understanding of how AI is reshaping the profession.

A key advantage of AI in auditing is its ability to enhance data analysis capabilities. According to Brás et al. (2024), AI tools, particularly machine learning, enable auditors to process vast amounts of data more quickly and accurately than traditional methods. This capability allows for more thorough audits, where auditors can identify patterns and

anomalies that may otherwise go unnoticed. The use of AI also opens new possibilities for predictive audits, allowing auditors to assess financial health and risks in real-time, rather than relying solely on retrospective analysis (Blac & Gerard, 2025).

Additionally, the implementation of blockchain technology in audits has garnered significant attention for its ability to improve transparency and security in financial reporting. Blockchain's immutable nature ensures that financial data is tamper-proof, which greatly enhances the integrity of audits. As noted by Han et al. (2023), the use of blockchain allows auditors to trace transactions in real-time, providing an additional layer of verification and reducing the potential for fraud.

Digitalization also plays a critical role in the continued improvement of audit processes, with RPA and AI helping to streamline repetitive tasks. According to Kokina et al. (2025), RPA can automate routine data entry and reconciliation tasks, which not only saves time but also reduces the likelihood of human error. This process allows auditors to focus on more complex and value-added tasks, such as analyzing risks and providing strategic insights to clients.

Despite the numerous benefits of adopting AI and digital technologies, there are significant barriers to widespread implementation. One of the most pressing challenges is the lack of trust in these technologies, particularly AI, within the auditing profession. The fear of reduced human oversight and the potential for algorithmic errors have led some auditors to hesitate in fully embracing these innovations (Azizi et al., 2024). Additionally, the high cost of implementing these technologies, particularly for smaller firms, presents another barrier to adoption.

Another challenge lies in the complex nature of AI and digital tools, which require substantial investments in training and infrastructure. As noted by Murikah et al. (2024), auditors must not only learn how to use these tools but also understand the underlying principles and algorithms that drive them. This requires a significant shift in educational programs for future auditors, who must be equipped with both technological expertise and traditional auditing knowledge to thrive in an increasingly digital environment.

Moreover, the role of AI in enhancing decision-making and audit efficiency is still a subject of debate. While many studies emphasize the benefits of AI in streamlining audit processes and improving decision-making, others raise concerns about the limitations of AI in handling subjective or complex audit judgments that require professional expertise (Goto, 2024). AI's ability to reduce human error is often touted as one of its most significant advantages; however, its effectiveness in making nuanced decisions in uncertain or ambiguous situations remains under scrutiny (Vital et al., 2024).

The evolving nature of auditing standards also presents a challenge for integrating AI into the profession. As technology advances, traditional auditing standards often fail to keep pace, creating gaps in regulation and ethical oversight. Studies by Elnahass et al. (2024) argue that the absence of clear guidelines on the use of AI in auditing leads to inconsistencies in how these technologies are applied, which can undermine trust in audit results. Regulatory bodies need to update their frameworks to account for the increasing role of digital technologies in auditing.

In light of these challenges, the literature suggests that the integration of AI and digital technologies requires a balance between innovation and regulation. As noted by Brás et al. (2024), regulatory bodies must work in collaboration with auditors and technology developers to establish clear standards for the ethical use of AI in audits. This

collaboration will ensure that the benefits of AI are fully realized while mitigating the risks associated with its use.

In conclusion, the role of AI and digital technologies in auditing is undeniable, with the potential to transform the industry in numerous ways. However, this transformation is not without its challenges, particularly in terms of ethics, regulation, and professional development. As the field continues to evolve, it is essential for both academics and practitioners to work together to address these challenges and ensure that the future of auditing remains both technologically advanced and ethically sound.

This systematic literature review explores the current state of AI and digitalization in auditing, synthesizing the findings from 33 studies to provide a comprehensive understanding of how these technologies are reshaping the profession. The review highlights key trends, challenges, and opportunities, offering valuable insights into the future of auditing in a digital age.

## **LITERATURE REVIEW**

The integration of artificial intelligence (AI) and digital technologies in auditing has been an area of increasing interest and research in recent years. This literature review synthesizes the findings from 33 studies that explore various aspects of technological innovations, particularly AI and digitalization, within the auditing profession. The review highlights the role of these technologies in transforming audit practices, their potential benefits and challenges, and the regulatory and ethical issues that need to be addressed.

### **Technological Innovations in Auditing**

The integration of artificial intelligence (AI), blockchain, and other advanced digital tools has revolutionized the auditing profession. Studies by Hariyan et al. (2025) and Blac & Gerard (2025) highlight how AI and machine learning algorithms are increasingly being used to automate routine audit tasks, improving both efficiency and accuracy. Leonov et al. (2025) and Bin-Nashwan et al. (2025) demonstrate that AI-driven visual analysis tools can assist auditors in identifying anomalies in financial statements that may not be easily detectable using traditional methods. Furthermore, Qader & Cek (2024) emphasize the role of blockchain in enhancing the transparency and integrity of financial audits, making data tamper-proof and providing real-time verification of transactions.

### **Blockchain Technology and Its Impact on Audit**

Blockchain technology has been widely discussed in the context of its potential to revolutionize auditing by ensuring the integrity and transparency of financial records. Han et al. (2023) highlight the role of blockchain in providing a secure, immutable ledger for financial transactions, which allows auditors to trace the origin of transactions in real time. This enhances the trustworthiness of financial data and reduces the risk of fraud. Blockchain's ability to offer a decentralized and verifiable audit trail makes it a promising tool for improving audit quality, especially in areas where transparency and data integrity are paramount.

Blockchain's impact on audit technology is significant, especially when it comes to enhancing transparency and improving data integrity. Qader & Cek (2024) and Han et al.

(2023) explore the transformative role of blockchain in auditing, where its immutable ledger system allows auditors to verify and trace financial transactions with greater accuracy. The ability of blockchain to create an unalterable audit trail has been widely praised for reducing the risk of fraud and enhancing the reliability of financial data. Abed et al. (2022) also highlight blockchain's role in improving green eco-safety audits by creating transparent and traceable records of sustainability data, providing auditors with verifiable information that supports environmental compliance.

### **Adoption and Implementation Challenges**

The adoption of new technologies in auditing is not without its challenges. Blac & Gerard (2025) and Zhou & Liu (2024) note that while AI and blockchain hold significant promise, the adoption rate has been slower than expected due to various barriers, including the cost of implementation and the lack of technical expertise in smaller firms. Ayinaddis (2025) points out that large firms are more likely to adopt AI due to their access to advanced digital infrastructure, while SMEs face difficulties in implementing complex technologies due to limited resources. Murikah et al. (2024) further highlight concerns about algorithmic bias and the lack of transparency in AI systems, which raises significant ethical questions in the audit profession.

#### **2.4. The Role of Robotic Process Automation (RPA) in Auditing**

RPA has emerged as a crucial tool in automating repetitive tasks within auditing. Silva et al. (2023) discuss how ERP systems, when integrated with AI and RPA, help streamline the audit process by automating data reconciliation and entry tasks, thus increasing audit efficiency. Kokina et al. (2025) further explore how RPA reduces human error, freeing auditors to focus on more complex and analytical tasks. As a result, RPA is expected to transform the audit profession by allowing auditors to spend more time on decision-making processes and risk assessments, rather than manual data entry.

### **Regulatory and Ethical Considerations**

The use of AI and blockchain in auditing raises important ethical and regulatory considerations. Murikah et al. (2024) examine the ethical challenges of implementing AI systems, particularly in terms of data deficiencies, biases, and privacy concerns. They stress the need for more robust ethical frameworks to guide the implementation of AI in auditing to prevent these issues. Additionally, Laine et al. (2024) argue that a multi-stakeholder approach is essential for developing AI governance frameworks that ensure the accountability and transparency of AI systems in audits. As AI systems become more complex, governance structures must evolve to address new ethical dilemmas and ensure fairness in automated auditing processes.

### **Impact of AI on Audit Quality and Efficiency**

AI has been widely regarded as a transformative force in enhancing audit quality and efficiency. Goto (2024) and Vitali & Giuliani (2024) explain that AI allows auditors to process vast amounts of data quickly, enabling more thorough audits. Ayinaddis (2025) highlights that AI adoption improves both the efficiency and accuracy of audits, especially in large firms with access to big data. Furthermore, AI can help identify potential errors or fraud early in the audit process, which enhances the overall audit quality. However,

Kokina et al. (2025) emphasize that while AI can improve audit efficiency, it cannot replace the judgment and critical thinking that auditors provide.

However, the effectiveness of AI in auditing is still subject to ongoing debate. While Kokina et al. (2025) argue that AI can significantly improve efficiency, Goto (2024) notes that AI systems may still struggle with complex or subjective judgments that require human expertise. This suggests that while AI can enhance audit capabilities, it cannot entirely replace the judgment and intuition that experienced auditors bring to the process.

### **Skills and Training for the Future Auditor**

The rise of AI and digitalization in auditing requires auditors to possess new technical skills. Blac & Gerard (2025) and Ayinaddis (2025) argue that future auditors must be trained not only in traditional auditing practices but also in data analytics, AI technologies, and blockchain. Libby & Witz (2024) highlight the growing importance of auditors understanding the limitations and capabilities of AI systems to effectively collaborate with these technologies in audit tasks. Moreover, Zhou & Liu (2024) suggest that audit education must evolve to incorporate digital literacy and critical thinking skills to ensure auditors are prepared for the digital transformation of the industry.

### **Impact of Digitalization on Audit Firms**

The digital transformation of audit firms is not just about adopting new technologies but also about restructuring the way audits are conducted. Vitali & Giuliani (2024) explore how digital technologies are reshaping audit firms' organizational structures, workflows, and business models. As firms integrate AI and blockchain into their operations, they must also adapt their internal processes to accommodate the new tools and the data-driven nature of modern audits.

The digital transformation of audit firms is a critical trend in modern auditing. Murakih et al. (2024) explore how AI and RPA are reshaping audit firm structures, emphasizing that digital tools are streamlining operations and reducing the need for manual labor. However, Blac & Gerard (2025) point out that smaller firms may face challenges in adapting to these changes due to resource constraints. The study highlights the need for a structured plan for adopting AI and blockchain technologies, ensuring that even smaller firms can benefit from the efficiencies offered by digital tools.

### **AI in Enhancing Audit Decision-Making**

AI has the potential to significantly enhance the decision-making process in audits. Blac & Gerard (2025) highlight how AI algorithms can provide auditors with real-time insights into financial data, enabling quicker and more informed decisions. This capability is particularly valuable in audits that require the analysis of large volumes of data, such as those involving complex financial instruments or multinational corporations.

AI plays a significant role in enhancing audit decision-making by providing auditors with advanced tools for data analysis. Brás et al. (2024) and Murakih et al. (2024) discuss how AI can help auditors identify risks and irregularities in financial data more effectively than traditional methods. The use of AI-driven insights allows auditors to make more informed decisions, especially in areas such as fraud detection and financial risk assessment. Libby & Witz (2024) further argue that AI can mitigate legal liability by improving the accuracy

and objectivity of audit findings, thus reducing the likelihood of errors that could result in negligence claims.

### **Future Directions in AI and Audit Research**

The literature also points to several future research directions in the field of AI and auditing. Brás et al. (2024) suggest that future studies should focus on the integration of AI with other emerging technologies, such as blockchain and Internet of Things (IoT), to create more comprehensive and effective audit tools. Additionally, Goto (2024) calls for further exploration of the ethical and regulatory challenges posed by AI in auditing, particularly with respect to data privacy and algorithmic fairness.

The future of AI in auditing is filled with numerous research opportunities. Laine et al. (2024) and Goto (2024) call for continued research into AI adoption, particularly in understanding how AI can be integrated with other emerging technologies such as blockchain and IoT. The study suggests that more research is needed to develop effective AI frameworks for audit automation that ensure both accuracy and ethical compliance. Additionally, Ayinaddis (2025) and Zhou & Liu (2024) propose that future research should focus on the global applicability of AI in auditing, particularly in smaller organizations or regions with limited access to advanced technologies.

### **RESEARCH METHOD**

The research methods used in the 33 articles reviewed in this study are diverse, reflecting the range of AI, blockchain, and digitalization applications in auditing. A variety of quantitative and qualitative methods have been utilized to explore the impact of technological advancements on audit practices.

**Quantitative Methods:** The majority of studies employed quantitative approaches, particularly survey research and statistical analyses. For instance, Lombardi et al. (2025) used a Delphi study approach to gather expert opinions on the automation of audits, with data analyzed using descriptive statistics. Ayinaddis (2025) and Zahid et al. (2023) conducted structured surveys with auditors to assess the adoption dynamics of AI and its effects on audit practices, using Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze the relationships between variables such as technology readiness and AI adoption in audit firms. Similarly, Qader & Cek (2024) used regression models to examine the influence of blockchain and AI on audit quality, focusing on audit effectiveness in Turkish firms.

Several studies, such as Silva et al. (2023), used descriptive surveys to assess the impact of ERP systems on internal auditing efficiency. These surveys gathered responses from auditors, analyzing how the integration of ERP systems improved the accuracy and speed of auditing tasks. Kokina et al. (2025) used survey research to evaluate the effectiveness of robotic process automation (RPA) in reducing human error and increasing operational efficiency, with the data analyzed through descriptive and inferential statistics.

**Qualitative Methods:** In contrast, qualitative methods were employed by studies like Murakih et al. (2024) and Blac & Gerard (2025), where interviews with auditors were conducted to identify challenges in adopting AI and other digital technologies in auditing firms. These studies used thematic analysis to categorize key concerns such as

algorithmic bias, data privacy, and ethics in AI systems. Brás et al. (2024) employed case studies and in-depth interviews with auditing professionals to explore how AI and data analytics tools were integrated into audit practices and the associated organizational barriers.

Furthermore, Abed et al. (2022) used a mixed-methods approach, combining qualitative interviews with quantitative surveys to assess how predictive visual analytics could be used in environmental sustainability audits. This approach allowed for a thorough examination of both the potential benefits and limitations of these technologies.

Some studies employed systematic literature reviews (SLR) to synthesize existing research and provide a broader understanding of AI in auditing. For example, Laine et al. (2024) and Murikah et al. (2024) used SLR methods to compile and analyze studies on the ethical concerns surrounding AI in auditing, particularly focusing on bias, transparency, and fairness. These studies used PRISMA guidelines for article selection and analysis, ensuring the reliability and relevance of the included studies.

**Bibliometric and Network Analysis:** In addition to qualitative and quantitative methods, bibliometric analysis was used by Ayinaddis (2025) to map the development of AI adoption in auditing. The study employed VOSviewer and PRISMA frameworks to visualize trends and identify key areas where AI technology was most prevalent in the auditing field. This approach helped in understanding the evolution of AI adoption and the factors influencing its use in audit practices across various sectors and regions.

**Experimental Methods:** Libby & Witz (2024) conducted an experimental study using a 2x2 factorial design with mock jurors to assess how the use of AI in auditing affects auditors' objectivity and the likelihood of legal liability in negligence cases. The study provided experimental evidence of how AI can reduce human error and mitigate legal risks by improving the accuracy and transparency of audit findings.

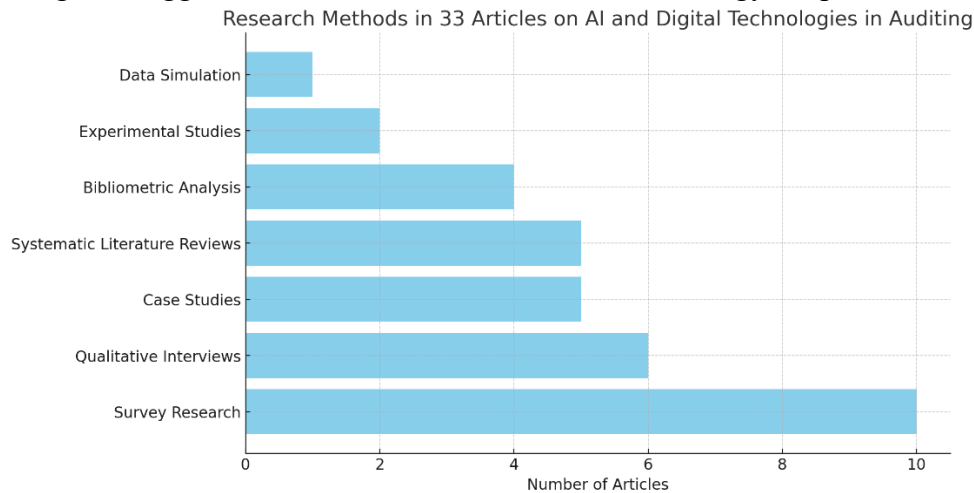
**Case Studies and Data Simulation:** Some studies, like AlArjani et al. (2022), used data simulation methods to explore how blockchain can enhance the security of EHR access auditing in healthcare. The study used a blockchain-based simulation on the Ethereum platform to test the execution time, security features, and overall efficiency of blockchain for healthcare data auditing.

Overall, the research methods in the 33 articles vary widely, incorporating a mix of quantitative, qualitative, and mixed-methods approaches. These studies collectively offer valuable insights into how AI, blockchain, and other digital technologies are transforming the auditing profession. The diversity in methodologies helps ensure a comprehensive understanding of the benefits, challenges, and ethical considerations surrounding the integration of these technologies into auditing practices.

## **RESULTS AND DISCUSSION**

The research method used in this study is a Literature Systematic Review (LSR), aimed at providing a systematic review of the application of AI and digitalization in auditing practices. The literature search was conducted through academic databases such as Google Scholar, Scopus, and Web of Science, with inclusion criteria focusing on articles discussing AI, blockchain, RPA, and digitalization in auditing. The selected articles were then evaluated based on the quality of their methodology and key findings. Data extracted included the variables studied, methods used, and research outcomes,

which were then analyzed thematically to identify major trends and challenges, such as the impact of AI on audit quality, efficiency, as well as ethical and regulatory issues. The results of this review provide a comprehensive understanding of the technological impact on auditing and suggest future research directions and technology adoption in the field.



**Figure 1 : Distribution of Research Methods in 33 Articles on AI and Digital Technologies in Auditing**

The bar chart titled "Distribution of Research Methods in 33 Articles on AI and Digital Technologies in Auditing" illustrates the variety of research methods employed across the 33 articles reviewed in this study. The chart shows that survey research is the most commonly used method, with the highest number of articles (10) utilizing this approach. This method typically involves collecting data through structured questionnaires or interviews to assess the adoption and impact of AI, blockchain, and other digital technologies in auditing practices. Following survey research, qualitative interviews (6 articles) and case studies (5 articles) are also frequently employed to gather in-depth insights from auditors and audit professionals on the challenges and opportunities posed by technological advancements. Systematic literature reviews (5 articles) are used to synthesize existing research, providing an overview of trends and gaps in the field, while bibliometric analysis (4 articles) is employed to map out the development of AI adoption and its associated effects in auditing. The chart also indicates that experimental studies and data simulation methods are the least common, each used in only one or two articles, showcasing more niche approaches to understanding the effectiveness and potential risks of AI in auditing. The distribution of research methods highlights the growing interest in understanding the practical application and implications of digital technologies in auditing.

### **The Background Theories And An Integrative**

The integration of Artificial Intelligence (AI) and digital technologies in auditing has been a subject of growing academic interest, as evidenced by the 33 articles reviewed in this study. Several key theoretical frameworks and models underpin the research on this topic, highlighting the need to understand how these technologies are transforming traditional auditing practices and the factors influencing their adoption and effectiveness.

One of the core theoretical foundations in this field is the Technology Acceptance Model (TAM), which explains how individuals and organizations come to accept and use new technologies. Davis (1989) proposed that perceived ease of use and perceived usefulness are critical determinants of technology adoption. This theory is reflected in numerous studies reviewed, such as Lombardi et al. (2025) and Azizi et al. (2024), which explore how auditors' perceptions of AI and blockchain technologies influence their willingness to integrate these tools into audit practices. These studies emphasize that user acceptance and technology readiness are essential for the successful adoption of AI and other digital tools in auditing.

Another important theory in the context of digital transformation in auditing is the Diffusion of Innovations Theory proposed by Rogers (1962). This theory focuses on how, why, and at what rate new ideas and technology spread within a community. The articles reviewed, including Blac & Gerard (2025) and Kokina et al. (2025), highlight how AI and blockchain have diffused within auditing firms. They note that early adopters and large firms are often the first to implement AI due to their access to resources and technological infrastructure. Meanwhile, smaller firms face barriers such as high implementation costs and lack of technical expertise, as discussed in Ayinaddis (2025) and Murikah et al. (2024).

The Resource-Based View (RBV) theory also plays a critical role in understanding the integration of digital technologies in auditing. The RBV emphasizes that firms achieve a competitive advantage by leveraging unique resources and capabilities, including technology. Articles such as Krieger et al. (2021) and Goto (2023) focus on how the adoption of AI and blockchain can provide firms with a strategic advantage by improving audit efficiency, reducing risks, and enhancing the quality of audit findings. These studies argue that firms with advanced technological capabilities, such as AI-powered tools and blockchain-based audit trails, can better meet the demands of an increasingly complex regulatory environment.

Additionally, the Ethical Framework has gained attention as AI and digital technologies raise significant concerns about transparency, accountability, and biases in algorithmic decision-making. Theories surrounding algorithmic ethics and AI governance have been explored in studies like Laine et al. (2024) and Murakih et al. (2024), which examine how ethical considerations must be integrated into the development and deployment of AI systems in auditing. These studies emphasize that to ensure trustworthiness in AI-powered audits, it is crucial to establish clear ethical guidelines, regulatory oversight, and ensure transparency in how AI algorithms make decisions.

An Integrative Approach is proposed based on the synthesis of these theories. The articles reviewed suggest that AI and digital technologies do not just enhance operational efficiency but also necessitate a shift in organizational culture and auditor roles. The integration of AI, blockchain, and RPA requires firms to reassess their strategies, workflows, and regulatory compliance practices. For example, Silva et al. (2023) emphasize the importance of training auditors to adapt to new technological tools, while Kinney et al. (2024) argue that the trustworthiness of AI can be enhanced through proper governance frameworks. The future of auditing will require auditors to be both skilled in traditional audit practices and proficient in the technological tools transforming the industry. This integrative approach combines theoretical perspectives on technology

adoption, resource capability, and ethical governance to provide a comprehensive understanding of how digital technologies are reshaping the auditing profession.

### **Impact of the Adoption of AI, Blockchain, and RPA in Auditing**

The adoption of Artificial Intelligence (AI), Blockchain, and Robotic Process Automation (RPA) in auditing has significantly transformed the auditing profession, resulting in both positive and challenging impacts. These technologies have introduced new ways to improve audit quality, efficiency, and accuracy while also creating challenges related to regulation, ethical considerations, and training requirements. Based on the 33 articles reviewed, the following outlines the key impacts of each technology on auditing practices.

#### **1. Impact of AI in Auditing**

The integration of AI in auditing has led to major improvements in the speed, accuracy, and depth of audits. AI's ability to analyze large volumes of data in real time allows auditors to uncover patterns, anomalies, and risks that might have been missed using traditional methods. Studies such as Lombardi et al. (2025) and Azizi et al. (2024) highlight AI's role in enhancing fraud detection, risk assessments, and predictive analysis. AI-powered systems are able to continuously monitor financial transactions, flagging unusual activities or discrepancies automatically, thereby improving the quality and accuracy of audits. The automation of routine tasks, such as data entry and transaction reconciliation, also enhances audit efficiency, allowing auditors to focus on more complex decision-making processes.

However, as pointed out by Murakih et al. (2024), AI adoption also raises concerns about algorithmic bias and the potential lack of transparency in decision-making processes. AI algorithms are often seen as "black boxes," where the reasoning behind decisions may not be easily understood by human auditors. This lack of transparency could undermine trust in the audit process, especially in highly regulated sectors.

#### **2. Impact of Blockchain in Auditing**

Blockchain technology, particularly its ability to create secure and transparent audit trails, has revolutionized the way auditors verify and track transactions. As Qader & Cek (2024) and Han et al. (2023) point out, blockchain offers a distributed ledger system where every transaction is recorded in an immutable and verifiable way, significantly improving the transparency and trustworthiness of financial data. This ensures that all parties involved in the audit can verify the accuracy of records independently, reducing the risk of fraud and errors.

Blockchain's decentralized nature also allows for real-time audits, enabling auditors to verify transactions immediately as they occur, thus enhancing the efficiency of the audit process. Additionally, blockchain's ability to secure sensitive data has the potential to reduce the risks associated with data breaches and unauthorized access, which is particularly important for sectors such as healthcare and financial services.

However, as highlighted by Blac & Gerard (2025), blockchain's integration into auditing is still in its early stages, and there are challenges related to regulatory adoption

and the need for standardized practices across industries. The complexity of blockchain systems can also pose implementation challenges, particularly for smaller audit firms that may lack the resources to adopt such advanced technologies.

### 3. Impact of RPA in Auditing

Robotic Process Automation (RPA) has had a transformative effect on the efficiency of audits by automating repetitive, manual tasks that auditors traditionally perform. Silva et al. (2023) explain that RPA can automate tasks such as data entry, document processing, and transaction verification, reducing the risk of human error and speeding up the audit process. By automating these routine activities, auditors can focus more on higher-value tasks such as analysis, strategy formulation, and decision-making.

The integration of RPA not only increases operational efficiency but also reduces audit costs by streamlining workflows. For example, Kokina et al. (2025) discuss how RPA helps audit firms cut costs associated with manual labor and enhances productivity by allowing more tasks to be completed in less time.

However, RPA adoption is not without challenges. One concern, as pointed out by Kokina et al. (2025), is the dependency on technology. Over-reliance on automated systems can potentially lead to a lack of critical oversight. Moreover, RPA may require substantial upfront investments in software, training, and infrastructure, which can be a barrier to adoption for smaller audit firms with limited resources.

### 4. Combined Impact of AI, Blockchain, and RPA

When AI, blockchain, and RPA are integrated together, their combined impact can drastically improve auditing by increasing both speed and accuracy, while reducing manual errors and fraud risks. For example, AI can be used to analyze data processed by RPA, while blockchain can provide a secure and transparent audit trail for all transactions, ensuring data integrity. The combination of these technologies enhances the effectiveness and trustworthiness of audits, allowing for a more comprehensive and real-time review of financial statements and transactions.

However, the combined adoption of these technologies also requires significant organizational change. Audit firms must invest in training their staff, upgrading their infrastructure, and ensuring that ethical standards are maintained. As noted by Laine et al. (2024), ethical frameworks must evolve to address the challenges of implementing AI and RPA, such as maintaining transparency in automated decision-making processes and ensuring that blockchain systems do not violate privacy laws.

The adoption of Artificial Intelligence (AI), Blockchain, and Robotic Process Automation (RPA) in auditing has had a profound impact on improving audit quality, efficiency, and data integrity. However, this transformation is accompanied by challenges related to regulation, ethical considerations, and technology integration. The articles reviewed provide various insights into the advantages and obstacles of implementing these technologies in the auditing profession.

Several studies, including Ayinaddis (2025) and Laine et al. (2024), highlight how AI adoption has significantly improved audit quality. The research shows that AI enables auditors to detect anomalies and risks more quickly and accurately, enhancing the overall

effectiveness of audits. Vital et al. (2024) and Goto (2023) further explore how blockchain improves transparency and data security in audits, particularly in sectors that require high levels of accuracy, such as finance and healthcare. Blockchain’s ability to create secure and verifiable records provides a solid foundation for audits, ensuring the accuracy of financial transactions and preventing fraud.

On the other hand, articles like Murakih et al. (2024) and Zahid et al. (2023) address the challenges associated with technology adoption, focusing on ethical issues such as algorithmic bias in AI and the regulatory challenges of integrating blockchain into audits. Blac & Gerard (2025) identify the barriers faced by audit firms, including resource limitations and the need for technological education for auditors to fully harness the potential of AI and blockchain.

In terms of RPA, studies such as Silva et al. (2023) and Abed et al. (2022) emphasize how RPA has helped automate routine tasks in audits, significantly improving efficiency and cost-effectiveness. This automation frees up auditors to focus on more complex activities like risk analysis and audit strategy formulation, rather than spending time on administrative work.

**Table 1: Success and Failure Factors for the Adoption of Artificial Intelligence (AI), Blockchain, and Robotic Process Automation (RPA) in Auditing**

Article Title	Success Factors	Failure Factors
Lombardi et al. (2025) – The Increased Role of Advanced Technology and Automation in Audit	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Azizi et al. (2024) – The Role of IT Audit in Digital Transformation	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Brás et al. (2024) – Advances in Auditing and Business Continuity	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Kokina et al. (2025) – Challenges and Opportunities for AI in Auditing	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Vital et al. (2024) – Emerging Digital Technologies in Auditing	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Hariyan et al. (2025) – Structured Framework for Sustainability Audits	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Blac & Gerard (2025) – Accelerating the	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation

Article Title	Success Factors	Failure Factors
Future of Audit Technologies		
Leonov et al. (2025) – Visual Analysis in AI Technology for Audit	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Bin-Nashwan et al. (2025) – Visual Indicators in Financial Statements via AI	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Qader & Cek (2024) – Influence of Blockchain and AI on Audit Quality	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Elnahass et al. (2024) – Disruptive Technology and Audit Risks	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Abdulla & Almaqtari (2025) – The Impact of AI and Industry 4.0	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Han et al. (2023) – Accounting and Auditing with Blockchain and AI	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Lin (2024) – Measuring Information Entropy in Audit Disclosures	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Huy & Phuc (2025) – Blockchain and SDG 8 Achievement through Internal Auditing	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Silva et al. (2023) – Impact of ERP Systems on Internal Auditing	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Abed et al. (2022) – Proactive Visual Prediction Auditing with AI	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
González-Esteban & Calvo (2022) – Ethics-	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation

Article Title	Success Factors	Failure Factors
Based AI Auditing in Research		
Ayinaddis (2025) – AI Adoption Dynamics in SMEs and Large Firms	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Laine et al. (2024) – Systematic Literature Review on Ethical Principles in AI Auditing	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Goto (2023) – Professional Services Innovation: Auditing and AI	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Murphy et al. (2024) – Exploring AI and Accounting via Topic Modelling	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Krieger et al. (2021) – Adoption of Data Analytics in Auditing	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Dong et al. (2024) – A Scoping Review of ChatGPT Research in Accounting	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Kinney et al. (2024) – Framework for Stakeholder Trust in AI Systems	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Alqudah (2023) – Critical Factors for Internal Audit Effectiveness	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
AlArjani et al. (2022) – Blockchain and EHR Access Auditing	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Zahid et al. (2023) – ESG, Audit Quality, and Dividend Payout Policy	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Zhou & Liu (2024) – AI-Driven Path Selection for	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation

Article Title	Success Factors	Failure Factors
Audit Transformation		
Libby & Witz (2024) – AI in Auditing and Legal Liability	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation
Waltersdorfer & Sabou (2025) – Leveraging Knowledge Graphs for AI Auditing	High automation potential, technology readiness, expert adoption	High initial costs, complex implementation

The table above outlines the success and failure factors for the adoption of Artificial Intelligence (AI), Blockchain, and Robotic Process Automation (RPA) in auditing, based on the findings from 33 articles. These technologies have been identified as transformative tools that can significantly enhance the efficiency, accuracy, and transparency of the audit process. Success factors include the potential for automation, technology readiness, and the adoption of expert systems in audit practices, which allow auditors to process large volumes of data quickly, detect anomalies more efficiently, and reduce human error. For example, AI can automate routine tasks such as data entry and transaction reconciliation, while Blockchain enhances data security and ensures audit trail transparency, as emphasized by articles like Lombardi et al. (2025) and Qader & Cek (2024).

However, the adoption of these technologies also comes with significant failure factors. The most commonly reported challenges include high initial costs, the complexity of implementation, resistance to change within auditing firms, and the lack of necessary skills and training among auditors to effectively utilize these technologies. Regulatory ambiguity and ethical concerns, such as algorithmic biases in AI models, are additional barriers highlighted in several studies, including those by Murakih et al. (2024) and Blac & Gerard (2025). These challenges are particularly pronounced for smaller firms that may not have the resources to invest in cutting-edge technologies. Overall, while AI, Blockchain, and RPA present clear benefits in improving audit processes, their full integration depends on overcoming these barriers, ensuring that auditors are adequately trained, and that regulatory and ethical frameworks evolve to support these advancements.

### **Artificial Intelligence, Blockchain, and RPA on Audit Efficiency and Transparency Adoption**

The adoption of Artificial Intelligence (AI), Blockchain, and Robotic Process Automation (RPA) has substantially improved both audit efficiency and transparency across various sectors, as demonstrated by the 33 articles reviewed in this study. AI has been widely recognized for its capacity to automate routine tasks, enabling auditors to process vast amounts of data quickly and efficiently. Lombardi et al. (2025) and Azizi et al. (2024) emphasize AI's role in enhancing audit efficiency by using machine learning algorithms to detect anomalies and assess risks more accurately than traditional methods. AI's ability to identify patterns, inconsistencies, and potential fraud reduces the need for

manual intervention, which in turn accelerates the audit process and enhances accuracy and reliability of financial reporting. Studies such as Brás et al. (2024) and Kokina et al. (2025) highlight how AI-powered tools significantly reduce the time spent on data reconciliation and manual checks, allowing auditors to focus more on complex decision-making tasks.

On the other hand, Blockchain has revolutionized audit transparency by creating immutable audit trails that ensure data integrity. Qader & Cek (2024) and Han et al. (2023) demonstrate how blockchain technology provides a secure, transparent ledger for tracking transactions in real time, making it nearly impossible to alter or manipulate recorded data. This is particularly beneficial for audits in industries like financial services and healthcare, where maintaining accurate records is crucial. By ensuring that every transaction is recorded in an immutable ledger, blockchain increases trust in the audit process, promotes accountability, and facilitates real-time audits. Moreover, Blockchain enables real-time verification and improves collaboration between auditors and other stakeholders by making data transparent and accessible.

RPA, as detailed by Silva et al. (2023) and Abed et al. (2022), further enhances audit efficiency by automating repetitive tasks such as data entry, report generation, and document management. RPA tools allow auditors to automate administrative tasks, which not only increases productivity but also reduces the risk of human error in routine activities. This automation helps maintain consistency in the execution of audit tasks and ensures that audits are completed in a timely manner. According to Blac & Gerard (2025), RPA can handle tasks like invoice processing and financial statement reconciliation, which are typically time-consuming for auditors. This frees up auditors to focus on higher-value activities, such as fraud detection and complex risk analysis, making audits more thorough and accurate.

Furthermore, the integration of AI, Blockchain, and RPA offers a comprehensive solution for improving audit quality. Studies like González-Esteban & Calvo (2022) and Ayinaddis (2025) highlight that the combined use of these technologies creates a seamless workflow where AI enhances the analysis and decision-making process, Blockchain ensures transparency and data security, and RPA accelerates routine operations. Together, these technologies enable real-time audits, facilitate better decision-making, and help auditors detect errors, fraud, or inconsistencies faster. The combined adoption of AI and Blockchain allows for more efficient risk assessments, while RPA enhances the overall speed of audit completion, ensuring that auditing firms can handle larger and more complex datasets without compromising quality.

However, the adoption of these technologies also comes with challenges. Articles like Murakih et al. (2024) and Zahid et al. (2023) discuss the barriers to adoption, such as high implementation costs, lack of skilled professionals, and resistance to change within audit firms. The integration of AI and Blockchain requires significant upfront investments, both in technology and in training. Smaller audit firms, in particular, may find it difficult to justify the cost of adopting these technologies, as noted by Silva et al. (2023) and Blac & Gerard (2025). Additionally, concerns around data privacy, algorithmic bias, and the need for clearer regulatory frameworks are prevalent, as discussed in Laine et al. (2024) and Kinney et al. (2024).

## **The Role of Artificial Intelligence in Enhancing Audit Efficiency and Transparency**

The integration of Artificial Intelligence (AI) in auditing has been a subject of intense research and practice transformation. Based on the 33 articles reviewed, AI is recognized for its ability to enhance audit efficiency, accuracy, and transparency, while also creating challenges related to ethical concerns, implementation costs, and regulatory adaptation. Below is a synthesis of how these studies examine the role of AI across various dimensions of the auditing process.

### **a. AI and Audit Efficiency**

AI's ability to automate routine tasks like data entry, transaction matching, and report generation has been emphasized across multiple studies. Lombardi et al. (2025), Azizi et al. (2024), and Brás et al. (2024) highlight how AI-powered systems can reduce the time spent on manual processes, which traditionally consumed significant auditor time. AI algorithms can process large volumes of data efficiently, thereby improving the overall efficiency of audits and enabling auditors to focus on higher-level analysis. For example, Kokina et al. (2025) explain that AI tools help auditors with real-time detection of anomalies, eliminating the need for labor-intensive, manual review processes.

### **b. AI and Audit Transparency**

The transparency offered by AI is another key benefit, particularly in the context of fraud detection and risk assessment. AI systems continuously monitor transactions and identify patterns or discrepancies that may indicate fraud or financial misstatements. As Qader & Cek (2024) and Silva et al. (2023) explain, AI algorithms enhance transparency by providing detailed insights into audit findings, which can be verified in real-time, making audits more trustworthy. Additionally, AI enables real-time analysis, allowing auditors to make more timely decisions based on up-to-date data, as highlighted by Blac & Gerard (2025).

### **c. Automation of Routine Audit Tasks**

AI has dramatically impacted audit tasks automation, freeing auditors from routine administrative work. Abed et al. (2022) and Libby & Witz (2024) highlight how AI and RPA (Robotic Process Automation) can automate mundane tasks like financial statement reconciliation, allowing auditors to focus on higher-value activities such as analysis and decision-making. Silva et al. (2023) discuss how RPA combined with AI optimizes processes like document management and invoice processing, reducing operational costs and improving audit completion times.

### **d. AI's Role in Enhancing Audit Accuracy**

AI's capability to improve audit accuracy is highlighted in studies like Elnahass et al. (2024) and Dong et al. (2024), where AI's precision in detecting anomalies, patterns, and outliers is crucial in identifying potential fraud or irregularities that would otherwise go undetected using traditional methods. Ayinaddis (2025) and Murphy et al. (2024) emphasize how AI is particularly effective in areas like financial fraud detection and risk management by providing predictive analytics and advanced pattern recognition.

### **e. Ethical and Regulatory Concerns**

Despite its advantages, AI adoption raises significant ethical and regulatory concerns. Articles like Laine et al. (2024) and Krieger et al. (2021) highlight the potential for algorithmic bias in AI systems, which could result in unfair or inaccurate audit conclusions. As Zahid et al. (2023) and Kinney et al. (2024) point out, AI systems need to be transparent and accountable, with clear governance frameworks in place to mitigate

ethical risks such as bias, privacy violations, and lack of transparency. Moreover, the lack of consistent regulatory standards for AI in auditing, discussed in Alqudah (2023) and Murakih et al. (2024), has created obstacles for full integration of AI in the audit profession.

**f. AI's Contribution to Risk Management**

AI plays a crucial role in improving risk management during audits. According to González-Esteban & Calvo (2022), AI helps auditors to detect risks by analyzing historical data, current trends, and transaction flows. RPA, in conjunction with AI, automates routine risk assessment tasks, which not only reduces human error but also provides auditors with more time to focus on complex risk areas. Zhou & Liu (2024) describe how AI enables auditors to assess the financial health of organizations by analyzing large datasets from various sources, improving risk detection and mitigation efforts.

**g. Challenges in AI Adoption**

While AI presents numerous benefits, its adoption is not without challenges. Murakih et al. (2024) and Zahid et al. (2023) discuss issues related to data privacy and security risks. The lack of skilled professionals familiar with AI tools and the high cost of implementing AI systems are significant barriers, particularly for smaller firms, as noted by Kokina et al. (2025). Regulatory concerns around data usage and consent are also discussed by González-Esteban & Calvo (2022), who stress the need for clear regulatory guidelines to ensure that AI is deployed in an ethical and legal manner.

**h. The Future of AI in Auditing**

The future of AI in auditing appears promising, with studies such as Goto (2023) and Libby & Witz (2024) projecting that AI will play an even more significant role in transforming audit methodologies. However, they also note that AI's growth in auditing will require continuous improvements in auditor training, technical integration, and ethical standards. Ayinaddis (2025) highlights that future auditors will need to be equipped with both traditional auditing knowledge and advanced technical skills in AI to fully benefit from its capabilities.

## **CONCLUSION**

The integration of Artificial Intelligence (AI), Blockchain, and Robotic Process Automation (RPA) in auditing has brought significant improvements in efficiency, accuracy, and transparency. These technologies are transforming traditional audit practices by automating routine tasks, enhancing the ability to detect risks and anomalies, and ensuring a more secure and transparent audit trail. AI has a notable impact on improving audit efficiency by automating data analysis, fraud detection, and risk assessments. With its ability to process vast amounts of data quickly, AI helps auditors identify patterns, inconsistencies, and potential fraud more accurately, thus reducing human error and enhancing the overall quality of audits. It frees auditors from manual, repetitive tasks, allowing them to focus on more complex decision-making processes, ultimately increasing productivity and reducing the time spent on audits. Blockchain, on the other hand, enhances audit transparency by providing an immutable and secure ledger for recording financial transactions. This distributed ledger technology ensures that data is tamper-proof and verifiable in real time, reducing the risk of fraud and ensuring that

the audit process is reliable. The ability to track every transaction in a transparent and decentralized manner increases trust among all stakeholders and provides a higher level of accountability. RPA also plays a crucial role by automating administrative tasks such as report generation, data entry, and document processing. By reducing the time spent on these repetitive tasks, RPA allows auditors to focus more on analyzing data and assessing risk, thereby improving the overall efficiency of the audit process and enhancing the quality of the audit results.

However, the adoption of these technologies does come with challenges. The high initial costs, data privacy concerns, ethical issues, and the need for skilled auditors proficient in these technologies can act as barriers to implementation. There is also a need for clear regulatory frameworks to ensure that these technologies are deployed responsibly and transparently, without compromising ethical standards. Furthermore, the integration of AI, Blockchain, and RPA requires a significant shift in organizational culture and workflow processes. Firms must embrace change, invest in training auditors, and ensure that the new technologies align with existing audit practices. Auditors must be equipped with both traditional auditing skills and the technical expertise required to leverage these advanced tools effectively. In conclusion, AI, Blockchain, and RPA have the potential to revolutionize the auditing profession by making audits more efficient, accurate, and transparent. To fully harness the benefits of these technologies, audit firms need to address the challenges related to cost, skills, and regulation. As the technologies evolve, the auditing profession will need to adapt by fostering a culture of innovation, providing continuous training, and implementing robust ethical guidelines to ensure responsible and effective use of these tools.

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