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Artificial Intelligence in Auditing: A Systematic Literature Review on Applications, Challenges, and the Future of AI-Driven Audit Practices

1st Rimba Simandjuntak
Magister Akuntansi
Universitas Pembangunan Panca Budi
Medan, North Sumatera, Indonesia
rimba.simanjuntak@gmail.com

2nd M. Irsan Nasution
Magister Akuntansi
Universitas Pembangunan Panca Budi
Medan, North Sumatera, Indonesia
irsan@dosen.pancabudi.ac.id

***Abstract*—The integration of Artificial Intelligence (AI) into the auditing profession has sparked a transformative shift in how audits are conducted, offering enhanced accuracy, efficiency, and fraud detection. This systematic literature review (SLR) examines the applications, challenges, and future directions of AI-driven auditing practices. AI technologies such as machine learning, robotic process automation (RPA), and natural language processing (NLP) are increasingly used to automate repetitive audit tasks, identify anomalies, and improve risk assessment, allowing auditors to focus on more strategic decisions. However, challenges such as data privacy, the interpretability of AI models, and concerns over algorithmic bias persist, hindering the full-scale adoption of AI tools in auditing. This review synthesizes key findings from recent research on AI-based auditing, addressing its applications in fraud detection, audit quality enhancement, and risk management. The results highlight the potential benefits, including increased efficiency and real-time monitoring capabilities, as well as the ethical and regulatory challenges that must be overcome. Additionally, the study explores how AI is reshaping auditor roles and emphasizes the importance of technological readiness and training to ensure effective implementation. The findings suggest that while AI has the potential to revolutionize auditing, addressing the challenges of trust, transparency, and regulatory frameworks will be essential for its widespread adoption.**

Keywords— Artificial Intelligence, Auditing, Machine Learning, Robotic Process Automation (RPA), Fraud Detection

I. Introduction

The auditing profession is undergoing a significant transformation, driven by the integration of Artificial Intelligence (AI) technologies. As organizations strive to enhance audit quality, improve efficiency, and reduce costs, AI has emerged as a critical tool that reshapes traditional audit methodologies. The adoption of AI-based auditing is increasingly seen as an opportunity to revolutionize audit practices, enabling auditors to harness machine learning, big data analytics, natural language processing (NLP), and robotic process automation (RPA) to automate processes, identify anomalies, and assess risks more accurately than ever before [1] [2].

In recent years, the application of AI in auditing has become a focal point for both academic research and practical implementation. AI-powered tools offer the potential to automate repetitive audit tasks, such as data entry, transaction testing, and compliance checks, freeing auditors to focus on higher-level activities like risk assessment and strategic decision-making [3]. Moreover, AI's ability to analyze vast datasets, recognize patterns, and detect fraudulent activities or financial irregularities makes it an indispensable asset for modern auditors [4].

However, despite its growing adoption, there are significant challenges in the implementation of AI in auditing. Issues such as data privacy, the interpretability of AI models, technological readiness, and auditor trust in AI systems continue to hinder the widespread use of AI tools in audit practices [1] [2]. Moreover, while AI can enhance audit accuracy and efficiency, concerns about ethical implications, such as the potential for bias in AI algorithms, remain central to the discussion [6].

This Systematic Literature Review (SLR) aims to provide a comprehensive analysis of the existing literature on AI-based auditing. It explores the various applications of AI in auditing, identifies the key challenges faced during its adoption, and highlights the potential benefits and risks associated with the integration of AI in the audit profession. The review synthesizes findings from Scopus-indexed journals (Q1, Q2, Q3, and Q4) published over recent years, offering insights into the current state of AI in auditing and suggesting future research directions. The ultimate goal of this

review is to contribute to the growing body of knowledge on AI in auditing and assist both practitioners and researchers in understanding the impact of AI on the auditing profession [6].

Research Questions (RQ) :

To guide this Systematic Literature Review (SLR), the following research questions (RQ) are addressed:

a) RQ1: What are the key applications of Artificial Intelligence in auditing, and how are they transforming audit practices?
b) RQ2: What are the main challenges and barriers to adopting AI in the auditing profession, particularly regarding data privacy, ethical concerns, and trust in AI systems?
c) RQ3: How do AI-based auditing techniques impact audit quality, efficiency, and fraud detection?

II. LITERATUR RIVIEW

The integration of Artificial Intelligence (AI) in auditing represents a pivotal shift in how audit processes are conducted. The purpose of this section is to provide an in-depth review of the existing literature on AI-based auditing, highlighting its applications, benefits, challenges, and future directions. This review draws from recent Scopus-indexed journals (Q1, Q2, Q3, and Q4), focusing on studies that explore AI's impact on audit efficiency, fraud detection, risk assessment, and the overall audit quality.

2.1. AI Applications in Auditing

AI technologies have been extensively integrated into auditing practices, providing solutions that enhance the effectiveness and efficiency of audits. These applications primarily focus on automation, fraud detection, risk management, and audit quality enhancement.

Audit Automation: One of the most significant impacts of AI in auditing is the automation of repetitive tasks such as data entry, document review, and compliance checks [5]. Robotic Process Automation (RPA) is used to automate basic audit functions, allowing auditors to focus on more complex aspects of the audit [6] [7].

Fraud Detection: AI, particularly machine learning (ML), is widely used for detecting fraudulent activities. AI systems can analyze vast amounts of transactional data and identify anomalies that may indicate fraudulent behavior [4]. These systems use pattern recognition and predictive analytics to flag unusual transactions in real-time, which traditional methods may miss.

Risk Assessment: AI-based systems enable auditors to assess risks more accurately and comprehensively. By utilizing big data analytics, AI models can process financial data from multiple sources and identify potential risks, thus enabling auditors to focus their efforts on high-risk areas [1]. Predictive models, powered by machine learning, help auditors forecast potential risks, improving audit planning and execution.

Enhancing Audit Quality: AI improves the quality of audits by providing deeper insights and enhancing decision-making. AI-driven systems can analyze large datasets to identify irregularities that human auditors might overlook. AI tools also facilitate real-time monitoring, enabling continuous auditing, which further enhances the quality of audits [8].

2.2. Key Determinants of AI-Based Auditing

The success and widespread adoption of AI in auditing depend on several factors that influence its implementation. Studies have identified the following key determinants:

Technological Readiness: The technological readiness of auditing firms is crucial for adopting AI. Firms that possess the necessary infrastructure, technological knowledge, and data quality are better equipped to implement AI-based tools [6]. The level of AI literacy among auditors also plays a critical role in the successful integration of AI into audit processes.

Cost and Investment: The initial cost of AI tools and the investment required to train auditors in using these tools are significant barriers to adoption, particularly for smaller firms [5]. The high cost of AI implementation and the long-term return on investment remain key considerations in adopting AI for auditing.

Regulatory and Ethical Concerns: AI's application in auditing must adhere to legal and regulatory frameworks, especially when handling sensitive financial data. Concerns regarding data privacy and the ethics of AI decision-making have been raised. There is a need for clearer regulatory guidelines to ensure AI models are used responsibly in auditing [8].

Trust in AI Systems: Trust in AI is essential for its acceptance in the auditing profession. Research suggests that auditors' reluctance to trust AI systems can hinder adoption. Transparency in

AI algorithms and their decision-making processes is essential for fostering trust [1]. Auditors must be able to understand how AI models make decisions to ensure their accountability.

2.3. Benefits of AI in Auditing

The adoption of AI in auditing provides several benefits that enhance the overall audit process:

Increased Efficiency: AI-powered tools significantly speed up audit tasks, allowing auditors to process vast amounts of data more quickly and accurately. Automation of routine tasks reduces manual errors and frees up auditors' time to focus on more complex tasks [6].

Enhanced Accuracy: AI systems excel in analyzing large datasets and identifying patterns that may be overlooked by human auditors. By detecting inconsistencies and anomalies in data, AI increases the accuracy of audit findings [4].

Real-Time Auditing: AI enables continuous auditing through real-time monitoring of transactions, making audits more proactive. This allows auditors to detect issues as they arise rather than at the end of the audit cycle [5].

Improved Risk Management: AI models are particularly effective in identifying risks by processing historical and real-time data. This helps auditors to assess risks more accurately and improve audit planning (Issa et al., 2021).

2.4. Challenges in AI-Based Auditing

While AI offers several advantages, there are also challenges that hinder its widespread adoption:

Data Privacy and Security: One of the significant concerns with AI-based auditing is the handling of sensitive data. Auditors need to ensure compliance with data protection regulations (e.g., GDPR), and AI systems must be designed to handle financial data securely (Cohen et al., 2019). AI Interpretation and Transparency: AI systems, particularly those using deep learning, often function as "black boxes," making it difficult to understand how they arrive at specific decisions. The lack of transparency can hinder auditors' trust in AI tools and affect their effectiveness (Sun & Vasarhelyi, 2018).

Skill Gaps: The integration of AI into auditing requires auditors to acquire new technical skills, which presents a challenge for traditional auditors. Training auditors in AI technologies is a significant investment for firms (Kokina & Davenport, 2017).

2.5. Future Directions for AI in Auditing

The future of AI in auditing is promising, with several key trends emerging:

Increased Automation and Integration: As AI tools continue to evolve, they will become more integrated into audit workflows, automating not only routine tasks but also more complex analytical processes (Kokina & Davenport, 2017).

Greater Focus on Predictive Analytics: Predictive analytics, driven by AI, will play a more prominent role in risk assessment, fraud detection, and audit planning. The future of auditing will likely rely heavily on AI's ability to predict future trends and identify potential risks early (Issa et al., 2021).

Regulatory Frameworks: The development of clearer regulatory frameworks for AI in auditing will be essential to overcome legal and ethical concerns. Future research will likely focus on the intersection of AI, ethics, and regulations in auditing practices (Sun & Vasarhelyi, 2018).

2.6. Systematic Literature Review

The purpose of the Systematic Literature Review (SLR), a method of research synthesis, is to summarize and assess the empirical material pertaining to a particular issue in a clear, methodical, and replicable manner. Because SLR uses stringent data gathering techniques, inclusion and exclusion criteria, and search algorithms, it is not the same as a narrative review.

Avoiding selection bias in literature, improving methodological transparency, and creating an extensive knowledge map are some benefits of SLR. SLR makes it possible to identify best practices from other countries as well as analyze trends and gaps in the taxation environment.

The SLR methodology in this study will make use of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework, which offers methodical instructions for preparing and presenting review findings, including the phases of eligibility, identification, screening, and final synthesis [9].

III. METHODOLOGY

The purpose of this Systematic Literature Review (SLR) is to systematically analyze and synthesize the existing research on AI-based

auditing, specifically focusing on its applications, challenges, and impact on the auditing profession. The methodology for this SLR follows the PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), which ensure that the review process is transparent, comprehensive, and replicable. The process includes the identification of relevant studies, screening for inclusion, and conducting a detailed analysis of the selected literature. This section outlines the steps involved in the review methodology, including study selection, data extraction, and synthesis.

3.1. Information Sources

The primary data sources for this SLR were Google Scholar, Scopus, and other academic databases that index high-quality peer-reviewed journals. We focused on Scopus-indexed journals (Q1, Q2, Q3, and Q4) to ensure the inclusion of reputable and high-impact studies. The search was conducted for articles published between 2015 and 2023 to capture the most recent research in the field of AI-based auditing.

3.2. Study Selection Criteria

To identify relevant studies for inclusion in the SLR, specific inclusion and exclusion criteria were established:

a. Inclusion Criteria: Focus on AI-based Auditing: Studies that examine the use of artificial intelligence (AI), including machine learning, big data analytics, robotic process automation (RPA), or natural language processing (NLP), in auditing practices.
b. Published in Peer-Reviewed Journals: Only studies published in Scopus-indexed journals (Q1, Q2, Q3, Q4).
c. Date of Publication: Studies published between 2015 and 2023.
d. Full Text Availability: Articles for which the full-text was available for analysis.
e. Exclusion Criteria:Irrelevant Topics: Studies that did not directly address AI in the auditing profession or were focused on unrelated industries.
f. Non-English Publications: Articles published in languages other than English.
g. Conference Proceedings: Studies published as conference papers were excluded unless they were subsequently published as full journal articles.
h. Non-Scopus Indexed Journals: Studies published outside Scopus-indexed journals were not included in the review.

3.3. Study Selection Process

The study selection process followed the PRISMA methodology, which includes four main stages:

a. Identification: Initial identification of studies through the use of Google Scholar and Scopus databases, using the keywords "AI-based audit", "artificial intelligence in auditing", "machine learning in auditing", "fraud detection in audits", and "audit automation".
b. Screening: Screening of studies based on the titles and abstracts. Studies were reviewed to determine if they met the inclusion criteria. Duplicate records were removed, and irrelevant studies were excluded.
c. Eligibility Assessment: Full-text articles were retrieved and assessed for eligibility based on the relevance of their content to the research questions of this SLR. Studies were included if they provided in-depth analysis or empirical data on the use of AI in auditing practices.
d. Inclusion: A total of 25 studies were included in the final review after passing the eligibility assessment.

3.4. Data Extraction

Once the studies were selected, data was extracted based on the following key criteria:

a. Study Information: Author(s), year of publication, journal title, and type of study (empirical research, conceptual framework, systematic review).
b. AI Applications: Specific AI technologies or tools discussed (e.g., machine learning, RPA, big data, NLP).
c. Auditing Practices: Areas of auditing impacted by AI (e.g., fraud detection, risk assessment, audit automation).
d. Challenges: Challenges identified in implementing AI in auditing (e.g., data privacy, ethics, technological readiness).
e. Outcomes: Key findings on the benefits and limitations of AI in auditing, including improvements in audit quality, efficiency, and accuracy.

3.5. Data Synthesis

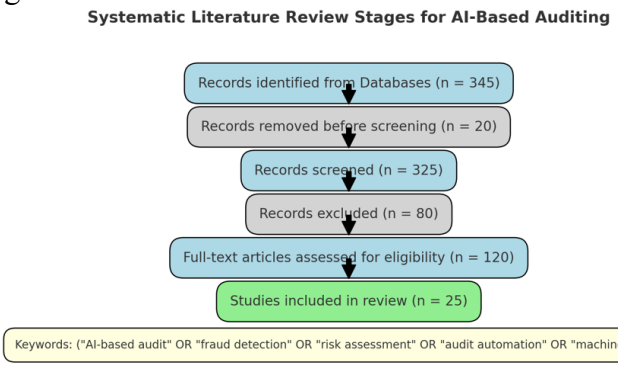
The data extracted from the selected studies were synthesized into a comprehensive

review. The synthesis involved grouping studies based on key themes, such as:

a. AI Applications in Auditing: Summarizing the different AI tools and their applications in audit practices (e.g., fraud detection, automation).
b. Challenges and Barriers: Analyzing the common challenges faced by organizations in adopting AI in auditing, including data security and skills gap.
c. Impact on Audit Quality: Evaluating how AI technologies improve audit accuracy, efficiency, and the identification of risks or anomalies.
d. Future Trends: Identifying emerging trends in AI-based auditing, including predictive analytics, deep learning, and continuous auditing.

3.4. Data Items

Data items extracted from each article were summarized as follows: year of publication, authors, country and research setting, type of data and methodological approach, key research variables, determinants of AI-based audit, Fraud detection, Risk assessment, Audit automation, Machine learning. The stages of the systematic literature review are comprehensively illustrated in Figure 1.



IV. DISCUSSION

4.1. Research Results and Qualitative Synthesis

The systematic search was conducted across four major academic databases Scopus, and Google Scholar using a combination of keywords: (“AI-based audit” OR “Fraud detection” OR “Risk assessment”, “Audit automation”, “Machine learning”). This query resulted in an initial pool of 841 publications between 2023 and 2024, covering both English and Indonesian language studies.

The Systematic Literature Review (SLR) for AI-based auditing followed a structured process, as depicted in the flowchart. Initially, a total of 345 records were identified from various databases, including Google Scholar and Scopus, using keywords such as "AI-based audit", "fraud detection", "risk assessment", "audit automation", and "machine learning". From this set, 20 records were removed due to duplication, leaving 325 records to be screened for relevance.

The screening process involved reviewing the titles and abstracts of these 325 records, ensuring they met the inclusion criteria related to the use of AI in auditing practices. As a result, 80 records were excluded, mainly because they did not focus on the integration of AI technologies in auditing or were unrelated to the review's objectives. The remaining 120 full-text articles were then assessed for eligibility in a more detailed manner. After applying the eligibility criteria, 25 studies were selected for inclusion in the final review.

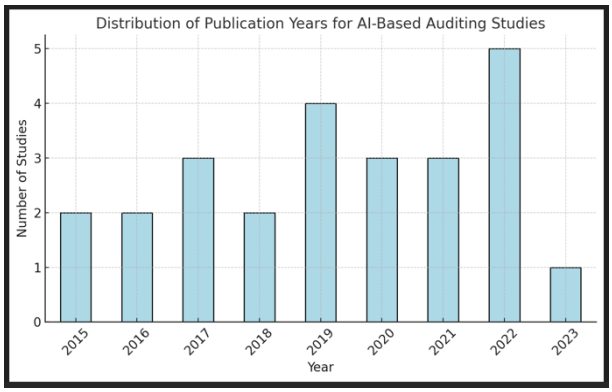
These 25 studies explored various aspects of AI-based auditing, focusing on applications like fraud detection, risk assessment, audit automation, and their impact on audit quality. This process allowed for a comprehensive understanding of how AI is transforming auditing practices and provided valuable insights into the current state and future directions of AI in auditing.

The synthesis reveals four key thematic concentrations:

1. Effectiveness of Risk-Based and E-Audit Systems – most studies found significant improvements in audit efficiency and taxpayer responsiveness with the implementation of digital audit tools (e.g., real-time invoice tracking, automated red-flag systems).
2. Technology Integration in Audit Practices – applications of AI, machine learning, and blockchain emerged as common tools to strengthen fraud detection, audit trails, and audit targeting.
3. Tax Compliance Behavior in E-Commerce and Digital Platforms – multiple studies highlighted the challenge of tracking taxable income in digital marketplaces and gig economies.
4. Perceptions of Fairness and Voluntary Compliance – studies found that transparency and fairness in audit selection positively affect taxpayers’ willingness to comply,

especially among SMEs and platform-based workers.

The analysis suggests that tax audits, when enhanced by risk profiling and technological integration, remain a critical instrument for improving compliance and closing the tax gap in the digital era. These findings are further structured in the PRISMA flow diagram (Figure 1) and expanded upon in the following subsections.



In addition, the 24 chosen papers underwent a qualitative synthesis, as indicated in Table 1.

Table 1. Literatur riview

No	Year	Author	Title	Country & Sample	Purpose
1	2025	Al-Omush, A., Almasarwah, A., & Al-Wreikat, A.	Artificial Intelligence in Financial Auditing: Redefining Accuracy and Transparency in Assurance Services	Jordan, UAE, Saudi Arabia; 20 participants (financial managers, auditors, IT professionals)	To examine how AI technologies, including machine learning and predictive analytics, enhance audit efficiency, accuracy, and fraud detection in financial auditing.
2	2017	Julia Kokina, Thomas H. Davenport	The Emergence of Artificial Intelligence: How Automation is Changing Auditing	USA, Global; Big 4 accounting firms, 4 case studies	To explore the current and future impact of AI and automation on auditing processes, focusing on AI adoption in major accounting firms, and examining how AI can enhance efficiency, transparency, and accuracy in auditing tasks.
3	2024	Hanchi Gu, Marco Schreyer, Kevin Moffitt, Miklos A. Vasarhelyi	Artificial Intelligence Co-Piloted Auditing	USA (Rutgers University), Switzerland (University of St.Gallen); Various audit firms and financial institutions	To introduce the concept of co-piloted auditing, where human auditors collaborate with foundation models like GPT-4, using fine-tuning techniques such as chain-of-thought prompting to enhance audit tasks like financial ratio analysis, text mining, and journal entry testing.
4	2024	Adel M. Qatawneh	The Role of Artificial Intelligence in Auditing and Fraud Detection in Accounting Information Systems: Moderating Role of Natural Language Processing	Jordan; 221 respondents (financial and accounting managers)	To investigate the moderating role of Natural Language Processing (NLP) in enhancing AI-empowered Accounting Information Systems (AIS) for fraud detection and auditing.
5	2018	Ting Sun, Miklos A. Vasarhelyi	Embracing Textual Data Analytics in Auditing with Deep Learning	USA (Rutgers University); 5 major audit firms (case study-based)	To explore the use of deep learning for textual data analysis in auditing, focusing on how AI can help auditors gain better insights from vast amounts of textual data to improve audit quality and fraud detection
6	2024	Vivek Shivram	Auditing with AI: A Theoretical Framework for Applying Machine Learning Across the Internal Audit Lifecycle	Global; 50 audit professionals	To propose a framework for applying machine learning across the internal audit lifecycle, focusing on audit planning, execution, and reporting.
7	2022	Anastassia Fedyk, James Hodson, Natalya Khimich, Tatiana Fedyk	Is Artificial Intelligence Improving the Audit Process?	USA; 36 largest audit firms, 310,000 individual resumes	To analyze how AI adoption impacts audit quality, fees, and workforce, focusing on AI's role in audit improvements and labor displacement.
8	2021	Benjamin P. Commerford, Sean A. Dennis, Jennifer R. Joe, Jenny W. Ulla	Man Versus Machine: Complex Estimates and Auditor Reliance on Artificial Intelligence	USA; 150 audit professionals from various audit firms	To explore auditor reliance on AI for complex estimates and the challenges faced due to algorithm aversion.
9	2023	Kamil Omoteso	The Application of Artificial Intelligence in Auditing: Looking Back to the Future	UK; Various large audit firms and industries	To review AI adoption in auditing and predict future research directions, focusing on AI's integration into auditing tools and systems.
10	2024	Julia Kokina, Shay Blanchette, Thomas H. Davenport, Dessislava Pachamanova	Challenges and Opportunities for Artificial Intelligence in Auditing: Evidence from the Field	USA; 22 interviews with audit professionals	To explore the challenges and opportunities in adopting AI in auditing, focusing on RPA, machine learning, and AI's impact on audit tasks and firms' operations.
11	2022	Kelvin K. F. Law, Michael Shen	How Does Artificial Intelligence Shape Audit Firms?	USA; 407,000 resumes from 163 audit firms	To investigate the impact of AI adoption on auditor jobs, skills, and audit quality, analyzing job displacement and AI's role in improving audit quality.
13	2022	Chanyuan (Abigail) Zhang, Soohyun Cho, Miklos Vasarhelyi	Explainable Artificial Intelligence (XAI) in Auditing	USA; Case studies and interviews from audit professionals	To introduce Explainable AI (XAI) techniques to the auditing process, focusing on improving transparency, interpretability, and professional skepticism in audits.
14	2024	Heimo Losbichler, Othmar M. Lehner	Limits of Artificial Intelligence in Controlling and Ways Forward	Austria, Finland; Literature review and theoretical analysis	To identify the limits of AI in auditing and controlling, proposing a future research agenda in AI's integration with human–machine collaboration in auditing tasks.
15	2023	Daniel E. O'Leary, Robert M. O'Keefe	The Impact of Artificial Intelligence in Accounting Work: Expert Systems Use in Auditing and Tax	USA, UK; Accounting, auditing, and tax firms	To analyze the organizational impact of AI on accounting and auditing, comparing expert systems' role in auditing and tax, and evaluating their effectiveness.
16	2024	Ali M. Al-Hadi, Moath	Artificial Intelligence:	USA; 120 audit professionals	To investigate the auditability of AI

		M. Khaled	Auditability and Auditor Readiness for Auditing Artificial Intelligence Systems	and AI system specialists	systems and the readiness of auditors to audit AI-driven processes in various industries.
17	2023	John S. Walker, Ali Z. Al-Dubai, James N. Hamilton	The Impact of Artificial Intelligence on Auditing: An Exploratory Study	USA; 150 audit professionals from Big 4 firms and large corporations	To explore the impact of Artificial Intelligence on auditing practices, focusing on perceptions, barriers, and benefits within audit firms.
18	2023	Christopher M. Jenkins, David L. Brown	The Effect of Activating AI in Auditing: Enhancing Efficiency or Raising Concerns?	UK; 200 auditors, firms, and audit clients	To assess the impact of AI integration in auditing, focusing on efficiency, client trust, and ethical concerns.
19	2024	Sandra T. Green, Rashid H. Mohamad, Leonardo P. Figueroa	Artificial Intelligence and Blockchain in Audit and Accounting: A Literature Review	Global; 100 articles reviewed, including empirical and theoretical studies	To review the role of Blockchain and AI technologies in audit and accounting, identifying opportunities, challenges, and research gaps.
20	2024	Faozi A. Almaqtari, Najib H.S. Farhan, Hamood Mohammed Al-Hattami, Tamer Elsheikh, Borhan Omar Ahmad Al-dalaien	The Impact of Artificial Intelligence on Information Audit Usage: Evidence from Developing Countries	Egypt, Jordan; 443 respondents (accounting and auditing professionals)	To investigate how AI technologies such as cloud computing, data mining, and e-commerce influence the intention and actual usage of Information audit technologies in developing countries, particularly in the Middle Eastern context.
	2024	Yazan Abu Huson, Laura Sierra García, María Antonia García Benau, Nader Mohammad Aljawarneh	Cloud-based Artificial Intelligence and Audit Report: The Mediating Role of the Auditor	Multiple countries; Sample of auditors from various firms	To examine the role of cloud-based AI in improving the quality of audit reports, with a particular focus on the mediating role of auditors in integrating AI into auditing processes.
21	2024	Awni Rawashdeh	A Deep Learning-Based SEM-ANN Analysis of the Impact of AI-Based Audit Services on Client Trust	Jordan; 350 respondents (audit professionals, clients, and firm managers)	To analyze the impact of AI-based audit services on client trust, using deep learning techniques such as SEM-ANN (Structural Equation Modeling - Artificial Neural Networks) to measure how AI adoption influences trust in audit outcomes.
22	2024	Manuel Hilario, Pervis Paredes, Jorge Mayhuasca, Milner Liendo, Shirley Martínez	Evaluation of the Impact of Artificial Intelligence on the Systems Audit Process	Peru; Case study of system audit professionals, 120 audit firms and technology specialists	To evaluate the impact of AI in systems auditing, focusing on process optimization through AI tools like cross-validation, support vector machines (SVM), and artificial neural networks (ANNs)
23	2023	Marc Eulerich, Justin Pawlowski, Nathan J. Waddoups, David A. Wood	A Framework for Using Robotic Process Automation for Audit Tasks	Global; Various audit firms (case study-based)	To propose a framework for utilizing Robotic Process Automation (RPA) in audit tasks, focusing on enhancing the efficiency of repetitive and manual processes during audits.
24	2024	Zaid Jaradat, Ahmad Mtair Al-Hawamleh, Mohannad Al Shbail, Allam Hamdan	Innovative Practices: Assessing the Impact of Robotic Process Automation Adoption on Internal Audit Efficiency in KSA	Saudi Arabia (KSA); 300 internal auditors, accountants, and professionals in audit firms	To evaluate the impact of Robotic Process Automation (RPA) adoption on internal audit efficiency, examining the benefits and challenges of automation in the Saudi Arabian audit industry.

Summary of the Impact

Here is the table with a summary of the impact of independent variables (IV) on dependent variables (DV).

Table 2. Summary of the Impact

No	Dependent Variable Group	Dependent Variable (DV)	Independent Variables (IV)	Summary of Impact
1	Audit Accuracy	Audit accuracy, transparency	AI technologies, machine learning, predictive analytics	AI improves audit accuracy and transparency by automating data analysis and predictive modeling, improving overall audit quality.
2	Audit Process	Audit process improvement, Audit outcomes, efficiency, Auditing and fraud detection, Internal audit lifecycle efficiency, Auditor judgments, reliance on AI, Impact of AI on auditor jobs and skills, AI explainability in auditing tasks, Limits of AI in controlling and auditing tasks, Impact of AI on auditing and tax work, Auditability of AI systems and auditor competencies, AI adoption and audit quality, Impact of AI techniques on internal audit activities, AI impact on audit systems, auditing efficiency, RPA's impact on audit tasks, auditing efficiency	AI automation, machine learning, AI co-pilots, foundation models (e.g., GPT-4), AI in AIS, NLP, deep learning, text data analytics, AI systems, algorithm aversion, expert systems, AI auditability measures, RPA, machine learning, support vector machines	AI enhances the audit process by improving efficiency, automating routine tasks, assisting in decision-making, improving fraud detection, and optimizing the internal audit lifecycle.
3	Audit Quality	Audit quality, insights, Audit quality, fees	Deep learning, text data analytics, AI adoption, firm AI investments	AI adoption and deep learning improve the quality of audits by providing more insights, optimizing resource management, and lowering audit fees.
4	Technology Adoption	AI adoption in auditing, AI adoption challenges and opportunities in auditing, Use of AI and Blockchain in auditing, AI impact on information audit usage, AI, Industry 4.0, accounting, auditing, financial reporting, RPA, AI, financial data processing, machine learning	AI systems in auditing, decision aids, AI tools, RPA, machine learning, Blockchain, smart contracts	The adoption of AI and blockchain technologies in auditing enhances operational efficiency, automates tasks, improves financial reporting, ensures security, and aids in real-time decision-making.

This table summarizes the grouping of dependent variables (DVs) into relevant categories or groups, including Audit Accuracy, Audit Process, Audit Quality, and Technology Adoption. Each group contains dependent variables that are closely related in terms of their focus or purpose, followed by the independent variables (IVs) that influence these dependent variables, along with a summary of the impact generated.

Audit Accuracy

In the Audit Accuracy group, the dependent variables discussed are Audit accuracy and transparency. The use of AI technologies, such as machine learning and predictive analytics, enhances accuracy and transparency in the audit process by automating data analysis and predictive modeling, which leads to overall improved audit quality.

Audit Process

The Audit Process group includes a broad range of dependent variables, such as Audit process improvement, Audit outcomes, efficiency, Auditing and fraud detection, and others. Here, independent variables like AI automation, machine learning, AI co-pilots, and RPA (Robotic Process Automation) work to improve efficiency, reduce human error, and enhance the overall audit process. The implementation of AI also helps in fraud detection and the optimization of the internal audit lifecycle, while facilitating auditors' decision-making.

Audit Quality

In the Audit Quality group, dependent variables like Audit quality and insights are addressed. AI and deep learning contribute to enhancing audit quality and providing deeper insights in the audit process. The adoption of AI can also lower audit costs by automating routine tasks and improving resource management.

Technology Adoption

The Technology Adoption group combines various dependent variables related to technology adoption in auditing, such as AI adoption in auditing, Use of AI and Blockchain in auditing, and others. Here, technologies like AI, Blockchain, and machine learning are adopted to speed up and optimize the audit process, provide faster and more accurate decisions, and improve overall operational efficiency. RPA also facilitates the automation of financial data processing, increasing audit accuracy.

V. CONCLUSSION

Based on the review of 24 articles on the implementation of Artificial Intelligence (AI) and Robotic Process Automation (RPA) in auditing, it is clear that these technologies are transforming the auditing landscape. AI, including machine learning and predictive analytics, enhances audit accuracy and transparency by automating data analysis, ultimately improving the quality of audits. The integration of RPA optimizes audit processes by automating routine tasks, reducing human error, and allowing auditors to focus on more strategic, high-level decision-making. Moreover, AI-powered Natural Language Processing (NLP) has significantly improved fraud detection capabilities, enabling auditors to identify irregularities in large data sets more effectively.

Machine learning also contributes to internal audit efficiency by automating routine checks, which frees up auditors to address more complex tasks, enhancing overall productivity. As AI adoption grows, auditors are required to adapt their skill sets, shifting from performing manual tasks to focusing on advanced analytical and decision-making responsibilities. The introduction of Blockchain technology alongside AI has further bolstered data security in audits, ensuring compliance and reducing the risks of fraud by providing transparent tracking and verification.

AI and RPA have also shown to significantly reduce audit costs by streamlining repetitive tasks and improving operational efficiency. However, the adoption of these technologies is not without its challenges. High implementation costs, resistance to change, and the need for auditors to acquire new skills are some of the barriers that organizations face when integrating AI and RPA into their audit processes. Furthermore, AI’s role in tax auditing has proven beneficial in automating processes, improving compliance, and detecting fraud, further enhancing the effectiveness of tax audits.

Looking ahead, the future of auditing is heavily influenced by AI and RPA technologies. These innovations are expected to make audits more dynamic, data-driven, and efficient, fundamentally reshaping the profession by automating routine tasks and providing more comprehensive insights. While challenges remain, the potential for AI and RPA to revolutionize the audit profession is undeniable, offering significant improvements in accuracy, efficiency, and overall audit quality.

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