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## Article

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Administrative Sciences

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*Suggested Citation:* Leocádio, Diogo; Malheiro, Luís; Reis, João (2024) : Artificial intelligence in auditing: A conceptual framework for auditing practices, Administrative Sciences, ISSN 2076-3387, MDPI, Basel, Vol. 14, Iss. 10, pp. 1-16,  
<https://doi.org/10.3390/admsci14100238>

This Version is available at:

<https://hdl.handle.net/10419/321052>

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# Artificial Intelligence in Auditing: A Conceptual Framework for Auditing Practices

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**Abstract:** The transition to digital business systems has revolutionized organizational operations, driven by the integration of advanced technologies such as artificial intelligence (AI). This integration indicates a shift, redefining traditional practices and enhancing efficiency across diverse sectors such as finance, healthcare, and manufacturing. This study explores the impact of AI on auditing through a systematic literature review to develop a conceptual framework for auditing practices. The theoretical implications show the transformative role of AI in redefining auditors' roles, shifting from retrospective examination to proactive real-time monitoring. Moreover, managerial contributions stress the benefits of AI integration, enabling informed decision-making in risk analysis, financial management, and regulatory compliance. Future research should explore AI's influence on auditing efficiency, performance, regulatory challenges, and auditor adaptation. Overall, this study underlines the importance for organizations to embrace AI integration in auditing practices, fostering innovation, competitiveness, and resilience.

**Keywords:** artificial intelligence; auditing; conceptual framework; real-time monitoring



**Citation:** Leocádio, Diogo, Luís Malheiro, and João Reis. 2024.

Artificial Intelligence in Auditing: A Conceptual Framework for Auditing Practices. *Administrative Sciences* 14: 238. <https://doi.org/10.3390/admsci14100238>

Received: 9 August 2024

Revised: 24 September 2024

Accepted: 26 September 2024

Published: 28 September 2024



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## 1. Introduction

The transition of business systems to digital formats has integrated advanced technological tools, pushing innovations in diverse operations conducted by organizations (Afsay et al. 2023). This process, driven by the increasing access to large databases and the ease of direct communication among them, reflects the current digital revolution. The integration of artificial intelligence (AI), big data, and cloud computing is consolidating a paradigm shift in organizational processes and how current professionals conduct their activities (Shapovalova et al. 2023).

AI encompasses various capabilities, including real-time information processing, trend identification, and task automation (Jagatheesaperumal et al. 2022). It is defined as “a system’s ability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation” (Kaplan and Haenlein 2019). Therefore, integrating data-driven insights and automated processes enhances productivity and efficiency, complementing human decision-making (Seethamraju and Hecimovic 2023). AI is being used by accounting firms to enhance audit processes, risk assessments, transaction tests, analytics, and audit work-paper preparation for improved accuracy and compliance (Munoko et al. 2020). Big data introduces a revolutionary

approach to handling large amounts of information, materialized by the ability to collect, store, and process data on a large scale and allowing organizations to anticipate trends, identify patterns, and make reasoned decisions (Agustí and Orta-Pérez 2023). In turn, cloud computing establishes an important element amid innovative technologies, reconfiguring the technological infrastructure of organizations (Alotaibi 2023). This transformation significantly reduces dependence on physical infrastructures and offers scalable and flexible computing resources over the internet, enabling swift adaptation to the market. Hence, the combined implementation of these advanced technologies redesigns professionals' approach to task execution. The agility, predictive capability, and automation introduced by these innovations present a transformative landscape, fostering efficiency, adaptability, and innovation across all levels of the organization (Rahman and Ziru 2023).

The evolution of advanced technologies has changed the way business systems are structured, with the integration of AI standing out as a transformative strength, particularly in the field of auditing (Goto 2023). Currently, AI in auditing plays a crucial role in redefining traditional practices and enhancing efficiency in financial reports (Rodrigues et al. 2023). The impact of AI on auditing is still a path to explore and is growing to encompass other aspects related to advanced data analytics, automation, and decision support. The Big-4 corporations—Ernst and Young (EY), Deloitte, PwC, and KPMG—are at the forefront of adopting AI technologies to ensure greater efficiency and effectiveness in their activities, leading in the auditing sector (Adeoye et al. 2023). The incorporation of AI in auditing indicates that auditors in the digital era gain specific skills and obey the fundamental ethical considerations of the profession. Consequently, while there are numerous advantages to the integration of advanced technologies in auditing, it is crucial to adopt a more critical perspective, particularly in evaluating the strengths and limitations of existing studies. Many publications tend to emphasize positive outcomes, often overlooking significant challenges, such as data privacy issues, the complexities involved in technology integration, and the potential displacement of human auditors (Cornacchia et al. 2023). This tendency towards an overly optimistic narrative does not fully reflect the practical realities and ethical considerations these innovations may introduce. A more balanced evaluation is essential to reveal both the transformative potential and the inherent limitations of these technologies, ensuring that their implications for the auditing profession are examined rigorously.

As organizations increasingly embrace the integration of more advanced technologies into their processes, it becomes crucial to address the best practices to adopt to meet the challenges and opportunities of daily operations. Faced with a dynamic technological landscape and the integration of AI in auditing, auditors face the challenge of working with greater creativity and being attuned to the creation of innovative frameworks that simplify the execution of their tasks. By conducting a systematic literature review (SLR), this study aims to explore the development of a conceptual framework for performing audit procedures. Hence, the research question for this research is: "What is the impact of AI on auditing practices?"

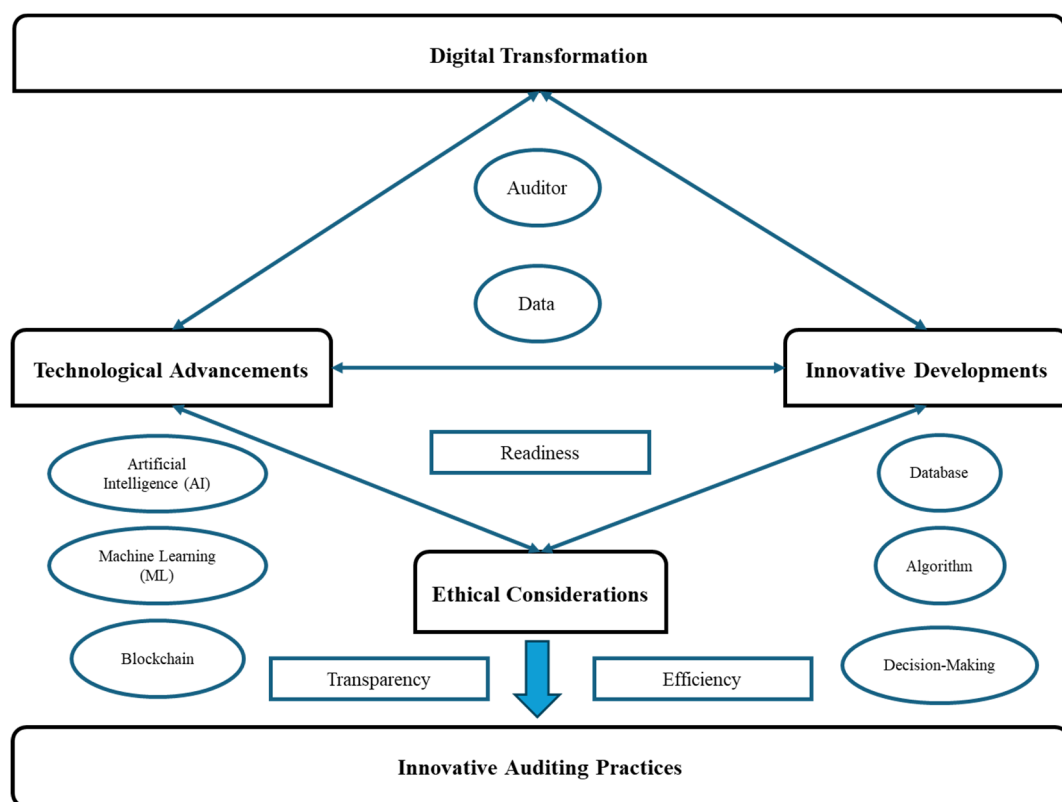
The remainder of the study is structured as follows: Section 2 presents the results. Section 3 contains the data analysis and discussion of the conceptual framework. Section 4 provides the materials and methods used. Lastly, Section 5 summarizes the results, highlighting both the theoretical implications and managerial contributions, addressing the study's limitations, and outlining topics for future research.

## 2. Results

Of the twenty-one included manuscripts, fifteen are from 2023, and six are from 2024. Additionally, 67% of the published studies were Scopus Q1, 9% were Scopus Q2, and 24% were Scopus Q3. The average CASP score is 17 pts (Table A2) on a four-level scale (poor, moderate, good, and excellent), which indicates the overall quality is good. The CASP evaluation shows that 38% of the articles scored excellent, 48% good, and 14% moderate quality.

The dominant subjects in the reviews center on digital transformation (Taherizadeh and Beaudry 2023), technological advancements (Hu et al. 2023), innovative developments (Goto 2023), and ethical considerations (Estep et al. 2023). The authors explored technologies like AI, Machine Learning (ML), Blockchain, and the Internet of Things (IoT), assessing their applications in accounting and auditing, while also highlighting the ethical issues for their reliable use. Moreover, these studies provided valuable contributions to better understanding the paradigm shift in the field of accounting, addressing associated challenges, and identifying key dimensions of AI-driven digital transformation. Ethical considerations were also consistently emphasized, highlighting the crucial need for the mindful and clear adoption of these technologies in the auditing profession.

Thus, based on the aforementioned information, we present a conceptual framework for auditing practices (Figure 1). The development of this conceptual framework essentially relied on data extracted from articles with high CASP scores.



**Figure 1.** Conceptual framework for auditing practices.

The concept of digital transformation is progressively redefining auditing practices through the integration of emerging technologies. This shift relies heavily on technological advancements, including AI, ML, and Blockchain. AI and ML significantly enhance data analysis and automation, while Blockchain provides a secure and transparent mechanism for recording transactions. These advancements foster innovative developments, resulting in clean databases, more refined algorithms, and enhanced decision-making processes. However, these emerging technologies introduce critical ethical considerations. As technology evolves, auditors must be prepared to evaluate issues related to data privacy, algorithmic bias, transparency, and more. The following subsections offer detailed explanations of each topic, designed to help readers gain a deeper understanding of the concepts and their importance within the field of auditing.

### 2.1. Digital Transformation

The digital transformation in the field of auditing is tied to changes in the global economy and professional practices (Rodgers et al. 2023). The shift from traditional auditing practices to technology-driven digital audits is propelled by factors such as more centralized accounting systems and the growth of e-commerce (Semenikhin et al. 2023).

The global perspective on digital transformation is substantiated by evidence found in Saudi Arabia's Vision 2030, where digital transformation strategies are proliferating (Abdullah and Almaqtari 2024). The focal point lies in the auditors' readiness to embrace this change, highlighting the need to explore organizational factors for this transformation. The increasing importance of integrating emerging technologies into auditing practices is also emphasized as a crucial approach to addressing the complex demands of the digital economy (Adeoye et al. 2023). Reluctance to embrace these advancements poses a substantial challenge for auditing firms, threatening their ability to adapt to the contemporary business landscape (Shapovalova et al. 2023). The perspective explored on the grounded theory of AI-driven digital transformation in Canadian SMEs highlights five essential dimensions of the digital transformation in the field of auditing: assessing the transformation context, auditing organizational readiness, piloting AI integration, expanding implementation, and leading the transformation (Taherizadeh and Beaudry 2023). Within this context, this topic not only provides benefits but also accentuates the challenges associated with data analysis, including the need for trust in emerging technologies, the establishment of ethical conduct, and shifts in business models. Emphasis is also placed on the profound cultural, professional, and strategic changes that auditors must experience to remain relevant in the digital era (Estep et al. 2023).

Global trends combined with practical dimensions redefine the foundations of auditing practices. The convergence of different perspectives illustrates how this revolution is influenced by various factors, encompassing economic contexts to the organizational spectrum. Hence, a necessity arises for a proactive adaptation to ensure continuous efficiency and transparency within the dynamic landscape.

### 2.2. Technological Advancements

Technological advancements have played a transformative role in the field of auditing, enhancing not only efficiency and precision but also providing a comprehensive understanding of the involved procedures (Huson et al. 2024). The integration of AI and Machine Learning (ML) technologies into auditing processes revolutionizes the way auditors operate. By harnessing the power of AI, auditors can analyze vast datasets in record time, identifying complex patterns and anomalies that may elude human detection (Taherizadeh and Beaudry 2023). ML models continuously learn from data, improving their accuracy and efficiency over time. Therefore, AI-driven tools can prioritize areas of concern, allowing auditors to allocate their time and resources more efficiently. This innovative approach enhances the quality of audits, ensuring that critical issues are addressed swiftly (Adeoye et al. 2023). Consequently, the development of new competencies for auditors requires a redefinition of the inherent responsibilities in such activities (Samiolo et al. 2023).

AI technologies arise as a clear example capable of transforming the effectiveness and transparency of auditing practices (Goto 2023). ML empowers auditors to process extensive real-time data, discerning patterns, and trends with heightened precision (Blösser and Weihrauch 2024). Blockchain in auditing stands out as an essential topic, promoting safer, automated, and transparent processes due to its immutable and decentralized nature (Han et al. 2023). In this context, there are increasingly more resources and means to achieve an optimized solution for conducting auditing activities.

The transition to advanced technology-driven auditing practices requires careful analysis, considering both cultural and operational transformations (Agustí and Orta-Pérez 2023). Cloud computing serves as an essential example, allowing remote access to data and fostering more efficient collaboration. Auditors in the digital era need a more flexible and agile mindset. Technological competencies become crucial, going beyond mere tool

usage and demanding a critical understanding of data and the ethical implications of AI (Seethamraju and Hecimovic 2023). Therefore, the importance of specialized knowledge in data analysis is highlighted, emphasizing the need for accurate interpretation of results.

In the Industry 4.0 context, the ability to incorporate disruptive technologies brings about a profound transformation in procedures related to various activities, resulting in the creation of an interconnected network of real-time information and redefining the role of auditors (Abdullah and Almaqtari 2024). In the current digital era, instead of being confined to the traditional review of historical records, auditors take on a proactive role, monitoring and evaluating various events in real-time. The adoption of these technologies is seen as a strategic requirement for the evolution and relevance of auditing. In a global scenario, as witnessed during the COVID-19 pandemic, these tools provide the flexibility to face significant challenges. This pandemic example highlights the urgency of implementing advanced technologies in this field, making it more efficient and resilient in the face of unexpected crises (Castka and Searcy 2023).

Thus, technological advances in auditing extend beyond the simple update of tools for innovative practices. They represent a radical transformation in the auditor's approach to the collection, analysis, and processing of significant volumes of data. Therefore, the effective implementation of these technologies optimizes operational efficiency, endowing auditors with a fundamental strategic role.

### 2.3. Innovative Developments

The pursuit of innovative developments has been significant in all spheres of knowledge, particularly gaining prominence in the field of auditing. This phenomenon signals the need for adaptation and redefinition of traditional practices in response to rapid advancements in the digital era (Seethamraju and Hecimovic 2023). In this context, it becomes fundamental to effectively integrate different technological capacities, gain greater familiarity with emerging technologies, and foster an innovative organizational culture (Taherizadeh and Beaudry 2023).

Innovation in the field of auditing involves a profound shift in the professional mindset joined with a reevaluation of traditional practices. Strategies like digital auditing, the exploration of ethical concerns linked to AI, and remote collaboration via cloud computing emerge as key elements in this new paradigm (Shapovalova et al. 2023). Specialization in AI is essential for addressing current challenges, enhancing efficiency and precision across all processes, and easing decision-making. Auditor competencies encompass the ability to manage emerging technologies, enabling the analysis of large volumes of real-time data, identification of complex patterns, and detection of anomalies. Therefore, specialization in databases also becomes crucial, aiming to create customized algorithms to achieve efficiency and effectiveness in auditing practices (Rodgers et al. 2023). Hence, real-time monitoring capability, along with the auditor's competence in handling vast amounts of available data, provides a solid foundation for decision-making.

The implications of innovations in auditing practices redefine the role of auditors in the digital era. In a profession where knowledge and practice are directly interrelated, innovation developments require the adoption of a transformative mindset that shapes the future of this profession (Goto 2023). Beyond technical competence, a deeper understanding of ethical issues in using these advanced technologies is mandatory (Samiolo et al. 2023). Moreover, the ability to adapt and readiness to embrace technological innovations become crucial as auditing advances toward an era of convergence between human expertise and digital potential (Anh et al. 2024). Thus, the current challenge lies in ensuring the broader adoption of emerging technologies and a profound understanding of their interactions, ensuring sustainable change in auditing practices.

### 2.4. Ethical Considerations

As advanced technologies become prevalent in the field of auditing, reflection on ethical considerations may be indispensable. Addressing more specific aspects such as



data analysis, cybersecurity, continuous learning, and global standardization is crucial for providing a comprehensive overview of the ethical complexities associated with emerging technologies in auditing practices (Abdullah and Almaqtari 2024).

From a broader perspective, the scrutiny of ethical considerations is undertaken in the context of four fundamental pillars—equity, responsibility, transparency, and explainability (Blösser and Weihrauch 2024). These principles, given the growing impact of AI across various domains, offer a guiding framework for organizations to implement more rigorous ethical standards. In the context of AI, ethics becomes critical, with issues related to accuracy, data security, and regulatory compliance arising as key elements to ensure auditors perform their duties efficiently and transparently (Han et al. 2023).

Examining the review of specific parameters and the use of AI-based monitoring systems associated with the automation of critical tasks, it becomes essential to establish ethical conduct standards. Therefore, the complexity of the ethical landscape in modern auditing is emphasized, requiring a careful approach and a constant commitment to fundamental ethical values (Adeoye et al. 2023). Beyond these considerations regarding the auditor's role, there is a need to establish clear guidelines for the adoption of innovative technologies in auditing, ensuring integrity, transparency, and accountability at all stages of the audit procedures. This aspect proves essential for constructing more efficient and innovative auditing practices in line with ethical conduct standards, enabling auditors to confront current dynamic challenges and technological transformations (Seethamraju and Hecimovic 2023).

It can be asserted that the establishment of regulatory standards by influential organizations, including the OECD (Organization for Economic Co-operation and Development) and the European Commission, reinforces a collective commitment to uphold these pillars, not only to protect consumer rights but also to promote ethical AI use (Blösser and Weihrauch 2024). In parallel, the European Union (EU) is leading the way in AI regulation, aiming to set global standards for the responsible development and use of AI through initiatives such as the AI Act. Although this act addresses critical issues in the field, significant gaps remain, particularly in ensuring that AI systems are both transparent and accountable when failures arise. This is in line with the criticisms highlighted by Laux et al. (2024), who argue that the Commission's approach of equating "trustworthiness" with acceptable risk levels is overly simplistic. The authors point out that the theoretical and empirical foundations of the AI Act are insufficient, and that additional sector-specific regulation may be necessary to fully address these issues. It is also emphasized that building trust in AI cannot rely solely on expert judgments about risk, as this overlooks the knowledge gaps between AI developers and the general public. Instead, public participation and the presence of impartial intermediaries, such as "notified bodies," are crucial for fostering genuine trust. While the EU's leadership in AI regulation is essential for setting a global standard, there is a clear need for more comprehensive measures to align regulatory policies with real-world understanding and public perceptions of AI (Laux et al. 2024).

Hence, the integration of advanced technologies assumes a strong commitment to the principles of ethical AI, crucial for strengthening ethical considerations in the development and implementation of AI systems. It is a commitment that contributes to the broader effort of achieving a harmonious balance between technological innovation and ethical responsibility in auditing.

### 3. Discussion: The Case of MindBridge

As observed earlier, digital transformation is reshaping the core competencies of the auditing profession. This change involves an integration of emerging technologies, designing a new approach to how auditors perform their tasks (Saengsith and Suntraruk 2022).

Auditing plays a critical function in guaranteeing the reliability of an organization's financial information. Currently, this scenario faces complex challenges, highlighting the importance of safeguarding transparency and integrity in business operations (Wassie and Lakatos 2024). In this regard, AI stands out as a potent ally, providing innova-

tive approaches and solutions to auditors (Samiolo et al. 2023). Traditionally, auditors have scrutinized accounting records to uphold adherence to standards and regulations, while also identifying irregularities and potential instances of fraud (Peng and Tian 2023). However, technological advancements, particularly in AI, open up new possibilities for financial auditing, providing innovative solutions to improve performance in audit procedures (Fedyk et al. 2022).

Headquartered in Ottawa, Canada, and founded in 2015, MindBridge stands out as a pioneer in adopting advanced technologies in the context of auditing, providing support to organizations worldwide in dealing with the growing challenges of the contemporary business environment (MindBridge 2024). This company has developed a revolutionary solution to enhance auditing by creating an advanced data analysis platform—MindBridge AI. This platform empowers auditors to identify unusual patterns, potential frauds, and errors swiftly and efficiently in financial information (Prokofieva 2023). It has the capacity to automate manual tasks and perform real-time data analysis, allowing organizations to conduct more effective audits, mitigate risks, ensure legal compliance, and make informed decisions based on accurate information (Bento and White 2023). The MindBridge AI platform significantly reduces the time needed to conduct audits, boosting auditors' productivity and enabling them to concentrate on more strategic matters (MindBridge 2024). The platform uses complex data analysis algorithms to identify irregularities and unusual trends that may indicate fraud, mistakes, or financial risks. This improves audit accuracy and gives companies a deeper understanding of their financial position.

With the increasing public scrutiny of companies' financial practices, this platform plays a vital role in ensuring regulatory compliance and transparency in financial operations, helping to identify and mitigate non-compliance risks and protecting the reputation and integrity of organizations (Prokofieva 2023). MindBridge employs an integrated approach, employing AI, ML, and advanced data analysis to enhance efficiency, accuracy, and relevance in auditing. Consequently, this AI-based platform effectively detects irregularities and uncommon patterns in financial data, such as suspicious transactions and discrepancies in accounting records. This ongoing assistance aids auditors in identifying potential frauds, errors, and financial risks, providing pertinent insights into areas of concern. Furthermore, the MindBridge AI enables a comprehensive analysis of all available data, eliminating the need for sampling result reliability.

The platform has the capacity to analyze historical trends and relationships between different sets of financial data, helping auditors better understand the context and inter-connection of information (Prokofieva 2023). MindBridge AI provides reporting and data visualization features, making it easier for auditors to communicate the results of their analyses clearly and comprehensibly to stakeholders (KPMG 2024). These are just some of the ways in which MindBridge employs advanced technologies to enhance innovative auditing practices, providing efficiency, accuracy, and relevance in an increasingly complex and data-driven environment. This innovative technology is redefining auditing practices and assisting companies in maintaining market confidence and driving sustainable growth (Bento and White 2023). Moreover, MindBridge has also formed strategic collaborations with renowned audit and consulting organizations, broadening the platform's reach and effect. MindBridge's collaboration with KPMG emphasizes the success and relevance of its platform in auditing processes, highlighting firms' commitment to embracing innovative and advanced technologies to ensure transparency and integrity in their financial operations (KPMG 2024).

The integration of real-time auditing with AI and advanced data visualization techniques has highlighted several innovative research avenues in the field of financial oversight and compliance. The shift from traditional audits to continuous, AI-driven monitoring represents a substantial evolution in auditing practices, allowing organizations to identify and address financial issues with unprecedented immediacy and precision. This transformation underscores the need for further exploration into how real-time data processing and visualization can enhance auditing accuracy and effectiveness. Therefore, MindBridge



serves as a compelling example of how innovative developments can profoundly transform the field of auditing. Its platform empowers auditors with powerful tools to identify risks and anomalies, enhancing efficiency, accuracy, and reliability in the processes developed.

Thus, in a context where the use of advanced technologies plays a crucial role, the AI-based platform stands out as a leader at the forefront of auditing, reflecting the commitment to provide innovative solutions that propel the profession to new levels of excellence.

## 4. Materials and Methods

### 4.1. Search Process

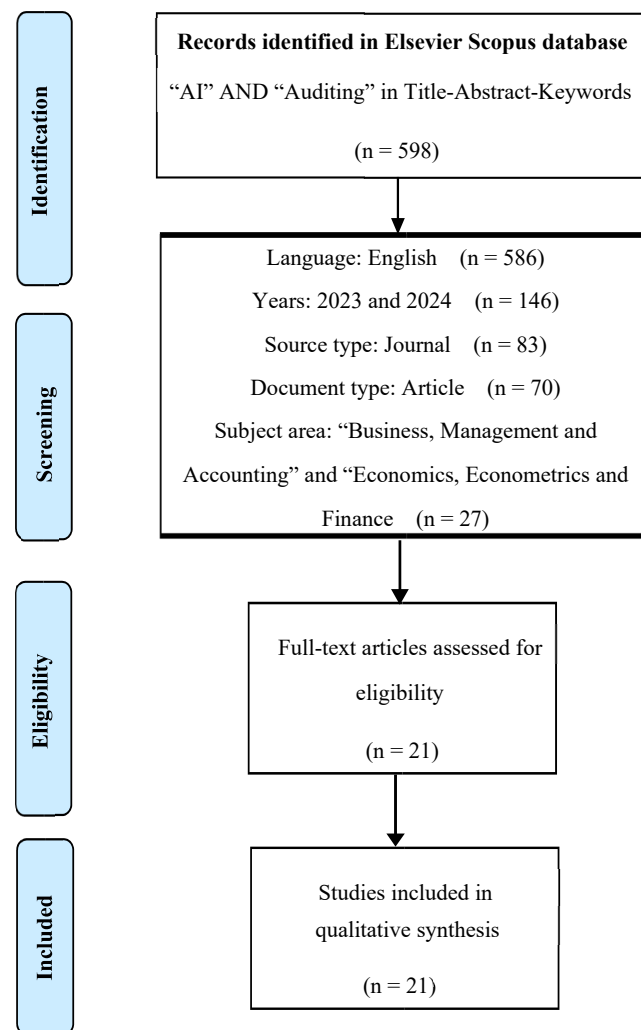
In the current scenario of auditing, marked by increasing interest, regulatory intervention, interdisciplinary research, and information volume, there is a need to attain a clear understanding of how these technological advancements are reshaping traditional audit practices and creating new opportunities for innovation and efficiency in the auditing industry. Therefore, an advanced search was conducted on Elsevier Scopus using article titles, abstracts, and keywords to identify manuscripts in English. The search terms employed were “Artificial Intelligence” AND “Auditing”. On 18 February 2024, Scopus yielded 598 documents, showing a consistent growth trend since 2016 (representing 78% of total hits). The identified documents were mostly conference proceedings (45%) and articles (40%) from the USA, China, India, and the United Kingdom, with a focus on computer science (65%), and engineering (23%).

### 4.2. PRISMA Protocol

The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) protocol is widely acknowledged and essential in various research domains, serving as a checklist for the systematic literature review process. This checklist provides a transparent and well-organized method for presenting the outcomes of such reviews (Tranfield et al. 2003). Therefore, a systematic literature review (SLR) is a fundamental method for accurately, dependably, and transparently synthesizing information. It employs predefined eligibility criteria to select empirical evidence and address precise research questions (Moher et al. 2009). We used a single database to offer a pragmatic overview of the characteristics, through a systematic review, aiming to be transparent, replicable, and easily accessible in all steps (Page et al. 2021). Selected for its reputation, Scopus stands as the largest international and multidisciplinary database of peer-reviewed manuscripts and, therefore, a fundamental tool to simplify the investigation process (Guz and Rushchitsky 2009).

The PRISMA statement oriented the selection process into four phases (Page et al. 2021): initially, we identify relevant research by thoroughly exploring databases and academic journals, aiming to compile a comprehensive list of potential studies. This broad net is cast to encompass the diverse literature contributing to the research question. Next, a screening process is employed, systematically examining titles and abstracts to assess their relevance to the research topic. This serves as a filter, excluding studies not aligned with the research focus, resulting in a more precise compilation of literature for subsequent evaluation. Moving to the eligibility phase, we conduct a comprehensive assessment of chosen studies based on predetermined criteria. This involves scrutinizing complete texts to verify alignment with specific inclusion criteria, such as study design, publication date, main findings, or other pertinent parameters. The final and critical step encompasses the selection of studies for inclusion in the SLR. Conclusive decisions are made based on alignment with the research question, adherence to predefined criteria, and the provision of valuable insights. Hence, this selection process ensures that the final compilation of literature may be pertinent and characterized by methodological rigor (Krippendorff 2019).

Figure 2 shows the PRISMA flowchart for this SLR:



**Figure 2.** PRISMA flowchart.

In the screening phase, we only selected studies in the English language, obtaining 586 manuscripts. Then, we restricted the sample between 2023 and 2024, concentrating on recent investigations (146 records). Additionally, we also applied filters to select journal articles, in the areas of “Business, Management and Accounting” and “Economics, Econometrics and Finance” (27 hits).

All documents were carefully read to exclude any articles lacking full-text access. We prioritized methodological rigor by evaluating the strength of the research design and the overall contribution to the field. Articles that did not provide sufficient detail in these areas or failed to meet established academic standards were excluded from our analysis ( $n = 6$ ). Therefore, the process was completed with 21 manuscripts included in qualitative synthesis, considering that no additional articles were included beyond those obtained in the Scopus database. Moreover, this study serves as a comprehensive summary of the literature from the preceding year. It is crucial to recognize that studies from different types of literature have not been incorporated, thereby characterizing this study as a snapshot of a period.

#### 4.3. Data Extraction and Synthesis

Data extraction from Scopus, refined by the PRISMA protocol, culminated in the creation of a comprehensive report. This report included pertinent information about the author(s), year, purpose, methodology, and main findings, providing the synthesis of

current knowledge over the past year (Appendix A). Therefore, a content analysis was developed to further enhance the depth of understanding.

We conducted the analysis with the aid of computer-assisted data analysis software (CAQDAS) called NVivo (Bazeley and Jackson 2019). NVivo is a powerful tool that enhances the efficiency and precision of content analysis, particularly when managing large data sets. In this study, NVivo (Version 12) streamlined the analysis of the 21 included documents by facilitating the systematic classification, coding, and interpretation of key concepts and relevant ideas. Therefore, this software enables researchers to identify patterns and organize data effectively, making it invaluable for rigorous qualitative research.

The synthesis process was developed following five essential steps (Braun and Clarke 2021): firstly, the manuscripts underwent thorough reading and re-reading to acquire a more profound understanding of the content. Then, the information about the title, author, publication year, country, and main findings was extracted and recorded in a spreadsheet. The data were coded to identify patterns and connections, resulting in the establishment of an initial set of themes. Following, themes were refined, ensuring alignment with the research objectives. Lastly, the outcomes under each theme were integrated, considering the research question delineated for this investigation.

#### 4.4. Quality Assessment

The assessment of methodological quality involved the use of the Critical Appraisal Skills Program (CASP), which is a qualitative scoring checklist applied to the included reviews. We adhere to the procedural guidelines outlined on the CASP website (<https://casp-uk.net>, accessed on 22 February 2024), which comprehensively delineates information affecting systematic reviews (Singh 2013). This checklist evaluates the included reviews using 10 possible items. The use of CASP played a fundamental role in the identification of high-scoring reviews and the delineation of relevant themes for subsequent analysis. The necessity of critical evaluation in qualitative studies, crucial for ensuring validity, further underscores our deliberate decision to employ CASP in this context (Miller et al. 2009).

### 5. Conclusions

#### 5.1. Theoretical Implications

The integration of AI into auditing practices represents a significant and paradigmatic shift in the fields of accounting and financial management. This study enriches existing theory by examining and emphasizing the theoretical implications of this transition through the construction of a conceptual framework.

Firstly, our research addresses a critical need to comprehend the effects of digital transformation on auditing. We examined a wide array of studies, providing a comprehensive understanding of emerging trends and areas of interest for future investigation. As the analysis progressed, it became evident that the shift towards technology-driven auditing practices implies a fundamental change in the core of the auditing context. Historically, auditing has been interpreted as a retrospective examination of records, with auditors examining documents to uncover errors and irregularities. However, our research reveals that AI is redefining this scope, transforming auditors into proactive agents of real-time monitoring and assessment. This paradigm shift is indispensable for advancing the theoretical conception of auditing as an ever-evolving discipline. It entails a fundamental reimagining of auditors' roles and responsibilities in the digital age, surpassing the mere adoption of innovative technologies to augment current practices. The integration of AI into auditing practices demands an innovative adaptation in auditors' competencies, requiring them to understand and analyze real-time data, apply advanced pattern analysis techniques, and proactively detect anomalies.

Hence, this study contributes to a holistic understanding of the ongoing transformation in the field of auditing. By situating AI integration as part of a broader shift towards a more dynamic and future-oriented profession, we explored a new track for auditing practices.

This theoretical perspective is essential not only for informing academic research but also for guiding professional practices and policy development in auditing.

### *5.2. Managerial Contributions*

This study highlights several contributions to management that can revolutionize how organizations approach auditing and decision-making strategies. The integration of innovative developments into auditing practices not only redefines organizational processes but also offers a range of managerial benefits crucial for professionals in the field. Recognizing the transformative role of AI in reshaping organizational processes is crucial. These technologies constitute a profound transformation in organizational operations and data engagement. Managers, equipped with a deep comprehension of their impact on auditing practices, can make informed decisions about their integration within their respective organizations, extending their influence to encompass risk analysis, financial decision-making, and regulatory compliance strategies.

Furthermore, by examining the business case of MindBridge, this study provides valuable practical contributions for managers in selecting and integrating AI solutions into their auditing strategies. By demonstrating how leading companies are employing AI to enhance efficiency, accuracy, and transparency in their auditing operations, this investigation offers an innovative framework for other organizations to follow. Managers can learn from these success stories and adapt these practices to their own organizational realities, promoting innovation and competitiveness in the sector. Understanding the implications of emerging technologies and their integration into auditing practices not only enhances operational efficiency but also fortifies organizations' capacity to respond to market dynamics and evolving regulatory requirements. Managers who adopt these innovative solutions are strategically positioning their organizations at the vanguard of digital transformation, thereby equipping them to confront future challenges with confidence and resilience.

### *5.3. Limitations and Future Research*

While we acknowledge the significant contributions of this study, it is essential to address the inherent limitations that may influence the interpretation of the results. One potential limitation lies in the possibility that some relevant contributions may have been inadvertently omitted during the search and selection of articles. Despite diligent efforts to cover a wide range of sources, time constraints, access to certain databases, and the selection of keywords may have limited the inclusion of certain pertinent studies. Moreover, as systematic reviews depend on the quality and timeliness of available materials, our analysis is subject to the quality of the included studies as well as the risk of publication bias, where studies with negative or neutral results may not be as readily available or published. This may impact the generalizability of the results and the comprehensive understanding of the field of study.

Another limitation to consider is the constant evolution of the field of study. AI-driven auditing technologies are in a state of rapid change and development. As a result, our analysis may reflect a snapshot limited in time, not fully capturing the most recent or emerging trends. Additionally, the final remarks of this research may be influenced by the quality of the included studies. Variations in the quality of the studies may affect the reliability and validity of the results, as well as the facility to generalize the conclusions. Consequently, it is fundamental to consider these constraints and acknowledge that our overview of the subject matter may be influenced by methodological and contextual variables.

Based on our analysis, we have identified promising areas for future research. These suggestions represent only some of the many potentially fruitful research areas that have arisen from our literature review. We expect that these directions will encourage future investigations and contribute to a more comprehensive understanding of the impact of AI on auditing practices. Therefore, to further enrich the presented analysis, it would be

beneficial to include a broader range of industry case studies beyond MindBridge, showcasing its impact on performance and audit outcomes. There is also a need to explore the regulatory challenges related to using AI in auditing and create guidelines to ensure responsible and transparent AI usage. The EU is at the forefront of AI regulation, establishing global standards for responsible AI development and use. While the AI Act addresses key issues like transparency and accountability, there are still gaps, particularly in ensuring systems are understandable and accountable when failures occur. Moreover, it is essential to assess how auditors adapt to emerging technologies and their role in organizational change, including perspectives on AI adoption and the development of training programs, to ensure a seamless transition and enhance their competencies in dealing with innovative developments.

These new research frontiers are indispensable for enhancing our comprehension of the connection between technology, auditing, and management, thereby empowering organizations to confront the challenges and seize the opportunities presented by the digital age.

**Author Contributions:** Conceptualization, D.L.; methodology, D.L.; software, D.L.; validation, L.M. and J.R.; formal analysis, D.L.; investigation, D.L.; resources, D.L.; data curation, D.L.; writing—original draft preparation, D.L.; writing—review and editing, D.L., L.M. and J.R.; visualization, D.L.; supervision, L.M. and J.R.; project administration, D.L.; funding acquisition, J.R. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** No new data were created or analyzed in this study.

**Conflicts of Interest:** The authors declare no conflicts of interest.

## Appendix A

**Table A1.** Report—Characteristics of review studies (n = 21).

Author(s) (Year)	Purpose	Methodology	Main Findings
Lookadoo and Moore (2024)	Examine coverage of résumés and AI Applicant Tracking Systems (ATSs) in textbooks	Literature Review	The findings indicate a lack of consensus in 18 textbooks, highlighting challenges in providing specific advice on emerging AI technology
Semenikhin et al. (2023)	Explore the impact of management accounting on payment risks in online trade during military operations	Exploratory Study	The findings show that effective management accounting, including fast transaction identification and fraud loss estimation, significantly reduces payment risks in online trade during crises
Zhao and Wang (2024)	Explore ChatGPT’s applications in accounting	Literature Review	The findings indicate that ChatGPT can automate tasks, enhance reporting, and improve auditing, but ethical considerations are crucial for reliable use
Shapovalova et al. (2023)	Develop a modernization concept for national accounting policy within the Accounting 4.0 paradigm, integrating advanced technologies like AI, blockchain, and IoT	Literature Review	The findings indicate that adopting advanced technologies like AI, blockchain, and IoT enhances efficiency, accuracy, and transparency in national accounting policy, improving competitiveness
Adeoye et al. (2023)	Explore the effect of AI on audit quality	Exploratory Study	The results showed that AI has a positive impact on audit quality



Table A1. Cont.

Author(s) (Year)	Purpose	Methodology	Main Findings
<a href="#">Samiolo et al. (2023)</a>	Examine the impact of technological advancements, particularly AI, on the auditing profession and challenge assumptions about automation's feasibility	Literature Review	The results indicate that technology in auditing has risks: automating simple tasks may overlook judgment aspects, changing auditor habits and affecting practical knowledge acquisition.
<a href="#">Anh et al. (2024)</a>	Investigate the impact of technology readiness (TR) on artificial intelligence (AI) adoption by accountants and auditors in Vietnamese companies	Exploratory Study	The findings reveal a positive relationship between TR and AI adoption, with perceived usefulness and ease-of-use mediating this relationship
<a href="#">Khuong et al. (2023)</a>	Explore factors influencing AI demand in Vietnamese accounting and auditing	Experimental Research	The findings, validated by fsQCA, show that finance, tasks, technology, epidemics, readiness, and trust positively impact AI use
<a href="#">Seethamraju and Hecimovic (2023)</a>	Explore the impact of AI on auditing, examining factors influencing AI adoption in audit practice	Exploratory Study	The findings display that several factors affect AI adoption in audits. While AI can enhance audit quality, concerns about control and transparency exist, necessitating a reevaluation of audit practices
<a href="#">Estep et al. (2023)</a>	Examine managers' perceptions of AI use in financial reporting and its impact on audit adjustments	Literature Review	The findings indicate that managers are uncertain about the benefits of auditors' AI use, but it influences larger audit adjustments for companies using AI in complex accounting estimates
<a href="#">Castka and Searcy (2023)</a>	Explore the adoption of new technologies in auditing	Literature Review	The study reveals an emerging TIC paradigm, shaped by innovative technology, urging an immediate transition
<a href="#">Taherizadeh and Beaudry (2023)</a>	Identify the key dimensions of AI-driven digital transformation (AIDT) and develop a grounded theory that provides an understanding of how the AIDT process unfolds within Canadian SMEs	Literature Review	The study reveals five core dimensions: evaluating transformation context, auditing organizational readiness, piloting the AI integration, scaling the implementation, and leading the transformation
<a href="#">Abdullah and Almaqtari (2024)</a>	Investigate the impact of AI, Industry 4.0 readiness, and Technology Acceptance Model (TAM) variables on various aspects of accounting and auditing operations	Experimental Research	The findings indicate that AI, big data analytics, cloud computing, and deep learning can improve accounting and auditing practices
<a href="#">Han et al. (2023)</a>	Explore the impact of blockchain on accounting, particularly AI-enabled auditing, focusing on transparency, trust, and decision-making improvement	Literature Review	The findings indicate that blockchain enhances transparency, trust, and efficiency in accounting, along with highlighting challenges and the need for cautious adoption
<a href="#">Van Bekkum and Borgesius (2023)</a>	Explore whether the GDPR's rules on special categories of personal data hinder preventing AI-driven discrimination, focusing on the European context	Literature Review	The findings demonstrate that the GDPR generally prohibits using special category data, posing challenges in preventing AI-driven discrimination. The paper explores arguments for and against exceptions to address this tension
<a href="#">Huson et al. (2024)</a>	Examine the literature about information technology, artificial intelligence, and blockchain in auditing	Literature Review	This study provides an overview of the profound impact of technology on the evolution of the auditing profession
<a href="#">Rodgers et al. (2023)</a>	Propose a framework to employ think-aloud protocols (TaP) and thematic analysis in qualitative accounting research	Exploratory Study	The results indicate that the lack of an AI framework, IFRS knowledge, and legislation conflict may adversely interact with standard implementation

Table A1. Cont.

Author(s) (Year)	Purpose	Methodology	Main Findings
Hu et al. (2023)	Explore the incorporation of AI in internal audit practices, proposing strategies for effective implementation and decision-making within a comprehensive and interconnected framework	Experimental Research	The results indicate that the prioritized improvement order for implementing AI-driven internal audit involves strategies, governance, human factors, and data infrastructure, fostering efficient decision-making in a big data environment
Blösser and Weihrauch (2024)	Reveal important insights into the consumer perspective of AI certifications	Literature Review	The findings show that trust in AI certification is complex, and consumers seem to approve more of non-profit entities than for-profit entities, with the government approving the most.
Agustí and Orta-Pérez (2023)	Explore the influence of big data and AI in the fields of accounting and auditing	Literature Review	The main findings encompass mapping the evolution of publication activity, highlighting key contributors, and summarizing significant literature within this specific domain
Goto (2023)	Explore how PSFs can establish and utilize service R&D to innovate services	Case study	The findings outline the detailed process by which newly created service R&D organizations adopt advanced AI in firms

Table A2. Methodological quality ratings based on CASP (n = 21).

Author(s)	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Score	Classification Quality	Scimago
Lookadoo and Moore	Y	C	C	C	C	Y	Y	C	Y	Y	15	Good	Q2
Semenikhin et al.	Y	C	C	N	C	Y	Y	Y	Y	C	14	Moderate	Q3
Zhao and Wang	Y	C	C	C	C	Y	Y	C	Y	Y	15	Good	Q2
Shapovalova et al.	Y	C	C	C	C	Y	Y	C	Y	Y	15	Good	Q1
Adeoye et al.	Y	C	C	N	Y	Y	Y	C	Y	C	14	Moderate	Q3
Samiolo et al.	Y	Y	C	C	Y	Y	Y	Y	Y	Y	18	Excellent	Q1
Anh et al.	Y	Y	C	N	Y	Y	Y	Y	Y	C	16	Good	Q3
Khuong et al.	N	C	C	N	Y	Y	Y	Y	Y	Y	14	Moderate	Q3
Seethamraju and Hecimovic	Y	Y	Y	C	Y	Y	Y	Y	Y	Y	19	Excellent	Q1
Estep et al.	Y	Y	C	C	Y	Y	Y	Y	Y	Y	18	Excellent	Q1
Castka and Searcy	Y	N	C	C	Y	Y	Y	C	Y	Y	15	Good	Q1
Taherizadeh and Beaudry	Y	C	C	Y	Y	Y	Y	C	Y	Y	17	Good	Q1
Abdullah and Almaqtari	Y	Y	Y	Y	C	Y	Y	C	Y	Y	18	Excellent	Q1
Han et al.	Y	Y	Y	C	C	Y	Y	C	Y	Y	17	Good	Q1
Van Bekkum and Borgesius	Y	Y	Y	C	C	Y	Y	C	Y	Y	17	Good	Q1
Huson et al.	Y	Y	C	Y	Y	Y	Y	C	Y	Y	18	Excellent	Q1
Rodgers et al.	Y	Y	C	C	C	Y	Y	Y	Y	Y	17	Good	Q1
Hu et al.	Y	Y	C	C	Y	Y	Y	Y	Y	Y	18	Excellent	Q1
Blösser and Weihrauch	Y	Y	Y	C	Y	Y	Y	Y	Y	Y	19	Excellent	Q1
Agustí and Orta-Pérez	Y	Y	C	C	C	Y	Y	C	Y	Y	16	Good	Q3
Goto	Y	Y	Y	Y	C	Y	Y	C	Y	Y	18	Excellent	Q1

Abbreviations: Y = Yes; C = Can't tell; N = No. Classification: Yes = 2; C = 1 and N = 0. Overall classification: Excellent = 18/20; Good = 15/17; Moderate 10/14; Poor  $\geq 10$ . 1 = Did the review address a clearly focused question?; 2 = Did the authors look for the right type of papers?; 3 = Do you think all the important, relevant studies were included?; 4 = Did the review's authors do enough to assess the quality of the included studies?; 5 = If the results of the review have been combined, was it reasonable to do so?; 6 = What are the overall results of the review?; 7 = How precise are the results?; 8 = Can the results be applied to the local population?; 9 = Were all important outcomes considered?; 10 = Are the benefits worth the harms and costs? (Van Hueveln 2017).

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