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a systematic literature review**

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Artificial intelligence in audit processes: a systematic literature review

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ABSTRACT - SOMMARIO

In an increasingly digitization-driven global environment, companies are integrating advanced technologies to innovate auditing processes and develop more effective solutions. New technologies are redefining the operational dynamics of organizations, providing innovative tools to enhance efficiency and optimize interactions with stakeholders. Among them, artificial intelligence (AI) is transforming the way companies analyze and process information, revolutionizing auditing activities as well. Auditors are encouraged to adopt a technology-centric strategic approach, aiming to improve access to business data, optimize analysis, and enhance audit quality. With AI, a deeper understanding of all the evidence can be gained, providing greater assurance to stakeholders of audited entities. However, despite the obvious benefits, the adoption of AI in auditing is proceeding slowly: on the one hand, technical procedures do not mandate its use, limiting its diffusion; on the other hand, the regulatory framework and the need for additional assurance drive companies to a cautious approach. Although AI is being studied in a variety of fields, its application in auditing remains an evolving field, with many issues yet to be investigated. This paper employs a Systematic Literature Review (SLR), supported by bibliometric and content analysis, to provide a detailed overview of AI adoption in audit processes. The analysis identifies five primary research clusters that constitute the current knowledge pathways in academic research. In addition to synthesizing the state of the art, this study identifies critical gaps in the existing literature and offers strategic directions for future research.

In un contesto globale sempre più orientato alla digitalizzazione, le imprese stanno integrando tecnologie avanzate per innovare i processi di auditing e sviluppare soluzioni più efficaci. Le nuove tecnologie stanno ridefinendo le dinamiche operative delle organizzazioni, offrendo strumenti innovativi per migliorare l'efficienza e ottimizzare l'interazione con gli stakeholder. Tra queste, l'intelligenza artificiale (IA) sta trasformando il modo in cui le aziende analizzano ed elaborano le informazioni, rivoluzionando anche le attività di controllo. I revisori dovrebbero porre la tecnologia al centro delle loro strategie, con l'obiettivo di migliorare l'accesso ai dati aziendali, ottimizzare l'analisi e, di conseguenza, perfezionare la qualità dell'audit. Grazie all'IA, è possibile ottenere una comprensione più approfondita di tutti gli elementi probativi, offrendo maggiori garanzie agli stakeholder degli enti sottoposti a revisione. Tuttavia, nonostante i benefici evidenti, l'adozione dell'IA nell'auditing procede lentamente: da un lato, le procedure tecniche non ne impongono l'utilizzo, limitandone la diffusione; dall'altro, il quadro normativo e la

necessità di garanzie aggiuntive spingono le aziende a un approccio prudente. Sebbene l'IA sia studiata in diversi ambiti, la sua applicazione nell'auditing rimane un campo in evoluzione, con molte questioni ancora da approfondire. Il presente lavoro, attraverso una revisione sistematica della letteratura, affiancata da un'analisi bibliometrica e di content analysis, si propone di offrire una panoramica dettagliata sull'adozione dell'IA nei processi di audit. Dall'analisi effettuata sono stati individuati cinque principali cluster di ricerca che rappresentano i percorsi di conoscenza su cui si è concentrata la ricerca accademica. Oltre a riassumere lo stato attuale delle conoscenze, questo studio identifica le lacune nella letteratura esistente e offre preziosi suggerimenti per le future direzioni della ricerca.

Keywords: artificial intelligence, audit, systematic review, bibliometric analysis, intelligenza artificiale, audit, revisione sistematica, analisi bibliometrica

1 – Introduction

Over the past few years, digital evolution has been transforming the field of auditing, introducing new technologies and advanced data analytics tools that are reshaping the processes and practices used. The evolution of auditing in the digital age is marked by significant technological innovations, a transformation of auditors' roles, and improved audit process quality and governance. The integration of digital technologies such as data analytics, big data, artificial intelligence, blockchain, and automation have improved information accuracy, risk management, and transparency (Manita et al., 2020), enabling real-time monitoring and faster decision-making (Lois et al., 2020; Abdullah & Almaqtari, 2024). Advanced digital technologies enable more reliable and credible financial reporting, strengthening internal controls and improving governance by limiting discretionary power (Manita et al., 2020; Huang et al., 2025). However, fully understanding the language of information technology requires continuous investment in knowledge and skills, robust cybersecurity measures, and adaptation to ever-changing regulatory and institutional environments (Lois et al., 2020; Ferry et al., 2025).

Among these technologies, artificial intelligence (AI) plays a particularly important role in redefining traditional practices and improving the efficiency of financial reporting (Fedyk et al., 2022; Rodrigues et al., 2023). More broadly, AI is increasingly recognized as a strategic enabler of competitive advantage, particularly in highly dynamic and complex market environments, where its diagnostic and predictive capabilities support innovation-driven strategies (Selleri, 2024).

Thanks to AI, it is possible to obtain a deeper understanding of all audit evidence, faster data analysis, anomaly detection, fraud prevention, and risk assessment, offering greater assurance to stakeholders of audited companies (Fedyk et al., 2022; Abdullah & Almaqtari, 2024; Hasan, 2021).

Most studies in the literature focus primarily on the main technologies used in accounting and auditing, while research examining the topic of auditing in relation to AI technologies is more limited. For this reason, we deemed it appropriate to analyze the broad overview of emerging trends linking AI to auditing, to investigate the most important aspects and contribute to the existing literature.

The objective of this paper is twofold: in addition to providing insights into the main trends currently driving the academic debate on the application of AI in auditing, it also identifies potential future research directions on this topic.

Through the combined use of a systematic literature review, bibliometric analysis, and content analysis, the study provides a clear and structured overview of the state of the art in artificial intelligence in auditing, highlighting key research trends and bringing to light unexplored gaps.

The original contribution of this study resides in its integrated methodological approach, which transcends conventional narrative reviews by synthesizing the analytical rigor of a Systematic Literature Review with the quantitative precision of bibliometric mapping. This research presents one of the most comprehensive and current investigations in the field, encompassing scientific contributions while capturing the latest advancements in generative AI and automated auditing protocols, thereby providing a clear evolutionary framework of the topic.

The research presents a research framework organized around three pillars: enabling technologies, audit quality, and ethics. It also identifies two additional clusters addressing the evolution of auditor skills and the institutional legitimacy of digital transformation. This emphasizes that successful integration depends not only on technological capability, but also on organizational culture and professional accountability.

The remainder of this article is organized as follows: Section 2 details the methodology; Sections 3 and 4 present the results of the bibliometric and content analyses, respectively; and Section 5 provides concluding remarks, discussing limitations, practical implications, and future research directions.

2 – Methodology

Consistent with the research objective—to analyze the state of the art regarding the implementation of artificial intelligence in auditing—a systematic literature review (SLR) method was adopted (Tranfield et al., 2003; Kraus et al., 2022).

The choice of this methodology is based on the consideration that the topic under study is still evolving, making it particularly important to identify new research trends and explore potential knowledge gaps, to promote the development of new investigative perspectives (Massaro et al., 2016; Centobelli et al., 2017). Furthermore, compared to traditional reviews, SLR provides additional insights by comparing the body of research through an objective process (Urbinati et al., 2023). To perform a thorough analysis of the existing literature and provide detailed information and more reliable answers, the study was integrated with a bibliometric analysis (Caputo et al., 2018). This analysis is more objective than traditional systematic reviews in terms of sample selection and extraction and allows for the evaluation and graphical representation of journals, authors, and keyword networks. To perform the bibliometric analysis, “Biblioshiny” (Bibliometrix package for R-studio) and VOSviewer software were used (Aria and Cuccurullo, 2017; Van Eck and Waltman, 2010).

Specifically, following the studies of Centobelli et al., 2020, the research used a pre-established protocol divided into three fundamental phases (Figure 1). The first phase involves the selection of articles for inclusion in the study, which also includes identifying the research questions, identifying the keywords and database used, and defining the inclusion and exclusion criteria.

The second phase involved a bibliometric analysis, structured around descriptive statistics and the identification of key research trends. Finally, in the third phase, the articles in the sample

were thoroughly analyzed using content analysis to enhance the robustness of the analysis and identify additional trends currently fueling academic debate.

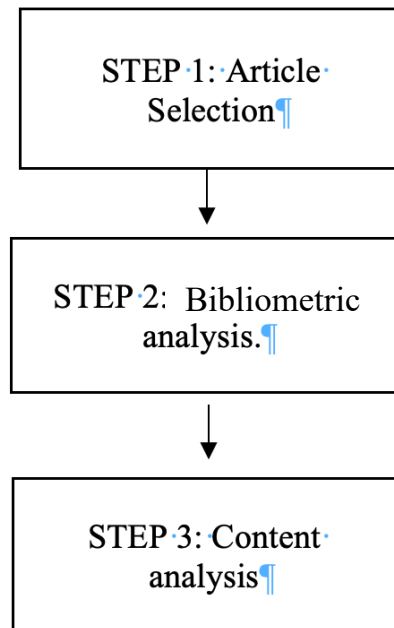


Fig. 1– The SLR process (Source: Our elaboration)

2.1 – Step 1: Article Selection

The first step involves defining the research question to be answered, namely:

RQ: *What is the current state of research regarding the use of artificial intelligence in auditing?*

Next, the search database and keywords were defined. All articles were extracted from the Scopus database, and document collection was concluded in May 2025. The study developed a simple search framework to identify the initial pool of articles. The keywords used for the search were: “artificial intelligence,” “ai,” and “auditing.” The selected keywords were finally converted into search strings using Boolean logic, i.e., the application of * along with the “OR” and “AND” connectors to select relevant articles from the literature (Table 1). Based on the selected keywords and without applying any filters, the database returned 1.129 articles (Figure 2).

Table 1 – Keywords (Source: Our elaboration)

Search string	“artificial intelligence” OR “ai” AND “auditing”
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To perform an initial screening of the initial pool of articles returned by the database, several inclusion and exclusion criteria were selected (Table 2). First, only English was selected as the language (Language); given that this is a recent phenomenon, the time horizon considered was from 2015 to May 2025 (Years); furthermore, two research areas were considered (Business,

Management and Accounting and Economics, Econometrics and Finance); finally, only scientific articles were included (Document Type).

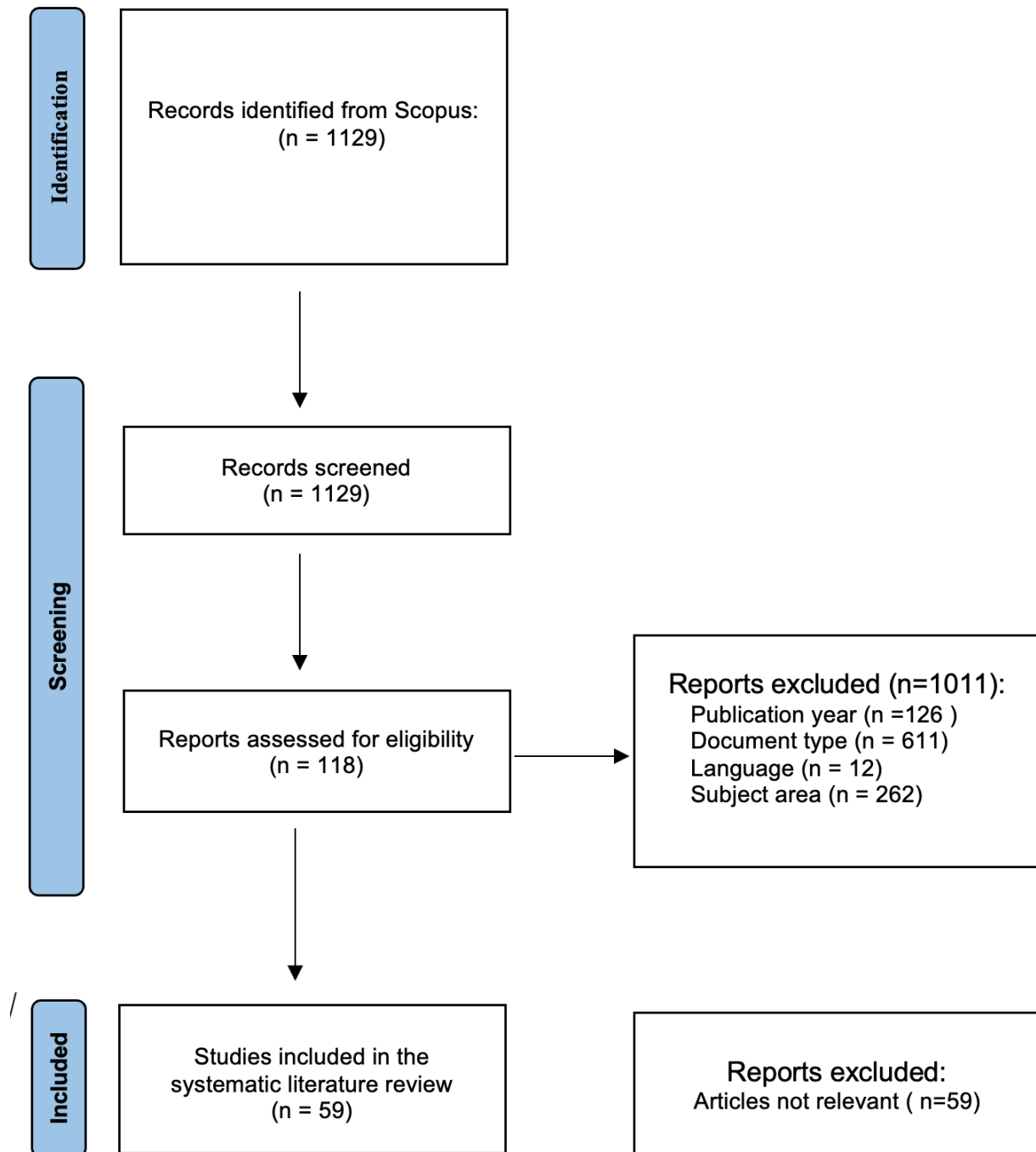


Fig. 2 – Preferred reporting items for systematic reviews and meta-analyses methodology
(Source: Our elaboration on Moher et al., 2009)

The total number of articles thus reached 118. For each article, the title was initially examined and the abstracts were read to exclude any publications that were inconsistent with our study and to include, instead, those that provided information on the topic under analysis and that discussed artificial intelligence and auditing in depth. Subsequently, the entire document was read.

Articles that studied the two topics separately and/or did not analyze their relationship were also excluded at this stage. Ultimately, a total of 59 eligible articles were included in the literature review.

Table 2 – Inclusion and exclusion criteria (Source: Our elaboration)

Criteria	Description
<i>Exclusion</i>	
Articles not relevant	<p>The article fails to furnish substantial information regarding the application of artificial intelligence in the auditing domain. This deficiency is evident in several respects:</p> <ol style="list-style-type: none"> 1. Artificial intelligence is only referenced in the abstract, keywords, or title, without any detailed discussion within the main body of the article. 2. The application of artificial intelligence is primarily addressed in contexts unrelated to auditing. 3. There is a predominant emphasis on digital transformation as a general theme, without an exploration of the specific role of artificial intelligence within the auditing process.
<i>Inclusion</i>	
Timeframe	Last 10 years, because we want to address future challenges and new developments
Language	English
Document type	Articles
Subject area	Business, Management, and Accounting; Economics, Econometrics, and Finance

2.2 – Step 2: Bibliometric Analysis

The bibliometric analysis was divided into two main parts (Caputo et al., 2018; Kraus et al. 2020). The first part, carried out using the Bibliometrix software (Aria and Cuccurullo, 2017), allowed us to identify the main characteristics of the sampled articles and their performance in terms of distribution over time, journals, citations, and countries (Donthu et al., 2021).

The second part, namely scientific mapping, analyzed the relationships between the elements that make up the research (Donthu et al., 2021). Using the VOSviewer software, a map of the co-occurrence network was constructed, which allowed us to verify the importance of the topics and the strength of their connections, represented respectively by the size of the nodes

(circle) and the thickness of the lines connecting them (Galletta et al., 2022). Each color represents a thematic cluster, where nodes and links can be used to explain the topics (nodes) and the relationships (links) between them.

The greater the co-occurrence of specific keywords in the articles, the stronger the connection between those articles and the likelihood of sharing the same search topic (Caputo et al., 2021).

2.3 – Step 3: Content Analysis

Content analysis is a systematic and replicable technique that allows us to examine and interpret texts, images, and other communication data, identifying recurring and underlying themes through explicit coding rules, ensuring validity and reliability, and drawing accurate conclusions about their contextual use (Stemler, 2000; Krippendorff, 2018). The use of this methodology allowed us to conduct an objective and textual review of the literature, obtaining detailed conceptual insights and shifting the analysis from the level of the author and their citations to the content of individual articles (Cheng et al., 2018).

To provide a detailed overview of the adoption of artificial intelligence in auditing processes, content analysis was conducted on selected articles, using a manual approach focused on identifying and distinguishing the main themes that emerged within the analyzed sample (Beattie et al., 2004). Qualitative data coding, identifying themes, and the relationships between them were performed using short words and phrases as labels, making them easier to navigate and organize.

This approach allowed the results to be grouped into informative blocks. Furthermore, group meetings were held among the authors to confirm the categorization of articles into clusters identified using bibliometric tools.

This analysis was conducted independently by three authors and subsequently reconciled by a fourth author to reach consensus on the results (Miles, 1994). After this phase, the articles were redistributed among the authors as a further measure of reliability, revealing no significant discrepancies.

3 – Results

3.1 – Descriptive Analysis

3.1.1 – Scientific Production Over Time

The analysis of the chronological distribution of the selected articles reveals a significant and accelerating upward trend in this research field. As illustrated in Figure 3, academic interest has intensified recently, reaching a peak of 18 publications in 2024.

Notably, by the end of May 2025, the database already recorded 15 publications, suggesting that 2025 is poised to surpass previous records.

The substantial growth observed over the last two years—approximately a 52% increase—can be attributed to several factors. Beyond the general digital transformation, this surge is likely driven by critical regulatory milestones, most notably the approval of the European Union’s AI Act, which has heightened the debate on compliance and ethics. Furthermore, the escalation in publications reflects the professional necessity to adopt AI-driven tools to enhance operational efficiency, analytical precision, and overall audit quality.

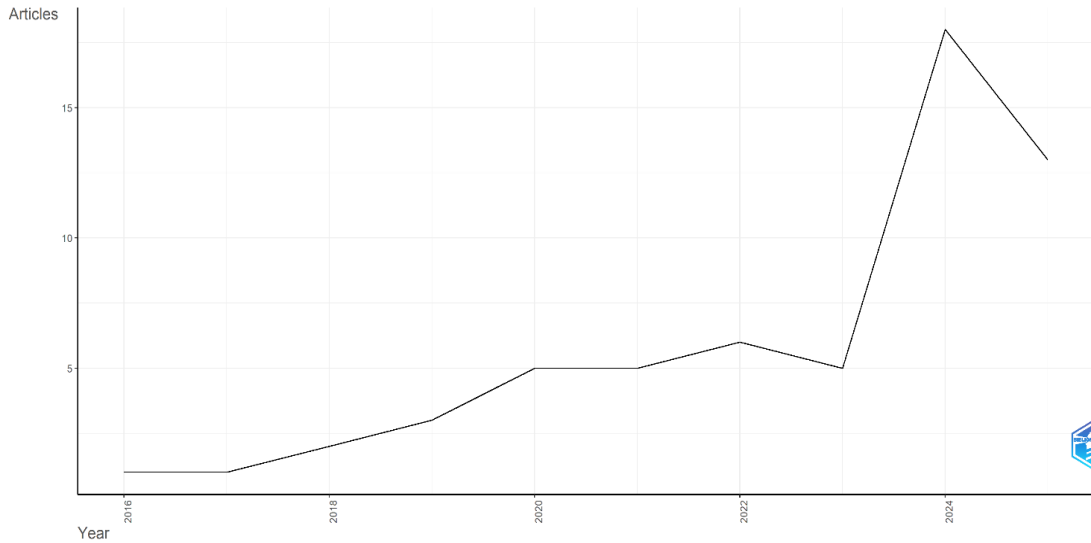


Fig. 3. – Annual Scientific Production (Source: Bibliometrix)

3.1.2 – Countries

The research identified the countries with the highest scientific output in the field. This indicator is based on the institutional affiliation reported by the authors; consequently, a country's scientific production increases each time an affiliated author contributes to one or more publications. In cases of international co-authorship, a single article may be counted multiple times—once for each participating country. Similarly, if an article is co-authored by researchers from the same country, each contribution is accounted for in that country's total output.

The map in Figure 4 illustrates the intensity of production, showing a marked concentration in highly developed economies. Research intensity is depicted through varying shades of blue, where darker tones indicate a higher volume of scientific output per country. Countries with a minimum production score of 8 are listed in Table 3.

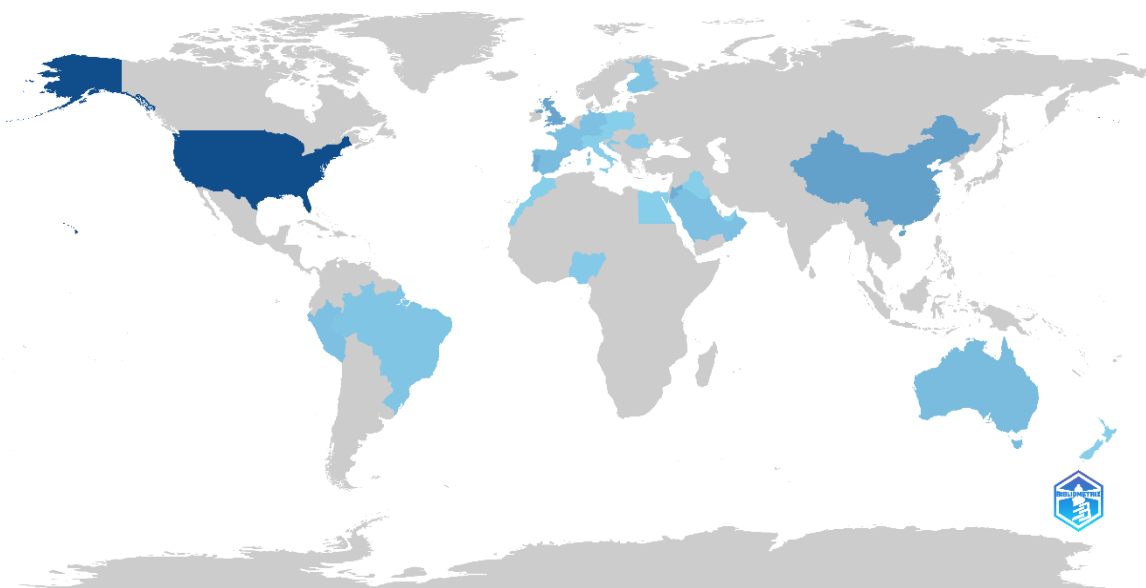


Fig. 4 – Country scientific production (Source: Our elaboration based on Bibliometrix)

The United States emerges as the leading global contributor, with more than double the number of publications compared to China, which holds the second position. These are followed by the United Kingdom, Jordan, and Portugal. The dominance of the United States and China can be attributed to several factors, including advanced technological infrastructure, access to vast datasets, and world-class research centers.

Furthermore, in the US and the UK, stringent regulatory pressures, combined with government incentives and high technological capacity, further drive research in this area. Of particular interest is the significant contribution from Jordan, which may reflect a targeted and collaborative national strategy that leverages Artificial Intelligence as a pivotal tool for economic development and institutional transparency.

Table 3 – Sampled documents and scientific production per country (*Source: Our elaboration*)

Country	Score
United States	31
China	11
United Kingdom	10
Jordan	8
Portugal	8

3.1.3 – Journals

Table 4 lists the journals that have published at least two articles from the sampled pool, collectively accounting for approximately 39% of the total selected articles. The analysis of these sources reveals a clear concentration in journals specialized in accounting, auditing, and information technology.

Table 4 – Sample articles by journal (*Source: Our elaboration*)

Journal	No. article
International Journal of Accounting Information Systems	6
Journal of Emerging Technologies in Accounting	4
Journal of Financial Reporting and Accounting	3
Journal of Risk and Financial Management	3
Review of Accounting Studies	3
Accounting	2
Journal of International Accounting, Auditing and Taxation	2

Notably, the quality of the publishing venues is remarkably high, as evidenced by their rankings in the ABS (Association of Business Schools) Journal Quality Guide. For instance, the

Review of Accounting Studies is ranked as a 4-star (World-Class) journal. Other prominent sources include the Journal of International Accounting, Auditing and Taxation (3 stars), the Journal of Accounting Information Systems (2 stars), and the Journal of Financial Reporting and Accounting (1 star).

This high concentration of top-tier journals underscores the academic rigor and the growing strategic importance of Artificial Intelligence within the auditing and accounting discourse.

3.2 – Keyword Co-occurrence Analysis

A total of 59 articles were analyzed, spanning 34 different journals. Regarding geographical affiliation, the distribution demonstrates a broad international scope, with a predominance of English-speaking and Middle Eastern institutions.

By analyzing the keyword co-occurrence network in the 59 sampled articles, we identified the terms most frequently used by authors. To visualize keyword recurrence and highlight the main research trends, the VOSviewer tool was used, considering only keywords that appeared at least 3 times. Specifically, nodes represent keywords; the larger the node, the greater its frequency in the sample of selected articles. Lines, on the other hand, indicate co-occurrence in the analyzed documents, reflecting conceptual similarities.

Groups of frequently occurring keywords represent clusters, each of which symbolizes a specific research topic. The analysis identified three main clusters (Figure 5): the first, colored blue, concerns AI-enabling technologies; the second, colored green, concerns the adoption and impact of AI in auditing processes; and the third, colored red, concerns ethical, regulatory, and governance implications.

3.2.1 – Blue Cluster: AI-Enabling Technologies in Auditing

The blue cluster highlights the main enabling technologies in the field of auditing. It includes keywords such as “machine learning,” “big data,” and “deep learning,” demonstrating the focus of research on advanced technology tools to support corporate audit processes.

In particular, systems based on artificial intelligence (AI) technologies, by processing large amounts of data, enable auditors to perform more in-depth analyses because they are based not on samples but on entire data populations (Kokina & Davenport, 2017).

Kokina et al. (2025) found that the use of machine learning technology allows auditors to anticipate and predict potential risks and issues through the implementation of models based on historical data. Machine learning algorithms, as argued by Noordin et al. (2022), can also support auditors in identifying potential anomalies and fraud and, thanks to automation, make audit processes more efficient and accurate than traditional manual processes. Zhang et al. (2022) demonstrated that explanatory artificial intelligence techniques, when used in auditing, improve the interpretability of results and assess potential fraud risks. Allassuli (2025) evaluated the impact of artificial intelligence through robotic process automation systems on the efficiency of internal audit operations in Jordanian commercial banks.

The results showed that robotic process automation systems improve the various phases of the internal audit process because they reduce costs and human errors, and the work process is streamlined by technology.

Big data technologies, through data analysis and the integration of different sources, can optimize auditors’ work, enabling more accurate risk assessments and the identification of errors and inaccuracies (Albawwat & Frijat, 2021). Furthermore, the application of an innovative

big data analytics technique (deep learning) assists auditors throughout all phases of the audit decision-making process, from planning to professional judgment (Sun & Vasarhelyi, 2018). Conversely, Kend & Nguyen (2020) found that the implementation of big data analytics technology could lead to excessive scrutiny, complicating rather than simplifying audit processes.

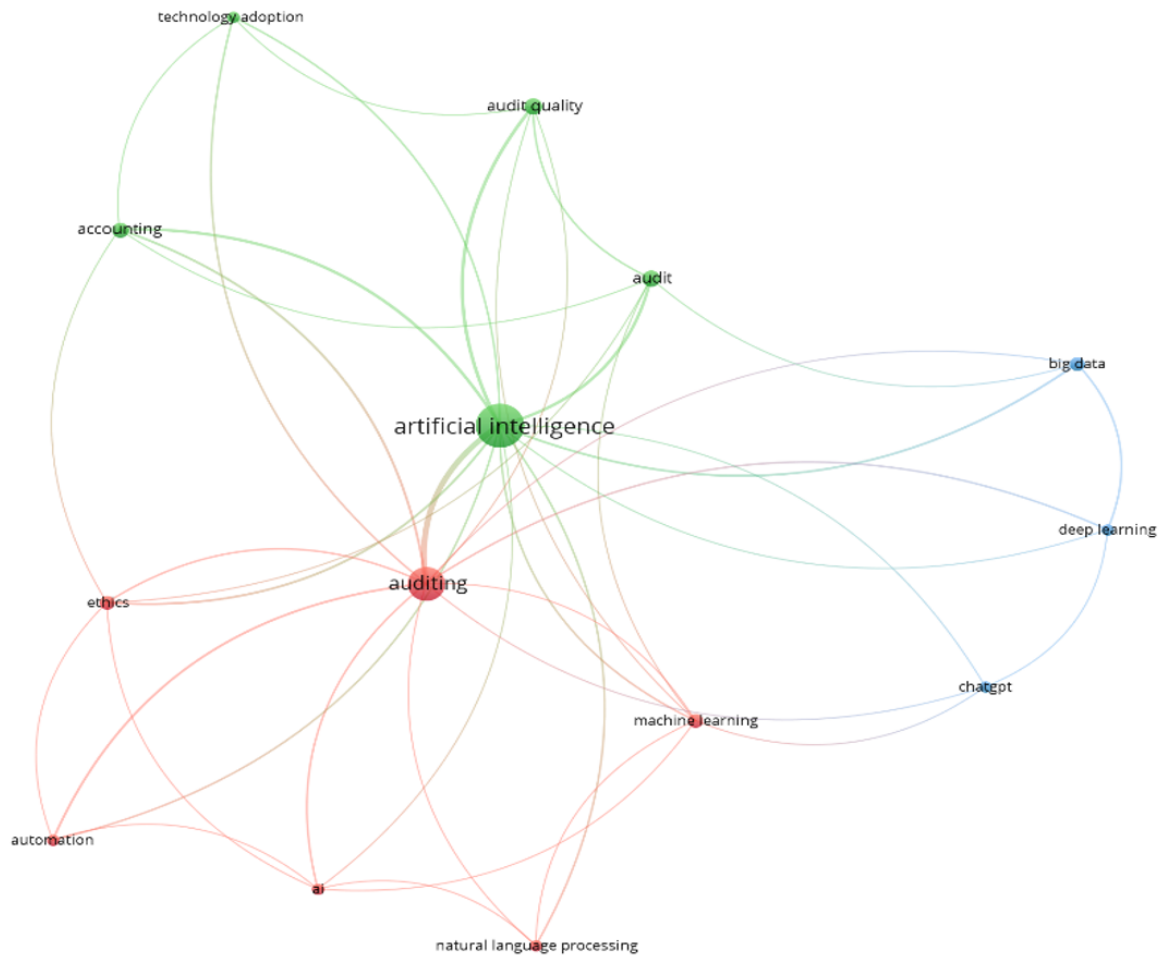


Fig. 5 – Keyword co-occurrence network map
(Source: Keyword co-occurrences network from VOSviewer)

According to Al-Aroud (2020) and Al-Sayyed et al. (2021), expert systems have a positive impact on audit evidence gathering, improving auditors' ability to collect and analyze data effectively. However, neural network technology has not had a significant impact on evidence gathering.

3.2.2 – Green Cluster: The Impact of AI on Audit Processes

The green cluster shows the application and management aspects of artificial intelligence in auditing. It includes keywords such as “audit quality”, “technology adoption”, and “accounting” and indicates a strong interest in the academic literature on the practical adoption of artificial intelligence and digital technologies in the accounting and auditing context. The implementation of artificial intelligence in the auditing field is based on other advanced technologies that contribute to the transformation of traditional auditing practices and

processes. These technologies improve data analysis and audit quality (Fedyk et al., 2022). According to Adeoye et al. (2023), AI improves accuracy, reliability, and timeliness and allows auditors to efficiently analyze large amounts of data, identifying potential errors.

Anh et al. (2024) highlighted that accountants and auditor show a greater predisposition to adopt artificial intelligence when they possess a high level of openness towards technology. This effect is further amplified if AI is perceived as useful for carrying out work activities and is easy to use. Abdullah and Almaqtari (2024) also emphasize that the ease of use of technology is perceived as a key factor influencing AI adoption intentions. Thottoli (2024), however, suggests that training is the key element because, thanks to it, auditors are able to understand how to apply technologies and integrate digital tools into decision-making processes.

3.2.3 – Red Cluster: Ethical and Regulatory Implications

The red cluster focuses on works that explore the topic of trust in intelligent systems, also highlighting the importance of human oversight, transparency, and clear regulatory frameworks. The most used term is “ethics,” which, in this case, goes beyond the concept of simple morality as it refers to the fact that AI, to ensure trustworthiness and transparency, must be regulated, governed, and integrated into audit processes. According to Munoko et al. (2020), AI offers greater speed, accuracy, and detailed data analysis; however, the inherent opacity of AI algorithms, often described as “black boxes”, poses challenges for auditors to explain their results, thus undermining trust and transparency. Indeed, technologies should support the auditing process and not replace human judgment. Lehner et al. (2022) also emphasize in their study the importance of human-machine collaboration because the actions of humans and AI must be carefully balanced.

The opacity of machine learning (ML) models presents significant legal and professional liability concerns for auditors who depend on these systems. When a non-transparent algorithm fails to detect fraud, it becomes unclear whether the auditor has exercised appropriate professional skepticism or has merely delegated judgment to the model (Zhang et al., 2022). This issue is exacerbated by the limited interpretability of machine learning outputs which complicates the attribution of liability in cases of audit failure. Lehner et al. (2022) emphasize that auditors must justify their conclusions to regulators, courts, and stakeholders, a responsibility that becomes more challenging when the evidentiary basis is derived from a system whose reasoning cannot be fully articulated. Explainable artificial intelligence (XAI) techniques, including SHAP (Shapley Additive exPlanations) and LIME (Local Interpretable Model-agnostic Explanations), offer a technical solution by enhancing the interpretability of AI outputs and enabling auditors to document the rationale behind their conclusions more effectively (Zhang et al., 2022). Nevertheless, the issue of ultimate professional liability persists and necessitates revisions to regulatory frameworks and auditing standards to explicitly address the evidentiary value and legal significance of AI-generated outputs.

To ensure appropriate moral behavior, auditors must continuously examine the ethical implications arising from AI decision-making. Alaskar et al. (2025) also studied the impact of technologies on auditing with a specific focus on ethical issues and performance. Their research findings revealed that there is a balance between performance and ethics; ethical concerns are considered as important as performance expectations. To address these issues, Mökander et al. (2021) propose in their study new governance mechanisms, including the ethical audit, defined as a structured process aimed at assessing consistency with principles and standards. This

mechanism is based on seven criteria to ensure the correct design and implementation of procedures, thus ensuring regularity and transparency. Lacmanovic & Skare (2025) also emphasize the importance of standard techniques that guarantee AI systems an adequate level of reliability and transparency in compliance with ethical and regulatory expectations.

3.3 – Additional research clusters

Manual content analysis allowed us to identify additional research trends not identified by the bibliometric analysis. Specifically, new relevant factors were identified, such as the role of auditors' digital skills and the legitimacy of digital change, which are also closely linked to the field of auditing and artificial intelligence.

Several studies have analyzed how artificial intelligence and the implementation of other technologies have influenced auditor training and the changing profession. The main keywords that emerged were "digital skills" and "cognitive resistance," related to the theme of identity transformation, practical experiences, and obstacles related to the role of auditors. With the advent of artificial intelligence, the role of auditors is changing. According to Manita et al. (2020), the new role of auditors must be able to combine critical analysis, data analysis skills, and an innovative spirit. Conversely, Tiberius & Hirth (2019) highlight how auditors do not perceive artificial intelligence technologies as a direct threat. However, such innovations could undermine the centrality and relevance of the profession, generating uncertainty and potential challenges regarding the future attractiveness of audit careers. Neves et al. (2019) also found that auditors often prefer traditional audit methods to digital innovations, as they perceive limited benefits in using artificial intelligence and are not fully convinced of the value this technology can bring to daily activities and audit processes. Tudor & Deliu (2022) argue that auditors do not play a merely passive supervisory role but propose a model in which they act as conscious and active "governors" in the digital transformation process.

Beyond changing required competencies, the spread of AI raises important questions about professional responsibility. As AI systems increasingly assist with or automate core audit tasks, the boundaries of auditor accountability become less defined. When an audit conclusion relies on AI-generated output, it is unclear to what extent the auditor remains fully responsible for the result. This concern is especially relevant in accounting control, where certification ethics depend on the auditor's ability to independently verify data accuracy and consistency (Lehner et al., 2022; Munoko et al., 2020). The literature indicates that this issue remains insufficiently addressed, highlighting a critical need to redefine professional standards and liability frameworks for AI use in audit certifications.

The trend related to the legitimacy of digital change allows us to observe technologies from a more critical perspective. It includes terms such as "digital transformation," "legitimacy," and "resistance." In particular, Neves et al. (2019), drawing inspiration from institutional theory, found that advanced AI systems are not adopted unless they are explained, legitimized, and integrated into the culture and organization.

In fact, if auditors do not perceive the AI tool as useful, they are unlikely to adopt it. Gotthardt et al. (2020) and Manita et al. (2020) also argue that the adoption of AI is influenced by several factors such as cultural practices, organizational storytelling, and openness to change. According to Zemánková (2019), the integration of AI and blockchain in auditing depends on technological capabilities but also on organizational practices and the nature of auditing standards. Mökander et al. (2021), taking a more systematic view, argue that the legitimacy of

AI in auditing practices does not depend solely on its use, but must be based on criteria such as traceability, accountability, and ethical alignment.

4 – Discussion and research agenda

The literature reviewed reveals a fundamental dichotomy: while artificial intelligence is celebrated as the engine of unprecedented efficiency, there is growing concern about the loss of “professional judgment” and algorithmic opacity.

While authors such as Zhang et al. (2022) emphasize the technical solution of explainable AI to overcome the “black box” problem, our analysis highlights that the problem is not only technological, but also cultural and regulatory. There is a significant gap between the potential offered by Big Data and the ability of international audit frameworks (such as the ISAs) to formally integrate these tools. Furthermore, a tension emerges between the automation of routine tasks and the auditor’s need to maintain social legitimacy; the risk is that excessive reliance on machines will reduce the auditor’s perceived responsibility in the eyes of stakeholders.

The shift towards an AI-based paradigm, therefore, requires not only the implementation of new algorithms but also a profound redefinition of ethical and professional boundaries. In this new environment, artificial intelligence must evolve from mere computational support to a true enabler of transparency, acting as a resource that enhances audit effectiveness without ever replacing the critical judgment of human decision-makers.

These challenges are also confirmed in the Italian context, where recent contributions have highlighted how the adoption of AI and RPA in audit processes raises critical questions of algorithmic transparency, accountability of automated decisions, and the need for new professional competencies (Daniele & Mariani, 2025).

In summary, based on the analysis conducted, the following research agenda (Table 5) is proposed to guide future studies in the field of digital auditing.

5 – Conclusions

In recent years, the literature on artificial intelligence applied to auditing has experienced significant growth, as evidenced by the descriptive analysis. Most studies are focused on the period between 2024 and 2025, reflecting growing interest from the academic community. This paper offers a systematic and in-depth overview of these contributions, adopting the systematic literature review (SLR) methodology, integrated with bibliometric analysis and content analysis.

The study identified five thematic clusters, which summarize emerging trends and outline the main theoretical strands animating the current scientific debate. Specifically, the implementation of the keyword co-occurrence map led to the identification of the following three research clusters: (1) the enabling technologies of AI in auditing (blue cluster); (2) the impact of AI on audit processes (green cluster); (3) the ethical and regulatory implications of AI in auditing (red cluster). Subsequently, the integration of content analysis allowed two additional lines of research to emerge: the first relating to the transformation of the role and training of auditors, the second focusing on the legitimacy of digital change within the profession.

From a theoretical perspective, the findings of this study provide a solid foundation for future research by the academic community, facilitating a better understanding of authors, the

most influential journals, and the main emerging trends in this area of research. From a practical perspective, the analysis identified several key factors that managers should consider to improve audit processes and quality, but also highlights the importance of developing new skills among auditors. From a managerial perspective, the study highlights the urgency for legislators to update professional standards and the need to introduce tax incentives, training programs, and funding for the digital transition.

Table 5 – Research Agenda for Future Studies (Source: Our elaboration)

Thematic Cluster	Gap Identified in the Literature	Future Research Directions
1. Enabling Technologies and Big Data	Predominance of theoretical studies; little empirical evidence on real-time data integration.	Study business cases of continuous auditing integrated with AI-based ERP systems.
2. Operational Impact and Audit	Quality Excessive focus on time efficiency at the expense of complex fraud risk assessment.	Analyze how AI modifies auditors' "professional skepticism" when faced with non-standard anomalies.
3. Ethical Implications and Governance	Lack of clear technical standards for algorithm accountability (Black Box).	Define ethical audit protocols and validation methodologies for machine learning models.
4. Skills and Professional Development	Risk of de-skilling (loss of skills) of young auditors due to automation.	Propose new pedagogical and curricular models that combine Data Science and Law/Economics.
5. Legitimacy and Change	Poor understanding of the cultural factors that hinder AI adoption in medium-sized audit firms.	Investigate the psychological and organizational barriers to AI adoption through qualitative research (interviews).
6. AI Liability and Legal Accountability	Absence of clear legal and professional standards governing auditor liability when AI-based tools fail to detect fraud or produce erroneous outputs.	Develop regulatory frameworks and professional guidelines that define the evidentiary standards and liability boundaries for auditors using ML systems

The research findings not only provide an updated snapshot of the academic literature but also suggest concrete implications for auditors, businesses, and policymakers, as well as stimulating new theoretical reflections on ethics, the oversight of the use of artificial intelligence, and professional training.

Despite the results obtained, the research has some limitations. First, the use of a single database (Scopus) may lead to the exclusion of some contributions not included in it. Second, the analysis focuses on a specific, yet relevant, time period with respect to the development of the research topics. Third, the terminology used in this work may also overlook some relevant studies on the topics of artificial intelligence and auditing. Finally, the selected articles are in English, and therefore, documents written in other languages were excluded. The SLR followed all standard procedures necessary to ensure the reliability and generalizability of the results and

allowed us to identify starting points, i.e., areas for improvement on which to focus future research. Given that several studies address the gap between technological innovation and regulation, without identifying potential changes to international standards, future studies could develop guidelines and standards that integrate the use of artificial intelligence in review procedures. Furthermore, empirical cases of human-machine interaction are lacking; future research could study real-world cases to identify best practices in which auditors and AI systems, seamlessly integrated, work together to provide guidance on which practices work best. Finally, further research could consider using different keywords and filters to obtain broader information. Books, book chapters, and conference papers and technical training seminars could also be included, thus not limiting the scope of the research.

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