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A BIBLIOMETRIC ANALYSIS OF RESEARCH TRENDS IN ADOPTING TECHNOLOGY IN AUDITING (1995-2025)

Abstract:

This study conducts a bibliometric analysis of research trends in technology adoption in auditing over the period from 1995 to 2025. Technological advancements have fundamentally transformed auditing practices, and this research aims to map the evolution, focus areas, and key contributors to the field. Using a dataset of 50 highly relevant articles from the Web of Science, the study explores publication trends, co-authorship networks, geographic collaboration patterns, keyword co-occurrence, and citation analysis. Findings reveal a marked increase in publications post-2010, with a surge observed around 2020. Key emerging topics include artificial intelligence, blockchain, and cloud computing, which have become central to the discourse on audit innovations. The analysis also highlights the dominant journals and institutions in the field, with significant contributions from RMIT University and Cairo University. By examining these trends, this research provides valuable insights into the evolving relationship between technology and auditing, suggesting future directions for both scholars and practitioners.

Keywords:

Technology Adoption in Auditing; Digital Transformation; Audit Innovation; Artificial Intelligence in Auditing; Blockchain in Auditing

JEL Classification: M42

1. Introduction

Technological advancements have significantly transformed the audit profession, challenging traditional practices and reshaping expectations. Once considered peripheral, information technology is now central to the auditing process, enhancing efficiency, accuracy, and scope (Indriyanto, 2023). Innovations such as big data analytics, artificial intelligence, cloud computing, and blockchain are increasingly embedded in audit workflows, fundamentally altering how auditors assess risk, verify transactions, and deliver assurance (Al-Omush et al., 2025).

Despite the apparent advantages, the implications of adopting these technologies in auditing remain a topic of ongoing debate. While many studies highlight the potential for improved audit quality and operational efficiency, others point to uncertainty around the roles and relevance of traditionally-trained auditors in an increasingly automated environment (Miller et al., 2025; Scalco & Palmer, 2022; Walker & Rowlinson, 2019). Moreover, as the pace of technological change accelerates, concerns persist regarding the audit profession's readiness to adapt, both practically and conceptually. These diverging perspectives reveal a critical research gap: the lack of a consolidated understanding of how academic literature has captured the progression of technological adoption in auditing over time, and which areas remain underexplored.

To address this gap, the purpose of this study is to provide a comprehensive overview of the scholarly discourse surrounding technology adoption in auditing. Specifically, it aims to examine the extent, focus, and evolution of research efforts in this area through a systematic bibliometric analysis. By evaluating a curated dataset of 50 English-language research articles published between 1995 and 2025, the study maps the intellectual, conceptual, and collaborative structures that underpin the field.

The study's objectives are twofold. First, from a macro-level perspective, it analyzes publication performance to identify key contributors- including authors, institutions, countries, and journals- that have shaped the research landscape. Second, from a micro-level perspective, it explores thematic trends and emerging topics in technology-driven audit innovations, with a particular focus on developments in cloud computing, artificial intelligence, and blockchain.

Through this dual lens, the study not only highlights the trajectory of technological integration in auditing but also offers insights into future research directions. Ultimately, it contributes to a deeper understanding of how the audit profession is evolving in response to digital transformation and aims to support scholars and practitioners in navigating this complex and dynamic environment.

2. Literature Review

While several recent studies (Abu Huson et al., 2024; Atanasovski & Tocev, 2022; Hakami et al., 2024; Lamboglia et al., 2021; Pizzi et al., 2021) have addressed related aspects of technology adoption in auditing, this research significantly advances the current discourse by uncovering critical gaps and proposing concrete avenues for future investigation. By systematically mapping the evolution of technology adoption in auditing, it deepens our understanding of the profession's adaptive processes in response to digital transformation. Moreover, it serves as a strategic guide for both scholars and practitioners, offering a comprehensive foundation for navigating the complexities and opportunities of an increasingly data-driven and technology-intensive audit environment.

Auditing, as an essential component of internal control, has evolved from informal, manual practices in the pre-industrial era into a structured system of procedures including compliance, investigation, and internal and external audits. Over more than two centuries, these procedures have been shaped by advancements in techniques and tools(Bandara et al., 2021; Franken et al., 2020). Traditionally, auditing involves examining accounts by sampling records, entries, and verifying cash-books (Carnegie, 1995). Risk assessments, similarly, rely heavily on sampling methods (Greenberg et al., 2014; Gyamera et al., 2023; Lichtenstein, 1996).

However, these practices often rest on outdated assumptions that fail to address the complexities of modern financial environments. The growing volume and variety of data, combined with increasingly sophisticated trading activities, expose the limitations of conventional methods, especially as outlined in the evolving Statements on Auditing Standards (SAS) (Gepp et al., 2018; Krahel & Titera, 2015). The continued reliance on traditional models-despite the availability of advanced technologies- has resulted in suboptimal audit practices. For instance, Oldhouser (2016) notes that current auditing effectiveness has already decreased by 20% compared to benchmarks from leading management consulting standards (MBB), and this gap is expected to widen without strategic technological integration (Brás et al., 2024).

Moreover, traditional audit procedures are not only costly and time-consuming but are also prone to issues like information asymmetry, opportunistic behavior, and inconsistent quality-often influenced by short-term revenue fluctuations within audit firms (Pierce & Sweeney, 2004). In this context, the need for legitimacy and assurance modeling-approaches often overlooked in mainstream research-is emphasized as a potential solution to elevate audit performance (He et al., 2024). Concepts like fractal structuring of audit practices, enhanced knowledge retrieval systems, and new metrics for evaluating technological adoption have been identified as promising strategies, though sustainability in competitive advantage remains uncertain at the current pace of innovation.

Technological innovation has also been closely linked to economic growth and post-colonial development across nations, affecting audit practices through the introduction of more efficient, automated techniques (Fathima, 2025). The digitalization of transactions, coupled with AI-driven systems and cloud environments, demands that auditors adapt quickly to a dynamic risk landscape (Anomah et al., 2024; Mogali, 2025). Not only are existing risks evolving, but new threats- especially related to cybersecurity and data integrity- continue to emerge at an accelerated pace.

The demand for real-time financial reporting and data transparency from stakeholders adds further pressure on the profession to modernize. However, while the benefits of adopting new technologies, such as improved audit speed and quality, are widely recognized, there remains a lag in widespread implementation. As Inigo and Albareda (2016) and Russ (2021) emphasized, a sustainable approach to adopting technological innovations must be grounded in sound scientific principles and proactive knowledge generation, not reactive adaptation.

The initial impact of new technologies often remains limited due to hesitancy in exploration and integration. Over time, as implementation becomes widespread and practical experience accumulates, technology shifts from being a disruptive force to a standard practice. Still, for these benefits to materialize fully, a clear understanding of the effects of emerging technologies on audit procedures is essential, alongside practical strategies for mitigating associated risks (Sewpersadh, 2025).

Modern audit environments operate within hyper-digital ecosystems (Ionescu et al., 2021). Today, businesses can execute transactions via handheld devices or desktop systems with real-time connectivity, often without active intervention from traditional accounting personnel. Despite

these advancements, the fundamental approach to audit execution continues to mirror past practices. Many audit functions are now carried out digitally or with minimal human oversight, yet governance and accountability mechanisms have not evolved at the same pace (Otia & Bracci, 2022; Tiron-Tudor & Deliu, 2022). These discrepancies highlight a pressing need for the audit profession to respond to technological change not just gradually, but decisively- by adopting new models, rethinking skill sets, and enhancing audit resilience in a data-driven economy.

3. Methodology

This study employed a bibliometric analysis to explore the scholarly landscape of adopting technology in auditing (Johri & Singh, 2024; Nadzari et al., 2024). The analysis was designed to systematically examine the evolution, distribution, and thematic trends within this research domain. To ensure a focused and relevant dataset, a multi-step filtration process was applied using the Web of Science (WoS) database.

3.1 Data Collection and Filtration

An initial dataset comprising 350 research papers was retrieved from the Web of Science Core Collection. The selection encompassed various disciplines to capture the interdisciplinary nature of the topic. However, to refine the dataset for relevance and quality, several inclusion criteria were applied:

- Topics: Only articles explicitly addressing *"adopting technology in auditing"* and *"auditing"* were included.
- Publication Years: The dataset was filtered to include articles published between 1995 and 2025.
- Document Types: Only records categorized as "Article" or "Proceeding Paper" were considered.
- Web of Science Categories: The focus was narrowed to the Business Finance, Management, and Business categories.
- Language: Only articles published in English were included.
- Countries/Regions: The analysis included papers affiliated with institutions in countries where English is commonly used in academic publishing, ensuring accessibility and consistency in the review process.
- Research Areas: The filter was further refined to focus on the Business Economics research area.

Following the application of these filters, the dataset was reduced to 50 highly relevant research articles published between 1995 and 2025, as shown in Figure 1. These articles form the core of the bibliometric analysis.

Figure 1 Main Information

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3.2 Analysis Techniques

The selected articles were subjected to a comprehensive bibliometric analysis using Bibliometrix (R package) (Dervis, 2019; Hakami et al., 2023; Volpe et al., 2023). Key indicators examined include:

- Publication trends over time
- Co-authorship networks and geographic collaboration patterns
- Keyword co-occurrence to identify thematic clusters
- Journal and institutional impact within the domain
- Citation analysis to determine influential works and authors

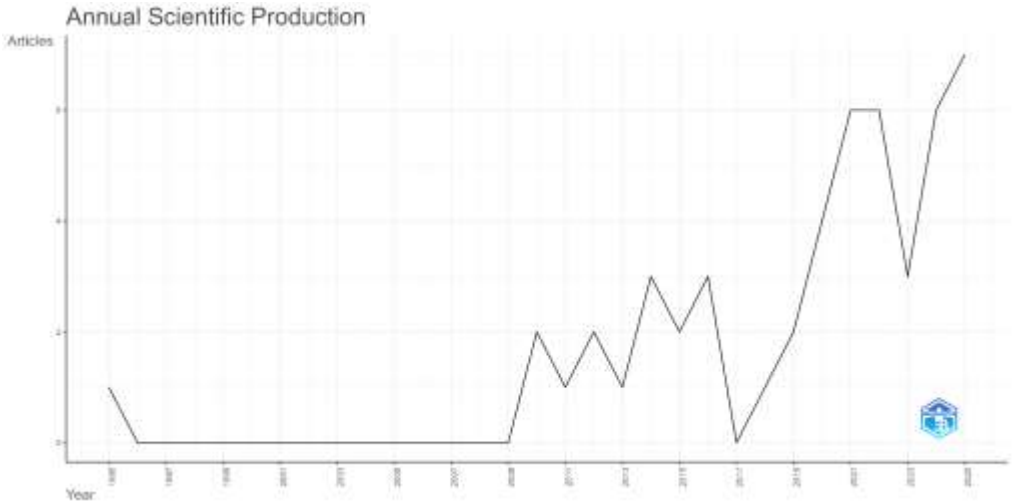
This methodological approach facilitated a structured exploration of the intellectual, social, and conceptual structure of research at the intersection of technology adoption and auditing (Lardo et al., 2022).

4. Results

4.1 Publication Trends over Time

Figure 2, Annual Scientific Production, illustrates the trend of published articles related to technology adoption in auditing between 1995 and 2025. The production remained low or nonexistent for an extended period until around 2010, after which there's a noticeable increase with fluctuations. A significant surge in publications is observed starting around 2020, peaking in 2022 before a sharp decline and a subsequent rebound towards 2025. This suggests a growing research interest in the intersection of technology and auditing in recent years.

Figure 2 Annual Scientific Production Trends in Technology Adoption in Auditing (1995-2025)



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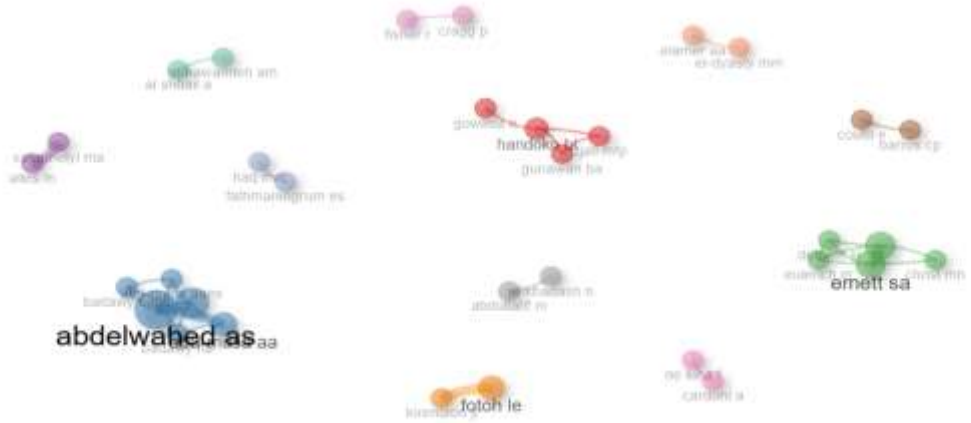
4.2 Co-authorship Networks & Geographic Collaboration

Figure 3, visually represents collaborations among researchers in the field. The network displays connections between authors, indicating co-authorship relationships. Clusters of interconnected authors suggest active collaboration groups, while the geographic information, likely represented by node colors or locations, illustrates international collaboration patterns.

Figure 3 Co-authorship and Geographic Collaboration Network



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4.3 Co-Occurance Netwrok

Figure 4, Co-occurrence Network, reveals "information-technology" and "technology" as central keywords, strongly linked to "management" and "systems." Emerging areas like "artificial-

intelligence" and "blockchain" form separate clusters. The network also highlights the importance of "user acceptance," "business," and "cost," alongside the influence of "big 4" firms. This visualizes the key themes and their connections in technology adoption in auditing research.

Figure 3 Co-occurrence Network

source: created by the author

4.4 Keyword co-occurrence to identify thematic clusters

Figure 4, Keyword Frequency Treemap, shows that "information-technology" (11 occurrences, 8%) and "technology" (8 occurrences, 6%) are the most frequent keywords. Following them are "management" (7, 5%), "big data" (7, 5%), and "user acceptance" (5, 4%). The size of the rectangles visually represents these percentages, highlighting the dominant topics in the research. Emerging areas like "artificial-intelligence" (4, 3%) and "blockchain" (2, 1%) also appear.

Figure 4 Treemap of Technology Adoption in Auditing Research

source: created by the author

4.5 Thematic Maps

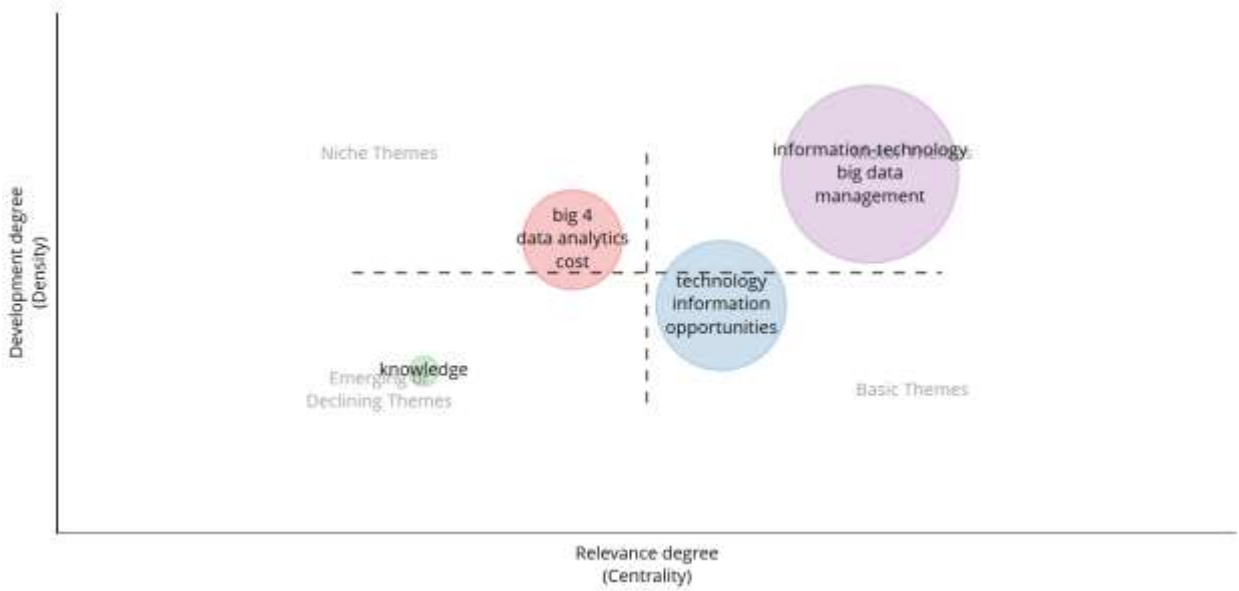
Figure 5, this thematic map visualizes research themes based on their relevance (centrality) and development degree (density). Different positions and sizes of the circles represent distinct thematic clusters and their prominence within the research landscape.

Several key themes emerge from Figure 5. A cluster in the top-right quadrant, indicating high relevance and development, centers around "information-technology," "big data," and "management," suggesting a core, established research area. In the bottom-right, a cluster with high relevance but lower development includes "technology" and "information opportunities," representing important but potentially less mature research.

Furthermore, a cluster with moderate relevance and development features "big 4," "data analytics," and "cost." Themes with lower relevance and development, potentially emerging or declining, are grouped around "knowledge," "risk," and "emerging" in the bottom-left. The absence of themes in the top-left suggests a lack of well-developed but less central research areas.

This thematic map provides a strategic overview of the research field's intellectual structure, revealing the major themes and their maturity based on their centrality and development.

Figure 5 Thematic Map of Technology Adoption in Auditing Research



source: created by the author

4.6 Journal and institutional impact within the domain

Table 1 presents the distribution of articles across various sources, illustrating the concentration of research on technology adoption in auditing. The MANAGERIAL AUDITING JOURNAL leads with the highest number of articles, totaling 7, followed by the INTERNATIONAL JOURNAL OF ACCOUNTING INFORMATION SYSTEMS with 6 articles. Other notable sources include the ACCOUNTING HORIZONS and the INTERNATIONAL JOURNAL OF ACCOUNTING AND INFORMATION MANAGEMENT, each contributing 2 articles. A range of journals and conference proceedings, including the 2024 15TH INTERNATIONAL CONFERENCE ON E-BUSINESS, MANAGEMENT AND ECONOMICS and ACCOUNTING AUDITING & ACCOUNTABILITY

JOURNAL, account for 1 article each. This table highlights the varied landscape of research publication in the field, with certain journals and conferences being more prominent in advancing knowledge on the integration of technology in auditing practices.

Table 1. Top Sources of Research on Technology Adoption in Auditing

	Sources	Articles
1	MANAGERIAL AUDITING JOURNAL	7
2	INTERNATIONAL JOURNAL OF ACCOUNTING INFORMATION SYSTEMS	6
3	ACCOUNTING HORIZONS	2
4	INTERNATIONAL JOURNAL OF ACCOUNTING AND INFORMATION MANAGEMENT	2
5	2024 15TH INTERNATIONAL CONFERENCE ON E-BUSINESS, MANAGEMENT AND ECONOMICS, ICEME 2024	1
6	ACCOUNTING AUDITING \& ACCOUNTABILITY JOURNAL	1
7	ACCOUNTING EDUCATION	1
8	ACCOUNTING PERSPECTIVES	1
9	ACCOUNTING RESEARCH JOURNAL	1
10	AFRICAN JOURNAL OF BUSINESS MANAGEMENT	1

4.7 Citation analysis to determine influential works and authors

Table2 presents the most relevant affiliations based on the number of articles published. RMIT University leads with 7 articles, closely followed by Cairo University and Karlstad University, each contributing 6 articles. Rutgers Business School is also a significant contributor with 5 articles. Several other affiliations, including Universitas Muhammadiyah Yogyakarta and Victoria University, have published 4 articles each. Arizona State University, Bina Nusantara University, Juraj Dobrila University of Pula, and Leuphana University of Lüneburg have each contributed 3 articles. This ranking highlights the institutions most actively involved in research related to the topic, indicating centers of expertise and scholarly output in this area.

Table 2: Top Affiliations by Number of Articles

	Affiliation	Articles
1	RMIT UNIV	7
2	CAIRO UNIV	6
3	KARLSTAD UNIV	6
4	RUTGERS BUSINESS SCH	5
5	UNIV MUHAMMADIYAH YOGYAKARTA	4
6	VICTORIA UNIV	4
7	ARIZONA STATE UNIV	3
8	BINA NUSANTARA UNIV	3
9	JURAJ DOBRILA UNIV PULA	3
10	LEUPHANA UNIV LUNEBURG	3

Conclusion:

This study offers a comprehensive bibliometric analysis of research trends in adopting technology in auditing from 1995 to 2025. It reveals a significant shift in the audit profession driven by the integration of advanced technologies such as artificial intelligence, blockchain, cloud computing, and big data analytics. These technologies are not only enhancing the quality and efficiency of audits but also reshaping the overall approach to risk assessment, fraud detection, and financial reporting. The results of this study underscore the growing importance of these technologies in modernizing audit practices, making them more data-driven, real-time, and capable of handling the complexities of contemporary business environments.

The analysis highlights a marked increase in research interest since 2010, with a notable surge in publications around 2020. This upward trend reflects the increasing recognition of the potential of digital tools to transform the auditing profession. Additionally, thematic clusters identified through keyword co-occurrence analysis emphasize the centrality of topics like artificial intelligence, blockchain, and cloud computing, indicating their growing significance in the field. These findings suggest that while some areas of technology adoption are well-established, others, such as the application of AI and blockchain in auditing, are still emerging and warrant further research.

The study also sheds light on the key contributors to the field, with institutions such as RMIT University and Cairo University emerging as prominent research hubs. The findings emphasize the need for continued collaboration across geographic and institutional boundaries to tackle the challenges posed by these technological advancements. Furthermore, the citation analysis reveals that certain authors have significantly shaped the discourse on technology adoption in auditing, highlighting the intellectual leadership in this area.

In conclusion, this research not only maps the evolution of technology adoption in auditing but also offers a roadmap for future research. As technological advancements continue to evolve, the audit profession must adapt by embracing these innovations while addressing the associated challenges. The findings of this study serve as a valuable guide for both academics and practitioners navigating the complexities of digital transformation in auditing.

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