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MAPPING THE SHIFT TO DIGITAL AUDITING: TRENDS AND INSIGHTS FROM A BIBLIOMETRIC ANALYSIS

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ABSTRACT

The advent of digital technologies has transformed the auditing landscape, enabling enhanced accuracy, efficiency, and transparency in audit processes. However, integrating digital tools within auditing practices remains uneven, with significant gaps in understanding emerging trends and their implications. This study explores the advancements in auditing through digital technologies using bibliometric analysis to map the evolution and current state of research in this domain. Leveraging Scopus Analyzer and VOSviewer software, we systematically analysed 668 publications, spanning a wide range of scholarly works. The analysis focused on identifying influential authors and collaborative networks, as well as mapping keyword co-occurrence and citation trends. Results reveal a steady growth in publications since 2015, highlighting the increasing scholarly interest in topics such as blockchain, artificial intelligence, and data analytics in auditing. Prominent clusters indicate a shift toward automation, fraud detection, and ethical considerations in digitally enabled audits. Despite these advancements, gaps persist in addressing the behavioural and organisational challenges associated with digital adoption in auditing. This study provides valuable insights into the trajectory of research in digital auditing, offering a comprehensive overview for academics and practitioners. By synthesising trends and identifying future research opportunities, our findings contribute to advancing the understanding of digital transformation in auditing and fostering its effective implementation in practice.

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***Keywords**: auditing; bibliometric analysis; digital audit; digital technologies.*

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1. INTRODUCTION

The rise of digital technologies has fundamentally transformed the field of auditing, presenting both opportunities and challenges for audit firms and public sector organisations. This digital shift has empowered auditors to expand their service offerings, enhance audit quality, and cultivate a culture of innovation within their practices. For example, the integration of big data analytics, Artificial Intelligence (AI), and blockchain technology enables auditors to process and analyse extensive datasets with greater efficiency, thereby improving the reliability and accuracy of audit reports (Manita et al., 2020; Vuković et al., 2023). Moreover, the emergence of new auditor profiles equipped with advanced technological competencies is reshaping the profession, making it more responsive to the demands of an increasingly dynamic digital landscape (Manita et al., 2020). This evolution enhances the relevance of audits and strengthens corporate governance by reducing managerial discretion and increasing transparency (Manita et al., 2020).

Despite its transformative potential, digitalisation in auditing introduces challenges that must be addressed to fully realise its benefits. A major concern is ensuring robust data protection and cybersecurity measures to safeguard audit processes against cyber threats, which are critical for maintaining the integrity and trustworthiness of digital audits (Lois et al., 2020). Additionally, the transition to digital auditing necessitates substantial investments in training and upskilling audit professionals to ensure they can utilise advanced digital tools and technologies (Lois et al., 2020; Noor et al., 2023). The underutilisation of such technologies in certain sectors, including the public sector in Malaysia, underscores the need for a more strategic approach to achieving digital readiness (Noor et al., 2023).

Although these challenges persist, the ongoing evolution of digital auditing practices holds great promise for improving audit quality and reliability. These advancements can foster greater trust among stakeholders by delivering more precise, transparent, and actionable audit outcomes (Vuković et al., 2023). To understand the progress and challenges associated with digital transformation in auditing, this study conducts a bibliometric analysis of highly cited articles from leading databases, examining key trends, technological innovations, and scholarly networks. This analysis aims to provide a comprehensive overview of the global landscape of digital auditing, focusing on publications, authors, institutions, keywords, and geographic contributions to the field.

2. LITERATURE REVIEW

The integration of digital technologies into auditing has undoubtedly transformed the field, introducing tools and methodologies that promise enhanced efficiency, accuracy, and decision-making capabilities. However, the implications of these advancements are not uniformly positive or straightforward. Robotic Process Automation (RPA), AI, and blockchain, hailed as transformative technologies, reveal a nuanced impact on auditing practices. Vitali and Giuliani (2024) assert that RPA and AI allow auditors to shift focus toward value-added activities. Nevertheless, this shift is accompanied by significant changes in organisational structures and hiring dynamics, which may introduce new challenges in workforce adaptation and training. Rahman et al. (2024) argue that coordinated AI adoption enhances efficiency and quality; however, this assumes an ideal alignment between firms and clients that may not always materialise due to varying levels of digital readiness.

Blockchain, as examined by Majeed and Taha (2024), offers considerable advantages in improving transparency and security, particularly in government audits. However, these benefits are contingent on the technical skills of auditors, a factor that remains a critical gap. Moreover, while RPA adoption is praised for its potential to streamline processes, its uptake among smaller firms remains limited, as highlighted by Wiklund and Fallan (2024). This disparity underscores a broader systemic issue: the accessibility and scalability of digital solutions. Smaller entities often face financial and technical constraints, which can exacerbate existing inequalities in the auditing industry rather than narrow them. These findings collectively highlight that while digital technologies hold transformative potential, their integration into auditing requires addressing significant contextual and operational challenges to achieve equitable and effective adoption.

The transformative potential of AI in auditing extends beyond efficiency, addressing complex challenges such as independence conflicts and fraud detection. Libby and Witz (2024) provide critical insights into AI's capacity to enhance perceived objectivity, mitigating liability risks related to auditor independence. However, the growing reliance on AI raises significant ethical concerns, including overdependence on algorithmic decision-making and the potential erosion of professional judgment. Similarly, Romero-Carazas et al. (2024) emphasise AI's pivotal role in forensic auditing, particularly in enabling early fraud detection and pre-emptive responses. Despite these benefits, effective deployment of AI in fraud detection hinges on the availability of robust implementation frameworks and high-quality datasets, resources that many organisations lack. In the domain of Environmental, Social, and Governance (ESG) assurance, Li et al. (2024) illustrate AI's potential to process complex datasets and enhance accountability. However, ESG assurance remains constrained by inconsistent data standards and regulatory disparities, limiting the efficacy of AI in this context without targeted efforts toward standardisation.

Generalised Audit Software (GAS) and Computer-Assisted Audit Tools (CAATTs) are becoming indispensable in modern auditing. Marei (2024) identifies technological, organisational, and environmental factors as key influences on GAS adoption, demonstrating its positive impact on financial performance. However, these advantages are not uniformly realised, as barriers such as resistance to change and resource limitations persist. Senan (2024) highlights the critical role of human capital expertise in CAATT adoption, linking it to improved auditor performance. Nevertheless, the reliance on skilled personnel underscores the risks of inadequate training and development. Al-Okaily et al. (2024) further emphasise the importance of compatibility and management support for CAATT integration, particularly in public sector audits. However, achieving this necessitates substantial investments in infrastructure and leadership.

Effective governance mechanisms are essential for successful digital transformation in auditing. Mulyana et al. (2024) identify risk management and executive support as critical IT governance enablers, while Ismail et al. (2024) emphasise that task knowledge, resource availability, and organisational readiness significantly influence readiness for digital auditing. Additionally, Liu and Xia (2024) highlight the importance of adaptive responses to industry technology complexity, which positively affects audit quality but requires continuous organisational evolution. The socio-behavioural and organisational implications of digital

transformation in auditing remain significant. Volodina and Grossi (2024) explore the tension between technological optimism and human apprehension in public sector auditing, emphasising the importance of balanced approaches that address risks and opportunities. Similarly, Romero-Carazas et al. (2024) stress the need for continuous adaptation to maintain forensic auditing quality amidst evolving technological advancements.

Despite these advancements, critical gaps persist in adopting and integrating digital auditing technologies. Wiklund and Fallan (2024) highlight the limited access to technology among smaller firms, while N. Li et al. (2024) identify the complexity of ESG assurance as a barrier to widespread adoption. Additionally, Sheldon (2024) raises concerns over the risks associated with blockchain implementation. Addressing these challenges requires future research that expands into underrepresented regions, examines behavioural impacts, and proposes targeted strategies to ensure equitable and effective adoption of digital auditing technologies.

3. RESEARCH QUESTION

The research question and the review's purpose, intended outcomes, and target audience guide the process of identifying, gathering, and presenting data (Booth et al., 2021). This paper seeks to address the following key questions:

- What are the prevailing research trends in digital auditing studies based on publication year?
- Which authors have contributed the highest number of articles to this field?
- Who are the top 10 authors ranked by research citations?
- What are the most frequently used keywords in digital auditing-related studies?
- What are the patterns of international collaboration among co-authoring countries?

4. METHODOLOGY

Bibliometrics involves gathering, organising, and analysing bibliographic information from scientific publications (Alves et al., 2021; Assyakur & Rosa, 2022; Verbeek et al., 2002). This process includes general descriptive statistics, such as publishing journals, publication years, primary author classifications (Wu & Wu, 2017), and more advanced techniques like document co-citation analysis. Conducting a successful literature review requires an iterative approach: identifying relevant keywords, conducting a thorough literature search, and performing detailed analysis to build a comprehensive bibliography and achieve reliable results (Fahimnia et al., 2015). This study focused on high-impact publications that provide valuable insights into the theoretical frameworks guiding the evolution of the research field. To ensure data reliability, the Scopus database was used for data collection (Al-Khoury et al., 2022; di Stefano et al., 2010; Khiste & Paithankar, 2017). Additionally, to maintain a high-quality standard, only articles from rigorously peer-reviewed academic journals were included, while books and lecture notes were deliberately excluded (Gu et al., 2019). Scopus, recognised for its extensive coverage, facilitated the collection of publications from 2015 through December 2024 for in-depth analysis.

4.1 Data search strategy

Advanced searching on the Scopus database enables users to perform highly targeted and precise searches, leveraging complex queries to filter and retrieve relevant academic literature. Unlike basic searches, which rely on simple keywords or phrases, advanced searching allows users to specify search fields, utilise Boolean operators, apply proximity operators, and create custom queries to focus on specific aspects of the literature. For example, in this study, an advanced search query was carefully crafted to locate documents containing the various keywords related to the digitalisation of auditing, which includes "digitalisation" OR "digital transformation" OR "automation" OR "data analytics" OR "artificial intelligence" OR "machine learning" OR "blockchain" OR "cloud computing" OR "big data" OR robotic process automation" OR "RPA" OR "cybersecurity" within the title, abstract, or keywords. The search parameters were further refined by setting a publication timeframe from 2015 to 2024, capturing 10 years to provide a comprehensive overview of recent developments in digital auditing literature. The search was restricted to English-language documents and included only those on business, management, and accounting, ensuring the data collected was accessible, high-quality, and complete. Tables 1 and 2 outline the keyword search strategy and the inclusion and exclusion criteria for achieving a focused dataset. This structured approach ensures that the resulting dataset is comprehensive and aligned with the study's objectives, offering valuable insights into the landscape of digital auditing trends.

Table 1: The search string

Scopus	TITLE-ABS-KEY (("digitalisation" OR "digitalisation" OR "digital transformation" OR "automation" OR "data analytics" OR "artificial intelligence" OR "machine learning" OR "blockchain" OR "cloud computing" OR "big data" OR "robotic process automation" OR "RPA" OR "cybersecurity") AND ("auditing" OR "audit process" OR "audit quality" OR "audit efficiency" OR "audit technology" OR "audit tools" OR "audit analytics")) AND PUBYEAR > 2014 AND PUBYEAR < 2025 AND (LIMIT-TO (SUBJAREA , "BUSI")) AND (LIMIT-TO (LANGUAGE , "English")) **Date of extraction: 15 November 2024**

Table 2: The selection criterion is searching

Criterion	Inclusion	Exclusion
Language	English	Non-English
Time line	2015 – 2024	< 2015
Subject area	Business, Management and Accounting	Other than Business, Management and Accounting

4.2 Data analysis

VOSviewer is a user-friendly bibliometric software developed by Nees Jan van Eck and Ludo Waltman at Leiden University, Netherlands (van Eck & Waltman, 2010, 2017). Widely utilised for visualising and analysing scientific literature, the tool

specialises in creating intuitive network visualisations, clustering related items, and generating density maps. Its versatility allows for examining co-authorship, co-citation, and keyword co-occurrence networks, providing researchers with a comprehensive understanding of research landscapes. The interactive interface and continuous updates ensure efficient and dynamic exploration of large datasets. VOSviewer's ability to compute metrics and customise visualisations and its compatibility with various bibliometric data sources make it valuable for scholars seeking insights into complex research domains.

One of the standout features of VOSviewer is its capacity to transform intricate bibliometric datasets into visually interpretable maps and charts. With a focus on network visualisation, the software excels in clustering related items, analysing keyword co-occurrence patterns, and generating density maps. Researchers benefit from its user-friendly interface, enabling novice and experienced users to explore research landscapes efficiently. VOSviewer's continuous development ensures it remains at the forefront of bibliometric analysis, offering valuable insights through metrics computation and customisable visualisations. Its adaptability to different types of bibliometric data, such as co-authorship and citation networks, positions VOSviewer as a versatile and indispensable tool for scholars seeking deeper understanding and meaningful insights within their research domains.

Datasets comprising information on the publication year, title, author name, journal, citation, and keywords in PlainText format were procured from the Scopus database, spanning the period from 2015 to December 2024. These datasets were then analysed using VOSviewer software version 1.6.19. Through VOS clustering and mapping techniques, this software facilitated the examination and generation of maps. Offering an alternative to the Multidimensional Scaling (MDS) approach, VOSViewer focuses on situating items within low-dimensional spaces, ensuring that the proximity between any two items accurately reflects their relatedness and similarity (van Eck & Waltman, 2010). In this respect, VOSViewer is similar to the MDS approach (Appio et al., 2014). Diverging from MDS, which primarily engages in the computation of similarity metrics like cosine and Jaccard indices, VOS utilises a more fitting method for normalising co-occurrence frequencies such as the Association Strength (AS_{ij}), and it is calculated as (Van Eck & Waltman, 2007):

$$AS_{ij} = \frac{C_{ij}}{w_i w_j},$$

which is "proportional to the ratio between, on the one hand, the observed number of co-occurrences of *i* and *j* and, on the other hand, the expected number of co-occurrences of *i* and *j* under the assumption that co-occurrences of *i* and *j* are statistically independent" (Van Eck & Waltman, 2007).

5. RESULTS AND DISCUSSIONS

5.1 What are the prevailing research trends in digital auditing studies based on publication year?

The trend of publications on digital technologies in auditing from 2015 to 2024 highlights a significant upward trajectory. Starting with modest numbers in 2015 and 2016, the field saw steady growth, with noticeable increases beginning around 2019. This upward trend aligns with global shifts towards digitalisation and the incorporation of advanced technologies in professional practices. By 2023, publications peaked sharply, reflecting heightened interest

and scholarly activity, likely driven by the transformative effects of COVID-19 on digital adoption in the auditing sector.

The surge in publications post-2020 suggests an accelerated focus on the implications, challenges, and innovations related to digital transformation in auditing. This period also coincides with a proliferation of government initiatives and private sector investments in automation and AI technologies. The slight plateau or stabilisation in 2024 indicates a potential shift towards more specialised or applied research. Overall, the data underscores the growing recognition of digital technologies as pivotal in reshaping auditing practices, driving efficiency, and enhancing audit quality.

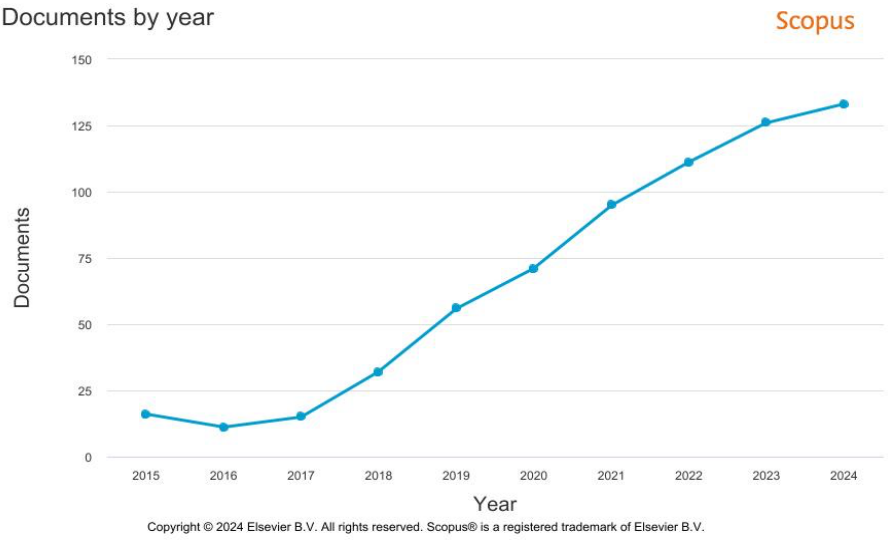

Figure 1: Plotting document publication by years

5.2 Which authors have contributed the highest number of articles to this field?

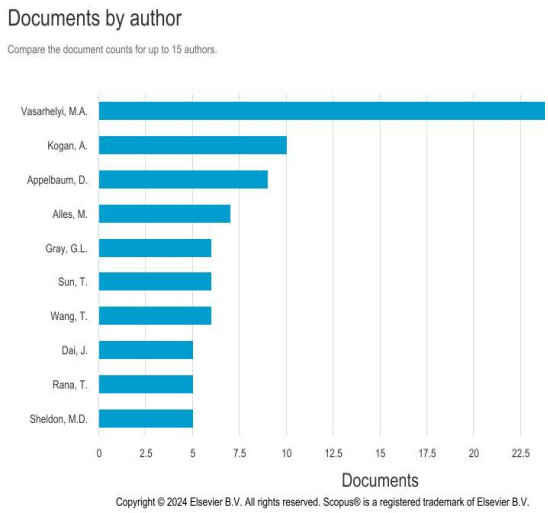

Figure 2: Publications number by author

Table 3: Percentage of publication by the top authors

Author	Number of publications	Percentage (%)
Vasarhelyi, M.A.	28	4.20%
Kogan, A.	10	1.50%
Appelbaum, D.	9	1.35%
Alles, M.	7	1.05%
Gray, G.L.	6	0.90%
Sun, T.	6	0.90%
Wang, T.	6	0.90%
Dai, J.	5	0.75%
Rana, T.	5	0.75%
Sheldon, M.D.	5	0.75%

The analysis of the number of publications by authors highlights key contributors driving research on digital technologies in auditing. Prominent authors like M.A. Vasarhelyi, A. Kogan, and D. Appelbaum have been at the forefront, publishing extensively in this domain. Their work likely explores the intersection of auditing and emerging technologies such as AI, blockchain, and data analytics, establishing foundational knowledge and innovative applications in the field. This leadership reflects individual expertise and sets the pace for the broader academic community.

The diversity of authors indicates a collaborative and interdisciplinary approach to addressing the challenges and opportunities brought by digital transformation in auditing. Researchers such as M. Alles and G.L. Gray bring varied perspectives, enriching the discourse with insights into audit quality, digital adoption, and regulatory frameworks. The presence of authors from different regions and institutions underscores the global nature of the digital auditing discourse, as technological advancements are reshaping practices worldwide.

Emerging contributors like T. Sun and T. Wang represent the next generation of thought leaders, signalling a sustained interest in this evolving field. Their inclusion in the list of active authors suggests ongoing innovation and exploration, particularly in niche areas such as fraud detection, automation, and real-time auditing systems. The collective efforts of these authors reveal a robust and expanding body of literature, offering invaluable resources for practitioners and policymakers aiming to harness digital technologies to enhance audit processes and outcomes.

5.3 Who are the top 10 authors ranked by research citations?

Table 4: Top 10 authors

Authors	Title	Year	Journal	Cited by
Dai & Vasarhelyi (2017)	Toward blockchain-based accounting and assurance	2017	Journal of Information Systems	472
Raji et al. (2020)	Closing the AI accountability gap: Defining an end-to-end framework for internal algorithmic auditing	2020	Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency	393
Vasarhelyi et al., (2015)	Big data in accounting: An overview	2015	Accounting Horizons	319
Kokina & Davenport (2017)	The emergence of artificial intelligence: How automation is changing auditing	2017	Journal of Emerging Technologies in Accounting	280
Brown-Liburd et al. (2015)	Behavioural implications of big data's impact on audit judgment and decision making and future research directions	2015	Accounting Horizons	243
Cao et al. (2015)	Big data analytics in financial statement audits	2015	Accounting Horizons	237
Appelbaum et al. (2017)	Big data and analytics in the modern audit engagement: Research needs	2017	Auditing	228

Choi et al. (2020)	Information disclosure structure in supply chains with rental service platforms in the blockchain technology era	2020	International Journal of Production Economics	226
Schmitz & Leoni (2019)	Accounting and Auditing at the Time of Blockchain Technology: A Research Agenda	2019	Australian Accounting Review	224
Manita et al. (2020)	The digital transformation of external audit and its impact on corporate governance	2020	Technological Forecasting and Social Change	211

The analysis of the top 10 most-cited authors provides critical insights into influential research shaping the integration of digital technologies in auditing. Notably, Dai and Vasarhelyi's (2017) work on blockchain-based accounting and assurance leads with 472 citations, underscoring the profound interest in blockchain's potential to revolutionise assurance practices. Similarly, Raji et al. (2020), with 393 citations, highlight the urgency of developing frameworks for AI accountability, reflecting the growing demand for responsible AI in auditing processes. These highly cited works indicate emerging technologies' relevance in addressing contemporary auditing challenges.

The significant influence of articles from earlier years, such as Vasarhelyi et al. (2015) on big data in accounting (319 citations) and Kokina and Davenport (2017) on AI-driven auditing (280 citations), reveals the foundational role these studies play in shaping ongoing research. These works have become cornerstones for discussions around digital transformation, guiding innovations in data-driven auditing methods and automation. The consistent citation counts across several works from 2015 to 2020 further illustrate how the field has developed progressively, with early contributions continuing to inform current advancements.

Interestingly, the diversity of topics, from big data analytics in financial audits (Cao et al., 2015) to the behavioural implications of big data (Brown-Liburd et al., 2015), demonstrates a holistic approach to exploring the digitalisation of auditing. Including corporate governance impacts (Manita et al., 2020) and blockchain technology in supply chains (Choi et al., 2020) underscores the interdisciplinary nature of these studies. Collectively, these highly cited authors and their works reflect the vibrancy of the research landscape and emphasise the transformative potential of digital technologies to enhance audit efficiency, decision-making, and transparency.

5.4 What are the most frequently used keywords in digital auditing-related studies?

The keyword analysis from the bibliometric study using VOSviewer reveals significant trends and focal areas in auditing research related to digital technologies. The keyword "auditing" leads with the highest occurrences (134) and total link strength (271), reflecting its centrality to the discourse. The keywords "blockchain" (116 occurrences, 197 link strength) and "artificial intelligence" (77 occurrences, 138 link strength) are closely followed, highlighting their prominence as transformative forces in the auditing domain. These results underscore the extensive exploration of how cutting-edge technologies reshape auditing practices and methodologies.

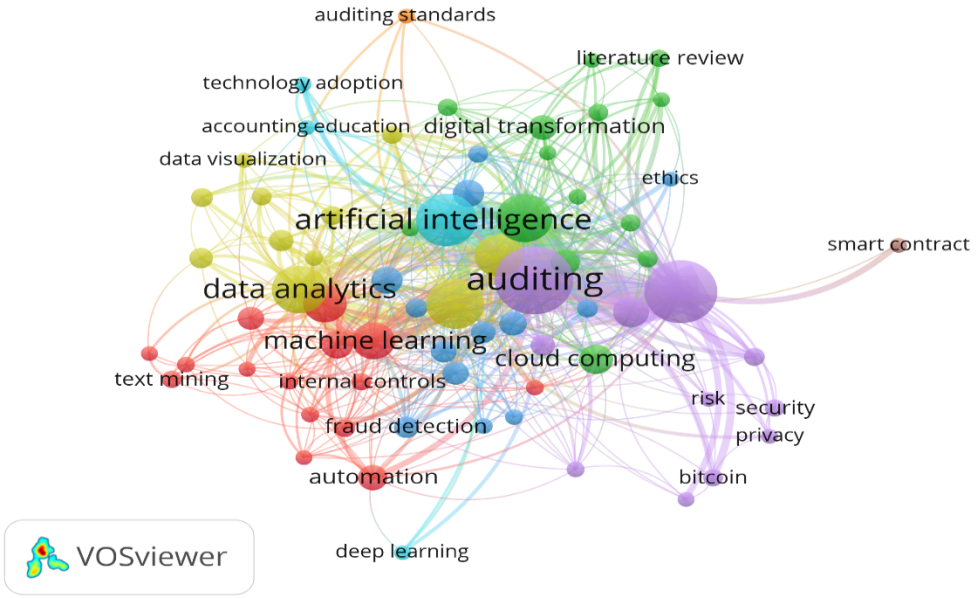

Figure 3: Network visualisation map of keyword's co-occurrence

Key themes emerging from the data also include "big data" (70 occurrences, 140 link strength) and "data analytics" (62 occurrences, 112 link strength), indicating the pervasive influence of data-driven approaches in modern auditing. The frequent association of these keywords with terms like "audit quality" (38 occurrences, 58 link strength) and "machine learning" (37 occurrences, 71 link strength) suggests a growing focus on leveraging data and AI to enhance audit efficiency, accuracy, and decision-making. This trend aligns with broader advancements in digital transformation and the increasing reliance on analytics to address complex auditing challenges.

Notably, keywords such as "continuous auditing" (20 occurrences, 39 link strength) and "digital transformation" (15 occurrences, 25 link strength) reflect the dynamic evolution of auditing processes driven by technological innovations like automation and blockchain. Emerging topics like "smart contracts" (25 occurrences, 58 link strength) and "cybersecurity" (14 occurrences, 21 link strength) highlight the expanding scope of auditing to address risks associated with digital ecosystems. Overall, the analysis illustrates a multifaceted research landscape where traditional auditing concepts are increasingly intertwined with advanced digital technologies, fostering innovation and redefining the field.

5.5 What are the patterns of international collaboration among co-authoring countries?

The analysis of co-authorship and country collaboration highlights the global distribution of research on advancing auditing with digital technologies. The United States leads significantly with 245 documents, 8,740 citations, and the highest total link strength (73), underscoring its dominance in producing and influencing scholarly contributions in this field. The United Kingdom and China also show robust research activity, with 44 and 55 documents, respectively, and high citation counts (1,403 for the UK and 1,181 for China). These countries act as major hubs for collaboration,

driving innovation and shaping the global discourse on digital transformation in auditing.

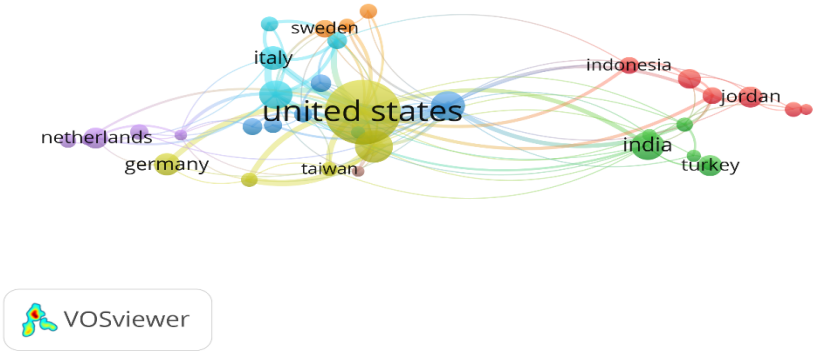

Figure 4: Authors' collaboration by countries

European countries such as Italy (27 documents, 1,093 citations, 21 link strength) and Germany (24 documents, 357 citations, eight link strength) demonstrate active participation, reflecting a strong interest in exploring advanced auditing technologies within the region. Smaller nations like Denmark and Norway, while producing fewer documents, show high citation impact relative to their output, indicating the quality and influence of their research. Countries from Asia, including India (40 documents, 312 citations, 15 link strength) and Malaysia (18 documents, 89 citations, seven link strength), reveal increasing contributions, signalling growing recognition of the importance of digital auditing in developing economies.

Emerging research centres in Saudi Arabia, Egypt, and Jordan show moderate collaboration and citation impact, suggesting a burgeoning interest in leveraging digital technologies for auditing practices. Notably, cross-country collaborations are reflected in total link strengths, with nations like the United States and the United Kingdom at the forefront. However, developing regions with lower total link strengths, such as Bahrain and Indonesia, indicate opportunities for expanding international collaboration. Overall, the data underscores the significance of a globally coordinated effort in advancing research and practical applications in digital auditing technologies.

6. CONCLUSION

The findings reveal a significant upward trend in publications focusing on digital technologies in auditing, particularly from 2019 onward. This growth corresponds to the increasing global adoption of digitalisation and technological advancements in auditing practices. A notable peak in scholarly activity occurred in 2023, likely driven by the broader adoption of automation and AI in response to economic and operational challenges introduced by the pandemic. While the data from 2024 suggests stabilisation, this may reflect a shift toward more specialised or practical applications of these technologies. Overall, the analysis highlights the expanding influence of digital tools and methods in transforming auditing into a more efficient and effective process. Additionally, the analysis identifies prominent contributors and widely cited works that form the foundation of this field. The body of literature illustrates a robust, collaborative effort, with contributions spanning topics such as blockchain technology, big data, and artificial intelligence. Early studies have laid the

groundwork for current and future innovations, emphasising the critical role of data analytics, fraud detection, and automation. The widespread citation of key works underscores their impact on academic research and professional auditing practices. This collective scholarly activity demonstrates the dynamic and interdisciplinary nature of the field, emphasising the strategic importance of digital transformation in advancing auditing processes.

The keyword analysis highlights significant themes and advancements in digital auditing. Core terms such as "auditing," "blockchain," and "artificial intelligence" dominate, indicating the field's focus on integrating transformative technologies. Keywords like "big data" and "data analytics" emphasise the increasing reliance on data-driven techniques, aligning with trends in automation and enhanced decision-making. The prominence of terms such as "continuous auditing" and "digital transformation" signals an evolution in auditing methodologies, while emerging topics like "smart contracts" and "cybersecurity" showcase the field's adaptation to address the complexities of modern digital ecosystems. This diverse keyword landscape reflects a dynamic and innovative research environment pushing the boundaries of traditional auditing practices. The global distribution of co-authorship reveals key contributors and collaborations shaping advancements in digital auditing. Leading countries, such as the United States, the United Kingdom, and China, demonstrate significant output and citation impact, underscoring their role in driving research and innovation. European nations, including Italy and Germany, alongside emerging Asian contributors like India and Malaysia, further enhance the diversity and breadth of research in this area. While well-established research hubs dominate, smaller nations and developing regions present greater collaboration and knowledge exchange opportunities. The collaboration patterns suggest a growing international effort to address shared challenges and explore the transformative potential of digital technologies in auditing.

REFERENCES

Al-Khoury, A., Hussein, S. A., Abdulwhab, M., Aljuboori, Z. M., Haddad, H., Ali, M. A., Abed, I. A., & Flayyih, H. H. (2022). Intellectual Capital History and Trends: A Bibliometric Analysis Using Scopus Database. *Sustainability (Switzerland)*, *14*(18). https://doi.org/10.3390/su141811615

Al-Okaily, M., Alqudah, H. M., Al-Qudah, A. A., & Alkhwaldi, A. F. (2024). Examining the critical factors of computer-assisted audit tools and techniques adoption in the post-COVID-19 period: internal auditors perspective. *VINE Journal of Information and Knowledge Management Systems*, *54*(5), 1062–1091. https://doi.org/10.1108/VJIKMS-12-2021-0311

Alves, J. L., Borges, I. B., & De Nadae, J. (2021). Sustainability in complex projects of civil construction: Bibliometric and bibliographic review. *Gestao e Producao*, *28*(4). https://doi.org/10.1590/1806-9649-2020v28e5389

Appelbaum, D., Kogan, A., & Vasarhelyi, M. A. (2017). Big data and analytics in the modern audit engagement: Research needs. *Auditing*, *36*(4), 1–27. https://doi.org/10.2308/ajpt-51684

Appio, F. P., Cesaroni, F., & Di Minin, A. (2014). Visualising the structure and bridges of the intellectual property management and strategy literature: a document co-citation analysis. *Scientometrics*, *101*(1), 623–661. https://doi.org/10.1007/s11192-014-1329-0

Assyakur, D. S., & Rosa, E. M. (2022). Spiritual Leadership in Healthcare: A Bibliometric Analysis. *Jurnal Aisyah : Jurnal Ilmu Kesehatan*, *7*(2). https://doi.org/10.30604/jika.v7i2.914

Booth, A., Martyn-St James, M., Clowes, M., & Sutton, A. (2021). *Systematic Approaches to A Successful Literature Review*. SAGE Publications.

Brown-Liburd, H., Issa, H., & Lombardi, D. (2015). Behavioral implications of big data's impact on audit judgment and decision making and future research directions. *Accounting Horizons*, *29*(2), 451–468. https://doi.org/10.2308/acch-51023

Cao, M., Chychyla, R., & Stewart, T. (2015). Big data analytics in financial statement audits. *Accounting Horizons*, *29*(2), 423–429. https://doi.org/10.2308/acch-51068

Choi, T.-M., Feng, L., & Li, R. (2020). Information disclosure structure in supply chains with rental service platforms in the blockchain technology era. *International Journal of Production Economics*, *221*. https://doi.org/10.1016/j.ijpe.2019.08.008

Dai, J., & Vasarhelyi, M. A. (2017). Toward blockchain-based accounting and assurance. *Journal of Information Systems*, *31*(3), 5–21. https://doi.org/10.2308/isys-51804

di Stefano, G., Peteraf, M., & Veronay, G. (2010). Dynamic capabilities deconstructed: A bibliographic investigation into the origins, development, and future directions of the research domain. *Industrial and Corporate Change*, *19*(4), 1187–1204. https://doi.org/10.1093/icc/dtq027

Fahimnia, B., Sarkis, J., & Davarzani, H. (2015). Green supply chain management: A review and bibliometric analysis. In *International Journal of Production Economics* (Vol. 162, pp. 101–114). https://doi.org/10.1016/j.ijpe.2015.01.003

Gu, D., Li, T., Wang, X., Yang, X., & Yu, Z. (2019). Visualising the intellectual structure and evolution of electronic health and telemedicine research. *International Journal of Medical Informatics*, *130*. https://doi.org/10.1016/j.ijmedinf.2019.08.007

Ismail, S., Mokhtar, N., & Ahmad, H. (2024). Factors influencing readiness to implement digital audit among internal auditors of the Malaysian public sector. *Accounting Research Journal*, *37*(5), 540–556. https://doi.org/10.1108/ARJ-01-2024-0033

Khiste, G. P., & Paithankar, R. R. (2017). Analysis of Bibliometric term in Scopus. *International Research Journal*, *01*(32), 78–83.

Kokina, J., & Davenport, T. H. (2017). The emergence of artificial intelligence: How automation is changing auditing. *Journal of Emerging Technologies in Accounting*, *14*(1), 115–122. https://doi.org/10.2308/jeta-51730

Li, N., Kim, M., Dai, J., & Vasarhelyi, M. A. (2024). Using Artificial Intelligence in ESG Assurance. *Journal of Emerging Technologies in Accounting*, *21*(2), 83–99. https://doi.org/10.2308/JETA-2022-054

Libby, R., & Witz, P. D. (2024). Can artificial intelligence reduce the effect of independence conflicts on audit firm liability? *Contemporary Accounting Research*, *41*(2), 1346–1375. https://doi.org/10.1111/1911-3846.12941

Liu, J., & Xia, Q. (2024). The impact of industry technology complexity on audit quality. *Technology in Society*, *79*. https://doi.org/10.1016/j.techsoc.2024.102737

Lois, P., Drogalas, G., Karagiorgos, A., & Tsikalakis, K. (2020). Internal audits in the digital era: opportunities risks and challenges. *Euromed Journal of Business*, *15*, 205–217. https://doi.org/10.1108/emjb-07-2019-0097

Majeed, R. H., & Taha, A. A. D. (2024). A survey study of Iraqi auditors' adoption of blockchain technology. *Asian Review of Accounting*, *32*(3), 521–546. https://doi.org/10.1108/ARA-01-2023-0015

Manita, R., Elommal, N., Baudier, P., & Hikkerova, L. (2020). The digital transformation of external audit and its impact on corporate governance. *Technological Forecasting and Social Change*, *150*, 119751. https://doi.org/10.1016/j.techfore.2019.119751

Marei, A. (2024). The moderation of trust on the relationship between TOE factors and generalised audit software usage and financial performance. *Uncertain Supply Chain Management*, *12*(3), 1703–1712. https://doi.org/10.5267/j.uscm.2024.3.011

Mulyana, R., Rusu, L., & Perjons, E. (2024). Key ambidextrous IT governance mechanisms for successful digital transformation: A case study of Bank Rakyat Indonesia (BRI). *Digital Business*, *4*(2). https://doi.org/10.1016/j.digbus.2024.100083

Noor, W. N. B. W. M., Razak, S. N. A. A., Jusoh, Y. H. M., & Hasan, S. J. (2023). Navigating the Digital Landscape: Unraveling Technological, Organisational, and Environmental Factors Affecting Digital Auditing Readiness in the Malaysian Public Sector. *Journal of Emerging Technologies in Accounting*. https://doi.org/10.2308/jeta-2022-072

Rahman, M. J., Zhu, H., & Yue, L. (2024). Does the adoption of artificial intelligence by audit firms and their clients affect audit quality and efficiency? Evidence from China. *Managerial Auditing Journal*, *39*(6), 668–699. https://doi.org/10.1108/MAJ-03-2023-3846

Raji, I. D., Smart, A., White, R. N., Mitchell, M., Gebru, T., Hutchinson, B., Smith-Loud, J., Theron, D., & Barnes, P. (2020). Closing the AI accountability gap: Defining an end-to-end framework for internal algorithmic auditing. *FAT* 2020 - Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency*, 33–44. https://doi.org/10.1145/3351095.3372873

Romero-Carazas, R., Espíritu-Martínez, A. P., Aguilar-Cuevas, M. M., Usuriaga-Palacios, M. N., Aguilar-Cuevas, L. A., Espinoza-Véliz, M. Z., Espinoza-Egoavil, M. J., & Gutiérrez-Monzón, S. G. (2024). Forensic auditing and the use of artificial intelligence: A bibliometric analysis and systematic review in Scopus between 2000 and 2024. *Heritage and Sustainable Development*, *6*(2), 415–428. https://doi.org/10.37868/hsd.v6i2.626

Schmitz, J., & Leoni, G. (2019). Accounting and Auditing at the Time of Blockchain Technology: A Research Agenda. *Australian Accounting Review*, *29*(2), 331–342. https://doi.org/10.1111/auar.12286

Senan, N. A. M. (2024). Influential factors shaping the adoption and utilisation of audit technology (CAATS) in the audit practices in Saudi Arabia: Human capital expertise as a moderating factor. *Uncertain Supply Chain Management*, *12*(4), 2607–2618. https://doi.org/10.5267/j.uscm.2024.5.009

Sheldon, M. D. (2024). Preparing Auditors to Evaluate Blockchains Used to Track Tangible Assets. *Current Issues in Auditing*, *18*(2), P29–P50. https://doi.org/10.2308/CIIA-2023-014

van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, *84*(2), 523–538. https://doi.org/10.1007/s11192-009-0146-3

van Eck, N. J., & Waltman, L. (2017). Citation-based clustering of publications using CitNetExplorer and VOSviewer. *Scientometrics*, *111*(2), 1053–1070. https://doi.org/10.1007/s11192-017-2300-7

Van Eck, N. J., & Waltman, L. (2007). Bibliometric mapping of the computational intelligence field. *International Journal of Uncertainty, Fuzziness and Knowldege-Based Systems*, *15*(5), 625–645. https://doi.org/10.1142/S0218488507004911

Vasarhelyi, M. A., Kogan, A., & Tuttle, B. M. (2015). Big data in accounting: An overview. *Accounting Horizons*, *29*(2), 381–396. https://doi.org/10.2308/acch-51071

Verbeek, A., Debackere, K., Luwel, M., & Zimmermann, E. (2002). Measuring progress and evolution in science and technology - I: The multiple uses of bibliometric indicators. *International Journal of Management Reviews*, *4*(2), 179–211. https://doi.org/10.1111/1468-2370.00083

Vitali, S., & Giuliani, M. (2024). Emerging digital technologies and auditing firms: Opportunities and challenges. *International Journal of Accounting Information Systems*, *53*. https://doi.org/10.1016/j.accinf.2024.100676

Volodina, T., & Grossi, G. (2024). Digital transformation in public sector auditing: between hope and fear. *Public Management Review*. https://doi.org/10.1080/14719037.2024.2402346

Vuković, B., Tica, T., & Jakšić, D. (2023). Challenges of using digital technologies in audit. *Anali Ekonomskog Fakulteta u Subotici*. https://doi.org/10.5937/aneksub2300014v

Wiklund, T. E., & Fallan, E. (2024). Adoption of RPA Technology in Micro and Small Audit Entities. *Journal of Emerging Technologies in Accounting*, *21*(2), 101–121. https://doi.org/10.2308/JETA-2023-036

Wu, Y. C. J., & Wu, T. (2017). A decade of entrepreneurship education in the Asia Pacific for future directions in theory and practice. In *Management Decision* (Vol. 55, Issue 7, pp. 1333–1350). https://doi.org/10.1108/MD-05-2017-0518