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Digital transformation in accounting: Emerging technologies, ethics, and regulation

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ABSTRACT

Over the past two decades, numerous studies have explored the intersection of technology and accounting. However, research that specifically examines digital transformation in accounting particularly concerning emerging technologies, ethical risks, and regulatory challenges remains fragmented. Therefore, the purpose of this study is to conduct a bibliometric analysis of scholarly works addressing digital transformation in accounting. This study adopts a systematic literature review approach, analyzing articles containing the terms "digital transformation," "accounting," and related keywords in the "Article Title, Abstract, and Keywords" fields of the Scopus database from 2006 to 2025. The final dataset was compiled and analyzed using VOSviewer software to identify key research trends, co-authorship networks, and thematic clusters. The findings show that research on digital transformation in accounting has grown significantly since 2020, with increased attention to technologies such as artificial intelligence (AI), blockchain, and cloud computing. However, ethical and regulatory dimensions remain underexplored, indicating a research gap. In addition, contributions are concentrated in developed countries, with limited studies from emerging economies, suggesting a need for more globally inclusive research. The study offers insights for practitioners, regulators, and educators to better align digital adoption with ethical principles and regulatory frameworks in accounting. The findings contribute to fostering trust, transparency, and accountability in the digital transformation of accounting, which is essential for both professional integrity and public confidence.

Introduction

The rapid advancement of digital technologies has significantly transformed various sectors, including accounting. This transformation is marked by the integration of cutting-edge technologies such as artificial intelligence (AI), blockchain, the Internet of Things (IoT), cloud computing, and automation into financial reporting processes (Chun et al., 2019; Groşanu et al., 2021; Han et al., 2021; Kumar, 2024). AI, in particular, plays a crucial role in risk analysis by leveraging machine learning to detect anomalies in transactions in real time (Schmitz & Leoni, 2019; Shiyyab et al., 2023). Meanwhile, the adoption of blockchain-based smart contracts enhances efficiency and minimizes manual errors in financial transactions (Cong et al., 2017). Cloud computing is equally pivotal, facilitating faster data processing and enabling seamless collaboration across jurisdictions (Marston et al., 2011). For instance, major accounting firms such as KPMG have implemented cloud-based audit platforms to optimize their operations (KPMG, 2022). The advantages of cloud technology, particularly in terms of efficiency and scalability, are further highlighted in the literature review by Taleb and Mohamed (2020), which emphasizes its strategic importance in supporting digital transformation in the accounting profession.

This transformation is driven by the integration of advanced technologies such as artificial intelligence (AI), blockchain, the Internet of Things (IoT), cloud computing, and automation into financial reporting and assurance practices (Chun et al., 2019; Groşanu et al., 2021; Han et al., 2021; Kumar, 2024). AI, in particular, plays a pivotal role in risk analysis, using machine learning algorithms to detect anomalies in transactions in real time (Schmitz and Leoni, 2019; Shiyyab et al., 2023). Likewise, blockchain technology has gained prominence for its capacity to create immutable, transparent, and verifiable records that strengthen the reliability of financial reporting (Dai & Vasarhelyi, 2017). The innovation has even enabled the emergence of three-entry accounting systems, where transactions are automatically recorded on secure distributed ledgers (Schmitz & Leoni, 2019).

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In parallel, cloud computing facilitates cross-border collaboration, enhances real-time access to financial data, and supports virtual audit processes by allowing auditors to securely access client documents from any location (Sultan, 2010; Yoon et al., 2015). The adoption of blockchain-based smart contracts further improves transactional efficiency while reducing human error (Cong et al., 2017). Major accounting firms, such as KPMG, have already implemented cloud-based audit platforms to streamline operations and enhance scalability (KPMG, 2022). The strategic value of cloud computing in promoting efficiency, flexibility, and scalability is further underscored by Taleb & Mohamed (2020), who highlight its critical role in supporting the broader digital transformation of the accounting profession.

However, the rapid adoption of digital technologies in accounting practices necessitates critical attention to the accompanying ethical implications and professional responsibilities (Groşanu et al., 2021). While technologies such as artificial intelligence (AI) and blockchain offer the potential for increased efficiency and accuracy, they also introduce new risks, including algorithmic bias, a lack of transparency in automated decision-making, and threats to client privacy and data security (Burr & Cristianini, 2019; Groşanu et al., 2024; Kokina & Davenport, 2017). From an infrastructure perspective, cloud-based accounting systems are particularly vulnerable to cyberattacks (Abrahams et al., 2023). A report by IBM Security (2023) noted that the average cost of a data breach in the United States reached a record high of USD 4.45 million in 2023, representing a 2.3% increase from the previous year. In this evolving digital landscape, professional accountants must be equipped to navigate both ethical and technical complexities to uphold the integrity and trustworthiness of financial reporting (Appelbaum et al., 2017; Richins et al., 2017). Accordingly, it is essential to explore how these ethical challenges manifest in practice and to what extent existing regulatory frameworks are capable of addressing them.

Literature Review

Digital transformation in accounting is increasingly becoming a relevant topic, particularly due to the existing gap in the literature regarding a comprehensive understanding of the regulatory challenges it poses (Morshed & Khrais, 2025). Existing regulatory frameworks often struggle to keep pace with the rapid development of digital technologies, resulting in legal gray areas and uncertainties in financial reporting (Alles, 2015; Moll & Yigitbasioglu, 2019). The wider the adoption of digital technologies in accounting, the greater the need to ensure ethical integrity and regulatory compliance (Gonçalves et al., 2022).

Although the literature on digital transformation in accounting has expanded considerably in recent years, it remains fragmented and conceptually unbalanced, with regulatory discourse struggling to keep pace with technological innovation. As a result, legal ambiguities and ethical blind spots continue to emerge within digital accounting practices (Morshed & Khrais, 2025). Existing regulatory frameworks often lack the agility to adapt to the accelerating evolution of digital technologies, creating gray areas and uncertainties in financial reporting and assurance processes (Alles, 2015; Moll & Yigitbasioglu, 2019). The broader the adoption of digital technologies in accounting, the greater the urgency to uphold ethical integrity, transparency, and regulatory compliance (Gonçalves et al., 2022). Yet, much of the existing research has focused narrowly on technological advancement while failing to systematically integrate ethical and regulatory dimensions, which are essential for achieving a holistic and sustainable understanding of digital transformation in accounting.

To bridge this gap, the present study introduces a novel, multidimensional bibliometric analysis that integrates three interrelated dimensions of digital transformation in accounting emerging technologies, ethical implications, and regulatory challenges within a single analytical framework. In contrast to prior bibliometric studies that examined these aspects in isolation, this research systematically maps how they intersect and co-evolve within global academic discourse. By analyzing international publications indexed in Scopus, the study identifies key publication patterns, research clusters, influential authors, and emerging thematic trends, thereby revealing the intellectual structure and research trajectory of digital transformation in the accounting domain. While a limited number of previous studies have explored specific facets of digital innovation in accounting, none have comprehensively synthesized the technological, ethical, and regulatory dimensions within one cohesive framework representing the principal contribution and novelty of this research.

Previous studies indicate that research on digital transformation in accounting remains fragmented, particularly in its limited integration of technological, ethical, and regulatory dimensions. To date, no comprehensive investigation has simultaneously examined these three interrelated aspects within a unified analytical framework. Addressing this gap, the present study conducts a holistic bibliometric analysis of digital transformation in accounting to uncover global research trends and identify areas requiring deeper theoretical and practical engagement. The findings are expected to provide valuable insights for both academics and practitioners, supporting the development of adaptive, transparent, and ethically responsible accounting practices.

This integrated approach contributes new theoretical understanding of how accounting scholarship conceptualizes digital transformation not only as a driver of innovation and efficiency but also as a governance and ethical challenge. The principal theoretical contribution of this study lies in constructing a comprehensive research

map that highlights where ethical and regulatory perspectives remain underrepresented in the current literature, thereby offering a foundation for more balanced and interdisciplinary future research.

This study analyzes scientific publications using bibliometric methods, focusing on the theme of digital transformation in accounting. The data collection process involved the use of selected keywords, research locations, applied methodologies, and a special emphasis on emerging technologies. The findings are expected to contribute to a deeper understanding of the evolution of accounting in the digital era and identify global research trends across countries. Its practical contribution lies in providing an evidence-based reference for policymakers, educators, and practitioners to formulate an adaptive, transparent, and ethically grounded accounting framework in the digital era.

To support the development of future research on digital transformation in accounting, it is important to understand the direction of prior studies and to identify remaining gaps, particularly those concerning the integration of emerging technologies, ethical risks, and regulatory challenges. Therefore, the research questions of this study are formulated as follows.

RQ1: Is research related to digital transformation in accounting still relevant to be researched in the future?
RQ2: What is the current distribution of research related to Digital Transformation in Accounting: Analysis of Emerging Technologies, Ethical Risks, and Regulatory Challenges?
RQ3: What are the theoretical and practical implications from the perspective of future research?

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Bibliometric analysis is applied to metadata obtained from the Scopus database to provide a comprehensive overview of the development of digital transformation in accounting, with a focus on emerging technologies, ethical concerns, and regulatory issues. This method enables the visualization of research trends, identification of literature gaps, and exploration of new research opportunities relevant to the advancement of accounting science. Through the mapping of scientific publications, this study aims to uncover key patterns in academic discourse that reflect the evolution and future direction of modern accounting. Specifically, this study seeks to identify publication trends, major sources of publication, the most prolific authors, frequently used keywords, and central research topics. The findings are expected to serve as a strategic reference for both academics and practitioners in formulating adaptive approaches to technological, ethical, and regulatory challenges in digital accounting practices.

Research Method

This study adopts a systematic literature review using a bibliometric approach, which is a statistical method used to analyze metadata from previous studies (Donthu et al., 2021). Bibliometric analysis, when conducted both quantitatively and qualitatively in a transparent manner, enhances the dissemination and reliability of knowledge across academic fields (Pritchard, 1969). It enables researchers to map the network of researchers, identify trends in topics, and analyze citation patterns, author collaborations, and keyword occurrences (Donthu et al., 2021; Zupic & Čater, 2015).

In this study, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework is applied to enhance the transparency and reduce potential bias in the review process. PRISMA provides a set of evidence-based guidelines to ensure the clarity and completeness of systematic reviews (Agustí & Orta-Pérez, 2023; Moher et al., 2016). The reason for using Scopus is due to its comprehensive indexing of scientific literature from reputable publishers, ensuring the quality and credibility of included sources. Scopus is widely used by researchers for conducting literature reviews, tracking citation metrics, identifying emerging trends, and analyzing scholarly networks across various disciplines.

The data used in this research were extracted from the Scopus database, which is recognized for its extensive and high-quality peer-reviewed scientific publications. The search was conducted using the following keywords: "accounting" AND "digital transformation" OR "technologies" AND "ethic" OR "regulation" in the article title field. The search was limited to the period from 2006 to 2025, resulting in a total of 171 documents in RIS format, which serves as the population of this study.

Only documents categorized as journal articles and indexed in Scopus were included. Excluded documents consist of book chapters, conference papers, reviews, editorials, and other non-article publications. The selection

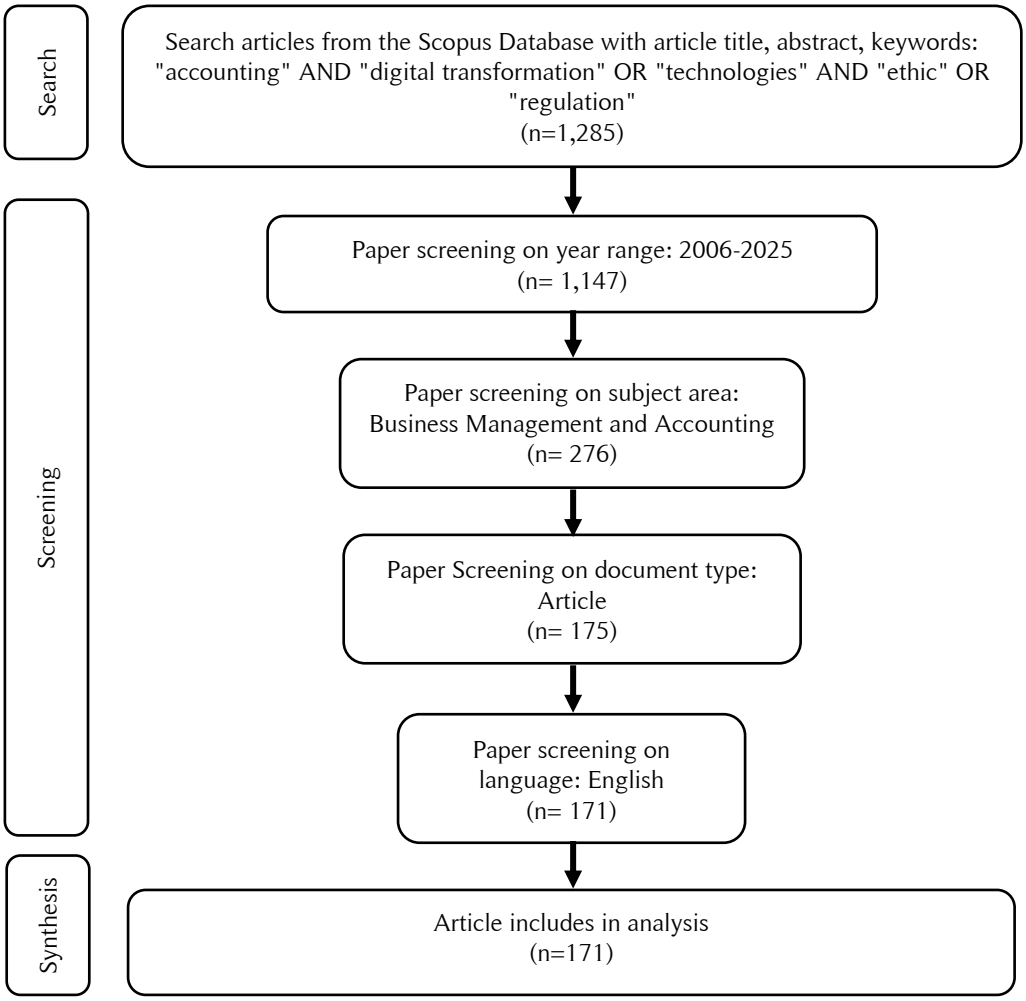
was guided by relevance to the research topic and document quality as indexed by Scopus. This rigorous selection ensures that the bibliometric data analyzed represent high-impact and scientifically valid publications.

Based on the search results from the Scopus database using the article title, abstract, and keywords: *"accounting" AND "digital transformation" OR "technologies" AND "ethic" OR "regulation"*, a total of 1,285 documents were initially identified (see Figure 1). The screening process was carried out in several stages to ensure the relevance and quality of the selected publications. First, papers were filtered based on the publication year range 2006–2025, resulting in 1,147 documents. Next, screening by subject area narrowed the focus to Business, Management, and Accounting, yielding 276 documents. Further filtering by document type included only journal articles, which reduced the number to 175 documents. Finally, screening based on language selected only English-language articles, resulting in 171 documents included in the final analysis.

The final set of 171 journal articles is analyzed using a bibliometric approach to examine titles, keywords, and abstracts. This method helps identify co-authorship networks, keyword co-occurrence, and thematic clusters related to digital transformation in accounting. The analysis is conducted using VOSviewer software, which supports the visualization of research trends and the intersection of technology, ethics, and regulation within the academic discourse.

Result and Discussion

This section presents the analysis results of 171 journal articles from the Scopus database related to digital transformation in accounting to answer the proposed research questions. The distribution of articles is examined based on annual publication trends, the number of articles published, and the journal sources. Influential aspects of digital transformation in accounting are also highlighted, including the most productive research themes, authors, affiliated institutions, and contributing countries.



Source: Author's elaboration based on Scopus database

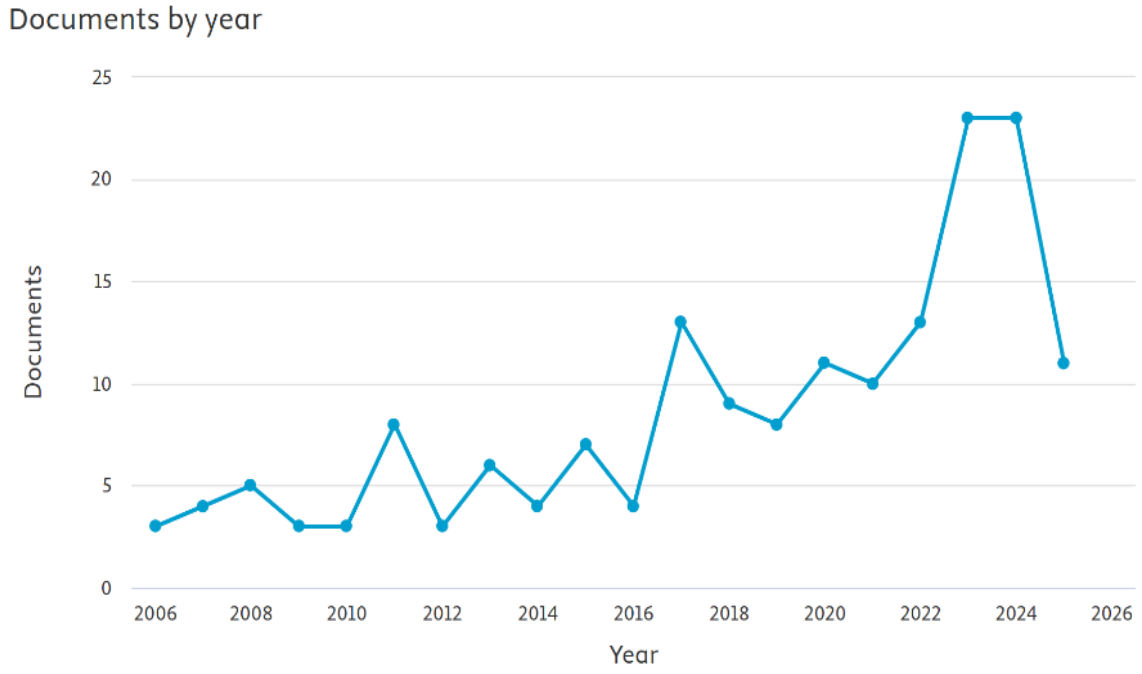
Figure 1. PRISMA flow diagram

RQ1. Is research related to digital transformation in accounting still relevant to be researched in the future?

The rapid advancement of digital technologies has significantly transformed accounting, driven by the adoption of artificial intelligence (AI), blockchain, the Internet of Things (IoT), cloud computing, and automation in financial reporting processes (Chun et al., 2019; Groşanu et al., 2021; Han et al., 2021; Kumar, 2024; Marston et al., 2011). AI, in particular, supports real-time risk analysis through machine learning, while blockchain enhances transparency and trust in financial transactions (Schmitz & Leoni, 2019; Shiyyab et al., 2023). These developments have positioned digital transformation as a critical topic in accounting research.

As shown in Figure 2, publications on digital transformation in accounting have steadily increased over the past two decades, with a sharp rise between 2022 and 2024. This growth reflects a rising scholarly interest in how digital technologies reshape accounting practices. However, bibliometric findings indicate that most studies still emphasize technological innovation, while ethical concerns and regulatory responses remain underexplored (Morshed & Khrais, 2025). This gap underscores the need for future research that integrates these dimensions to address emerging risks such as algorithmic bias, data security, and compliance uncertainty.

Therefore, digital transformation in accounting remains not only timely but essential for academic and professional advancement. Continued investigation is needed to support the development of responsible, adaptive, and regulation-aware accounting systems in an increasingly complex digital environment.



Source: Author's elaboration based on Scopus database

Figure 2. Number of digital transformation in accounting related to firm value publications

RQ2: What is the current distribution of research related to Digital Transformation in Accounting: Analysis of Emerging Technologies, Ethical Risks, and Regulatory Challenges?

To understand the global research landscape, this study explores the distribution of 171 articles related to digital transformation in accounting. The articles are categorized based on country/territory, institutional affiliation, journal source, and author contributions. Only the top 10 from each category are presented. This analysis aims to assist academics and practitioners in mapping global contributions and guiding future research strategies in the digital accounting domain.

First, the distribution by country reveals that the United States leads with 50 publications, followed by the United Kingdom (23), Indonesia (13), Canada (12), and Australia (11). Other countries in the top 10 include China and France (10 each), India and Italy (6 each), and Hong Kong (5) (see Table 1). This finding shows that digital transformation in accounting is not only a concern in technologically advanced Western nations, but also in emerging economies such as Indonesia and India.

To enhance the analysis, VOSviewer software is used to map co-authorship patterns. The visualization indicates strong collaboration between researchers in the United States, United Kingdom, Canada, and Australia, forming central hubs in the global research network. Meanwhile, countries like India, though less prolific, appear as independent but emerging contributors (see Figure 1). This global collaboration map suggests that digital transformation is a shared concern across both developed and developing economies.

Table 1. Number of articles by country or territory (top 10 countries)

Rank	Country/Territory	Articles
1	United States	50
2	United Kingdom	23
3	Indonesia	13
4	Canada	12
5	Australia	11
6	China	10
7	France	10
8	India	6
9	Italy	6
10	Hong Kong	5

Source: Author's elaboration based on Scopus database

Source: Author's elaboration based on Scopus database

Figure 3. Network country visualization

Table 2. Number of articles by affiliations (top 10 institutions)

Rank	Country/Territory	Articles
1	École des hautes études commerciales de Paris	6
2	University of Birmingham	4
3	RMIT University	3
4	National University of Singapore	3
5	New York University	3
6	University of Portsmouth	3
7	Birmingham Business School	3
8	Universitatea de Vest din Timişoara	2
9	Rutgers University-Newark	2
10	Ministry of Education of the People's Republic of China	2

Source: Author's elaboration based on Scopus database

Second, based on Figure 3, the analysis by institutional affiliation shows that the most productive institutions include École des hautes études commerciales de Paris (6 articles), followed by the University of Birmingham (4), and a cluster of institutions contributing three articles each, such as RMIT University, National University of Singapore, and New York University (see Table 2). This shows a diverse institutional base, with leading universities across Europe, Asia, and North America contributing to the field. Notably, institutions from non-English-speaking countries are beginning to emerge in the discourse, indicating growing inclusiveness in global accounting research.

Table 3. Number of articles by sources (top 10 sources)

Rank	Country/Territory	Articles
1	Journal of Cleaner Production	10
2	Accounting Auditing and Accountability Journal	7
3	Accounting Organizations and Society	7
4	Cogent Business and Management	6
5	International Journal of Accounting Information Systems	5
6	Accounting History	4
7	Critical Perspectives on Accounting	4
8	Journal of Emerging Technologies in Accounting	4
9	Journal of Information Systems	3
10	Journal of Risk And Financial Management	3

Source: Author's elaboration based on Scopus database

Third, the most active sources for publishing articles on digital transformation in accounting include the Journal of Cleaner Production (10 articles), Accounting, Auditing and Accountability Journal (7), and Accounting, Organizations and Society (7). Other notable journals include the International Journal of Accounting Information Systems, Accounting History, and Journal of Emerging Technologies in Accounting (see Table 3). These journals reflect the interdisciplinary nature of the topic, covering themes from sustainability and ethics to technology and innovation in accounting.

Table 4. Number of articles by author (top 10 authors)

Rank	Country/Territory	Articles
1	Camilleri, M.A.	2
2	Cooper, D.J.	2
3	Ezzamel, M.	2
4	Martinez, D.E.	2
5	Robson, K.	2
6	Sanad, Z.	2
7	Sgantzos, K.	2
8	Tzavaras, P.	2
9	Agustini, A.T.	1
10	Ahmed, S.	1

Source: Author's elaboration based on Scopus database

Based on Table 4, the distribution by author highlights that Camilleri, M.A., Cooper, D.J., and Ezzamel, M. are among the top contributors, each with two articles. Several other authors, including Robson, K., Sanad, Z., and Sgantzos, K., also appear prominently in the network (see Table 5). The co-authorship analysis using VOSviewer shows a relatively low degree of author connectivity, with only a few interconnected author clusters. This suggests that while interest in the topic is growing, research collaborations are still fragmented and could benefit from stronger interdisciplinary and cross-institutional linkages.

In summary, research on digital transformation in accounting is geographically and thematically diverse. It is supported by strong publication outlets and expanding institutional participation. However, the relatively low degree of author collaboration indicates room for fostering a more integrated global research community. These insights are useful for building future research agendas that are collaborative, interdisciplinary, and inclusive of diverse technological, ethical, and regulatory perspectives.

RQ3. What are the theoretical and practical implications from the perspective of future research?

Theoretical and practical implications for future research on digital transformation in accounting were identified through bibliometric analysis of 171 Scopus-indexed articles using VOSviewer. This analysis provides valuable insight for both academics and practitioners by mapping the antecedents and consequences of scholarly attention in this field. From an academic perspective, the bibliometric analysis helps identify frequently studied variables—such as artificial intelligence, blockchain, regulation, and ethics—and reveals underexplored areas, thus offering direction for addressing research gaps and formulating future research agendas.

From a practitioner's standpoint, the visualization of themes and their interconnections can inform strategic decisions on technology adoption, ethical standards, and regulatory alignment in digital accounting practices. The findings serve as a guide for accountants, auditors, and policymakers in developing forward-looking, adaptive, and ethically grounded digital accounting systems.

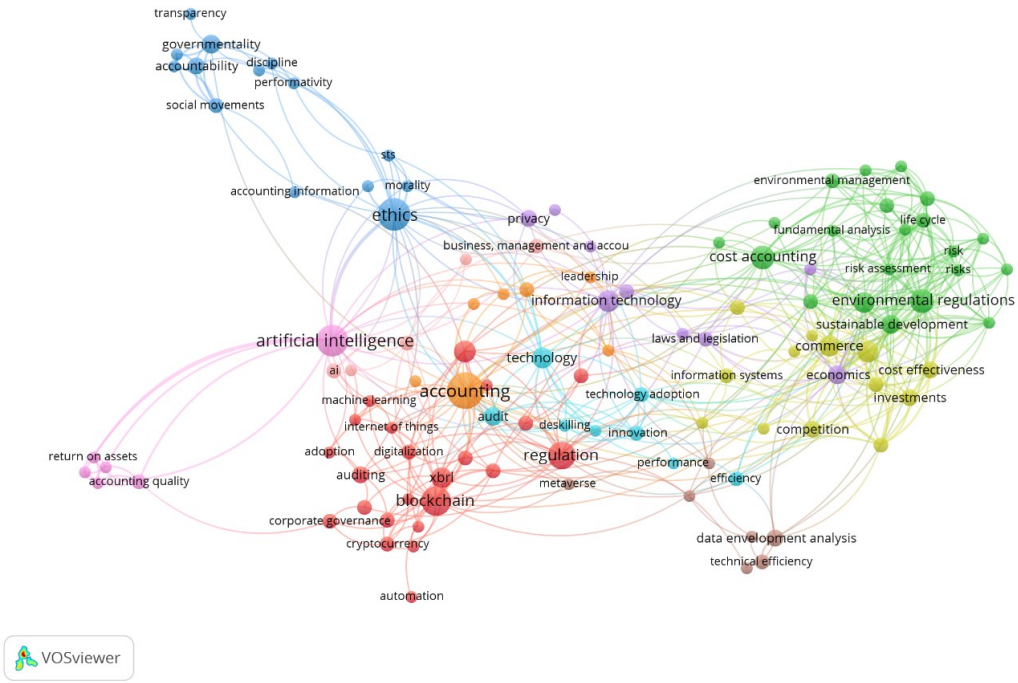
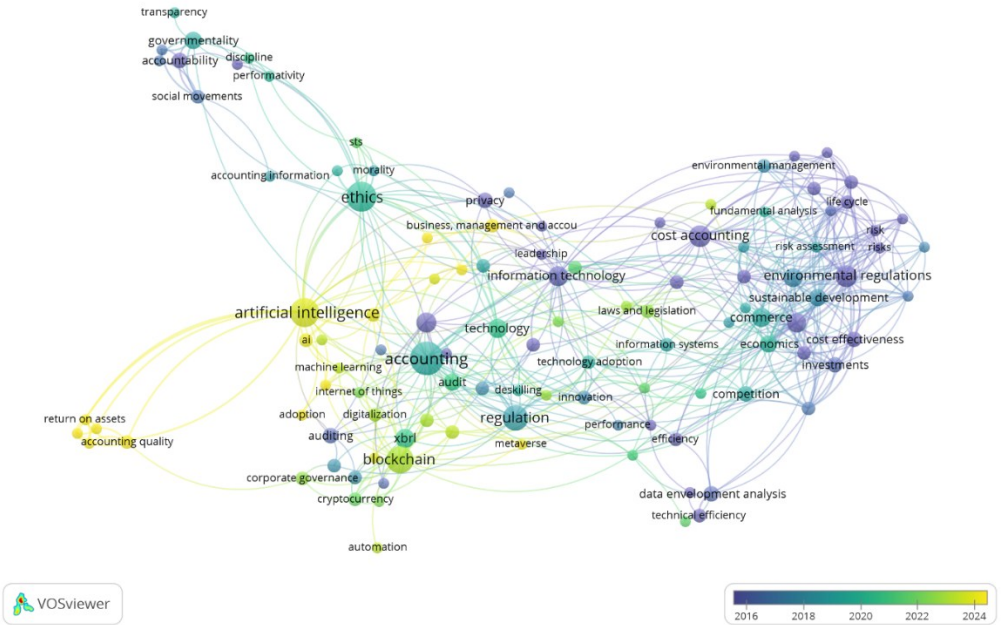


Figure 4. Co-occurrence network and visualization of keywords

Based on the VOSviewer analysis, 134 keywords were identified and grouped into five major thematic clusters. The first cluster highlights digital technologies such as artificial intelligence, blockchain, automation, cloud computing, Internet of Things, and XBRL, which collectively form the core of the digital transformation discourse. The second cluster focuses on ethical dimensions, including transparency, accountability, governmentality, and morality, indicating a growing emphasis on the ethical implications of emerging technologies in accounting. The third cluster is centered around sustainability and environmental concerns, encompassing keywords such as environmental regulations, cost accounting, risk assessment, and sustainable development—demonstrating a shift towards integrating financial and non-financial reporting.

The fourth cluster represents organizational and managerial aspects like privacy, leadership, and information technology, reflecting the evolving nature of governance in digital contexts. Lastly, the fifth cluster relates to economic performance and competitiveness, with terms such as efficiency, investment, and cost-effectiveness, emphasizing the value-driven outcomes of digital transformation.



Source: Author's elaboration based on VOSviewer software

Figure 5. Co-occurrence Overlay of keywords

Next, the visualization of thematic linkages in digital transformation and accounting research, as presented in Figure 5, offers strategic insight into the evolution and concentration of academic discourse in this field. The brighter yellow areas indicate newer and increasingly cited topics in recent years (2022–2024), such as *artificial intelligence*, *blockchain*, *accounting quality*, and *privacy*. These clusters reflect a growing academic emphasis on how emerging technologies are reshaping core accounting functions and creating new ethical and regulatory challenges.

Notably, the central role of *accounting* is reinforced through its strong linkages with both technological innovations (e.g., *machine learning*, *XBRL*, *cloud computing*) and governance-related themes (e.g., *regulation*, *audit*, *transparency*).

This underscores accounting's position as a convergence point for interdisciplinary studies that bridge technical, ethical, and policy considerations. Closely related nodes such as *regulation*, *compliance*, and *privacy* also appear in lighter shades, indicating a growing recognition of the need to examine digital transformation not just from a functional or efficiency perspective, but also through ethical and institutional lenses (Groşanu et al., 2021; Moll & Yigitbasioglu, 2019).

Conversely, clusters in darker shades—such as data envelopment analysis, technical efficiency, and cost effectiveness—suggest these areas, while methodologically significant, remain underrepresented in the latest wave of publications. These zones highlight untapped research potential, especially for scholars aiming to explore how performance analytics and sustainability accounting can complement digital systems and emerging technology frameworks.

The interconnected nature of ethical, technological, and institutional terms in the map reinforces the need for holistic research approaches. For example, recent concerns over *bias*, *accountability*, and *governmentality* reflect deeper interest in how automation and algorithmic governance affect transparency and trust in digital financial systems. This implies an urgent need to study how ethical safeguards and regulatory mechanisms can be designed to mitigate risks from AI and blockchain in accounting environments (Lehner et al., 2022; Morshed & Khrais, 2025).

Source: Author's elaboration based on VOSviewer software

Figure 6. Density visualization of keywords

Next, the density visualization in Figure 6 provides deeper insight into the thematic concentration and scholarly attention within digital transformation and accounting research. The brightest yellow regions indicate areas of intense academic engagement, prominently featuring keywords such as *accounting*, *artificial intelligence*, *blockchain*, *ethics*, and *regulation*. These terms not only serve as frequent anchors in the literature but also highlight

the convergence of technology, governance, and ethical oversight as dominant themes in the digital transformation of accounting.

The proximity between *accounting*, *audit*, *AI*, and *regulation* illustrates the central role of accounting as an interdisciplinary hub where automation, data integrity, and policy compliance coalesce. The high-density clustering around *artificial intelligence* and *blockchain* reflects a rapidly growing body of work investigating how these innovations enhance transparency, efficiency, and risk management in financial reporting and assurance functions (Moll & Yigitbasioglu, 2019; Silva et al., 2022).

Thus, this bibliometric visualization does more than illustrate keyword frequency—it serves as a roadmap for identifying critical research gaps and emerging intersections that can inform both scholarly inquiry and practical policy frameworks in the evolving landscape of digital accounting.

Table 5. Keywords by Author

Rank	Keywords	Total Link Strength
1	Accounting	82
2	Digitalization	49
3	Accounting Information System	36
4	Digital Transformation	33
5	Block-chain	26
6	Cloud Computing	24
7	Internet of Things	24
8	Regulation	20
9	Ethics	20
10	Technological Development	17

Source: Author's elaboration based on VOSviewer software

The most frequently occurring keywords include *accounting* (82), *digitalization* (49), *accounting information system* (36), *digital transformation* (33), *blockchain* (26), *cloud computing* (24), *Internet of Things* (24), *regulation* (20), *ethics* (20), and *technological development* (17), as presented in Table 5. These patterns provide both a theoretical foundation for future research and practical guidance for professionals in navigating the complexities of accounting in the digital era. Future studies could explore integrative models that bridge these clusters, particularly focusing on the intersection of technology, ethics, and regulation in shaping modern accounting practices.

Theoretical Implications

Based on the findings of the bibliometric analysis and thematic mapping, future research on digital transformation in accounting should consider developing a comprehensive conceptual model that integrates emerging technologies, ethical risks, and regulatory responses. Although previous studies have explored key digital innovations such as artificial intelligence (AI), blockchain, and the Internet of Things (IoT), the current literature remains largely fragmented, lacking an integrative framework linking these technologies to ethical risks, regulatory evolution, and compliance structures (Moll & Yigitbasioglu, 2019; Silva et al., 2022).

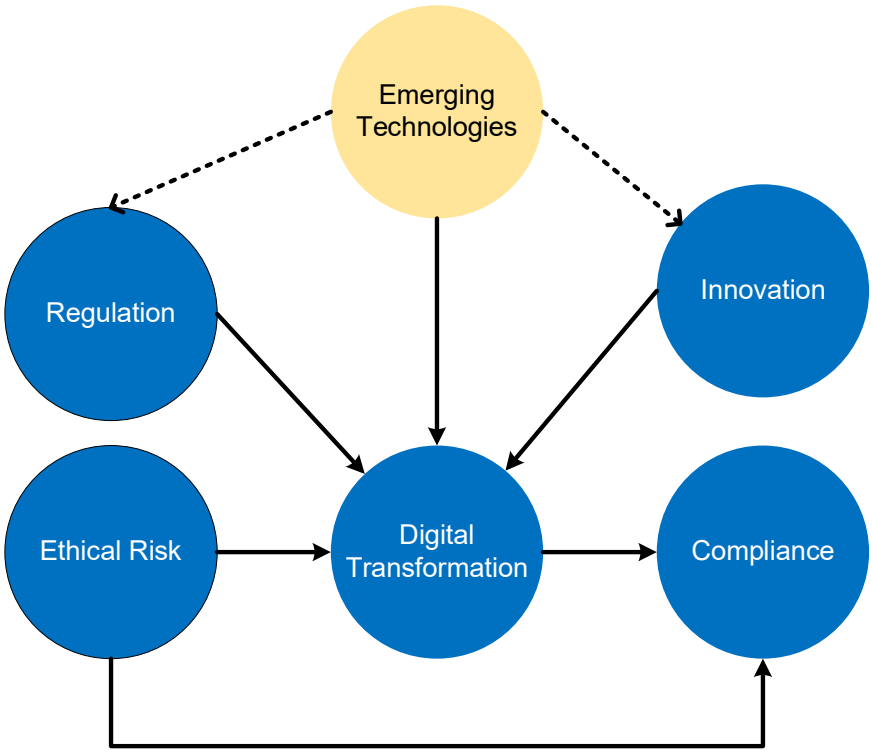
To address this research gap, this study proposes a conceptual model that illustrates the dynamic interactions among five core constructs: (1) emerging technologies that drive digital transformation; (2) ethical risks arising from issues such as data privacy breaches and algorithmic bias; (3) regulatory adaptations that define the boundaries of permissible innovation; (4) compliance mechanisms that ensure accountability and adherence to professional standards; and (5) innovation outcomes resulting from the responsible and ethical implementation of technology. As depicted in Figure 4, digital transformation in accounting is driven by the adoption of new technologies, which concurrently give rise to ethical risks and regulatory pressures (Rodríguez-Espíndola et al., 2022). These dynamics collectively influence the direction, legitimacy, and sustainability of innovation and compliance practices within the accounting profession (Chahed, 2014).

In this model, regulation assumes a dual function, serving simultaneously as a constraint and an enabler of digital transformation. On one hand, regulatory frameworks may restrict the use of certain technologies by imposing compliance obligations and ethical safeguards. On the other hand, they provide the institutional foundation and structural boundaries that facilitate the responsible, transparent, and sustainable adoption of innovation (Díaz-Rodríguez et al., 2023). In parallel, ethical risks associated with digital tools—such as algorithmic bias in automated decision-making or security vulnerabilities within blockchain systems—must be systematically identified and mitigated to prevent reputational damage and ensure compliance integrity (Anagnostopoulos, 2018).

This model also acknowledges that innovation and compliance are interdependent rather than isolated outcomes, functioning as mutually reinforcing mechanisms within the digital transformation process (Gonçalves et

al., 2022; Hung et al., 2023). Technological innovation in accounting enhances compliance by promoting automation, transparency, and traceability, thereby reducing human error and improving regulatory adherence. Conversely, robust compliance frameworks foster stakeholder trust, institutional legitimacy, and the wider diffusion of innovation across accounting practices (Modell, 2014). Consequently, regulatory clarity, ethical safeguards, and institutional support emerge as essential enablers of responsible and sustainable digital transformation within the accounting profession (Chahed, 2014; Díaz-Rodríguez et al., 2023).

This framework invites future research to synthesize insights from institutional theory, the technology acceptance model (TAM), and regulatory contingency theory to better explain how accounting firms manage the inherent tension between technological disruption and ethical accountability (Al Shanti & Elessa, 2023; Austin et al., 2021; Chahed, 2014; Davis, 1989; Díaz-Rodríguez et al., 2023; Lehner et al., 2022). By integrating these theoretical perspectives, the model provides a conceptual foundation for understanding the interplay between innovation, governance, and trust in digitally enabled accounting environments. In doing so, it contributes to the development of a more cohesive and interdisciplinary body of knowledge that bridges technological advancement with normative and institutional dimensions of professional practice in the digital era.



Source: Author's elaboration based on VOSviewer software

Figure 7. The conceptual model of digital transformation in accounting

The conceptual model proposed in this study warrants broader empirical validation, particularly through quantitative testing, to deepen understanding of how the digital transformation process unfolds within the accounting domain. This process can be viewed as a sequence beginning with technology adoption (Davis, 1989), followed by regulatory adaptation and ethical decision-making (Song, 2021), and culminating in performance outcomes such as enhanced audit quality, transparency, and compliance (Anto & Yusran, 2023; Mironiuc et al., 2013; Rahmatika, 2014; Slobodianyk et al., 2019).

Empirical testing of this model would provide both scholars and practitioners with a comprehensive, data-driven understanding of how emerging technologies—particularly artificial intelligence (AI), blockchain, and the Internet of Things (IoT)—reshape accounting practices under ethical and regulatory constraints. At the same time, the rapid evolution of blockchain technology introduces profound ethical, legal, social, and economic challenges (Radziwill, 2018). Key concerns include data protection, energy efficiency, fairness in smart contracts, market competition, and taxation (Dai & Vasarhelyi, 2017). While blockchain has the potential to enhance the integrity, transparency, and reliability of financial reporting (Fischer, 2019), its disruptive nature may also generate unforeseen "future shocks" that could destabilize established systems. Therefore, the development of a comprehensive ethical and governance framework is essential to guide the fair, responsible, and inclusive adoption of blockchain technologies in accounting practice (Banerjee, 2018).

Furthermore, the increasing integration of AI into accounting practice requires a re-evaluation of existing ethical standards and regulations (Warren et al., 2015). While traditional frameworks such as IAS, GAAP, IFRS, and the FASB continue to serve as the foundation for accounting standards, they do not fully address the unique ethical challenges posed by AI (Bhimani & Willcocks, 2014). Regulatory bodies such as the PCAOB and IAASB have begun to respond by updating standards and issuing guidance aimed at addressing new risks and maintaining professionalism in the digital age (Groşanu et al., 2024).

Furthermore, based on the results of bibliometric mapping and a review of previous studies, a significant research gap remains: most existing studies tend to focus on individual technologies in isolation without integrating them into a unified framework that takes into account the interplay between ethical risks and regulatory clarity (Brodny & Tutak, 2025). Furthermore, many studies have concentrated on developed Western economies such as the United States and the United Kingdom (see Table 1 and Figure 2), while emerging markets—especially those experiencing rapid digital adoption without mature regulatory ecosystems—remain underexplored (Groşanu et al., 2024; Thottoli, 2024). Therefore, future research should be conducted in underrepresented contexts, such as Southeast Asia or Africa, to enhance the global applicability of findings and address institutional and cultural diversity in technology governance.

Previous studies by Moll and Yigitbasioglu (2019) have shown that regulatory delays and ethical unpreparedness are key barriers to realizing the full benefits of digital accounting systems. Similarly, findings by Lehner et al. (2022) highlight that ethical awareness within accounting institutions can significantly influence responsible technology implementation. Therefore, this proposed model has the potential to bridge the theoretical and empirical gap by exploring how regulation, ethics, and innovation converge to shape digital transformation outcomes across various accounting environments.

Practical Implications

Based on the results of studies that have been conducted related to digital transformation in accounting, stakeholders—including accountants, regulators, technology developers, and professional associations—should pay close attention to the fundamental components that are key to effective and ethical adoption of emerging technologies. These components include trust-building mechanisms, risk awareness, regulatory alignment, ethical governance, and technological innovation (Groşanu et al., 2024; Lehner et al., 2022; Thottoli, 2024) (see Figure 4).

Digital transformation in accounting is more than just a shift in technical systems—it reflects a paradigm change in how financial data is processed, secured, and reported. As emerging technologies such as AI, blockchain, and cloud computing become integrated into accounting processes, practitioners must actively manage the ethical and compliance challenges that accompany these tools (Moll & Yigitbasioglu, 2019; Silva et al., 2022). Below are the key aspects that must be considered for developing resilient, accountable, and future-ready accounting systems (see Figure 8).

Trust-building mechanisms:

Accounting professionals must ensure that systems built on emerging technologies uphold integrity, reliability, and transparency (Gefen et al., 2016). Stakeholders must implement robust digital security measures and data validation protocols to increase user confidence in financial reporting and decision-making systems (Kovalenko et al., 2021). Establishing user trust is essential to mitigate skepticism around automation and machine-driven judgment.

Risk awareness and mitigation:

Firms need to anticipate and assess the ethical risks associated with digital technologies such as data breaches, algorithmic bias, and over-reliance on automated decision-making (Bélanger & Carter, 2008). Risk management protocols, including audits of AI-based outputs and system verification tools, should be standard practice to preserve the accuracy and ethical standing of financial reports (Kokina and Davenport, 2017).

Regulatory alignment:

Accounting institutions and professionals must operate within a framework that aligns with both domestic and international regulations, such as data protection laws (e.g., GDPR), digital asset standards, and AI audit guidelines (Morshed & Khrais, 2025). Regulatory clarity not only facilitates compliance but also fosters accountability and reduces institutional uncertainty (see Figure 7).

Ethical governance in digital use:

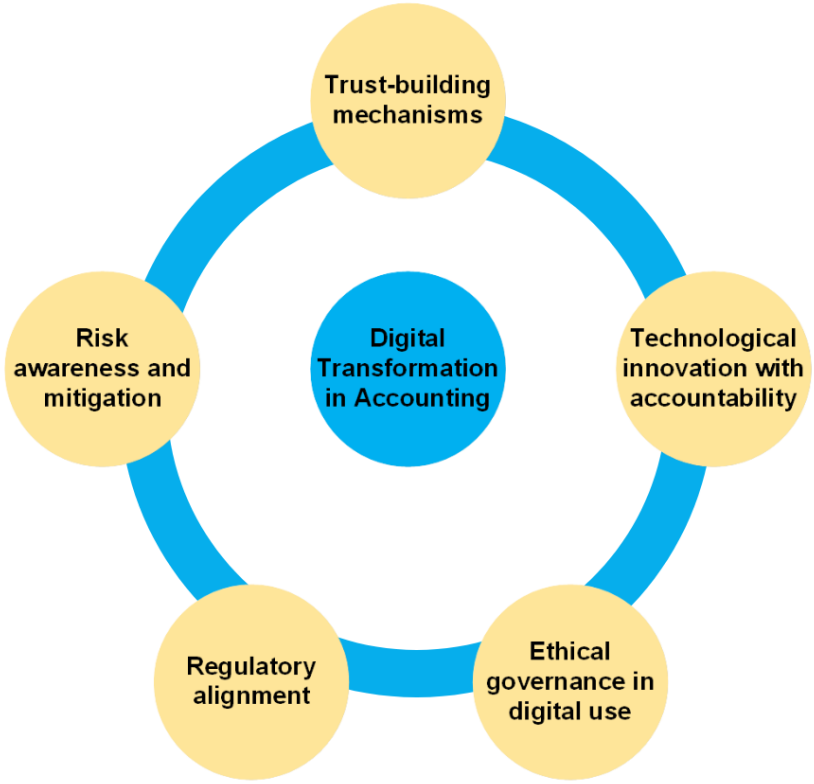
Professionals must be equipped with a clear ethical code for using digital accounting technologies. This includes preventing misuse of automated tools, ensuring fairness in algorithmic logic, and addressing conflicts of interest

that may arise in data-driven systems (Lehner et al., 2022). Firms should invest in continuous ethics training and establish internal review boards to monitor technology use in financial contexts.

Technological innovation with accountability:

While innovation is essential for improving efficiency and competitiveness, it must be pursued responsibly. Stakeholders must prioritize technologies that enhance transparency, real-time monitoring, and stakeholder accessibility—while also maintaining auditability and traceability (Groşanu et al., 2024). Collaboration between academia, regulators, and industry players is needed to promote best practices and technological standards.

By focusing on these five dimensions, practitioners can ensure that digital transformation in accounting supports not only operational excellence but also the ethical and regulatory integrity of the profession. These implications serve as a roadmap for future development of resilient and responsible accounting systems in the digital era.



Source: Author's elaboration based on VOSviewer sofware

Figure 8. Digital Accounting Attribute.

Conclusion

This study reviewed 171 scientific articles indexed in the Scopus database and presented several key findings regarding the current landscape of digital transformation in accounting. First, research in this field has shown a significant upward trend over the past two decades, particularly accelerating between 2022 and 2024, indicating a growing scholarly interest in emerging technologies such as artificial intelligence (AI), blockchain, and cloud computing.

Second, bibliometric mapping using VOSviewer revealed that while technological themes are dominant, research addressing the intersection of ethics and regulation remains underrepresented. Topics such as privacy, accountability, algorithmic bias, and regulatory compliance are gradually gaining attention but have yet to be explored comprehensively in relation to accounting innovation.

Third, the distribution of research by country is still uneven. Although the United States and the United Kingdom lead in publication volume, contributions from emerging economies such as Indonesia, India, and China show the beginning of a more diversified global interest in digital accounting transformation. However, the dominance of certain regions suggests that more inclusive research efforts are needed to understand technology adoption in varied regulatory and cultural contexts.

Fourth, the most cited sources and affiliations suggest that a few institutions—mainly from Europe, North America, and Asia-Pacific—act as key contributors to the discourse, yet collaborative networks across countries remain limited. Expanding international collaboration could enhance comparative studies and increase generalizability.

Finally, the authors acknowledge several limitations of this study. First, the data was drawn exclusively from the Scopus database, which may restrict the breadth of coverage and generalizability. Future studies are encouraged to incorporate data from other reputable databases such as Web of Science to provide a more comprehensive view. Second, the time range of the analysis was restricted to the past two decades; extending the timeline and updating with future publications could reveal evolving patterns in digital transformation. Third, although rigorous bibliometric methods were employed, future research may complement these findings with in-depth qualitative or mixed-method approaches to examine institutional, behavioral, and contextual nuances in the adoption of emerging technologies in accounting.

References

Abrahams, T. O., Ewuga, S. K., Kaggwa, S., Uwaoma, P. U., Hassan, A. O., & Dawodu, S. O. (2023). Review of strategic alignment: Accounting and cybersecurity for data confidentiality and financial security. *World Journal of Advanced Research and Reviews, 20*(3), 531–539. https://doi.org/10.30574/wjarr.2023.20.3.2691

Agustí, M. A., & Orta-Pérez, M. (2023). Big data and artificial intelligence in the fields of accounting and auditing: a bibliometric analysis. *Revista Espanola de Financiacion y Contabilidad*, *52*(3). https://doi.org/10.1080/02102412.2022.2099675

Al Shanti, A. M., & Elessa, M. S. (2023). The impact of digital transformation towards blockchain technology application in banks to improve accounting information quality and corporate governance effectiveness. *Cogent Economics and Finance*, *11*(1). https://doi.org/10.1080/23322039.2022.2161773

Alles, M. G. (2015). Drivers of the use and facilitators and obstacles of the evolution of big data by the audit profession. *Accounting Horizons*, *29*(2), 439–449. https://doi.org/10.2308/acch-51067

Anagnostopoulos, I. (2018). Fintech and regtech: Impact on regulators and banks. *Journal of Economics and Business*, *100*. https://doi.org/10.1016/j.jeconbus.2018.07.003

Anto, L. O., & Yusran, I. N. (2023). Determinants of the quality of financial reports. *International Journal of Professional Business Review*, *8*(3), e01331. https://doi.org/10.26668/businessreview/2023.v8i3.1331

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

Austin, A. A., Carpenter, T. D., Christ, M. H., & Nielson, C. S. (2021). The data analytics journey: Interactions among auditors, managers, regulation, and technology. *Contemporary Accounting Research, 38*(3), 1888–1924. https://doi.org/10.1111/1911-3846.12680

Banerjee, A. (2018). Blockchain technology: Supply chain insights from ERP. *Advances in Computers, 111*. https://doi.org/10.1016/bs.adcom.2018.03.007

Bélanger, F., & Carter, L. (2008). Trust and risk in e-government adoption. *Journal of Strategic Information Systems*, *17*(2). https://doi.org/10.1016/j.jsis.2007.12.002

Bhimani, A., & Willcocks, L. (2014). Digitisation, big data and the transformation of accounting information. *Accounting and Business Research*, *44*(4). https://doi.org/10.1080/00014788.2014.910051

Brodny, J., & Tutak, M. (2025). Stakeholder interactions and ethical imperatives in big data and AI development. *Journal of Open Innovation: Technology, Market, and Complexity*, *11*(1). https://doi.org/10.1016/j.joitmc.2025.100491

Burr, C., & Cristianini, N. (2019). Can machines read our minds? *Minds and Machines*, *29*(3). https://doi.org/10.1007/s11023-019-09497-4

Chahed, Y. (2014). Translations in regulatory space: The arenas of regulatory innovation in accounting standard setting. *Indiana Journal of Global Legal Studies*, *21*(1). https://doi.org/10.2979/indjglolegstu.21.1.195

Chun, K. W., Kim, H., & Lee, K. (2019). A study on research trends of technologies for industry 4.0; 3D printing, artificial intelligence, big data, cloud computing, and internet of things. *Lecture Notes in Electrical Engineering*, *518*. https://doi.org/10.1007/978-981-13-1328-8_51

Cong, L. W., He, Z., & Zheng, J. (2017). Blockchain disruption and smart contracts. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2985764

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

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly: Management Information Systems*, *13*(3). https://doi.org/10.2307/249008

Díaz-Rodríguez, N., Del Ser, J., Coeckelbergh, M., López de Prado, M., Herrera-Viedma, E., & Herrera, F. (2023). Connecting the dots in trustworthy artificial intelligence: From AI principles, ethics, and key requirements to responsible AI systems and regulation. *Information Fusion*, *99*. https://doi.org/10.1016/j.inffus.2023.101896

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, *133*. https://doi.org/10.1016/j.jbusres.2021.04.070

Fischer, D. (2019). Ethical and professional implications of blockchain accounting ledgers. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3331009

Gefen, D., Straub, D., & Boudreau, M.-C. (2000). Structural equation modeling and regression: Guidelines for research practice. *Communications of the Association for Information Systems, 4*(7), 1–77. https://doi.org/10.17705/1CAIS.00407

Gonçalves, M. J. A., da Silva, A. C. F., & Ferreira, C. G. (2022). The future of accounting: How will digital transformation impact the sector? *Informatics*, *9*(1). https://doi.org/10.3390/informatics9010019

Groşanu, A., Fülöp, M.-T., Cordoş, G.-S., & Raita, G. (2021). Challenges and trends for the incorporation of big data in the accounting profession: From the traditional approach to the future professional accountant. *CECCAR Business Review*, *1*(12). https://doi.org/10.37945/cbr.2020.12.08

Groşanu, A., Fülöp, M.-T., & Măgdaş, N. (2024). Ethical dilemmas in digital accounting: A comprehensive literature review. *CECCAR Business Review*, *5*(4), 56–67. https://doi.org/10.37945/cbr.2024.04.06

Han, H., Liu, Z., Wang, X., & Li, S. (2021). Research of the relations among cloud computing, internet of things, big data, artificial intelligence, block chain and their application in maritime field. *Journal of Physics: Conference Series*, *1927*(1). https://doi.org/10.1088/1742-6596/1927/1/012026

Hung, B. Q., Hoa, T. A., Hoai, T. T., & Nguyen, N. P. (2023). Advancement of cloud-based accounting effectiveness, decision-making quality, and firm performance through digital transformation and digital leadership: Empirical evidence from Vietnam. *Heliyon*, *9*(6). https://doi.org/10.1016/j.heliyon.2023.e16929

IBM Security. (2023). Cost of a data breach report 2023. *IBM*. https://www.securityhq.com/reports/cost-of-a-data-breach-report-2023/

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

Kovalenko, S. N., Kalutskaya, N. A., Bolvachev, A. I., Prodanova, N. A., Sotnikova, L. V., & Shevchenko, O. P. (2021). Artificial intelligence in the accounting profession. *Laplage em Revista, 7*, 378–383. https://doi.org/10.24115/s2446-622020217extra-b938p.378-383

KPMG. (2022). *Transparency Report 2022*.

Kumar, J. (2024). Integration of artificial intelligence, big data, and cloud computing with internet of things. *Convergence of Cloud with AI for Big Data Analytics: Foundations and Innovation*. https://doi.org/10.1002/9781119905233.ch1

Lehner, O. M., Ittonen, K., Silvola, H., Ström, E., & Wührleitner, A. (2022a). Artificial intelligence based decision-making in accounting and auditing: ethical challenges and normative thinking. *Accounting, Auditing and Accountability Journal*, *35*(9). https://doi.org/10.1108/AAAJ-09-2020-4934

Marston, S., Li, Z., Bandyopadhyay, S., Zhang, J., & Ghalsasi, A. (2011). Cloud computing - The business perspective. *Decision Support Systems*, *51*(1). https://doi.org/10.1016/j.dss.2010.12.006

Mironiuc, M., Chersan, I.-C., & Robu, I.-B. (2013). Ethics in providing non-audit services to ensure transparency in financial reporting. *Procedia - Social and Behavioral Sciences*, *81*. https://doi.org/10.1016/j.sbspro.2013.06.463

Modell, S. (2014). The societal relevance of management accounting: An introduction to the special issue. *Accounting and Business Research*, *44*(2). https://doi.org/10.1080/00014788.2014.882741

Moher, D., Shamseer, L., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelle, P., & Stewart, L. A. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. Systematic Reviews, 4(1), 1. https://doi.org/10.1186/2046-4053-4-1

Moll, J., & Yigitbasioglu, O. (2019). The role of internet-related technologies in shaping the work of accountants: New directions for accounting research. *British Accounting Review*, *51*(6). https://doi.org/10.1016/j.bar.2019.04.002

Morshed, A., & Khrais, L. T. (2025). Cybersecurity in digital accounting systems: Challenges and solutions in the Arab Gulf region. *Journal of Risk and Financial Management*, *18*(1). https://doi.org/10.3390/jrfm18010041

Pritchard, A. (1969). Statistical bibliography or bibliometrics. *Journal of Documentation*, *25*, 348.

Radziwill, N. (2018). Blockchain revolution: How the technology behind bitcoin is changing money, business, and the world. *Quality Management Journal*, *25*(1). https://doi.org/10.1080/10686967.2018.1404373

Rahmatika, D. N. (2014). The impact of internal audit function effectiveness on quality of financial reporting and its implications on good government governance research on local government Indonesia. *Research Journal of Finance and Accounting*, *5*(18).

Richins, G., Stapleton, A., Stratopoulos, T. C., & Wong, C. (2017). Big data analytics: Opportunity or threat for the accounting profession? *Journal of Information Systems*, *31*(3). https://doi.org/10.2308/isys-51805

Rodríguez-Espíndola, O., Chowdhury, S., Dey, P. K., Albores, P., & Emrouznejad, A. (2022). Analysis of the adoption of emergent technologies for risk management in the era of digital manufacturing. *Technological Forecasting and Social Change*, *178*. https://doi.org/10.1016/j.techfore.2022.121562

Schmitz, J., & Leoni, G. (2019). Accounting and auditing at the time of blockchain technology: A research agenda. *Australian Accounting Review*, *29*(2). https://doi.org/10.1111/auar.12286

Shiyyab, F. S., Alzoubi, A. B., Obidat, Q. M., & Alshurafat, H. (2023). The impact of artificial intelligence disclosure on financial performance. *International Journal of Financial Studies*, *11*(3). https://doi.org/10.3390/ijfs11030115

Silva, R., Inácio, H., & Marques, R. P. (2022). Blockchain implications for auditing: a systematic literature review and bibliometric analysis. *International Journal of Digital Accounting Research*, *22*. https://doi.org/10.4192/1577-8517-v22_6

Slobodianyk, Y., Shymon, S., & Adam, V. (2019). Compliance auditing in public administration: Ukrainian perspectives. *Baltic Journal of Economic Studies*, *4*(5). https://doi.org/10.30525/2256-0742/2018-4-5-320-331

Song, J. (2021). Ethical adaptation and legal regulation of modern technology. *Cultures of Science*, *4*(3). https://doi.org/10.1177/20966083211053085

Sultan, N. (2010). Cloud computing for education: A new dawn? *International Journal of Information Management*, *30*(2). https://doi.org/10.1016/j.ijinfomgt.2009.09.004

Taleb, N., & Mohamed, E. A. (2020). Cloud computing trends: A literature review. *Academic Journal of Interdisciplinary Studies, 9*(1). https://doi.org/10.36941/ajis-2020-0008

Thottoli, M. M. (2024). The tactician role of FinTech in the accounting and auditing field: a bibliometric analysis. *Qualitative Research in Financial Markets, 16*(2). https://doi.org/10.1108/QRFM-11-2021-0196

Warren, J. D., Moffitt, K. C., & Byrnes, P. (2015). How big data will change accounting. *Accounting Horizons*, *29*(2). https://doi.org/10.2308/acch-51069

Yoon, K., Hoogduin, L., & Zhang, L. (2015). Big data as complementary audit evidence. *Accounting Horizons*, *29*(2). https://doi.org/10.2308/acch-51076

Zupic, I., & Čater, T. (2015). Bibliometric methods in management and organization. *Organizational Research Methods*, *18*(3). https://doi.org/10.1177/1094428114562629