

A Bibliometric Study of Internal Audit Research Development

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ABSTRACT

This study aims to analyze the development of internal audit research through a comprehensive bibliometric approach. Using data collected from the Scopus database covering the period 2000–2026, this research examines publication trends, influential authors, leading countries, and the conceptual structure of the field. Bibliometric techniques, including co-authorship analysis, citation analysis, keyword co-occurrence, overlay visualization, and density mapping, were conducted using VOSviewer. The results indicate that internal audit research has experienced significant growth and increasing global collaboration, with dominant contributions from developed countries such as the United States and the United Kingdom. The intellectual structure of the field is centered on traditional themes such as internal control, auditing, and risk management, while emerging topics such as digital transformation, artificial intelligence, and sustainability are gaining prominence. The findings also reveal that internal audit research is becoming more interdisciplinary, extending into areas such as healthcare and environmental governance. This study contributes by providing a structured overview of the knowledge landscape and identifying research gaps, particularly in technology integration and sustainability practices. The results are expected to guide future research directions and support the advancement of internal audit practices in a rapidly evolving business environment.

Keywords: Internal Audit, Bibliometric Analysis, Risk Management, Digital Transformation, Sustainability

1. INTRODUCTION

The role of internal auditing has evolved significantly over the past few decades, transitioning from a traditional compliance-oriented function to a strategic partner in organizational governance and risk management [1], [2]. Initially perceived as a control mechanism focused on financial accuracy and regulatory adherence, internal audit now encompasses broader responsibilities, including risk assessment, internal control evaluation, fraud prevention, and value creation [2], [3]. This transformation has been largely driven by increasing organizational complexity, globalization, technological advancements, and heightened expectations from stakeholders regarding transparency and accountability [4], [5]. As a result, internal audit has become an integral component of corporate governance frameworks, contributing not only to assurance but also to advisory services that enhance organizational performance.

In parallel with these practical developments, academic interest in internal audit has expanded considerably. Scholars have investigated various dimensions of internal auditing, including audit effectiveness, independence, governance relationships, risk-based auditing, and the integration of emerging technologies such as data analytics and artificial intelligence [6], [7]. The growing body of literature reflects the dynamic nature of the field, with contributions spanning accounting, management, information systems, and organizational studies [8], [9]. This interdisciplinary orientation underscores the importance of internal audit as a research domain that bridges theory and practice, offering insights into how organizations can strengthen their control environments and achieve strategic objectives.

Despite the increasing volume of research, the intellectual structure and development trajectory of internal audit literature remain fragmented. Existing studies often focus on specific themes or employ narrative reviews that may not fully capture the broader evolution of the field. As

the number of publications continues to rise, it becomes increasingly challenging for researchers and practitioners to identify key trends, influential works, and emerging research fronts. In this context, bibliometric analysis provides a systematic and quantitative approach to mapping the knowledge landscape. By analyzing publication data, citation patterns, and collaborative networks, bibliometric methods enable a comprehensive understanding of how research in internal auditing has developed over time.

Bibliometric studies have been widely applied in various disciplines to evaluate research performance, uncover thematic structures, and identify knowledge gaps [10], [11]. However, within the domain of internal audit, such studies remain relatively limited and often lack a holistic perspective that integrates multiple analytical dimensions. This gap highlights the need for a more comprehensive bibliometric investigation that not only examines publication and citation trends but also explores co-authorship patterns, keyword co-occurrence, and thematic evolution. Such an analysis can provide valuable insights into the intellectual foundations of internal audit research and guide future scholarly inquiries.

The urgency of conducting a bibliometric study in this field is further reinforced by the rapid changes in the business environment. The rise of digital transformation, increased regulatory scrutiny, and the growing importance of sustainability and environmental, social, and governance (ESG) considerations have reshaped the scope of internal auditing. These developments demand new research perspectives and methodological approaches, making it essential to understand how the academic discourse is responding to these challenges. By identifying dominant themes and emerging topics, a bibliometric analysis can help researchers align their studies with current trends and address underexplored areas.

Accordingly, this study aims to provide a comprehensive bibliometric analysis of internal audit research. Specifically, it seeks to (1) examine the growth and distribution of publications over time, (2) identify the most influential authors, journals, and documents, (3) analyze collaboration patterns among researchers and institutions, and (4) map the thematic structure and evolution of the field through keyword analysis. By achieving these objectives, the study contributes to the literature by offering a structured overview of internal audit research development and highlighting directions for future research.

Ultimately, this research is expected to benefit both academic and professional communities. For scholars, it provides a roadmap for navigating the extensive body of literature and identifying potential research opportunities. For practitioners, it offers insights into the evolving focus of internal audit practices, enabling them to better understand emerging issues and align their strategies accordingly. Through this dual contribution, the study reinforces the relevance of internal audit as a critical function in modern organizations and as a vibrant area of academic inquiry.

2. METHODS

This study adopts a quantitative bibliometric approach to analyze the development of internal audit research. Bibliometric analysis is a systematic method used to evaluate scientific publications through statistical and mathematical techniques, enabling the identification of patterns, trends, and relationships within a specific research field [12], [13]. The data for this study were obtained from the Scopus database, which is widely recognized for its comprehensive coverage of high-quality peer-reviewed journals. The search was conducted using keywords such as “internal audit,” “internal auditing,” and related terms within titles, abstracts, and keywords. The time span of the analysis covers publications from 2000 to 2026 to capture the long-term evolution of the field.

Only articles and review papers written in English were included to ensure consistency and relevance, while conference papers, book chapters, and non-peer-reviewed documents were excluded.

The collected bibliographic data were then exported in CSV format and processed using VOSviewer, a widely used software for constructing and visualizing bibliometric networks. Several analytical techniques were employed, including citation analysis, co-authorship analysis, and keyword co-occurrence analysis. Citation analysis was used to identify the most influential publications, authors, and journals in the field. Co-authorship analysis examined collaboration patterns among researchers and institutions, highlighting the structure of academic networks. Meanwhile, keyword co-occurrence analysis was applied to explore the conceptual structure of internal audit research and to identify dominant and emerging themes. The visualization maps generated by VOSviewer provide a graphical representation of relationships between items, where nodes represent elements such as authors or keywords, and links indicate their connections [14], [15].

To ensure the validity and reliability of the findings, data cleaning and standardization processes were conducted prior to analysis. This included removing duplicate records, unifying variations in author names and keywords, and filtering irrelevant terms. Threshold criteria were also applied to focus on the most significant items, such as minimum citation counts for documents and minimum occurrence frequencies for keywords. The results were then interpreted descriptively to provide insights into publication trends, intellectual structure, and thematic evolution of internal audit research. By combining quantitative bibliometric techniques with qualitative interpretation, this study offers a comprehensive understanding of the development and future direction of the field.

3. RESULT AND DISCUSSION

3.1 Author Collaboration Analysis

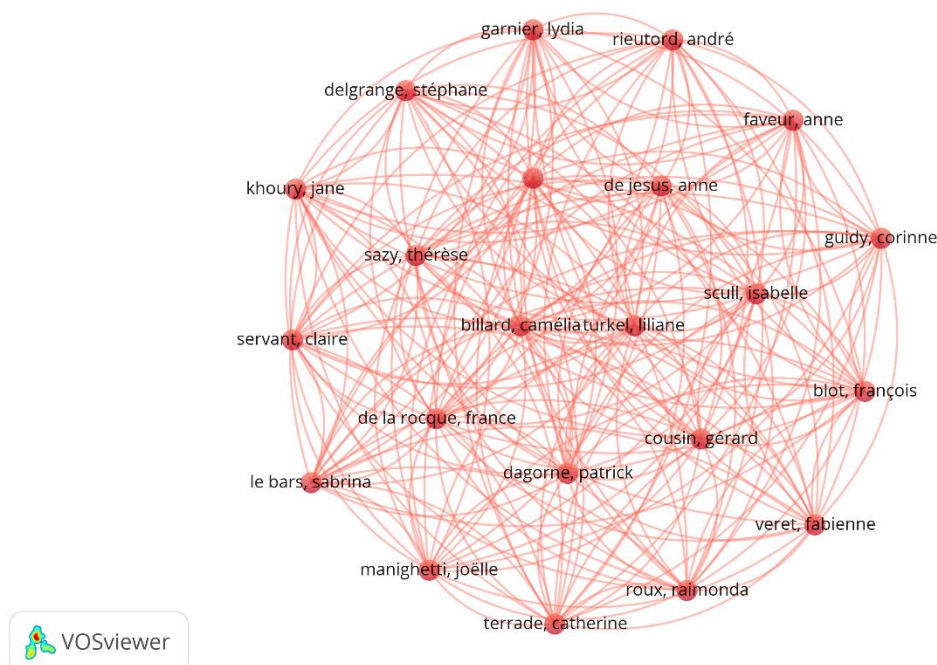


Figure 1. Author Visualization

Source: Data Analysis

Figure 1 illustrates the co-authorship network in internal audit research, revealing a densely interconnected structure among authors. The visualization shows that most researchers are linked through multiple collaborative ties, forming a highly cohesive network rather than isolated clusters. Several authors appear centrally positioned, indicating their important role as key collaborators who bridge different research groups and facilitate knowledge exchange. The density of connections suggests that collaboration within this field is relatively strong, although it is still concentrated within certain groups, likely reflecting institutional or regional affiliations. Overall, this pattern indicates that internal audit research is supported by an active but somewhat centralized collaboration structure, where a number of influential authors contribute significantly to the integration and dissemination of knowledge across the network.

3.2 Country Contribution Analysis

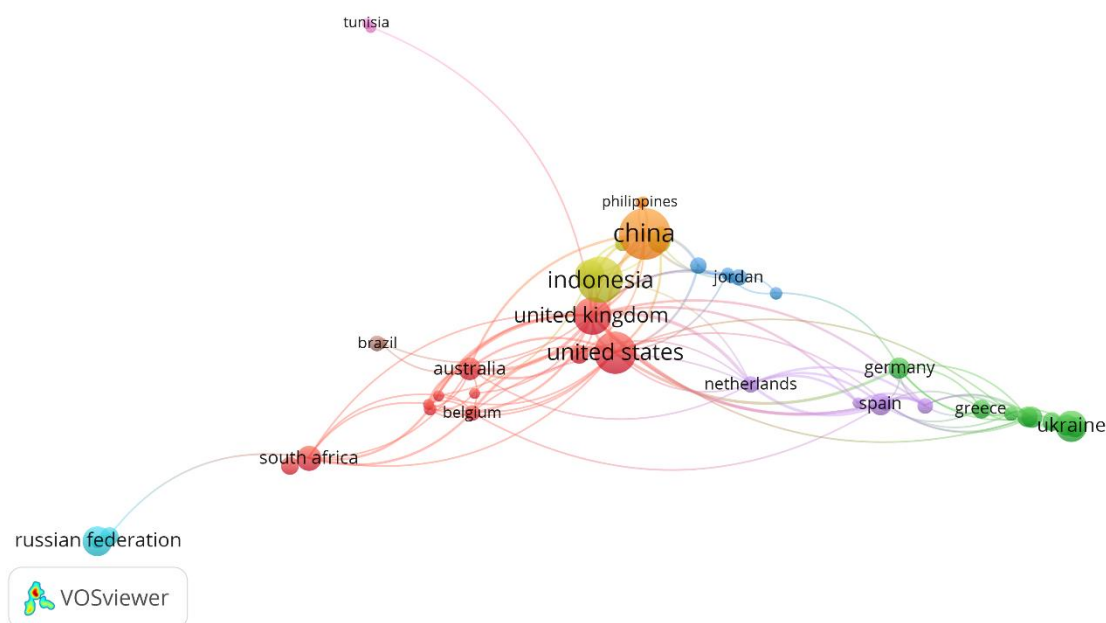


Figure 2. Country Visualization

Source: Data Analysis

Figure 2 presents the country-level collaboration network in internal audit research, highlighting the global distribution and interconnectedness of scholarly contributions. The visualization shows that the United States and United Kingdom occupy central positions, indicating their dominant role as key hubs in international research collaboration. These countries are strongly connected with others such as Australia, China, and Indonesia, reflecting both developed and emerging economies contributing to the field. Distinct clusters are also visible, such as European collaborations involving Germany, Spain, and Netherlands, as well as connections extending to countries like Ukraine and Greece. Meanwhile, countries such as South Africa and Brazil appear on the periphery, indicating growing but less integrated participation. Overall, the network suggests that internal audit research is increasingly global, with strong collaboration between leading academic nations and a gradual inclusion of emerging research contributors.

3.3 Citation Analysis

Table 1. The Most Impactful Literatures

Citations	Authors and year	Title
135	Callahan, C., Soileau, J. (2017)	Does Enterprise risk management enhance operating performance?
127	Pizzi, S., Venturelli, A., Variale, M., Macario, G.P. (2021)	Assessing the impacts of digital transformation on internal auditing: A bibliometric analysis
100	Hazaea, S.A., Zhu, J., Khatib, S.F.A., Bazhair, A.H., Elamer, A.A. (2022)	Sustainability assurance practices: a systematic review and future research agenda
97	Eulerich, M., Pawlowski, J., Waddoups, N.J., Wood, D.A. (2022)	A Framework for Using Robotic Process Automation for Audit Tasks*
86	Nerantzidis, M., Pazarskis, M., Drogas, G., Galanis, S. (2022)	Internal auditing in the public sector: a systematic literature review and future research agenda
83	Roussy, M., Perron, A. (2018)	New Perspectives in Internal Audit Research: A Structured Literature Review
80	Tiron-Tudor, A., Deliu, D., Farcane, N., Dontu, A. (2021)	Managing change with and through blockchain in accountancy organizations: a systematic literature review
77	Appelbaum, D., Nehmer, R.A. (2017)	Using drones in internal and external audits: An exploratory framework
62	Christ, M.H., Eulerich, M., Krane, R., Wood, D.A. (2021)	New Frontiers for Internal Audit Research*
57	Löffler, C., Böhmer, F. (2017)	The effect of interventions aiming to optimise the prescription of antibiotics in dental care – A systematic review

Source: Scopus, 2026

Table 1 shows that the most impactful literature in internal audit research is dominated by themes related to risk management, digital transformation, sustainability assurance, public sector auditing, and emerging technologies. Callahan and Soileau (2017) received the highest citation count, indicating the strong influence of enterprise risk management in shaping internal audit discussions. Several recent studies, such as Pizzi et al. (2021), Eulerich et al. (2022), and Christ et al. (2021), show that digital transformation, robotic process automation, blockchain, and technology-based audit tools have become increasingly important research directions. The presence of structured and systematic literature reviews also indicates that internal audit research is entering a more mature stage, where scholars are not only producing empirical studies but also consolidating

previous knowledge to build future research agendas. However, the inclusion of Löffler and Böhmer (2017), which focuses on antibiotic prescriptions in dental care, suggests that the dataset may contain at least one unrelated article, so further data cleaning is needed to ensure that the bibliometric results accurately represent the internal audit field.

3.4 Keyword Co-Occurrence and Research Themes

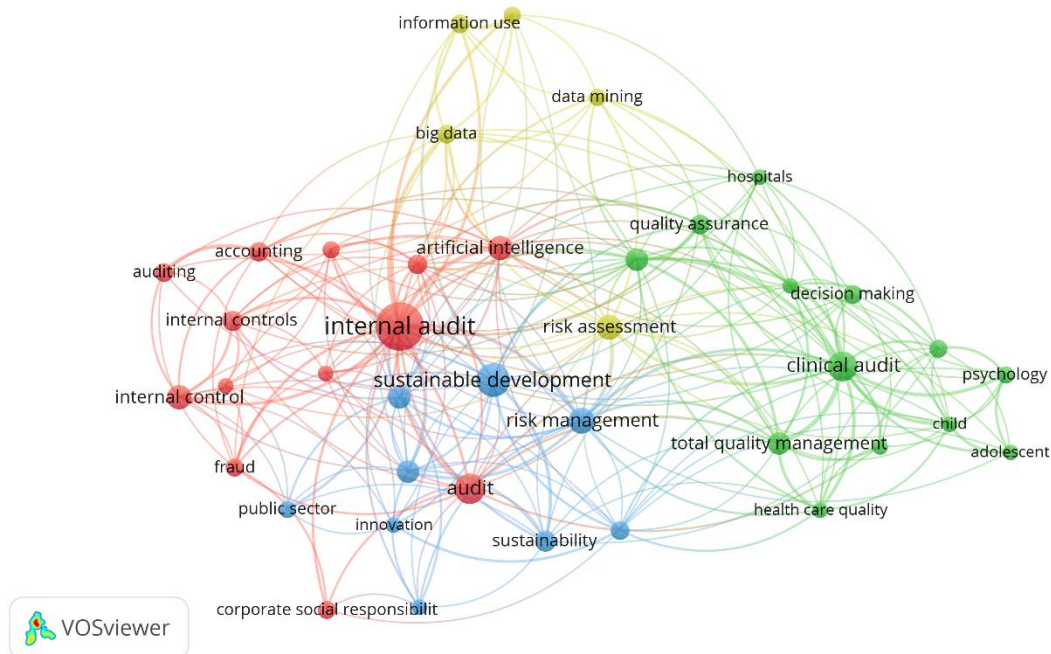


Figure 3. Network Visualization

Source: Data Analysis

Figure 3 presents the keyword co-occurrence network, illustrating the conceptual structure of internal audit research and its interconnected themes. The term “internal audit” appears as the central node, strongly linked with core topics such as auditing, internal control, accounting, and fraud, indicating the traditional foundation of the field. At the same time, the network reveals several distinct clusters, including a governance and control cluster (e.g., internal controls, fraud, public sector), a sustainability-oriented cluster (e.g., sustainability, corporate social responsibility, sustainable development), and a technology-driven cluster (e.g., artificial intelligence, big data, data mining). Additionally, a notable cluster related to healthcare and quality management (e.g., clinical audit, decision making, health care quality) suggests the expansion of internal audit concepts into interdisciplinary domains. The dense interconnections between these clusters indicate that internal audit research is increasingly integrative, combining traditional auditing functions with emerging areas such as digital transformation and sustainability, reflecting the evolving and multidisciplinary nature of the field.

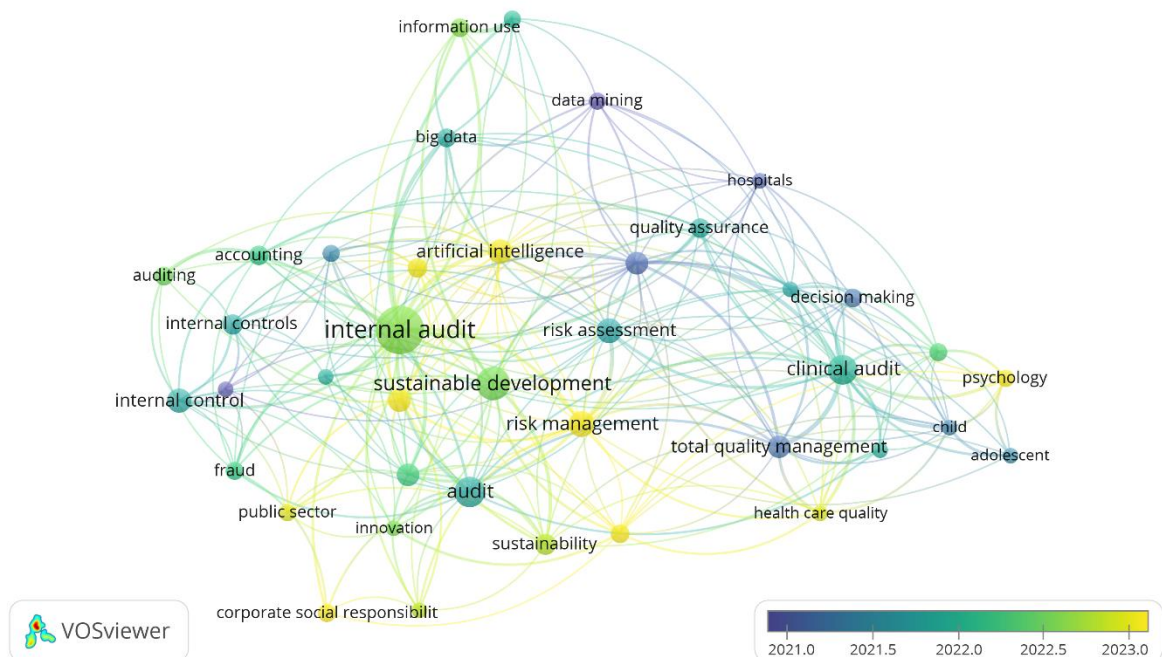


Figure 4. Overlay Visualization

Source: Data Analysis

Figure 4 presents the overlay visualization of keyword trends, illustrating the temporal evolution of internal audit research based on average publication years. Earlier themes, represented by darker blue tones, are primarily associated with traditional topics such as internal control, auditing, and quality assurance, indicating their foundational role in the field. As the color shifts toward green and yellow, more recent topics emerge, including artificial intelligence, big data, sustainability, and risk management, reflecting the growing integration of technology and sustainability considerations into internal audit practices. Notably, keywords such as sustainable development, data mining, and health care quality appear in more recent periods, suggesting a diversification of research into interdisciplinary domains. Overall, the visualization demonstrates a clear transition from conventional audit functions toward more innovative, data-driven, and sustainability-oriented approaches, highlighting the dynamic and forward-looking direction of internal audit research.

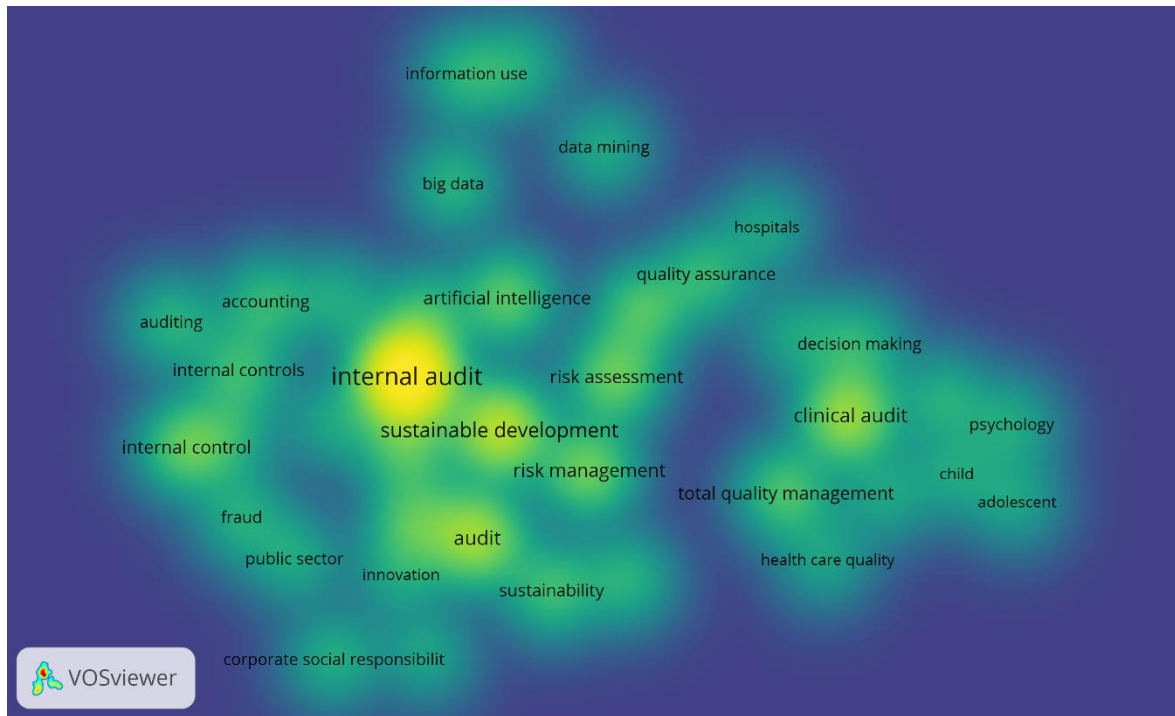


Figure 5. Density Visualization
Source: Data Analysis

Figure 5 presents the density visualization, highlighting the concentration and intensity of research topics within the internal audit field. Areas shown in brighter yellow indicate higher frequency and stronger relevance, with “internal audit” emerging as the most dominant and central theme, surrounded by closely related topics such as audit, sustainable development, and risk management. This concentration suggests that these themes form the core of the research landscape and have received the greatest scholarly attention. Meanwhile, moderately dense areas (green tones) include topics such as artificial intelligence, big data, quality assurance, and clinical audit, indicating growing but still developing areas of research. In contrast, peripheral topics with lower density (darker blue areas), such as corporate social responsibility and specific sectoral applications, reflect niche or emerging interests that have not yet reached high research intensity. Overall, the visualization demonstrates that while internal audit research remains strongly anchored in its traditional core, it is progressively expanding toward interdisciplinary and technology-driven domains.

Discussion

The findings of this bibliometric analysis demonstrate that internal audit research has evolved into a dynamic and increasingly interdisciplinary field. The dominance of core themes such as internal audit, audit, risk management, and internal control confirms that the field remains strongly rooted in its traditional foundations of governance and assurance. However, the presence of interconnected clusters and the expansion of research topics indicate that internal auditing is no longer confined to compliance functions but has developed into a strategic organizational role. This shift reflects broader changes in corporate governance, where internal auditors are expected to contribute to risk mitigation, decision-making, and value creation [2], [3].

Another important insight is the growing influence of technology-driven research within the internal audit domain. The emergence of keywords such as artificial intelligence, big data, and data mining, particularly in more recent years, highlights a clear transition toward digital transformation in auditing practices. These developments suggest that internal auditors are increasingly leveraging advanced technologies to enhance audit efficiency, improve risk detection, and provide real-time

insights [16], [17]. From a research perspective, this trend opens new avenues for exploring how digital tools can reshape audit methodologies, professional competencies, and organizational outcomes.

The analysis also reveals a notable expansion of internal audit research into sustainability and interdisciplinary contexts. Themes such as sustainable development, corporate social responsibility, and health care quality indicate that internal auditing is being applied beyond traditional financial and corporate settings. This diversification reflects the growing importance of environmental, social, and governance (ESG) considerations, as well as the need for accountability in various sectors, including public and healthcare organizations [18], [19]. Consequently, internal audit research is increasingly aligned with global challenges, emphasizing its relevance in supporting sustainable and ethical organizational practices.

Despite these advancements, several gaps and opportunities for future research remain. The collaboration patterns suggest that research networks are still somewhat concentrated, indicating the need for broader international and cross-disciplinary partnerships. Additionally, while emerging topics such as digital auditing and sustainability are gaining attention, they require deeper empirical investigation to establish robust theoretical and practical frameworks. Future studies are encouraged to explore these areas more comprehensively, particularly in emerging economies where internal audit practices are rapidly developing. By addressing these gaps, the field can continue to evolve and contribute meaningfully to both academic knowledge and professional practice.

CONCLUSION

This study provides a comprehensive overview of the development and intellectual structure of internal audit research using a bibliometric approach. The findings confirm that the field has grown steadily over time, both in terms of publication output and thematic diversity. Traditional topics such as internal control, auditing, and risk management remain central to the field, reflecting the foundational role of internal auditing in organizational governance. At the same time, the emergence of new themes such as artificial intelligence, big data, and sustainability indicates a shift toward more innovative and forward-looking research directions.

The analysis also highlights the importance of global collaboration in advancing internal audit research, although contributions remain concentrated in certain regions, suggesting the need for broader participation from emerging economies. Furthermore, the increasing integration of technology and sustainability considerations presents significant opportunities for future research, particularly in developing practical frameworks and empirical evidence. Overall, this study contributes to the literature by mapping the evolution of internal audit research and identifying key trends, influential works, and emerging areas of interest, while offering valuable insights for academics, practitioners, and policymakers in strengthening internal auditing as a strategic and value-adding function in modern organizations.

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