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Five Decades of Internal Audit Research

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ABSTRACT

This article offers a bibliometric analysis of published internal audit (IA) research between 1981 and 2025. Using the Web of Science (WoS) database and employing the Bibliometrix package in the R environment to analyze and map the bibliographic data, the study identifies the most influential authors, journals, countries, and research themes in this field. The results suggest that IA research has experienced rapid growth over the past five decades, emphasizing corporate governance, internal controls, audit committees, risk management, and the public sector. Other results of the bibliometric analysis indicate David A. Wood as the top author, "Managerial Auditing Journal" as the most prominent journal, the paper by Hay et al. (2006) as the most cited article, and the USA as the most influential country in the IA research field. Finally, there are discussions on the key insights and directions for future research, primarily based on the thematic map.

Keywords:
Internal audit,
Computational literature review,
Bibliometrics,
Citation analysis,
Bibliometrix R package.

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1. Introduction

Internal audit (IA) is not a new phenomenon. It has its roots in history, as the demand for it dates back to the public tax systems of regions such as Babylon, Greece, and the ancient Roman Empire (Ramamoorti, 2003). However, the role of internal auditors has evolved from providing IA services to management to offering advisory services to the organization (Rezaee & Fogarty, 2019). According to the Institute of Internal Auditors' (IIA) definition in 1999 (IIA, 1999), internal auditors now assist organizations in accomplishing their objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, internal control, and corporate governance processes. After the global financial crisis between 2007 and 2009, they played an important role in these processes, as well as in the financial reporting processes of their affiliated companies (Mashayekhi et al., 2022).

IA, as a component of corporate governance, is linked to the system of risk management and internal control (Arena & Azzone, 2009) and plays a significant role in fighting mismanagement, inappropriate risk taking, and fraud in organizations (Lenz et al., 2018) through its relationship with the board. According to Arena et al. (2010), the role of internal auditors in risk management and the internal control system is monitored by the board of directors through the audit committee, and this committee plays its supervisory role via internal auditors (Čular et al., 2020). With their knowledge of various aspects of a firm's operations and its internal controls, internal auditors not only assure the adequacy of risk management (Raiborn et al., 2017) but also act as risk management facilitators and consultants (Fraser & Henry, 2007). As such, the IA function adds value by strengthening the firm's risk management system (D'Onza et al., 2015). According to Standard 2120, internal auditors should consider areas of the business where fraud risk is present and respond appropriately by examining the internal controls in those areas, assessing the potential for fraud and how this risk is managed by the organization (IIA, 2019). Internal auditors serve as a key line of defense against fraud (Rezaee, 2005) due to their knowledge of the business and its internal control structure through continuous evaluation of its adequacy (Oussii & Boulila Taktak, 2018). Organizations with a practical IA function are less likely to engage in fraud and management misconduct (Ege, 2015) and are more likely to detect and self-report fraud (Coram et al., 2008).

In addition to the role of IA in governance, risk management, and control processes as well as deterrence and timely detection of fraud, accounting research envision additional roles for this function, such as assuring financial reporting quality, independent audit of financial statements (Boskou et al., 2019; Čular et al., 2020), and assuring other managerial reports, such as sustainability reports (Soh & Martinov-Bennie, 2015; Trotman & Trotman, 2015). However, the global financial crisis in the early 21st century raised concerns about the quality and effectiveness of IA, as well as the role and impact of internal auditors (Bartlett et al., 2016). This called into question IA's added value in the eyes of researchers, professionals, and the general public. Thus, it resulted in a new stream of research on the direct and indirect effects of IA (Behrend & Eulerich, 2019; Boskou et al., 2019; Erasmus & Coetzee, 2018; Jiang et al., 2020). In addition to this, IA is also observed in fields of research other than accounting and auditing, such as healthcare (Cengiz et al., 2020; van Gelderen et al., 2017) and the food industry (Powell et al., 2013).

Considering the above-mentioned thematic diversity of the research conducted in the field of IA, conducting a systematic review of the literature is necessary to provide deeper insights and outline the direction of future research for researchers who wish to explore further and expand this field. Additionally, due to a large number of published research papers in the field of IA over the years, conducting a systematic review of these papers requires the use of techniques such as bibliometrics and social network analysis. To the best of our knowledge, there are only a limited number of systematic reviews in this field (e.g., Behrend & Eulerich, 2019; Kotb et al., 2020; Mubako, 2019; Turetken et al., 2020), which cover only a relatively limited range of IA topics, publications, and periods. As such, a more comprehensive and focused review of IA literature seems necessary. The present study aims to fill this gap in the literature and respond to the calls for further research by Behrend and Eulerich (2019). The main research questions (RQ) are as follows.

RQ1- What are the most common topics that make up the IA research structure? What are the well-developed and emerging issues in the field of IA? And, what are the future directions of IA research?

RQ2- What are the highest-impact articles, journals, authors, and countries in IA research?

RQ3- What is the structure of collaboration between authors and countries in conducting IA research?

To address these questions, the computational literature review (CLR) approach is used, which allows for selecting, filtering, and analyzing large volumes of research articles related to the field of IA (Mortenson & Vidgen, 2016). The required data are collected from the Web of Science (WoS) database. All published articles in the IA literature between 1981 and February 2025 are analyzed after filtering out irrelevant cases (a total of 1,462 articles) using the *Bibliometrix* package in R. We identify 1981 as the starting point for our review of IA literature because our latest search in the WoS database, using specific search criteria, returned papers from that year.

The contribution of this research lies in its application of the CLR approach to the IA literature, spanning almost 50 years. It contributes to the literature on IA and provides a more holistic and focused perspective of the literature compared to prior reviews. Moreover, the results of the present research draw a relatively complete picture of the IA literature over the last 50 years and, thus, offer future directions for researchers. Notably, future researchers can employ the results of this research in choosing the subject, collaborator, and possible funding organization of the project. These results can also be useful for professionals seeking to enhance their IA practices and guide them toward studies that are related to their topic of interest, which can be further explored to extract practical implications.

The remainder of this paper is structured as follows. Section 2 provides a brief review of the IA literature to demonstrate the diversity of topics in this field and the existing review articles. Section 3 describes the methodology and the data collection process. In section 4, the descriptive statistics, including the frequency distribution of published articles by author, topic, journal, and country, are provided; finally, section 5 concludes.

2. Background

IA has played an important role in corporate governance in many organizations since the early 1940s (Moeller, 2004), and this role has evolved (Behrend & Eulerich, 2019). Since the results of many studies point to the evolution of the role of IA and the growing awareness of different stakeholders about its importance and, therefore, reliance and trust in the performance of internal auditors, it is significant to move the profession forward (Leung et al., 2011). In particular, these results indicate that the scope of IA activities has expanded to include issues such as reassuring non-financial information, including corporate sustainability reports, as well as providing advice to the board of directors or audit committee (Protiviti & IIA-Australia, 2011). Additionally, considering the positive impact of IA on the performance of companies based on previous research (Carmeli & Tishler, 2004), some regulatory bodies have also confirmed its important role in organizations by requiring the establishment of an IA department (Harrington, 2004; NYSE, 2009).

Today, the demand for robust internal controls and qualified internal auditors has increased in all organizations, including fields beyond accounting and auditing. For instance, Schuett (2024) argues that frontier AI developers need internal auditors to assess the sufficiency and effectiveness of a company's risk management, internal controls, and governance procedures. Therefore, the study of IA dimensions as an important part of corporate governance (Carcello et al., 2018) has received more attention due to its close relationship with risk management and internal control systems (Arena & Azzone, 2009). Indeed, a sound corporate governance system involves the establishment of a practical IA to prevent fraud similar to accounting scandals in recent years around the world (Boskou et al., 2019). Another growing area of research in recent years is the role of IA in the organization's risk management (Coetzee, 2016). For example, Carcello et al. (2020) highlighted that managers of departments that have been audited internally recognize a greater reduction in risk (Carcello et al., 2020). Additionally, according to D'Onza et al. (2015), the greater contribution of IA in assessing risk management leads to added value to the organization (D'Onza et al., 2015).

The concept of internal control as one of the important tools of Enterprise Risk Management (ERM) and IA involvement with this (Čular et al., 2020; van der Twist et al., 2015) indicates another direction of IA research. According to prior research, the occurrence of fraud in the organization is mainly due to non-compliance or overriding of internal controls (Albrecht et al., 2009). Because of the position of IA concerning internal controls, the role of internal auditors in preventing and detecting organizational fraud (Boskou et al., 2019; Scarbrough et al., 1998) is examined in a significant portion of the research

Nonetheless, the wave of financial crises over the past two decades has demonstrated that IA may not have been able to fulfill its supposed monitoring role in preventing and timely identifying internal control weaknesses, and consequently, in helping companies avoid bankruptcy (Kotb et al., 2020). These concerns have raised new questions about the actual value of IA and have led to another group of studies (Behrend & Eulerich, 2019) that focus specifically on the effectiveness of IA. Changes in the role of internal auditors in today's business world and the expansion of their consulting role have increased the importance of evaluating the IA effectiveness (i.e., the ability of its independent and objective oversight activities in the organization to help the organization achieve its goals effectively) (Sawyer et al., 2003). Put another way, IA effectiveness is seriously discussed in the profession, including the International Standards for the Professional Practice of Internal Auditing (ISPPIA), which sets mandatory requirements for evaluating the effectiveness of IA (IIA, 2015). This makes the study of IA effectiveness worthy of more attention in academic research (Dittenhofer, 2001).

Some studies have been conducted regarding the effect of competence and objectivity of internal auditors on the IA quality (Drogalas et al., 2015; Oussii & Boulila Taktak, 2018; Vitalis et al., 2024). Consequently, the issue of the external auditor's reliance on IA services (Barr-Pulliam et al., 2024), the consequent impact on the external audit fee (Gros et al., 2017), and audit efficiency (Usman et al., 2023) is another field of research in this regard.

As IA is being outsourced on a large scale, mainly due to cost savings as well as access to higher-quality expert resources (Mubako, 2019), it has raised some concerns regarding issues such as the objectivity of internal auditors (Abbott et al., 2007; Swanger & Chewning, 2001), which have been addressed in another group of IA research.

In addition to the recurring topics above, fewer studies have addressed other issues, including the IA involvement in the field of sustainability, its reporting, and ensuring those reports (Rakipi & D'Onza, 2024; Ridley et al., 2011; Soh & Martinov-Bennie, 2015; Trotman & Trotman, 2015). The internal auditors and other corporate governance participants' perceptions about the importance and role of the IA function in organizations (Bananuka & Kundabanyanga, 2023; Burton et al., 2015; Fanning et al., 2014; Roussy, 2013) are other issues that have been less studied. Interestingly, the concept of IA is applied and studied in disciplines other than accounting and auditing, including health and medical services (Ford et al., 2009; Heinänen et al., 2019; Langella et al., 2023; Shah et al., 2017) and the food industry (Powell et al., 2013).

As can be observed, the field exhibits a high level of subject diversity. Given this diversity, conducting a study that indicates various aspects of research in published papers on IA would be beneficial. Such a study could enhance our understanding of IA. To date, several studies have been conducted to provide an overview of research related to IA (see Table 1). However, the review studies listed in Table 1 do not offer a comprehensive understanding of IA research. This limitation results from the fact that these reviews focus on a narrow range of topics, publications, or timeframes. We can mention some examples of these deficiencies.

While Gramling et al. (2004) did not cover the studies about the post-Sarbanes-Oxley era, Kotb et al. (2020), using an SLR, reviewed just the IA literature after Enron's financial crisis in 2002. Stewart and Subramaniam (2010) review the literature on IA independence and objectivity. Behrend and Eulerich (2019) examined changes in IA research over time by analyzing articles published in only the top five accounting journals and ignoring other studies published outside these journals. Hazaea et al. (2022) studied only IA research conducted in 27 European countries and the UK, based on just the Scopus database from 1987. Additionally, Hazaea et al. (2023) systematically reviewed IA literature in just some Arab countries, focusing on four key IA factors: quality and effectiveness, independence and objectivity, consequences, and challenges to deliver understandings and directions for future IA research. In another study, Hazaea et al. (2025) explored IA research in the USA to understand how IA has developed in response to global changes in the business environment.

The studies mentioned, with several limitations in their scope, predominantly utilize a qualitative approach to review the literature. According to Mortenson and Vidgen (2016), qualitative literature reviews are primarily conducted without specific instruments or software, are limited in terms of the number of articles and their timespan, and are subject to the researcher’s bias. This is despite the fact that these limitations do not exist in the Computational Literature Review (CLR). An exception to this is the study conducted by Handoyo (2024). Handoyo employed a bibliometric analysis to investigate

the evolution of IA and its development from a simple oversight function of financial procedures to a crucial element in managing various aspects of a company, including corporate culture, IT concerns, and risk management. However, this study focused solely on IA effectiveness, neglecting other vital aspects of IA. Hence, it is necessary to conduct new research to provide a more comprehensive and focused view of IA studies. The current study aims to fill the literature gap in this area and is also conducted in response to the recommendation of Behrend and Eulerich (2019).

Table 1. Review Papers on the IA Until 2020

References/ Authors	Brief Description of Research	Research Method	Collection Method and Number of Studies Reviewed	Time Period
Review papers on the IA				
Behrend & Eulerich (2019)	A review of the IA research trend	Bibliometric Network Analysis	170 articles published in the top five accounting journals	1926-2016
Kotb et al. (2020)	A review of the IA literature after Enron's 2002 financial crisis	Structured Literature Review (SLR)	471 articles from 64 journals in the ABS and ABCD ranking list	2005-2018
Hazaea et al. (2022)	A review of studies on IA in Europe with a focus on four key features (governance, the effectiveness of IA, the relationship between internal auditors and other parties, and risk management)	Systematic Literature Review	142 published papers in business and management journals	1987- 2022
Hazaea et al. (2023)	A systematic review of the literature on IA in Arab countries	Systematic Literature Review	91 articles about 17 Arab countries collected from the Scopus database	1996-2022
Review papers on the IA trend				
Hass et al. (2006)	A review of literature to examine how IA performance has changed in response to changes in global business practices in USA.	Literature Review	N/A- 27 academic papers and professional reports	1997-2009
Allegrini et al. (2006)	A review of literature to examine how IA performance has changed in response to changes in global business practices in Europe.	Literature Review	N/A- 17 academic papers and professional reports	1997-2006
Cooper et al. 92006)	A review of literature to examine how IA performance has changed in response to changes in global business practices in Asia-Pacific.	Literature Review	N/A- 25 academic papers and professional reports	1983-2006
Hazaea et al. (2025)	Mapping the literature trends of internal auditing in the United States	Systematic Literature Review	171 studies retrieved from Scopus database	1984- 2023
Review papers on the role and characteristics of IA				
Gramling et al. (2004)	A review of research on the role of IA in corporate governance	Literature Review	N/A	N/A
Stewart & Subramaniam (2010)	A review of research on independence and objectivity of IA	Literature Review	N/A	1999-2010
Lenz & Hahn (2015)	A review of empirical research on IA effectiveness	Literature Review	N/A	1999-2015 (Sometimes older based on relevancy)
Roussy & Perron (2018)	A review of research on the multiple roles, quality and the practice of IA	Structured Literature Review (SLR)	91 articles selected from "A" and "B" journals, and "C" journals that focused on IA	2005-2017
Mubako (2019)	A review of empirical research on outsourcing of IA function	Literature Review	N/A	1998-2018
Turetken et al. (2020	A review of research on IA effectiveness	Structured Literature Review (SLR)	37 articles published in journals in major electronic libraries	2000-2019
Handoyo (2024)	Mapping the landscape of IA effectiveness research	Bibliometric Analysis	186 papers retrieved from Scopus database	1981- 2023

3. Methodology

3-1. Bibliometrics Analysis

The purpose of a literature review is to help researchers explore the existing literature on a topic and develop a research question to expand the boundaries of knowledge in that particular field (Tranfield et al., 2003). The literature review also provides an overview of the topic for new researchers. Most literature reviews rely on qualitative methods and are conducted without the use of specific instruments or software. They are limited in the number of articles and the period they cover, do not specify the structure of the research community, and are subject to the researcher's bias (Mortenson & Vidgen, 2016). For doing a literature review, we employ bibliometrics, which is often used in literature reviews to capture the structure and different components of scholarly research (Daum et al., 2019). Bibliometrics, primarily concerned with studying the links between cited and citing literature, includes evaluative and relational techniques (Benckendorff & Zehrer, 2013; Koseoglu et al., 2016). Evaluative techniques assess the impact of scholarly research based on the number of citations, while relational methods focus mainly on the relationships between domains, sources, and researchers. Bibliometric methods are used to analyze research output in a specific field. Such methods are increasingly used to measure science quality, productivity, and evolution (Martínez-Gómez, 2015).

Following Cobo et al. (2011), we have combined the bibliometric methodology with the performance analysis and scientific mapping in this research. Additionally, using co-word analysis, we analyzed the IA research and detected and visualized its conceptual themes and thematic evolution. According to Mahmud et al. (2025) and Shekhar (2023), we employed the R package Bibliometrix for our analysis.

3-2. Search Strategy

Articles related to IA were collected to analyze their bibliometric features and execute scientific mapping. Similar to Kamalipoor et al. (2023) and Abdian et al. (2023), we gathered raw data (articles) from the WoS Core Collection in this analysis. WoS is the most effective database that covers a wide range of disciplines and high-quality journals (Merigó & Yang, 2017); therefore, it allows comparisons across scientific fields (Herrera-Viedma, 2020) and allows for various types of scientific texts analysis (Li et al., 2018). The following advanced query was performed, as shown in the identification and screening steps reported in Figure 1. The procedure for article selection is based on the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines (Moher et al., 2009).

4. Findings

4-1. Data Description

First, our query identified 5,469 documents; however, after implementing the screening and eligibility steps, the final collection included 1,462 documents. As reported in Table 2, there is an average of 15.29 citations per document in the period 1981–2025, and 2,693 authors published them in 485 sources (e.g., journals, proceedings, books). Although we did not impose any limitation on the year range in the query, the oldest document returned by the query is dated to 1981. Of the 2,693 authors, 246 (less than 10%) were authors of single-authored documents. Additionally, 20.11% of the documents are international co-authorships, and 43,970 other documents have been referenced. On average, 9.3 years have passed since the publication of each document.

Database= Web of Science Core Collection. TOPIC= ("internal audit*"). Refined by: WC= (Business Finance or Management or Business or Economics or Operations Research Management Science or Public Administration) AND LANGUAGES: (ENGLISH). DOCUMENT TYPES: (ARTICLE OR PROCEEDINGS PAPER OR REVIEW) Timespan: All years. Indexes: Social Sciences Citation Index (SSCI) or Emerging Sources Citation Index (ESCI) or Science Citation Index Expanded (SCI-EXPANDED) or Conference Proceedings Citation Index – Social Science & Humanities (CPCI-SSH) or Conference Proceedings Citation Index – Science (CPCI-S).

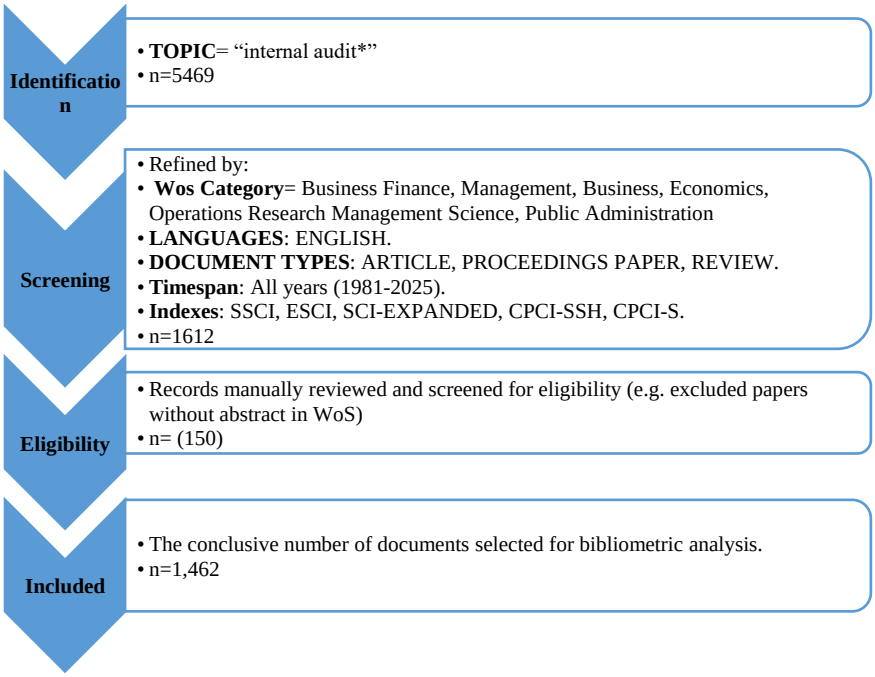

Fig. 1. Article Selection Procedure (PRISMA Framework).[1]

Table 2. Main Information About IA Collection

Description	Value
Timespan	1981- 2025
Sources (Journals, Books, etc.)	485
Documents	1462
Publication Annual Growth Rate %	3.39
Document Average Age	9.3
Average Citations Per Document	15.29
Total Citations	22,743
Authors and Collaboration	
Authors	2,693
Authors of Single-Authored Documents	246
Author's Keywords	3,168
Keywords Plus	1,202
Single-Authored Docs	292
Co-Authors Per Document	2.52
International Co-Authorships %	20.11

The annual growth rate of IA documents is 3.39%. According to Figure 2, until 2005, there was a steady growth of published documents in the field of IA, so that by 2004, only 4.65 percent of the total articles were published in this field. Since 2010, these documents have increased exponentially, reaching a peak in 2023.

1. Abbreviations used for indexes in screening stage include Social Sciences Citation Index (SSCI), Emerging Sources Citation Index (ESCI), Science Citation Index Expanded (SCI-EXPANDED), Conference Proceedings Citation Index – Social Science & Humanities (CPCI-SSH), and Conference Proceedings Citation Index – Science (CPCI-S).

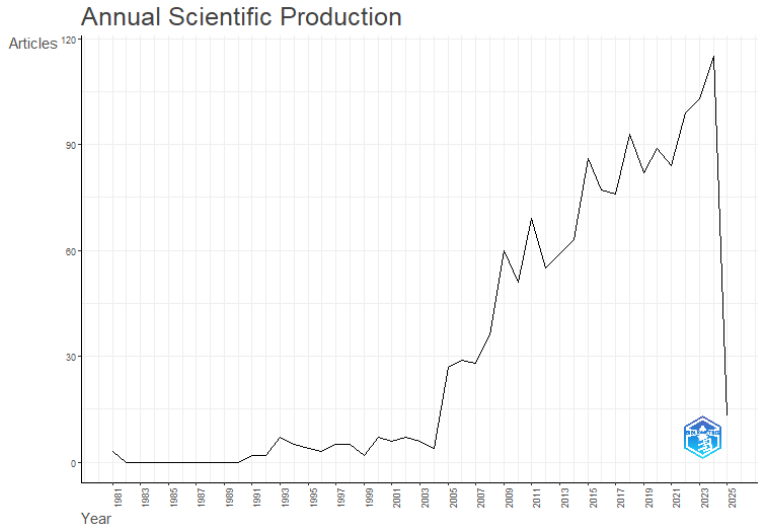

Fig. 2. Annual Documents Publication

Figure 3 illustrates the broad classification of topics in the field of IA. Based on Figure 3, a total of 985 articles (67%) belong to the subjects of 'Business Finance,' followed by the 'Management' (37%), 'Business' (21%), and 'Economics' (15%). The rest of the articles belong to other subjects, such as operations research, computer science, social science, engineering, and political science. This indicates that IA goes beyond its traditional implications in all industries and scientific fields.

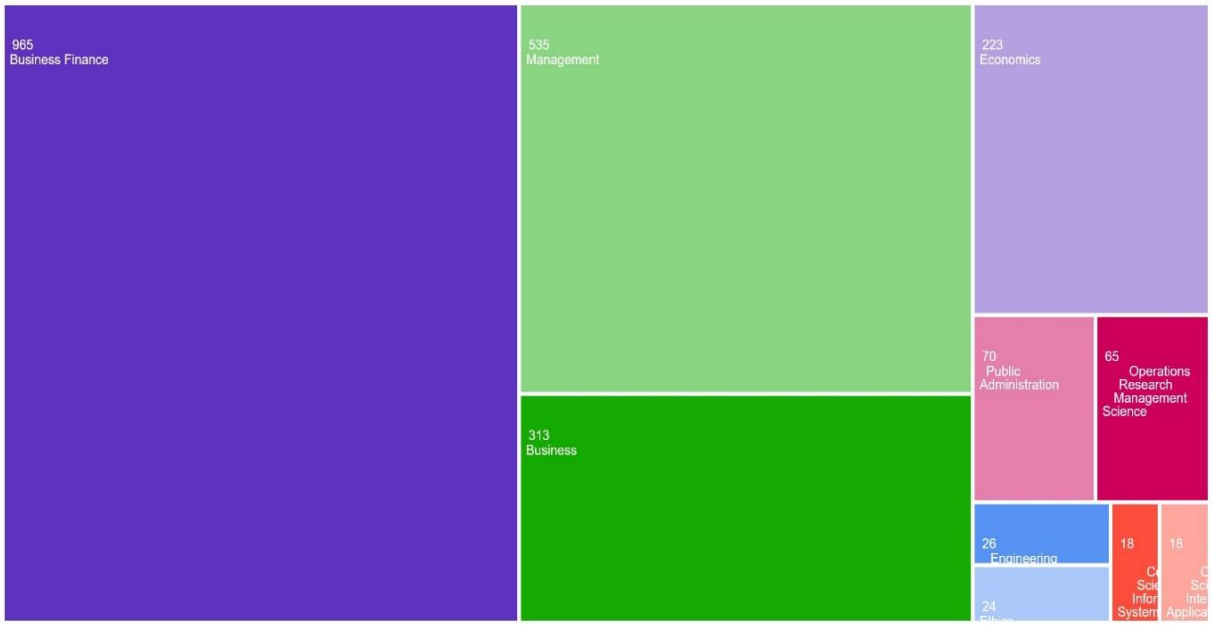

Fig. 3. IA Articles by WoS Subject Categories (Source: WoS Citation Analysis Outputs)

As presented in Table 3, 38 percent of all the published documents (568) and approximately 64 percent of the total citations (14,539) are from 2019 onwards. Additionally, approximately 82 percent of all documents and 81.5 percent of the total citations (22,201) were published after 2002, i.e., following the implementation of the Sarbanes-Oxley (SOX), 2002. This law requires U.S. public companies to establish and maintain an IA function under the supervision of an AC. This resulted in the approval of similar laws around the world. Therefore, it is not surprising that the tendency of academic research in this field will increase in this era. As seen in Figure 4, the peak of citations goes back to the documents published in 2004, which was before the global financial crisis.

Table 3. Cumulative Percentage of Documents and Citations Between 1981 and 2025

Period	Percentage of Publications	Percentage of Citations
2019-2025	38.84%	63.81%
2011-2018	39.88%	29.28%
1981-2010	21.27%	6.91%
2002-2022 (*post- Sarbanes-Oxley era*)1411	81.51%	97.44%

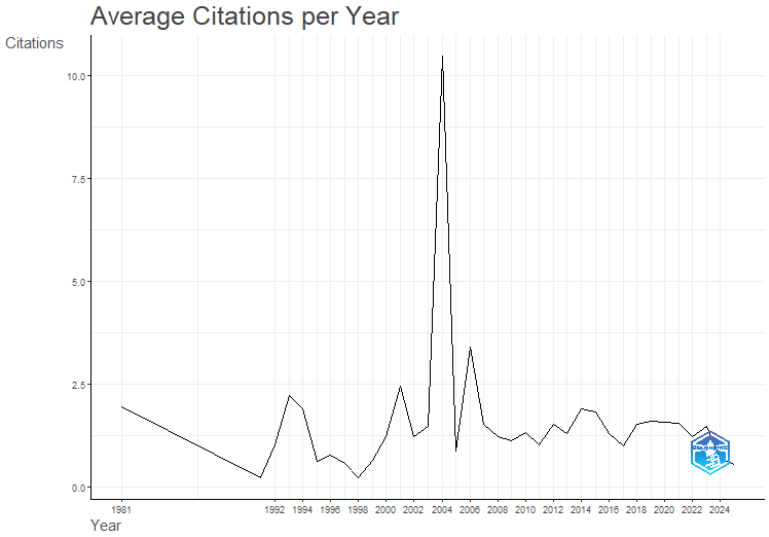

Fig. 4. Average Total Citations per Year

4-2. Keyword Analysis

To address the research question of what topics make up the conceptual structure of IA research and which topics are well-developed and which are developing and need more studies, keywords should be analyzed in different ways. In order to analyze keywords, both keywords identified by the database (Keywords Plus) and keywords defined by the author (Author Keywords) in WoS can be employed. Keywords Plus refers to keywords identified by a database based on their frequency. Since the author's keywords express the meaning or the main ideas presented in an article (Peset et al., 2020), we used the author's keywords to implement the co-occurrence of keywords. Between 1981 and 2025, a total of 3,168 author keywords have been defined by the authors, and the ten most frequent keywords are listed in Table 4. It is important to note that we have merged the different terms that refer to the same concept. For instance, the keywords "internal audit," "internal auditing," and "internal audit function" were all merged into the keyword "internal audit". Additionally, we merged the abbreviation of keywords with the keywords themselves (e.g., Corporate Social Responsibility and CSR). As expected, "internal audit" is the most frequent author keyword in this field. In addition to the keywords of internal auditors, audit, and external audit, which are repeated in IA research, some other important keywords in this field are: "corporate governance," "internal controls," "audit committees," and "risk management." It confirms the critical role of IA as one of the internal corporate governance mechanisms in companies. The need to pay attention to the role of IA in the public sector and governmental organizations is also evident in this Table. Likewise, concepts such as IA effectiveness and quality, fraud, accountability, and continuous audit have also been raised in IA research. The frequent appearance of the word "Malaysia" highlights the increasing attention among scholars in this country towards IA. This growing interest has resulted in a rise in the number of articles published on the topic. Additionally, the improvement in financial reporting quality, which can be the result of the implementation of IA in public and private companies, is a frequently cited aspect in this field of research.

Table 4. 10 Most Frequent Keywords

Author Keywords	Frequency
internal audit	682
corporate governance	243
internal controls	123
audit	109
audit committees	109
risk management	85
internal auditors	79
public sector	47
audit fees	32
internal audit quality	32
Malaysia	32
external auditors	31
audit quality	29
internal audit effectiveness	29
accountability	27
fraud	27
continuous audit	26
assurance	23
financial reporting quality	22
local government	22

WordCloud is a graphical representation of keyword frequency, emphasizing keywords that appear more frequently than others in a set of data. This technique serves as a method of data visualization for textual data, where the size of each keyword indicates its frequency or importance (Kadam, 2021). The more times a keyword is repeated in a data set, the larger and bolder it appears in the WordCloud. Figure 5 illustrates the WordCloud of IA research. As is evident, the results of Table 4 are validated in this figure.

Fig. 5. Internal Audit Research WordCloud

Keywords represent the core content of published papers and represent the range of areas investigated within the boundaries of any area (Su & Lee, 2010). A network of related keywords offers a precise picture of patterns, relations, and intellectual organization of the topics in an area (van Eck & Waltman, 2014). Mapping and visualizing keyword co-occurrence can provide a deeper understanding of the cognitive network within a field and help identify dominant themes and the existing landscape of the research area, as well as highlight subfields, neglected and emerging topics, and possible future directions (Mashayekhi et al., 2024). Figure 6 illustrates the keyword co-occurrence network in the field of IA.

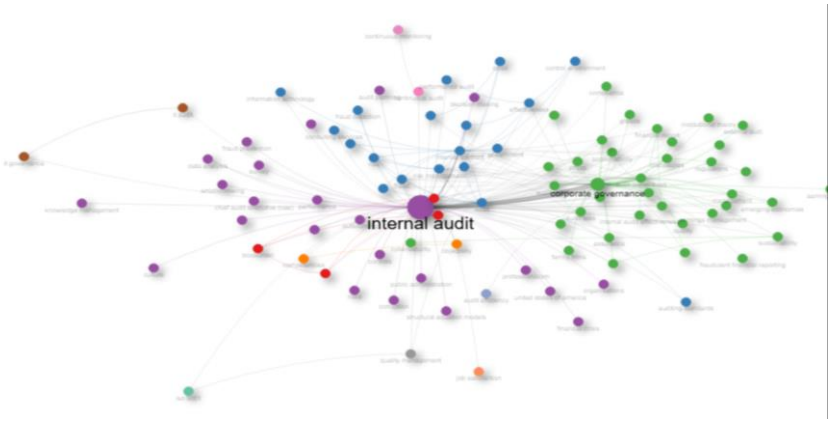

Fig. 6. Keyword Co-Occurrence Network

Since the keyword co-occurrence network output from *Bibliometrix* was unclear, (similar to Abdian et al., 2023; Goli & Haghighinasab, 2022; Hoseinzadeh Shahri et al., 2019) we conducted the analysis using VOSviewer[1], which provided a more precise visualization (see Figure 7). The results from both methods are consistent.

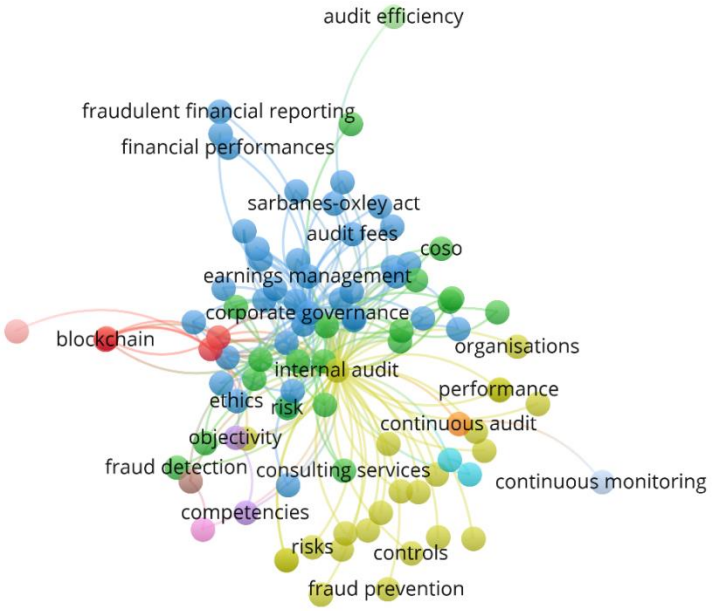

Fig. 7. Keyword Co-Occurrence Network (by VOSviewer)

According to Figures 6 and 7, twelve clusters were formed. Four clusters contained the most keywords, while the remaining eight contained only nine. The keywords within each cluster frequently appeared in related research. Additionally, high-frequency co-occurring keywords are grouped and displayed in distinct colors. Besides the cluster focusing on IA, other notable clusters include corporate governance, internal controls, and internal auditors, which are highlighted based on their frequency of occurrence. For example, the keywords related to "corporate governance," including "board of directors," "audit committees," "IA quality," "IA effectiveness," "financial reporting quality," "fraudulent financial reporting," "earnings management," and "audit fees" frequently appear together in the green and blue clusters (in Figures 6 and 7, respectively). The most frequently occurring term in this cluster is "corporate governance," as shown in Figures 6 and 7. These terms are grouped together, as the board of directors and audit committees are essential components of corporate governance. They play a vital role in ensuring effective and qualified IA. Together, they aim to

1. https://www.vosviewer.com/

enhance organizational transparency, improve the quality of financial reporting, prevent fraudulent financial activities and earnings manipulation, and potentially reduce audit fees.

The next cluster of frequently used keywords related to internal controls includes keywords such as "internal controls," "risk management," "enterprise risk management (ERM)," "audit risks," "public sector," "local government," and "performance audit." This group highlights the connection between risk management and internal controls, emphasizing the importance of internal controls in the public sector and the growing focus on performance audits in government entities. Additionally, a smaller cluster illustrates the relationship between "internal auditors" and "external auditors," as well as the use of "analytical procedures" by both parties.

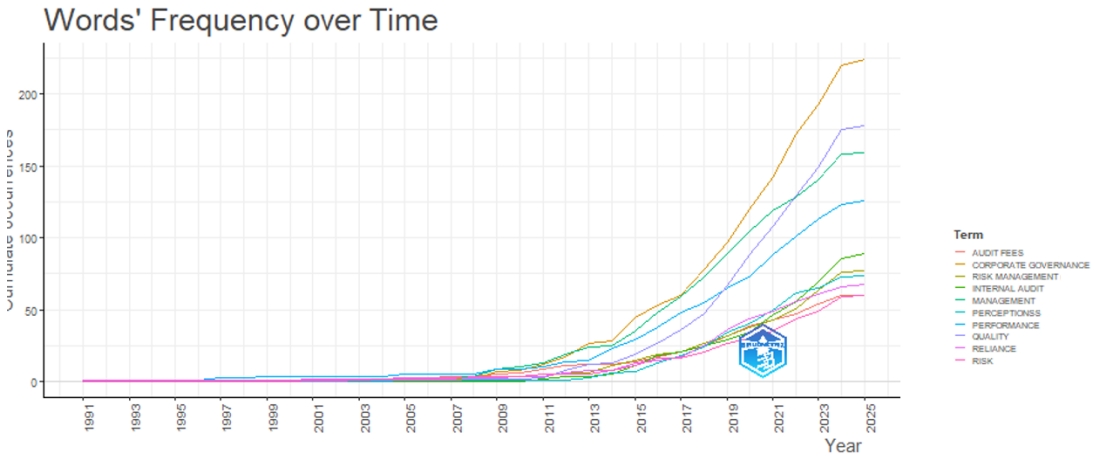

Fig. 8. Word Dynamics for the Top-10 Repeated Keywords in the IA Research Field

We extracted the word dynamics to present the word growth over time based on our dataset. Figure 8 depicts the growth of top-10 Author Keywords in the IA research domain from 1981 until 2025. As highlighted in Figure 8, the keyword "corporate governance" has been steadily gaining attention, indicating that it remains a primary focus for many researchers. Additionally, the rapid growth of the keywords "quality," "management," "performance," and "risk management" as well as "internal audit" in IA research confirms the critical role of internal auditors concerning these concepts for value creation in the companies. The duties of IA regarding the last concept, along with corporate governance, are consistent with the definition of IA provided by the IIA in 1999.

Fig. 9. Thematic Map

For identifying emerging topics, we conducted a co-word thematic analysis. According to Cobo et al. (2011), "thematic analysis" specifies themes based on their density and centrality, and subsequently, classifies these themes within the articles. In Figure 9, the mentioned themes are plotted on a thematic plot. Two measures are considered for each theme: centrality (which measures the degree of interaction of a network with others) and density (which measures the network's internal strength). Motor-themes: Themes in the upper-right quadrant (Motor-themes) are well-developed and important for the research field's structure. Themes in the upper-left quadrant (Niche Themes) are well-developed but unimportant for the field (specialized themes). Themes in the lower-left quadrant (Emerging or Declining Themes) are both weakly developed and unimportant. Themes in the lower-right quadrant (Basic themes) are important but not developed for a research field. "Internal audit," "corporate governance," and "internal controls" are key themes, indicating that the literature on these topics is well-developed and has yielded significant insights for IA research. The basic themes of "audit committees," "IA quality," "audit fees," "outsourcing," "management training ground (MTG)," "continuous audit," and "competencies" are fundamental areas that require further exploration in future research. The themes of "knowledge management," "ethics," and "whistleblowing" are niche topics that may not yet be widely acknowledged or incorporated into the broader discourse. However, they have the potential to gain significance over time. The emergence of "audit risk," "public administration," "cyber security," "IT audit," and "IT governance" in IA research indicates their increasing relevance (Mashayekhi et al., 2021; Vanaki et al., 2021). This trend can be attributed to changes in the regulatory environment, the rising complexity of administrative operations, and the growing importance of accountability, especially within public and governmental sectors. Additionally, IT or information technology and its audit have emerged as a relatively new topic that has garnered significant attention in recent studies, but warrants more thorough investigation.

4-3. Co-Authorship Network Analysis

Understanding the existing networks of scientific collaboration in a given field facilitates access to funds, specialties, and expertise, increases productivity, reduces isolated research, and ultimately, benefits scientific collaboration and boosts scholarly communications (Ding, 2011). Co-authorship network analysis can be used to trace nearly every aspect of scientific collaboration (Glänzel & Schubert, 2004). In this section, the collaboration networks of prominent researchers and influential countries are analyzed.

Figure 10 indicates the most locally cited authors. David A. Wood[1] from Brigham Young University is identified as the leading author in this field, with 671 citations. According to unpublished results, he is also the most productive author, with 22 articles in WoS journals from 2008 to 2024. The topics he has studied mainly include: external auditor's reliance decision, IA sourcing arrangement, IA quality, audit committees and managers' reliance on internal auditors, IA sourcing arrangement, IA as a management training ground (MTG), rotational IA programs, and the effects of IA on firm performance and perceived risk.

Figure 11 illustrates ten clusters, each cluster represents a group of authors that are connected either directly through collaboration in various publications or indirectly through joint co-authors. The largest group with orange bubbles, including Wood DA. (Brigham Young University), Eulerich M.2 (University Duisburg-Essen), Messier W.[3] (NHH Norwegian School of Economics), Vasarhelyi, M.A.[4] (Rutgers University), and Masli A.[5] (University of Kansas) indicates the most influential authors in the co-authorship networks. One of the most cited papers is published by the red group (IA Quality and Earnings Management), and three of the most productive authors are among this cluster (Wood DA, Eulerich M, and Messier W).

1. https://scholar.google.com/citations?hl=en&user=2yK47N0AAAAJ
2. https://scholar.google.com/citations?user=ZZbhuhMAAAAJ&hl=en&oi=sra
3. https://scholar.google.com/citations?hl=en&user=5BttzNkAAAAJ&view_op=list_works&sortby=pubdate
4. https://scholar.google.com/citations?user=MBJ_kK4AAAAJ&hl=en
5. https://scholar.google.com/citations?hl=en&user=aXKPA7YAAAAJ&view_op=list_works&sortby=pubdate

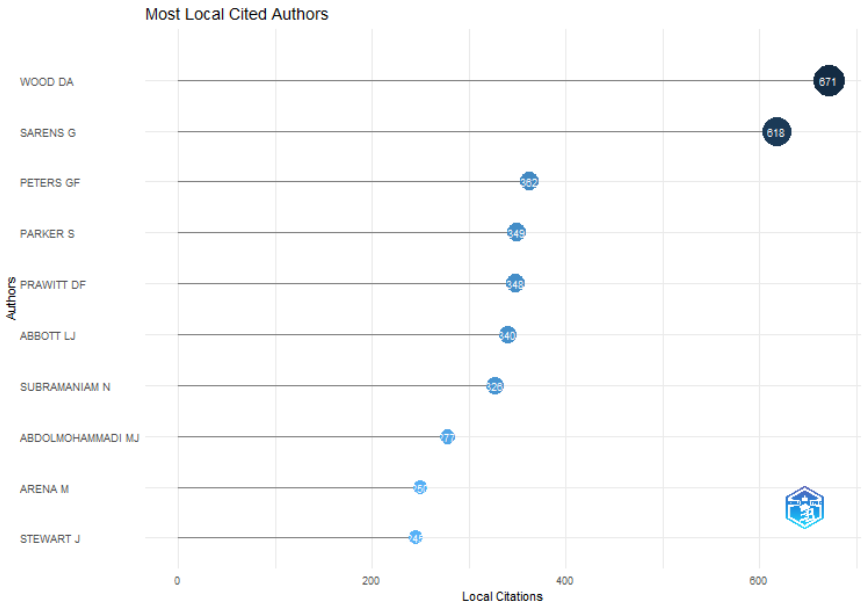

Fig. 10. Most Productive Authors

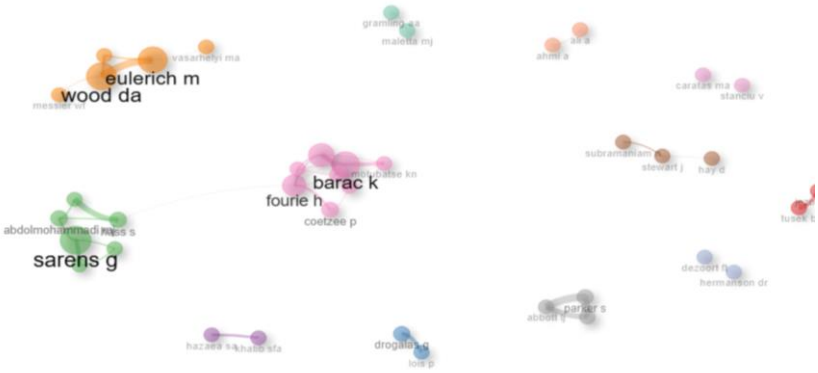

Fig. 11. The Author Collaboration Network

4-4. Leading Journals

According to Table 5, "Managerial Auditing Journal," "Auditing: A Journal of Practice & Theory," and "Accounting Review" are the top three most influential journals. The h-index for each journal was obtained from SCImago Journal Rank (SJR) which developed from the information contained in the Scopus® database (Elsevier B.V.)[1]. The "International Journal of Auditing" is the second most productive journal in IA field of research after the "Managerial Auditing Journal."

Table 5. Leading Journals

Sources	Citation	Articles	Country	H Index
Managerial Auditing Journal	3267	134	UK	61
Auditing-A Journal of Practice & Theory	2232	40	USA	85
Accounting Review	2093	16	USA	168
International Journal of Auditing	1490	67	UK	31
Journal of Accounting Research	1142	4	USA	149
Accounting Horizon	1114	15	USA	91
Contemporary Accounting Research	1108	11	Canada	109
Accounting Organizations and Society	1019	10	UK	140
Journal of Business Ethics	825	20	Netherland	253

1. These figures were extracted on January 5, 2023

According to Table 5, four US journals have the highest number of citations, of which three (including Accounting Review, Auditing: A Journal of Practice and Theory, and Journal of Accounting Research) are affiliated with the American Accounting Association (AAA). US journals have a special prominence among the accounting and auditing journals, and this dominance is probably due to the establishment of the AAA in 1916. The AAA has played a key role in accounting academics since 1926 by introducing "the Accounting Review," which has been the most important reference for presenting accounting research results for many years (Merigó & Yang, 2017). The AAA also published the highly prestigious "Auditing: A Journal of Practice and Theory" in 1981. This is consistent with the results of Carmona (2006), Wakefield (2008), and Chan et al. (2009), who identify the "Journal of Accounting Research," "Accounting Review," "Accounting Horizon," and "Auditing: A Journal of Practice And Theory"- journals published by the AAA- as well as "Accounting Organization and Society" and "Contemporary Accounting Research" as the most influential journals in the field of accounting and auditing.

4-5. Leading Countries

Since the contribution to various fields of research varies across countries, awareness of the most active countries in a given field could assist future collaboration, exchanges of technologies and innovation, and facilitate joint research funding (Wuni et al., 2019). Table 6 reports the most productive countries and shows each country's tendency to collaborate with others. Additionally, according to Ciavolino et al. (2022), Single Country Publications (SCP)[1] and Multiple Countries Publications (MCP)[2] are presented, which implies the number of documents produced by authors from the same country and the total number of documents published by authors from different countries, respectively. According to Table 6, the most productive countries in publishing documents regarding IA are the US, Malaysia, Australia, South Africa, and China. The dominance of the USA, Malaysia, South Africa, and China is also evident in terms of the Total Citations per Country (TCC). This is while the mentioned countries have less tendency for collaboration with other countries (MCP=13.67, 3.30, 25.61, and 15.19%, respectively). Among the most productive countries, the most cooperative ones are Saudi Arabia (MCP=47.72%), the UK (MCP=43.18%), Australia (MCP=26.32%), and Indonesia (MCP=21.31%). The USA superiority in publishing articles in the field of IA can be observed because of the establishment of the IIA in 1940 and its significant and extensive activity since then.

Table 6. The Most Productive Countries

Country	Documents	Citations	Freq%	SCP	MCP	MCP%
USA	656	6,280	20.52	259	41	13.67
South Africa	145	1,111	6.22	88	3	3.30
Malaysia	190	131	5.61	61	21	25.61
China	141	421	5.40	67	12	15.19
Australia	150	131	5.20	56	20	26.32
Indonesia	116	273	4.17	48	13	21.31
Romania	108	151	3.76	53	2	3.63
Saudi Arabia	74	159	3.00	23	21	47.72
UK	109	165	3.01	25	19	43.18
Italy	77	97	2.60	31	7	18.42

1. Intra-country collaboration
2. Inter-country collaboration

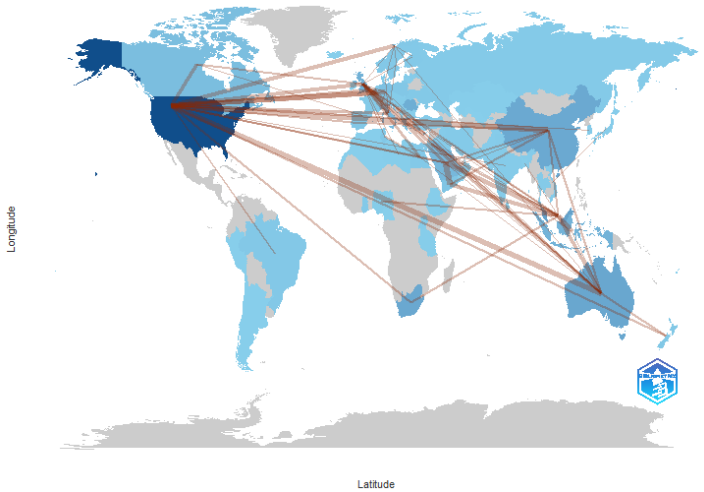

Fig. 12. Country Collaboration Map

4-6. Co-Citation Analysis

Citation patterns in a research corpus, as determined through co-citation analysis, can provide helpful information about the structure of a knowledge domain. In the co-citation network (Figure 13), each node's size indicates the number of citations, and the line between two nodes represents the co-citation link among the articles. As can be observed, two research clusters are formed. The red cluster centers on the study of Arena and Azzone (2009), who attempted to identify the corporate drivers of IA effectiveness after recent shifts in the IA's mission and position in corporate governance; therefore, many studies have referenced this study's findings. The cluster in blue is centered around the paper by Gramling et al. (2004), who synthesized literature on IA to inform future research on the new roles that IA can play in ensuring effective corporate governance, specifically focusing on the functions of external auditors, audit committees, and management. As is evident in Figure 13, the results of this study have attracted the attention of many researchers. Table 8 provides additional information about the articles with the highest co-citations and the visualized network, which includes pivotal points in a scientific domain (Chen, 2006).

Table 7 indicates ten most cited papers in the Period 1981-2025. Based upon the results in this Table, the study of Hay et al. (2006) entitled "Audit Fees: A Meta-Analysis of the Effect of Supply and Demand Attributes" has the highest number of co-citations in the IA literature. This result indicates that external audit fee is still at the center of the researchers' attention, and audit fee behavior is studied concerning other IA concepts. This is likely related to the role of internal auditing (IA) in assisting external auditors and, thus, its effect on the audit fee.

Table 7. Co-citation Analysis for the Period 1981-2025

Node	Cluster	Betweenness	Closeness	PageRank
Arena & Azzone (2009)	1	11.989	0.022	0.049
Carcello et al. (2005)	1	11.394	0.022	0.0337
Stewart & Subramaniam (2010)	1	7.217	0.022	0.0263
Soh & Martinov-Bennie (2011)	1	5.745	0.022	0.0402
Sarens & De Beelde (2006-1)	1	5.685	0.022	0.0319
...	...	...	...	...
...	...	...	...	...
...	...	...	...	...
Gramling (2004)	2	44.671	0.0243	0.0535
Prawitt (2009)	2	21.828	0.0243	0.0545
lin et al. (2011)	2	12.161	0.0243	0.0441
Felix (2001)	2	8.625	0.0243	0.0409
Coram et al. (2008)	2	7.536	0.0243	0.0268
...	...	...	...	...
...	...	...	...	...
...	...	...	...	...

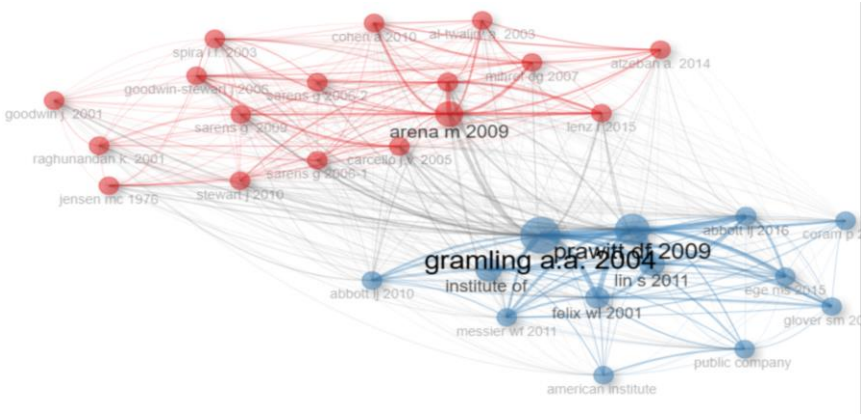

Fig. 13. Co-citation Network

Table 8. Ten Most Cited Papers in the Period 1981-2025

Article	Source	DOI	First Author	Total Citation (TC)	TC Per Year
Audit Fees: A Meta-analysis of the Effect of Supply and Demand Attributes	Contemporary Accounting Research	10.1506/4XR4-KT5V-E8CN-91GX	Hay (2006)	908	45.4
Servant Leadership and Serving Culture: Influence on Individual and Unit Performance	Academy of Management Journal	10.5465/amj.2013.0034	Liden (2014)	570	47.5
Auditor Independence, Non-Audit Services, and Restatements: Was the U.S. Government Right?	Journal of Accounting Research	10.1111/j.1475-679X.2004.t01-1-00141.x	Kinney (2004)	482	21.91
The Relationships Between Intangible Organizational Elements and Organizational Performance	Strategic Management Journal	10.1002/smj.428	Carmeli (2004)	364	16.54
Internal Audit Quality and Earnings Management	Accounting Review	10.2308/accr.2009.84.4.1255	Prawitt (2009)	281	16.53
The Association between Sustainability Governance Characteristics and the Assurance of Corporate Sustainability Reports	Auditing: A Journal of Practice & Theory	10.2308/ajpt-50849	Peters (2015)	269	24.45
Collusion in Hierarchical Agency	Econometrica	10.2307/2951721	Kofman (1993)	214	6.48
Evaluating Information System Effectiveness	MIS Quarterly	10.2307/249291	Hamilton (1981)	205	4.56
Relationship Between External Audit Fees, Audit Committee Characteristics and Internal Audit	Accounting and Finance	10.1111/j.1467-629X.2006.00174.x	Goodwin-Stewart (2006)	197	9.58
The Contribution of Internal Audit as a Determinant of External Audit Fees and Factors Influencing This Contribution	Journal of Accounting Research	https://doi.org/10.1111/1475-679X.00026	Felix (2001)	182	7.28

5. Conclusion

Given the growing awareness of the academic and professional community regarding the importance of IA in adding value to organizations, especially in light of the recent financial crisis, numerous articles and reports have been published in this field. Therefore, a review of the IA literature, followed by a report that sheds light on the numerous aspects of this concept, will be useful to practitioners, researchers, regulators, and standard setters. For example, it can provide professionals with insights into improving the IA effectiveness and determining the type of services that are needed (Usman et al., 2023). It can introduce researchers to those aspects of IA that have been covered less in the literature, thereby providing a roadmap for future research, which will in turn expand the research corpus in those particular areas. A review will also help regulators and standard setters become familiar with the issues and challenges in the profession, enabling them to contribute to IA effectiveness by setting or altering relevant regulations and standards.

Given the discussions above and in response to Behrend and Eulerich's (2019) calls, this study was an attempt to provide insights into the research conducted throughout the history of IA (from 1981 to 2025) and identify the most influential articles, journals, authors, and countries, the structure of collaboration among authors and countries, and repeating patterns in the field of IA over this period. Since conducting a systematic review of the IA literature over such a long period required reviewing a huge number of titles, abstracts, keywords and texts, it seemed necessary to use computational algorithms as a complementary strategy. Therefore, in this study, a CLR approach was used to conduct a systematic review of the IA literature. Since this approach has not been utilized in previous reviews and has no restrictions on time, journals, or geographical area, it can be regarded as the first contribution of this paper. To realize the above contribution and carry out the mission of this research, articles extracted through CLR were examined using bibliometric analysis. The necessary information was collected from the WoS database, and 1,462 IA articles were analyzed. Bibliometrix package in R environment was also used for the visualization of bibliometric networks.

The results of the initial review of the literature revealed that more than one-third of all the published documents are from 2019 onwards. More than 80 percent of the entire documents occur after 2002, i.e., the year the Sarbanes-Oxley Act was passed by the US Congress and similar laws and regulations were adopted in other countries which required companies to establish an IA under the supervision of the audit committee.

Regarding the first research question, the keyword analysis indicated that except for the keywords of "audit" and "internal auditors" which have been frequently used in the IA research, "corporate governance," "internal controls," "audit committees," "risk management," and "public sector" are the most five essential keywords that make IA research structure. As Mashayekhi et al. (2023a) noted in their study, there is an increasing trend in academic production related to IA in the public sector, and this is observed in the high frequency of "public sector" keywords in the IA research area.

The term *dynamics analysis* indicates that “corporate governance,” “quality,” “management,” “performance,” and “risk management” have been increasingly emphasized over the years and are now the primary focus of many researchers. This growing interest reflects the interconnections between these topics and their collective impact on organizational success. Scholars are examining how these elements interact, exploring questions such as how effective corporate governance can enhance risk management and how quality management can improve performance.

Analysis of the *thematic map* offers valuable insights that significantly improve our understanding of IA research. As mentioned below, a review of these results provides directions for future research.

- “Corporate governance” and “internal controls,” as *motor themes* in the thematic map, are well-established areas within the field of IA research and have yielded significant insights that have shaped the profession. They provide a strong foundation for IA research, offering practical guidance for auditors to mitigate risks, ensure compliance, and add value to organizations.
- As it appears in the thematic map as a *basic theme*, IA research encompasses several essential areas that require further exploration to enhance its effectiveness in a rapidly changing business environment. First, the role of “audit committees” in overseeing IA needs a deeper investigation to understand their dynamics and impact on audit quality. Second, it is crucial to comprehend the factors that drive “IA quality,” such as technology adoption and resource allocation, to facilitate improvement (Mashayekhi et al., 2023b). Third, research into “audit fees” is

important, as IA can significantly lower these costs by enhancing organizational efficiency, improving risk management, and providing valuable insights that streamline external audit processes. Fourth, “outsourcing” IA raises concerns about control and independence, indicating a need for research into best practices and risk mitigation strategies. Fifth, while IA can serve as an “MTG” for future leaders, its influence on IA effectiveness and career progression requires further exploration (Mubako & Mazza, 2023). Sixth, “continuous auditing” offers real-time assurance, but the challenges and benefits associated with this approach need to be analyzed. Lastly, it is essential to regularly assess the “competencies” required for internal auditors, including technical, analytical, and soft skills, to keep pace with modern IA demands (Mashayekhi et al., 2021).

- The *emerging themes* in the thematic map, including audit risk, public administration, cybersecurity, IT governance, and IT audit in IA research, underscore their growing relevance in response to the complexities of modern organizational environments. As businesses face dynamic risks, internal auditors need advanced assessment methods to address “audit risk.” Strong IA in “public administration” is essential for promoting accountability and public trust. “Cybersecurity” threats require internal auditors to strengthen their skills in identifying vulnerabilities and ensuring resilience (Lois et al., 2021). “IT governance” aligns IT strategies with organizational goals, necessitating evaluations of governance frameworks by internal auditors (Wu et al., 2024). Finally, “IT audits” ensure data integrity and compliance in a technology-driven environment.
- As it appears in the thematic map, niche themes, knowledge management, ethics, and whistleblowing are often overlooked yet crucial in internal audit (IA) research. Despite their significance, they have not fully integrated into the broader IA discourse. "Knowledge management" is essential for capturing and leveraging institutional knowledge to improve IA efficiency and decision-making, but it remains underutilized due to a lack of structured frameworks and awareness. "Ethics," while fundamental, is often treated as an implicit expectation rather than a proactive focus, with limited research on systematically embedding ethical frameworks into IA processes and culture (Rezaee & Fogarty, 2019). "Whistleblowing" mechanisms are critical for uncovering fraud and misconduct, while their integration into IA practices is inconsistent and hindered by challenges such as anonymity, trust, and organizational resistance (Antoh et al., 2024). As the IA profession evolves, further exploration and incorporation of these topics into the broader discussion are essential to address emerging risks, enhance organizational integrity, and strengthen the profession's value proposition.

The results regarding the second research question, focused on the most frequently cited articles and leading authors, countries, and journals in IA research, indicated that *David A. Wood*, from Brigham Young University (an American institute) is the leading author in this field; "*Managerial Auditing Journal*" (a UK journal) is the most cited journal; and the article titled "*Audit Fees: A Meta-Analysis of the Effect of Supply and Demand Attributes*" by Hay et al. (2010) is the most frequently cited. Additionally, the *USA, South Africa, Malaysia, China,* and *Australia* are the most influential countries regarding IA research. At the same time, *the USA* and *Malaysia* are the two most productive countries in this area.

In response to the third question, we found that the USA, the UK, Malaysia, Australia, and China are among the countries with the most extensive scientific collaboration networks. At the same time, the USA had the largest share of citations. The dominance of the USA in this respect can be attributed to the establishment of the IIA in 1941 and its significant activities in the years that followed. In addition, since the UK and Australia were among the first to adopt codes of good corporate governance in response to the financial scandals of the early twentieth century, IA has received much attention, and the demand for higher IA quality has increased in these countries. It must be noted that South Africa outperformed many other countries in the number of publications in the field of IA. This may be because this country is the most influential regulatory authority on corporate governance outside the USA.

This research contributes to the literature on IA by applying the CLR approach to nearly 50 years of studies, providing a holistic perspective lacked in previous reviews. It presents a comprehensive

overview of IA literature and offers future directions for researchers, helping them select topics, collaborators, and potential funding organizations.

This research has practical implications for various stakeholders. Our findings can support practitioners, regulators, and standard setters by highlighting key research topics in the field of IA that are gaining attention, as well as identifying areas that require further investigation. For instance, internal auditors should focus on becoming proficient in information technology and its application in the IA process. It is also crucial for them to familiarize themselves with information technology auditing and enhance their competencies in this area. Moreover, regulators and standard setters should prioritize the development of relevant regulations and standards related to information technology governance and associated internal controls. Additionally, these findings can guide universities in shaping their curricula to ensure that accounting and auditing students receive a contemporary education. This should include updated knowledge of emerging topics, the skills required by the industry, and opportunities for future research.

This study has some limitations. Firstly, the data used in this research were extracted from WoS, which was primarily selected due to its frequent references in many studies and the reliability of its information. This reliability allows for the comparison of the results of this research with similar studies. However, due to the possible emergence of new and emerging topics and ideas in some other journals (e.g., Q_3 and Q_4 journals not indexed in WoS), it is recommended that other databases, such as Scopus, be used in future research. Secondly, since the abstracts of articles can only be extracted from WoS outputs, we only analyzed the abstracts in the present study. We encourage researchers to replicate the same analysis on the full texts of these articles by reviewing them on a case-by-case basis. In addition, further research is recommended on full texts extracted from other databases, such as Scopus. Thirdly, while our analysis may provide a broad overview of research publications, it may not capture the nuances of IA, as the study is based only on published research. Fourthly, our study is limited to English-language publications, which can cause a bias towards particular authors, journals, and countries. Finally, due to the high volume of articles reviewed in this study, we utilized the CLR approach to analyze the literature on IA and identify common themes. To enhance the generalizability of the findings, the study refrained from including any personal opinions from the researchers. In future research, thematic classification of the IA literature could be conducted using alternative methods for reviewing articles.

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