Trends and Gaps in Audit Quality
A Bibliometric Analysis

Cristiano Bento [1, *], Helena Inácio [2] and Elisabete Vieira [3]

[1] University of Aveiro; cbento@ua.pt

[2] GOVCOPP (Research Unit on Governance, Competitiveness and Public Policies), ISCA-UA (Higher Institute of Accounting and Administration), University of Aveiro, Portugal; helena.inacio@ua.pt

[3] GOVCOPP (Research Unit on Governance, Competitiveness and Public Policies), ISCA-UA (Higher Institute of Accounting and Administration), University of Aveiro, Portugal; elisabete.vieira@ua.pt

* Corresponding Author

Abstract: This study performed a bibliometric analysis of 1546 articles on Audit Quality (QA), published between 1999 and 2022, showing the increase in interest in the topic, especially in periods of regulatory change. The analysis revealed that topics such as audit fees, corporate governance, earnings management and auditor independence are the most studied, underlining the importance of governance and independence for QA. Co-authoring networks show clusters of influential and interconnected authors, and the keywords indicate central themes such as regulation, audit performance, and the reputation of audit firms. Over time, research has adapted to new challenges, with a recent focus on areas such as corporate social responsibility and governance. The study suggests that future research explores the impact of new technologies, such as big data and artificial intelligence, on QA, as well as the diversity in audit teams and the effect of workload on the quality of reporting. It also identifies auditing ESG practices and the influence of local regulatory standards as promising areas. In summary, the study provides a comprehensive overview of the field of QA, pointing out directions for future research and highlighting the importance of new approaches to meet the growing demands for transparency and social accountability.

Keywords: bibliometric analysis; audit quality; bibliometrics; audit; IAASB.

1 Introduction

According to Bryan and Reynolds (2016), financial reporting plays a key role in mitigating information asymmetry between managers and shareholders. Audit quality

(QA), although not the only element that contributes to the quality of financial reporting (DeFond & Zhang, 2014), is an element that increases the confidence and quality of those and helps in investment decision and financial soundness (Albawwat, 2022; International Auditing and Assurance Standards (IAASB), 2020). QA also acts as a monitoring tool that reduces shareholder asymmetry (Arens et al., 2012). Over the years, QA has been the subject of study (placing 3 or 4 references), however, a consensus has not yet been reached on how to define and measure QA.

Confidence in auditing involves multiple aspects, from activities to be carried out according to predetermined rules and regulations and appropriate control processes, to independent and impartial professionals (auditors). Market confidence in auditing depends on these aspects, leading to audit providing financial growth (Albawwat, 2022; IAASB, 2020). It was observed that the procedures and standards related to QA increased exponentially from the 2000s onwards (Alves, 2009). This is a consequence of the Enron scandals of 2001, as well as the scandals of Worldcom, Adelphia Communications, AOLTime Warner, Rite Aid, Xerox, Tyco, Imclone and Qwest, Global Crossing, among others (Chang, Cheng, & Reichelt, 2010; Zhang, 2007). Such scandals have led to a reduction in trust in financial reporting, in the capital market and, especially, in auditing firms that have seen their performance and function called into question (Kilgore et al., 2011; Teck-Heang & Md Ali, 2008).

In response to the situation, several recommendations were made, and regulations were revised to restore reliability in capital markets. A key initiative was the introduction of the Sarbanes-Oxley Act (SOX) in the United States, which influenced many other countries, either through direct replication or by following its general principles (Aobdia et al., 2021). The Act led to the creation of the Public Company Accounting Oversight Board (PCAOB), aimed at overseeing auditors of publicly traded companies to protect investors and ensure accurate, independent audits, while setting auditing standards (John & Liu, 2021). The International Federation of Accountants (IFAC), through the IAASB, revised the International Standards on Auditing (ISA) to strengthen audits, reduce failure risks, and improve quality.

In 2014, the IAASB developed a framework, the 'Audit Quality Framework', with the aim of raising awareness of the key elements of QA, encouraging the improvement of QA and facilitating dialogue between key stakeholders on the topic. In this context, it is worth highlighting the joint project between the Centre of Audit Quality (CAQ) and the American Institute of Chartered Public Accountants (AICPA), with the aim of increasing the reliability of investors in the capital markets, as well as the reliability of the general public in financial information (Chambers et al., 2020). The IAASB framework has been improved and since December 2022 a new set of standards called IAASB Quality Management Standards has been in force.

The main audit regulators and standard-setters are committed to strengthening QA with a view to improving trust, legitimacy and QA (Montenegro & Bras, 2018a). Therefore, the topic of QA continues to be relevant today, for public and private entities and for

regulators, so this relevance is reflected in the fact that the amount of research in this area is growing (Ciger, 2020).

The literature identifies several factors that influence QA, such as the size of the auditee, industry specialization, frequency of switching between audit firms, results management, allocation of audit resources, and the legal liability of auditors (Balsam et al., 2003a; Becker et al., 1999; DeAngelo, 1981).

Understanding bibliometrics as a "quantitative and statistical technique for measuring the indices of production and dissemination of scientific knowledge" (Araújo, 2006, p.12), a bibliometric analysis of trends and gaps in QA is relevant to the field of auditing, since it provides an overview of the research carried out, as well as the areas that need more attention.

Bibliometrics aims to apply statistical and mathematical techniques in the compilation of works in a given area of knowledge, in order to analyze and have indicators about the development and evolution of academic-scientific information (Ellegaard & Wallin, 2015). It can be seen that the number of investigations that make use of bibliometric analysis as a method of analysis and evaluation of research has been growing in recent years (Waltman & Noyons, 2018), and that this methodology has been intensively used in different areas of research (Andreo-Martínez et al., 2020; Kandeal et al., 2021; Proskuryakova & Ermolenko, 2019).

A global bibliometric perspective has been indicated in several investigations and fields of research in the literature. Some bibliometric works on specific auditing topics were also identified, such as the case of Ciger (2020); and Santos-Jaén et al., (2021).

In view of the above, this research is carried out, of a bibliometric nature, with the general objective of knowing and understanding the research carried out in the area of QA, during the period 1999 - 2022, identifying its main trends and gaps, and thus envisioning opportunities for future research.

As a database, the Web of Science (WoS) was chosen, which, according to Waltman and Noyons (2018), together with Scopus and Google Scholar, are the most used databases in bibliometrics. WoS provides reference data and citations from academic journals, conference proceedings and other documents in various areas of knowledge. This bibliometric study will thus contribute to a reinforcement of qualitative research in the area, by answering the following research question: What are the emerging trends in research on audit quality, based on the main gaps in the literature? In this sense, the main objective of the research is to evaluate the evolution of research in QA and identify the main research trends in the field of QA, based on a bibliometric analysis. The relevance of the work results from the fact that the results of a bibliometric analysis can lead academia, regulators and audit professionals to better understand the problems related to QA and to develop policies and practices to improve it.

This study is structured in five parts, the first comprising the introduction, the second the literature review, which presents the relevant publications for the theoretical framework of the theme and the qualitative and quantitative investigations related to the

theme. The third part exposes and characterizes the methodology adopted to conduct this study. Then, the results of the bibliometric analysis are presented and discussed. Finally, the conclusions are presented.

2   Literature Review

2.1   Concept of Audit Quality

The literature on auditing is vast, and QA is frequently addressed in different studies, and there are several concepts of QA, but none of them is globally accepted. This is not unrelated to the fact that QA acts in several dimensions and, thus, is a complex topic, consequently, the evaluation of QA continues to be a challenge, even today (Albawwat, 2022; Chambers et al., 2020; Chi & Pan, 2021; Driskill et al., 2022; Yuan, 2021). Traditionally, the concept of QA widely mentioned in scientific research is referred to by DeAngelo (1981) as the ability of an auditor to detect and report accounting misstatements, if such misstatements exist, i.e., he defines QA as the auditor's joint action to detect the misstatement and report it. Bing et al., (2014, p.22), also state that QA assumes that the auditor "discovers a breach in the client's accounting system and reports the breach".

Such actions presuppose the auditor's competence to detect the misstatements, as well as the auditor's independence and objectivity to report them. If the independence of auditors is compromised, they may be subject to litigation and disciplinary sanctions that may compromise their reputation, DeAngelo, (1981) and DeFond and Zhang, (2014) also consider that a high-quality audit tends to offer greater security in the preparation of financial reports, as the accountant has the auditor's ability to identify material misstatements.

According to Mahdaleta et al., (2016) the effectiveness of QA is one of the most debated, controversial and challenging topics in the field of auditing, accounting and finance from different theoretical perspectives, without general consensus, either in the conceptual aspect or in relation to the factors that impact its existence. Consequently, it is possible to use arguments that high QA impacts incorrect financial reporting (DeFond & Zhang, 2014).

According to Francis (2004), QA is related to the possibility of audit failures, which can occur in two ways: due to the non-proper application of accounting references and/or the auditor's failure to issue the modified or qualified audit report in the appropriate circumstances, generating audited financial information that is potentially misleading for users.

According to Costa and Moreira (2010), QA occurs when the auditor expresses a correct opinion on whether or not the financial statements present the company's position in a true and appropriate way, that is, the auditor expresses his opinion with a higher level of certainty. This concept is based on the IAASB ISA 200, according to which the purpose of an audit is to increase the degree of confidence of users of financial statements by expressing

an auditor's opinion on whether they are prepared, in all material respects, in accordance with the applicable financial reporting benchmark.

QA is crucial to ensure the reliability of financial statements and stakeholder perception of them, as audit errors can cause economic damage to stakeholders, audit professionals, and audited companies (Francis & Yu, 2009; HosseinniaKani, 2014).

2.2   Determinants of Audit Quality

As we have seen, there is no single concept for QA, as it can be associated with different factors. The perception of QA varies according to the views of the various stakeholders. Each interest group — from managers to investors, regulators or auditors themselves — may have a different interpretation of what constitutes a quality audit. Knechel (2015) highlights that the choice of different proxies to measure QA, such as audit fees or auditor independence, is influenced by the different perspectives of stakeholders, thus reflecting the multiple dimensions that this concept can assume.

Francis and Yu (2009) found a positive link between large audit firms and QA. Ghosh and Moon (2005) highlight that mandatory limits on auditor-client relationships may harm capital markets, as financial statements, especially those from long-term relationships, are seen as more reliable. Carcello et al. (2004) noted that mandatory audit firm rotation negatively impacts QA, finding that auditors with terms under three years are more likely to issue fraudulent statements. This indicates shorter mandates hinder auditors' ability to deeply understand company operations, raising misstatement risks.

In the same vein, Tepalagul and Lin (2015), in their review of the literature on auditor independence and QA, concluded that the long tenure of the auditor did not affect the independence of the audit and, in some cases, it was evidenced that the long tenure actually improved the QA and that the short tenure is associated with low QA. The authors showed that non-audit services, in general, compromise QA.

Becker et al. (1998) used the auditor's brand name and investigated the relationship between the auditor's brand and the quality of audit results. Francis (2004) conducted a literature review on factors related to QA and presented a QA framework in which it is affected by the auditor's aptitude and independence, auditing firm, inappropriate conduct of the auditor and the accounting firm, or punishments for low-quality audits. The authors also propose collaborative investigations between practitioners and regulators for a better understanding of QA.

DeFond and Zhang (2014) state that QA depends on company characteristics and audit procedures. They note that while several proxies assess QA, few are reliable and call for further research on the auditor's role and the client's influence. They suggest focusing on auditor capability and skepticism, particularly in larger firms.

Montenegro and Bras (2018) reviewed QA literature (1980–2010) and found most studies use auditor fees and knowledge as proxies. They observed increased research on QA and the PCAOB but noted a lack of focus on audited companies' perspectives. The authors recommend combining proxies to measure QA effectively.

2.3   Bibliometric studies in Audit Quality

Studies on the frequency of written communication over time have identified patterns of behavior in data analysis. These patterns have given rise to principles such as Lotka's Law, Bradford's Law, and Zipf's Law, among others.

Lotka's Law (1926), also known as the Inverse Square Law, establishes that scientific production is highly concentrated: a few researchers publish a lot, while the majority publish little. In his study of authors of Chemical Abstracts (1909-1916), Lotka observed that the production of the few most prolific researchers was equivalent, in volume, to the sum of the publications of a large number of less productive researchers.

Bradford's Law, or Law of Dispersion (Rousseau & Rousseau, 2000), emerged from medical research conducted by Hill Bradford and other physicians from the US Medical Research Council. This law states that scientific literature on a specific topic is unevenly distributed among journals, with a small number of specialized journals concentrating the majority of publications on the subject. Bradford's Law allows us to estimate the relevance of journals within specific areas of knowledge.

Zipf's Law, or Law of Least Effort (Guedes & Borschiver, 2005), analyzes the frequency of words in texts, organizing them into an ordered list of terms on a specific topic. Although important, this law is not the focus of this study. However, bibliometric studies often use Lotka's, Bradford's, and Zipf's Laws, either individually or in combination.In terms of bibliometric studies in the area of auditing, we can highlight the works of Ciger (2020), Folador et al. (2018), Marassi et al. (2014), Porte et al. (2018) and Ribeiro (2015).

Marassi et al. (2014) investigated the topic of auditor rotation in the period 1996-2012, using bibliometric and sociometric methods, and examined a total of 69 articles in the Scopus and Science Direct databases. The research revealed that the most recurrent themes are related to QA and auditor independence.

Ribeiro (2015) made use of bibliometric methods and research in social networks, examining a total of 107 scientific investigations published in a journal in Brazil between 1999-2013, having concluded that there was a significant advance in the development of the theme "auditing" from 2003 onwards.

For their part, Folador et al. (2018) examined 96 scientific papers in the period between 2004 and 2014, with a final sample of 61 articles in the Scopus database and 35 published in Contesci in the field of auditing. They also concluded that disclosures at the international level are centralized (54%) in four scientific journals, Management Audit Magazine, Decision Support Systems, International Journal of Accounting Information Systems and the Audit Management Journal.

Porte et al. (2018) conducted a study on auditing and its main themes, with the aim of correcting gaps in the post-SOX period, identifying the transformations that occurred in the thematic areas and relating their association with auditing. The result of the study showed that the topics related to the audit report and financial statements, corporate

governance, audit market and external auditing, were the most investigated in the publications related to auditing.

Ciger (2020) presents a bibliometric review in the area of QA. The author analyzed a total of 1,419 articles from 1981 to March 2020, using the Scopus database in the area of social sciences. The analysis resulted in academic research on QA growing exponentially from the 2000s onwards. The topics on "audit quality", "audit fees", "performance management and auditing", "Public Company Accounting Oversight Board" (PCAOB) and auditing", "financial reporting and auditing" and "audit committee", are recurring themes in the surveys carried out on the topic of QA.

As noted, it is possible to see an increase in the number of bibliometric studies in the area of auditing, specifically on Audit Quality (QA), a central and cross-cutting theme in the field of auditing (Ciger, 2020).

In this context, it is pertinent to reinforce the relevance of research around the theme of QA, in line with the research question of this work.

3   Research Methodology

This research consists of a bibliometric analysis with the objective of knowing the research carried out in the area of QA, identifying the evolution of research over the last few years, its main gaps and trends of future evolution.

Bibliometrics makes it possible to observe the literature associated with a given topic under broad aspects. According to Li et al. (2020), a literature review uses quantitative methods to classify data and prepare summaries. For this reason, it is recognized as a useful methodology to carry out an adequate analysis of authors, journals, institutions and the main characteristics of a research topic. In this sense, we investigated different bibliometric parameters such as the number of publications per year, the number of publications by categories, the main journals and the main countries and regions, the number of publications per author and publications with the highest number of citations.

The work was developed in three stages, comprising:

- the phase of defining the objective and research question (Stage I);
- the planning phase (Stage II);
- the data analysis and interpretation phase (Stage III).

Some of these stages are divided into sub-stages, taking into account the different associated tasks.

Stage I focused on the delimitation of the theme, the objective and the research question. This stage led us to the main research question: What are the emerging trends in QA research, based on the main gaps in the literature?

Stage II focused on the development of the bibliometric review protocol, with the aim of ensuring the scientific rigor of bibliometrics, comprising two sub-stages: - definition of the search criteria (Sub-stage II.1): which involved the selection of the database to be used

(II.1.1), the keywords to be used in the search and the search fields (II.1.2), the areas of the documents to be selected (II.1.3) and then the period to be considered (II.1.4); - and organization of sample data (Substage II.2).

Substage II.1.1 corresponded to the selection of the database to be used in data collection, and WoS was chosen, a multidisciplinary platform that, according to Zhao (2017), is considered the most reliable database to search for publications worldwide.

In the next substage (II.1.2), given that it was intended to know the entire research in QA, "audit quality" and "auditing quality" were defined as keywords for research in the fields title, abstract and/or keywords. Applying these criteria, on March 10, 2023, the date of data collection, resulted in 2212 documents.

In substage II.1.3 we defined the areas that interested us, that is, those that may include research in the audit area. Thus, we restricted the collection to articles published in journals of "Administration", "Public administration" and "Economics and Accounting". Applying this restriction, we now have 1,925 documents selected.

In substage II.1.4, the definition of the period 1999 - 2022, aims to verify the history of the evolution and trends of QA, starting before the effects of the scandals at the beginning of the century and ending in the last full year at the date of collection of documents in WoS, thus obtaining a total of 1546 documents.

In Stage III of the treatment and interpretation, the collected data were organized in the spreadsheet with the previously designed structure (Stage II).

It is noteworthy that the analysis of the selected publications was carried out with the support of the VOSviewer Software (co-authorship and keyword networks and co-occurrence of keywords were analyzed), following the methodology proposed by Du et al. (2021).

Table 1 presents the protocol established for the bibliometric review carried out.

Finally, considering that the results of the analysis of different bibliometric tools may be different, we compared the VOSviewer co-occurrence keyword map with the trend topics and thematic maps of the Bibliometrix package of R Software to identify search trends in our field of study.

Table 1. Review protocol

Step	Description	Logic	Sample
II.1	Search Criteria	Web of Science	
	II.1.1 Preliminary research	TITLE-ABS-KEY (**"audit quality"** or **"auditing quality"**)	2212
	II.1.2 Refined search	TITLE-ABS-KEY ("Audit Quality"OR "Auditing Quality") AND (LIMIT-TO (SUBJAREA , "BUSI") OR LIMIT-TO (SUBJAREA , "ECON") OR LIMIT-TO (SUBJAREA , "SOCI")	1925
	II.1. 3 Restricted refined search	TITLE-ABS-KEY ("Audit quality" AND auditing quality*) AND (LIMIT-TO (SUBJAREA , "ECON") OR LIMIT-TO (SUBJAREA , "BUSI")) AND (LIMIT-TO (DOCTYPE , "ar")	1704
	II.1.4 Restricted refined search	TITLE-ABS-KEY ("Qualidade de Auditoria" OR "Qualidade de Auditoria") AND (LIMIT-TO (SUBJAREA , "BUSI") OR LIMIT-TO (SUBJAREA , "ECON") OR LIMIT-TO (SUBJAREA , "SOCI")) AND (LIMIT-TO (PUBYEAR , 2022) OR LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2015) OR LIMIT-TO (PUBYEAR , 2014) OR LIMIT-TO (PUBYEAR , 2013) OR LIMIT-TO (PUBYEAR , 2012) OR LIMIT-TO (PUBYEAR , 2011) OR LIMIT -TO (PUBYEAR , 2010) OU LIMIT-TO (PUBYEAR , 2009) OU LIMIT-TO (PUBYEAR , 2008) OR LIMIT-TO (PUBYEAR , 2007) OR LIMIT-TO (PUBYEAR , 2006) OU LIMIT-TO (PUBYEAR , 2005) OR LIMIT-TO (PUBYEAR , 2004) OR LIMIT -TO (PUBYEAR , 2003) OR LIMIT - TO (PUBYEAR , 2002) OR LIMIT-TO (PUBYEAR , 2001) OR LIMIT-TO (PUBYEAR , 2000) OR LIMIT- TO (PUBYEAR , 1999) AND (LIMIT-TO (DOCTYPE , " ar")	1546
II.2	Organization of sample data	Data compilation and analysis	

Note: prepared by the authors

4   Analysis of Research Results

4.1   Descriptive analysis of results

In the descriptive analysis, we focus on the distribution of publications by year, by publication categories, by geographical origin and by author. Figure 1 shows the evolution of publications in the period of analysis (1999-2022).
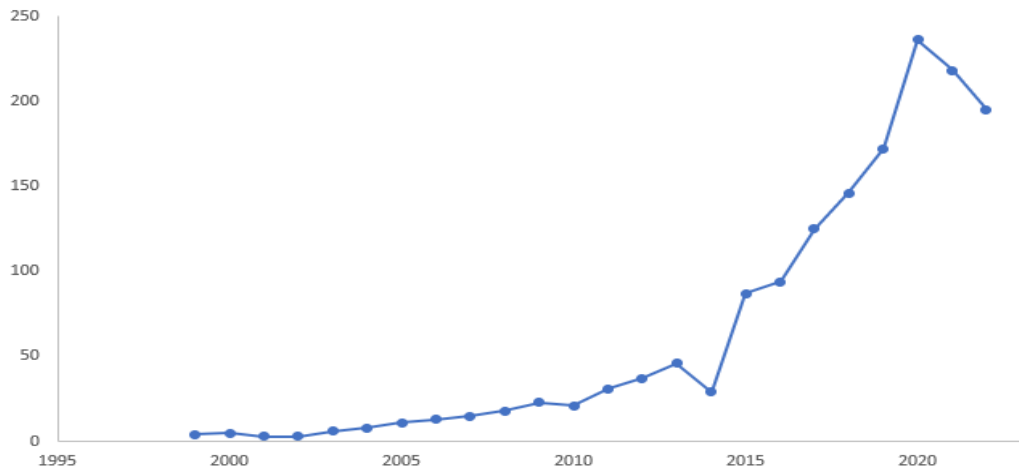
Figure 1. Evolution of publications on QA in the period 1999-2022
Source: the authors

By analyzing graph 1, it can be seen that there is an evolution in the number of publications on QA in WoS over the years under analysis. There was significant growth from 2014 to 2015 and from 2019 to 2020, indicating a growing interest in QA-related research.

The year 2020 had the highest number of publications in this period, with 236 articles, while 2001 and 2002 had the lowest number of publications, with only 3 articles each year. It is important to highlight that in 2002 the Sarbanes-Osley Act came into force, promoting good practices of control, reporting, accountability and transparency of financial information in the audit process. The strong growth in the number of publications from 2015 onwards is noteworthy, related to the fact that in the academic environment there has been a growing incentive to publish in journals indexed by WoS, which may have stimulated the increase in publications (Knechel, 2015). The drop from 2020 may be related to the pandemic, which may have impacted the researchers' ability to conduct the studies, resulting in a temporary drop in publications.

Table 2 shows the number and percentage of publications by each of the categories of WoS themes in the period under review.

Table 2. Articles published by categories

Web of Science Categories	Published	%
Business Finance	1.258	70,67%
Management	180	10,12%
Economics	148	8,31%
Business	144	8,09%
Public Administration	50	2,81%
TOTAL	1780	100%

Source: the author

From the analysis of Table 2, it appears that the "Business Finance" area is the category with the highest number of publications, representing 70.67% of the total publications. The "Management" category comes in second, with 10.12% of the documents, followed by "Economics" (8.31%), "Business" (8.09%) and "Public Administration" (2.81%). The remaining categories have a small percentage. Thus, the categories where the most QA articles are published in WoS are "Business Finance" and "Management".

It is noteworthy that the total number of articles divided by sub-area (1780) is higher than the number initially identified, of 1546, since the same work is considered in more than one area, such as 'Busines' and 'Business Finance', according to specific criteria defined in the WoS platform.

With regard to the countries of origin of the QA publications, Table 3 presents the results obtained in the sample under study.

Table 3. Articles published by countries

Countries	Pub. by Country	%	Countries	Pub. by Country	%
USA	700	45,28%	Tunisia	34	2,20%
China	209	13,52%	France	33	2,14%
Australia	174	11,26%	Singapure	32	2,07%
Canada	87	5,63%	Italy	31	2,01%
England	63	4,08%	Norway	25	1,62%
Taiwan	60	3,88%	Saudi Arabia	25	1,62%
South Korea	59	3,82%	Iran	24	1,55%
Malaysia	48	3,11%	South Afica	24	1,55%
New Zealand	42	2,72%	Belgium	23	1,49%
Indonesia	41	2,65%	Jordan	23	1,49%
The Netherlands	40	2,59%	United Arab Emirates	21	1,36%
Spain	38	2,46%	Finland	20	1,29%
Germany	35	2,26%			

Source: the author

The analysis of Table 3 shows that the United States is the leading country in number of publications on AQ, representing 45.28% of the total. Followed by China with 13.52% and

other nations with lower percentages, Australia 11.26% and Canada 5.63%. The other countries also present articles on QA, but on a smaller scale. These results indicate that there is a global interest in studies on QA, with a significant participation of researchers from the United States and China. North American countries publish about 50.91% of all publications. Publications on QA were produced in different countries or geographic regions. There are 9 in Europe, Asia 10, Africa 2, North America 2 and Oceania 2.

Table 4 Shows the authors who have published the most papers on the topic of AQ.

Table 4. Articles published by the author

Authors	Published by Authors
Knechel, Wr	25
Gul, Fa	19
Omer, Ct	13
Raman, Kk	12
Krishnan, J	11
Maroun, W	11
Salehi, M	11
Abbott, Lj	10
Chi, Wc	10
Choi, Jh	10

Source: the author

Table 4 shows that W. Knechel is the author with the highest number of publications during the period analyzed, with 25 publications F. Gul comes in second place, with 19 publications, followed by C. Omer with 13, K. Raman with 12, J. Krishnan, W. Maroun and M. Salehi with 11 and the others with 10 each. These results indicate that QA is an important area of research and that there is a significant group of authors who have produced 10 or more articles on the subject.

In order to concentrate the analysis on a smaller set of widely referenced studies, a common practice in bibliometric studies was to select the 10 most cited articles. This approach allows for a deeper understanding of research dynamics and key discussions on audit quality (QA) over time, preventing analysis from being dispersed by including articles with less relevance. In this way, it is possible to identify more accurately the most influential contributions to the development of this field of study. Table 5 presents the 10 most cited articles in the period under review (1999-2022).

From the analysis of Table 5, it appears that the 10 most cited articles all have more than 400 citations, the most cited being that of DeFond and Zhang (2014), which curiously is the most recent of the 10 and reaches 993 citations, and is also the one with the most comprehensive content, since it is a literature review.

The second most cited article, Myers et al. (2003), with 630 citations, explores the auditor-client relationship and emphasizes the need for auditors to resist pressures, such as prioritizing client satisfaction over QA.

Table 5. Articles (10) with the highest number of citations

Title	Authors	Journal	Year	Total Citations
A review of archival auditing research	Defond, Mark; Zhang, Jieying	Journal of accounting & economics	2014	993
Exploring the term of the auditor-client relationship and the quality of earnings: a case for mandatory auditor rotation?	Myers, JN; Myers, LA; Omer, TC	Accounting review	2003	630
Auditor industry specialization and earnings quality	Balsam, S; Krishnan, J; Yang, JS	Auditing-a journal of practice & theory	2003	522
Ownership concentration, foreign shareholding, audit quality, and stock price synchronicity: evidence from China	Gul, Ferdinand A.; Kim, Jeong-Bon; Qiu, Annie A.	Journal of financial economics	2010	487
National and office-specific measures of auditor industry expertise and effects on audit quality	Reichelt, Kenneth J.; Wang, Dechun	Journal of accounting research	2010	465
Big 4 office size and audit quality	Francis, Jere R.; Yu, Michael D.	Accounting review	2009	460
Board characteristics and audit fees	Carcello, JV; Hermanson, DR;	Contemporary accounting research	2002	460
Can Big 4 versus Non-Big 4 Differences in Audit-Quality Proxies Be Attributed to Client Characteristics?	Lawrence, Alastair; Minutti-Meza, Miguel; Zhang, Ping	Accounting review	2011	454
Audit-firm tenure and the quality of financial reports	Johnson, VE; Khurana, IK; Reynolds, JK	Contemporary accounting research	2002	427
Audit partner tenure and audit quality	Carey, Peter; Simnett, Roger	Accounting review	2006	405

Source: the author

The third most cited article, Balsam et al. (2003), with 522 citations, investigates the link between earnings quality and audit sector specialization.

The other most cited articles cover a wide range of topics, including concentration of ownership (Carcello et al. (2004); Gul et al. (2010)), Big 4 effects (Francis & Yu, 2009), auditing expertise (Reichelt & Wang, 2010), and term of office (Johnson et al., 2002).

The qualitative analysis of the publications was carried out with the support of Vosviewer and the networks of co-authorship, authors' keywords and co-occurrence of keywords were analyzed.

4.2 Qualitative analysis of the results

The qualitative analysis of the publications was carried out with the support of Vosviewer and the networks of co-authorship, authors' keywords and co-occurrence of keywords were analyzed.

4.2.1   Co-authoring networks

Co-authorship networks show the association between authors. Figure 2 shows the grouping of the main authors in the research on QA based on co-authorship relationships.
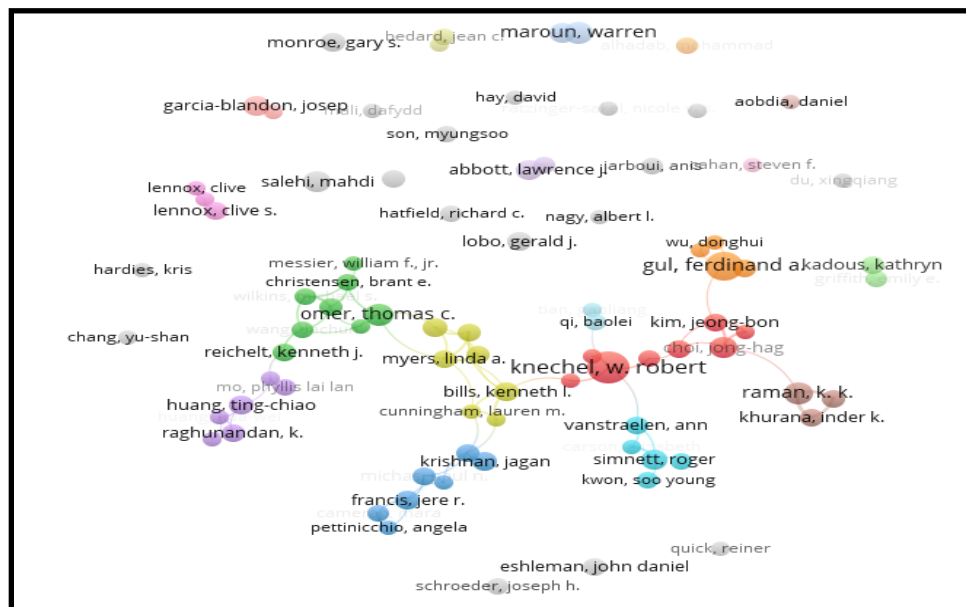

**Figure 2.** Collaboration network between authors
Source: VOSviewer

From the analysis in Figure 2, it is possible to identify thirty-six thematic clusters. These networks have a minimum number of 5 occurrences in 1546 selected articles. The size of each circle represents the number of articles published on the subject, while the colors denote possible groupings based on the number of collaborations between different authors. The thickness of the connecting line between two circles corresponds to the strength of the bond between them. What's more, as nodes grow, the impact of authors on the network also increases. Thus, the researcher Wr Knechel, from the United States, stands out, with a total of 25 publications, as we saw earlier, having a collaborative network with approximately 79 other researchers.

4.2.2   Authors' keywords

In the case of the authors' keywords, they are shown in Figure 3, after having removed the search keyword: "audit quality". The keywords of the article indicate and

reflect the theme of the investigation in question (Juhmani, 2017), providing more detailed information on the subject of the publications. In addition, the most used keywords appear associated to characterize the conceptual structure of the investigated theme (Mas-Tur et al., 2020). Thus, they are analyzed to identify the most relevant research trends and their frequency of occurrence highlights the main search fields and denotes possible lines for future work.
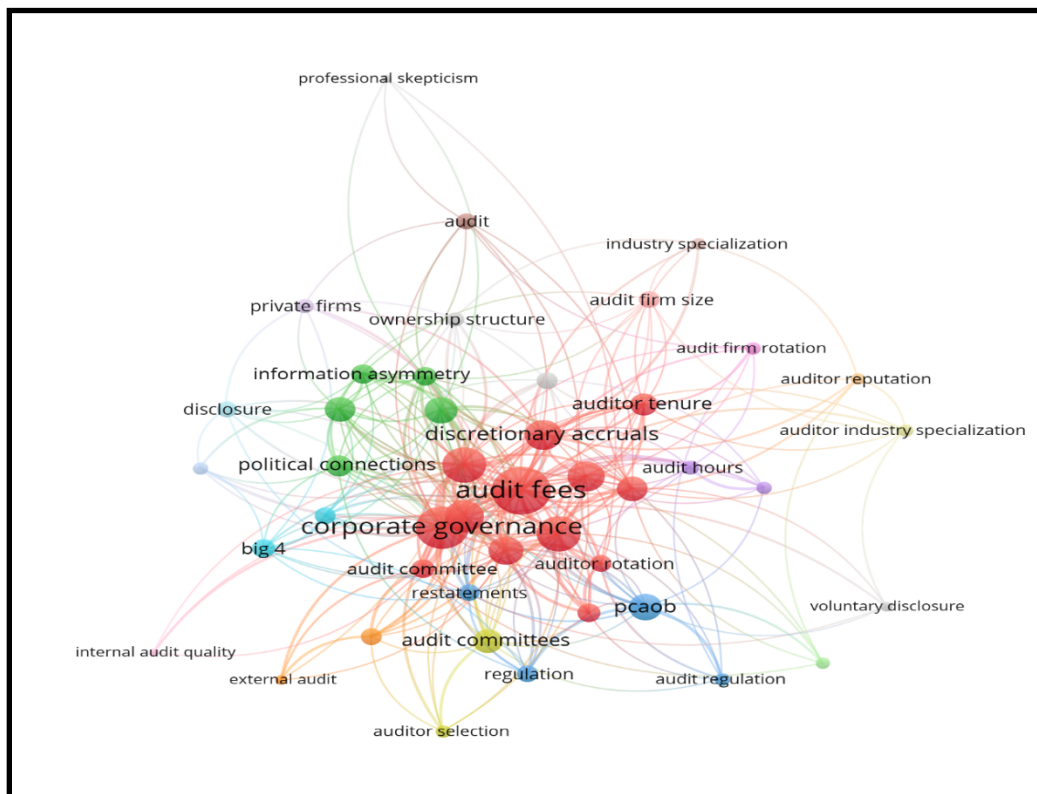

Figure 3. Author's keywords
Source: VOSviewer

Figure 3 shows that the authors' keywords have a minimum number of 12 occurrences, making it possible to identify 19 thematic clusters. The most representative keyword is 'audit fees' with a total of 150 occurrences in 1546 selected articles, in addition to the terms of significant occurrences such as 'corporate governance', followed by 'audit hours', discritionary accruals' and 'pcaob'.

4.2.3 Co-occurrences of all keywords

The co-occurrence network map based on the keywords allows to visualize the relationships between the most frequently used terms in the studies and to identify the central areas of research within the field of QA. The 1546 exported articles were analyzed using the VOSviewer software, with the aim of providing a better understanding of research topics and trends related to QA. This type of analysis is essential to recognize the patterns and evolution of the most relevant themes over time.

The keyword co-occurrence graph reveals a diverse network of QA themes, grouped into interconnected clusters. In Figure 4, each color represents a thematic group, with frequently mentioned keywords highlighting central QA topics.
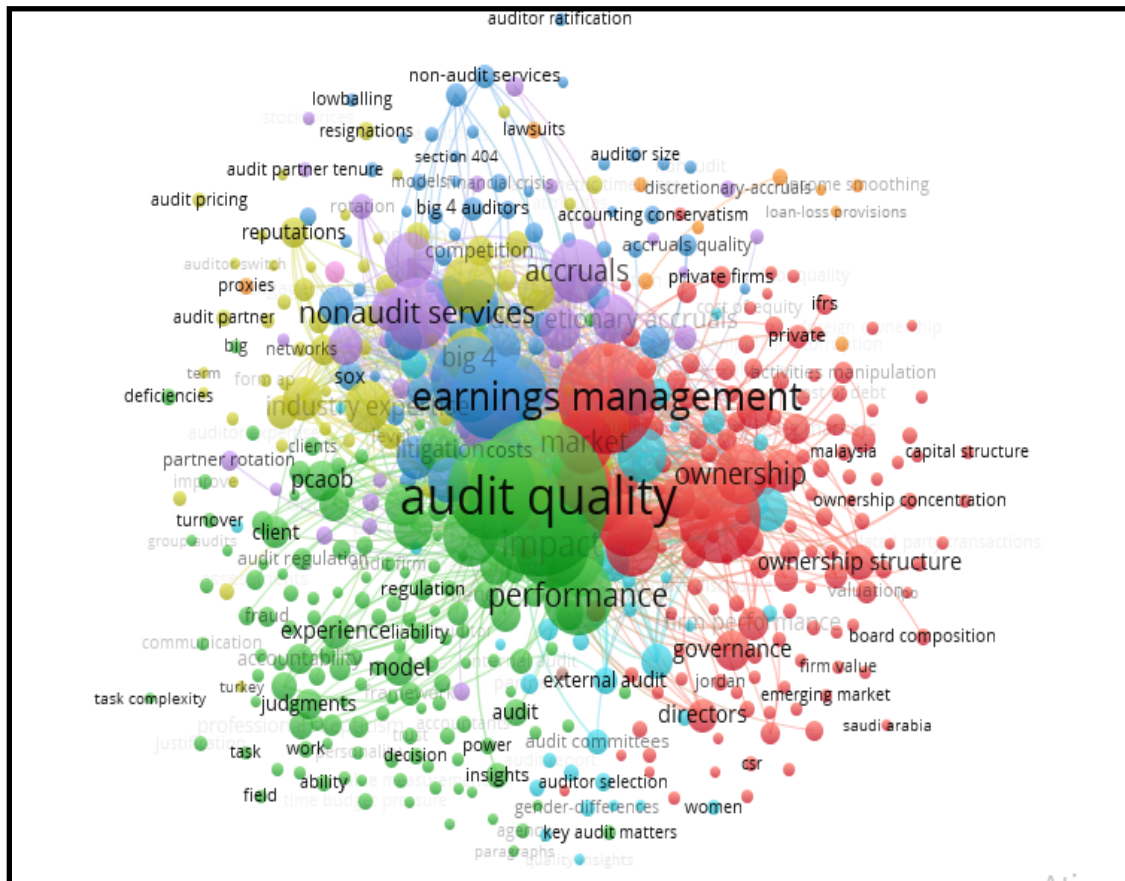
Figure 4. Co-occurrences of all keywords
Source: VOSviewer

The green cluster focuses on "audit quality," the most cited topic, linked to terms like "performance," "judgments," and "PCAOB," emphasizing the role of regulations and auditor performance in QA. The red cluster centers on "earnings management," "ownership," and "ownership structure," addressing corporate governance and financial result manipulation, key concerns in QA literature.

The blue cluster includes "non-audit services," "auditor size," and "lawsuits," focusing on legal issues, audit firm size, and conflicts of interest, underscoring the significance of ethical and independent audits.

The yellow cluster highlights "reputation" and "audit partner," emphasizing the role of firm reputation and partner rotation in influencing QA.

The purple cluster, with terms like "accruals" and "discretionary accruals," examines how discretionary adjustments in financial reporting affect QA, linking these practices to audit confidence.

Overall, the graph illustrates the complexity of QA research, covering regulation, performance, ownership structure, corporate governance, accounting practices, and ethical and legal issues. These interconnected themes reflect the global relevance of financial, organizational, and regulatory factors in shaping audit trust and practice.

It can be seen from the analysis of Figure 5 that the points highlighted in 2019 (the year with the highest number of publications, as shown in Figure 1) were mainly "earnings management", "independence" and "non audit services", followed by the clusters "fees" and "performance" and "earnings", for the year 2020. To complete the most relevant years on the map, in 2021 there are "impact", "firms" and "consequences".
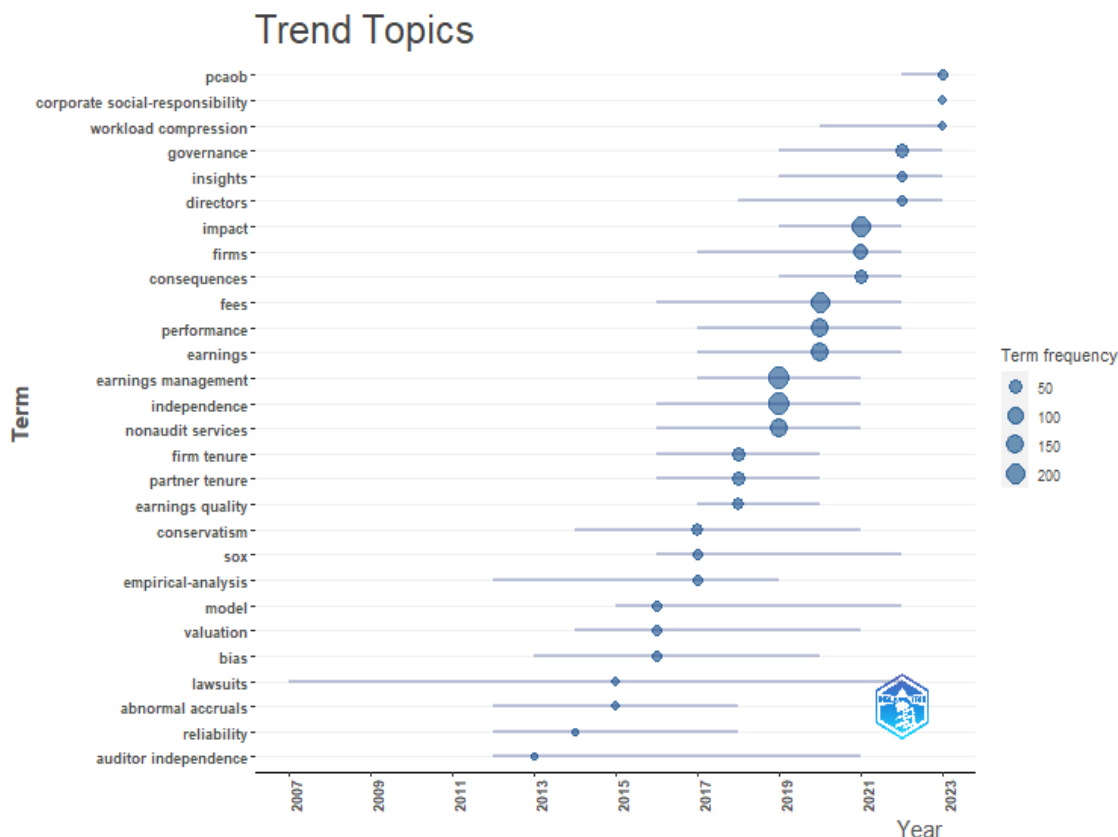
Figure 5. Trend topics on Bibliometrix
Source: Bibliometrix

It is worth highlighting the terms that had the longest influence in the interval of the analysis: 'lawsuits', 'auditor independence' and 'empirical analysis'; terms that had greater relevance before the others and that do not appear in the final years of the analysis: 'abnormal accruals' and 'reliability' (referred to only between 2012 and 2018); and the terms that began to be highlighted in the final years of the analysis: 'PCAOB', 'corporate social-responsibility' and 'workload compression'.

According to Yin et al. (2022), the thematic map formed by a two-dimensional matrix can better predict the direction of future investigations. Thus, the thematic map of keywords is presented in Figure 6 below.
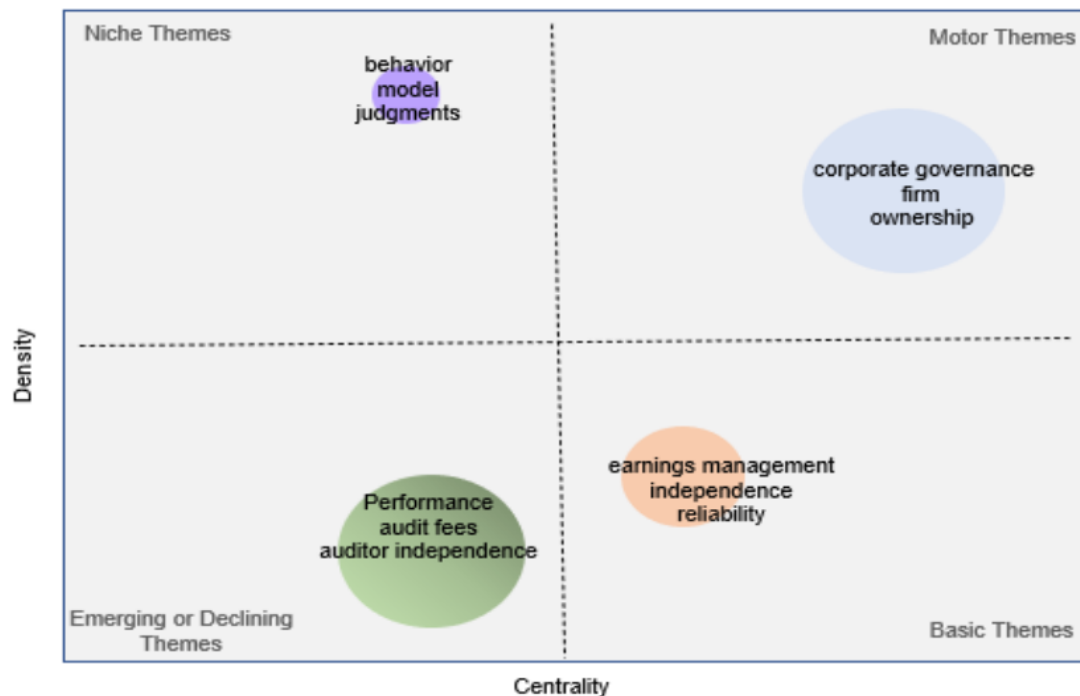
Figure 6. Co-occurrences of all keywords
Source: Bibliometrix

Figure 6 shows the thematic map from the co-word analysis, identifying keyword clusters and their interconnections as themes, characterized by "density" and "centrality."

The upper-right quadrant includes "corporate governance," "firm," and "ownership," classified as motor themes due to high density and centrality, driving research reorganization. The upper-left quadrant contains "behavior," "model," and "judgments," with strong internal but weak external connections, making them peripheral and highly specialized.

In the lower-left quadrant, themes like "performance," "audit fees," and "auditor independence" are marginal, with low density and centrality, representing emerging or declining topics. The lower-right quadrant features basic but underdeveloped themes, including "earnings management," "independence," and "reliability," which are broad and foundational to the field.

5 Conclusions

This research conducted a bibliometric analysis of 1546 articles published between 1999 and 2022, revealing a significant rise in QA-related publications. Notable peaks occurred in 2014-2015 and 2019-2020, reflecting the growing importance of the topic due to regulatory changes and evolving professional demands. Keyword and co-authorship analysis identified key research areas, including "audit fees," "corporate governance,"

"earnings management," and "auditor independence," highlighting the concentration of studies in critical QA areas.

Co-authorship networks, analyzed with VOSviewer, revealed clusters of authors, notably including Wr Knechel, who are part of widely interconnected collaborative networks, significantly contributing to knowledge production. Keyword analysis identified thematic clusters, with "audit fees" as the most frequent term, followed by "corporate governance" and "discretionary accruals," emphasizing the importance of governance and independence in QA. Keyword co-occurrence revealed central themes like QA regulation, audit performance, and audit firm reputation, reflecting the field's diverse approaches.

In addition, the study identified temporal trends that reflect the evolution of the research. In 2019, terms such as "earnings management" and "non-audit services" were widely covered, while in 2020 studies focused on "fees", "performance" and "earnings". In 2021, topics such as "impact" and "consequences" gained greater relevance, showing that QA research continues to adapt to contemporary market and regulatory challenges.

The charts highlight evolving themes in accounting and auditing. The first chart shows a rise in terms like "corporate social responsibility," "governance," and "impact," indicating growing interest, while "earnings management" and "independence" remain relevant. The second chart, analyzing theme centrality and density, identifies "corporate governance," "firm," and "ownership" as "Motor Themes," crucial to the field. Themes like performance, audit fees, and auditor independence are emerging or declining, suggesting the need for new perspectives. Future research should explore emerging topics like corporate social responsibility and governance, focusing on their influence on accounting practices, sustainability, and business ethics.

The decision to use the Web of Science database exclusively was motivated by its recognized quality and comprehensive coverage, especially in high-impact scientific areas. This database stands out for its rigorous curation and indexing of journals with a high impact factor, providing reliable data for consistent bibliometric analysis. Although other databases such as Scopus and Google Scholar are also relevant, the choice of Web of Science aimed to ensure greater accuracy and uniformity in the data analyzed. However, this approach may have limited the inclusion of relevant sources present in other databases, especially in less represented languages or areas.

Future research could explore understudied areas, such as the impact of new technologies like big data and artificial intelligence on audit quality, and the effect of diversity in audit teams on financial reporting. Other promising directions include auditing ESG practices and examining the influence of local regulatory standards on QA, particularly in markets outside major financial centers. The effect of workload compression on QA is also a key area for further investigation, focusing on how efficiency pressures affect report quality.

In summary, this research contributes to a better understanding of the field of QA by mapping key trends, collaboration networks, and gaps, suggesting promising directions for future research. The continuous development of studies on the impact of new

technologies and regional cultural factors can bring significant improvements to the practice of auditing and foster greater confidence in the global market, responding to the growing demands for transparency and social responsibility.

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