

Exploring Social Networks and Conceptual Structure in Accounting Research: A Study of Scientific Collaboration and Word Co-occurrence

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Abstract

This research analyzed the accounting field's scientific collaboration network and conceptual structure. All documents published in core accounting journals from 2006-2022 in Scopus with over 9 citations were examined. Scientific collaboration and co-occurrence networks were analyzed and visualized using VOSviewer software. The publishing of accounting documents is primarily led by three major countries: The United States, the United Kingdom, and Australia. Authors and institutions from these nations actively contribute to the publications in this field. Additionally, recent studies have shown a notable rise in research output in accounting from Malaysia, Germany, China, Italy, and Indonesia. The word co-occurrence revealed six subject areas within the field of accounting. These areas encompass emerging accounting and management control trends, financial reporting and market dynamics, sustainability reporting, corporate social responsibility, international financial reporting standards and accounting regulation, corporate governance, and firm performance, and audit quality and assurance. By tracking significant developments in accounting research, it becomes evident that the discipline has evolved from establishing foundational concepts and practices to focusing on financial reporting, auditing, corporate governance, international accounting, social and environmental considerations, technology integration, and specialized areas of interest.

Keywords: Accounting Research, Scientific Collaboration, Word Co-Occurrence, Bibliometric Analysis, Social Network Analysis, Conceptual Structure.

Introduction

Accounting is a venerable business discipline with roots traced back to ancient civilizations. However, it was not until the twentieth century that accounting gained widespread recognition as a critical aspect of modern business operations. In the early twenty-first century, the introduction of international accounting standards ushered in significant changes to the

profession, marking a new era of global financial reporting and transparency. As accounting has continued to evolve and grow, so too has research in this area of science, and through their publications, conferences, and other activities, accounting associations have helped to advance research in this area of science (Brown & Whittington, 2007; Merigó & Yang, 2017).

Among the many documents, scholarly journals are the primary means for disseminating accounting research to the broader academic community and beyond (McMillan & Casey, 2018). These publications provide a rigorous and peer-reviewed platform for scholars to share their findings, insights, and theories with others in the field. The quantity and quality of scholarly publications in journals are often used as metrics to assess the research productivity of individual researchers (Merigó & Yang, 2017). Many universities and research institutes use the quantity and quality of scholarly publications as critical criteria for evaluating researchers for appointments, promotions, salaries, and rewards. (Wakefield, 2008; Kerr, Simkin & Mason, 2009; Durieux & Gevenois, 2010; Meyer, Waldkirch, Rüdiger, Duscher & Just, 2018). In pursuit of their reputation and academic excellence goals, academic institutions often encourage faculty members to increase their research productivity and output (Uyar, Kılıç & Koseoglu, 2020b). This can lead to more remarkable professional development and personal satisfaction for researchers and increased opportunities for promotion, appointments, and rewards from their universities (Kılıç, Uyar & Koseoglu, 2019). Accounting academics are no exception to this trend, with their scholarly productivity being a key factor in their evaluation and advancement (Wakefield, 2008). As such, accounting researchers are motivated to produce high-quality research that contributes to the advancement of their field and enhances their academic standing.

Collaboration among scientists can be beneficial in overcoming limitations in research resulting from individual cognitive abilities and restricted skill sets, thereby facilitating the conduct and implementation of effective scientific research. Scientific collaboration provides numerous benefits for researchers, including the ability to leverage advanced communication technologies and overcome geographical barriers (Englebrect, Hanke & Kuang, 2008), integration of diverse abilities and expertise of individual researchers (Li, Liao & Yen, 2013), responsiveness to the expectations and needs of universities to conduct research (Tucker, Parker & Merchant, 2014), increase research performance (Endenich & Trapp, 2015) and making motivation to continue the research efforts (Li et al., 2013). Given these numerous advantages, it is no surprise that researchers demonstrate a strong interest in scientific collaboration (Kılıç et al., 2019). In addition, researchers in non-English-speaking countries are increasingly collaborating with English-speaking researchers to increase their chances of publishing research articles in reputable journals (Fleischman & Schuele, 2016). Analyzing co-authorship patterns is a valuable and objective way to assess scientific collaboration and understand research progress in different contexts (Li et al., 2013). Such analysis can reveal differences in the types of collaboration that occur at various levels of analysis, such as the author, institution, or country level (Uyar et al., 2020b).

Despite the substantial body of research in the accounting field, there has been a notable gap in the literature regarding network analysis of co-authorship patterns among accounting researchers. While some studies have reviewed a limited number of accounting journals indexed in the Web of Science (WOS) database (Kılıç et al., 2019; Uyar et al., 2020b), others have analyzed the writing patterns of top accounting journals (Andrikopoulos & Kostaris, 2017; McMillan & Casey, 2018). However, none of these studies have explored accounting journals

indexed in Scopus. A more comprehensive investigation of co-authorship networks in accounting research is needed. This could involve studying a more extensive and diverse range of accounting journals that may influence co-authorship patterns, such as geographic location, institutional affiliation, and research topic. Such an analysis could yield valuable insights into the structure and dynamics of the accounting research community and inform efforts to promote collaboration and knowledge-sharing within this field.

In addition to co-authorship network analysis, co-word analysis is another bibliometric technique that can provide valuable insights into research conducted in a particular field. Co-word analysis is a co-occurrence analysis that focuses on frequently occurring terms and can partially express the research focus of a given field (Wei, 2019). Co-occurrence analysis of terms is widely used to discover hot topics and is a tool for drawing a network of specialized issues. It is also a valuable tool for uncovering the conceptual structure of a scientific discipline (Uyar et al., 2020b; Wei & Zhang, 2020). By identifying and analyzing the common terms used in research articles, co-word analysis can reveal the underlying themes and topics of interest within a particular field. This information can be used to understand the current state of research better, identify gaps, and inform future research directions. Therefore, combining co-authorship network analysis and co-word analysis can provide a more complete and nuanced understanding of the research landscape in a given field.

Literature review

Co-authorship patterns in accounting have been studied since the 1980s, but in recent years, there has been an increased interest in analyzing these patterns and scientific collaborations between institutions and regions in academic journals related to accounting (K?l?ç et al., 2019). The availability of information on the institutional affiliations and geographical locations of authors in bibliographic data has made it possible to examine collaborations at the institutional and country levels through co-authorship or co-occurrence analysis (Zupic & Čater, 2015). Several studies have investigated authorship patterns in accounting. However, many of them have focused on specific countries or regions, such as the United States (Williams, 1985), Canada (Bujaki & Mcconomy, 2017), Australia (de Villiers & Hsiao, 2018), Europe (Carmona & Gutierrez, 1999), and the Asia-Pacific region (Chan, Chen & Cheng, 2005; Heang, Yap, Lim & Tam, 2012).

In addition to examining authorship patterns, some studies have investigated the dominance of certain countries or institutions in accounting journals. However, these studies have typically been limited to analyzing a single journal (Gaunt, 2014; Hassan, Alshater, Mumu, Sarea & Azad, (2021); Baker, Kumar & Goyal, (2023)) or a group of journals (Prather-Kinsey & Rueschhoff, 1999; Chan, Kam, Chen & Cheng, 2009). For example, Gaunt (2014) conducted a study focused on the journal *Accounting and Finance*, which found a significant and sustained increase in participation from five accounting/finance departments in Australia, as well as an increase in the share of non-US academics, mainly from universities in the United Kingdom, Hong Kong, Singapore, and Spain. Prather-Kinsey and Rueschhoff's (1999) study examined the most prolific authors and their academic environments in international accounting research published in 30 accounting journals. They found that the set of authors and schools of the most prolific authors in international accounting in the U.S. were not the same as the set of the most prolific authors and schools of Accounting Organizations and Society (AOS). U.S. or U.K. academic institutions dominated neither the international accounting authors nor their academic

affiliations. Another study by Chan et al. (2009) analyzed data from 24 accounting journals between 1991 and 2005 and found a significant increase in the percentage of co-authored articles in the accounting field. The study also revealed that articles with fewer authors, higher quality, and non-Asian/European co-authors tended to be listed in alphabetical order of co-authors.

Previous studies have used bibliometric indicators and methods to analyze authorship patterns, institutions, academic institutions, regions, rankings of journals, and scientific collaboration in accounting journals. However, these studies have typically been limited to specific regions, countries, or journals. In contrast, this study aims to extend previous research findings by analyzing a wide range of accounting journals without constraining the sample to a particular region or country. While some previous studies have used social network analysis to understand specific journals in the field of accounting (Bamel, Pereira, Del Giudice & Temouri, 2022; Baker, Kumar, Pattnaik, & Pandey, 2022; Baker, Kumar, Pandey & Kraus, 2022; Baker et al., 2023), this study aims to apply social network analysis as an advanced bibliometric method to identify and evaluate the field of accounting.

Wakefield (2008) was the first to use social network analysis in accounting, examining the relationships between 22 accounting journals. Andrikopoulos and Kostaris (2017) and McMillan and Casey (2018) also used social network analysis to examine the co-authorship structure of top accounting journals. More recent studies, such as Kılıç, Uyar and Koseoglu (2019), Uyar et al. (2020a), Uyar et al. (2020b), Hassan et al. (2021), and Mohd Sofian, Abdullah and Mohd-Sabrun, (2023), have used bibliometrics and scientific mapping to examine co-authorship patterns, conceptual structures, and patterns of scientific collaboration in accounting journals. In recent years, a growing body of literature has utilized bibliometric techniques to conduct in-depth analyses of specific journals in accounting and finance. Notable studies in this area include those conducted by Hassan et al. (2021), Bamel et al. (2022), and Baker et al. (2022, 2023, 2023). These investigations have predominantly focused on conducting retrospective reviews of particular journals, examining various aspects such as productivity, scientific impact, leading publication trends, journal performance, and the knowledge structure of the journal.

Previous studies regarding the co-occurrence of words in accounting have investigated specific issues in this scientific field. Such as Ellili (2023), who has reviewed the bibliometrics of corporate governance or other research related to sustainability reporting audit quality (Bosi, Lajuni, Wellfren & Lim, 2022; Ciger, 2020), IFRS (Tijjani, Ur Rehman, Peter, Bajwa & Khan (2023), and corporate social responsibility (CSR) (Nan, Tung-Boon, Lisong, Yongxin & Hang (2020).

However, no research has been done that comprehensively examines accounting bibliometrics, and none of the previous studies have examined the networks of scientific collaboration in the collection of accounting journals indexed in the Scopus database. This study aims to fill this gap by using science mapping to analyze patterns of scientific collaboration at three levels: authors, institutions, and countries, as well as the co-occurrence of words in research conducted in accounting.

Research objective

The primary purpose of this study is to conduct a comprehensive analysis of the field of accounting to achieve the following objectives through the mapping, evolution, and trends of

accounting in the Scopus database:

1. Mapping and analyzing social networks of the accounting field: This study aims to map the collaboration networks among authors, institutions, and countries in the accounting field. This research will provide valuable insights into crucial contributors and rising stars by identifying influential and emerging actors and examining the evolution and trends in collaboration patterns. The findings will facilitate the identification of important co-authors, institutions, and countries, fostering potential collaborations and informing future research endeavors in accounting.

2. Uncovering thematic areas, emerging topics, and hot research topics in accounting: By analyzing the co-occurrence network of keywords, this research aims to identify distinct clusters representing thematic areas within the accounting field. Additionally, by analyzing evolutionary trajectories and citation patterns, this study will unveil emerging topics and hot research areas in accounting. The findings will provide researchers, academics, and stakeholders with a deep understanding of the current landscape, enabling them to identify promising avenues for further investigation and contribute to advancing knowledge in accounting.

Materials and Methods

Data Source

Researchers can use a variety of reputable databases for bibliographic and illustration studies, including Google Scholar, Scopus, PubMed, and Web of Science (WoS). In this study, data were extracted from the Scopus database generated by Elsevier. Scopus is the largest citation database and review of peer-reviewed scientific texts in the world compared to other databases and annually publishes the impact factor of journals, which is a criterion for evaluating journals, articles, individuals, subject areas, research institutions, and countries (Falagas, Pitsouni, Malietzis & Pappas, 2008; Kulkarni, Aziz, Shams & Busse, 2009).

Search Method

The main subject of the present study is the published documents in the accounting field. Due to the large number of these documents, the articles of the core accounting journals from 2006 to 2022 were selected with at least nine citations. A total of 94 journals in the Scopus database were identified as relevant to the field of accounting and auditing. Among these, 84 journals published documents in Scopus between 2006 and 2022. To gather data, the titles of these journals were searched using the Advanced Search section of Scopus, with the search results limited to the period from 2006 to 2022. Considering the substantial number of documents and the limitations of the VOSViewer software for analysis, a criterion of at least 9 citations or more was applied to select documents for further analysis. As a result, 14,461 documents met this criterion and were subsequently extracted for analysis.

Data preparation

Similar keywords with overlapping meanings, such as IFRS and International Financial Reporting Standards, m41, and Accounting, were synchronized prior to their analysis using software to ensure the accuracy of the co-occurrence mapping of words. An example of 15 synced words is provided in Table 1.

Table 1

A sample list of keyword synchronization

Sarbanes-Oxley	Sarbanes-Oxley Act
SOX	Sarbanes-Oxley Act
accounting conservatism	conservatism
accruals	accruals and earning management
governance	corporate governance
voluntary disclosure	disclosure
discretionary accruals	accruals and earning management
earnings management	accruals and earning management
earnings quality	earning and financial reporting quality
fair value	fair value accounting
financial reporting quality	earning and financial reporting quality
performance	firm performance
IFRS	international financial reporting standards
legitimacy	legitimacy theory
risk	risk management
sustainability	sustainability reporting

Bibliometric Indicators and Visualization Techniques

The study presents bibliographic indicators based on 20 selected journals, authors, institutions, and countries/origins of the documents. Citations per document were used as a bibliometric measure to evaluate the quality of the publications. Visualization techniques were applied to present co-authorship maps of authors, institutions, and countries and a co-occurrence map of accounting documents' most frequently used keywords and terms. These techniques enabled a better understanding of the relationships among authors, institutions, and countries and the co-occurring themes and topics within the accounting field. The analysis of co-authorship focuses on the study of the social structure and network of collaboration of authors, institutions, and countries (Kumar, 2015). The co-occurrence analysis focuses on the most important words and keywords used in the documents and is used to draw the conceptual structure of a research area (Cheng, Huang, Yu & Wu, 2018).

Visualization Tools

For data visualization, the VOSviewer software and GunnMap were utilized. VOSviewer was employed to map the collaboration networks among authors, institutions, and countries. In addition, GunnMap, a freely available resource accessible at <http://gunnmap.herokuapp.com>, was utilized to map the geographic distribution of countries.

Results

Core Journals

Table 2 shows 20 journals in the field of accounting that have published more than 234 documents with at least 9 citations from 2006 to 2022 on the Scopus database. "Accounting Review", "Accounting, Auditing and Accountability Journal" and "Contemporary Accounting Research" have the most articles.

The journals "Journal of Accounting and Economics", "Journal of Accounting Research",

and "Accounting, Organizations and Society" are among the most highly cited journals in the field of accounting. In particular, these journals tend to have a high average citation count per article, indicating that the research published in these journals has had a significant impact.

Table 2
The 20 most accounting core journals in Scopus

Rank	Journal	Document	Sum of Citation	Average Citation (Rank)
1	Accounting Review	728	62048	85.23 (4)
2	Accounting, Auditing and Accountability Journal	644	31556	49 (9)
3	Contemporary Accounting Research	624	34272	54.92 (7)
4	Critical Perspectives on Accounting	603	22509	37.33 (15)
5	Accounting and Finance	515	14843	28.82 (18)
6	Accounting, Organizations and Society	515	44339	86.1 (3)
7	Journal of Accounting and Economics	514	54020	105.1 (1)
8	Journal of Business Finance and Accounting	497	17683	35.58 (16)
9	Journal of Accounting Research	466	43540	93.43 (2)
10	Managerial Auditing Journal	416	13721	32.98 (17)
11	Review of Accounting Studies	398	19006	47.75 (11)
12	Review of Quantitative Finance and Accounting	387	9460	24.44 (20)
13	Auditing	369	18080	48.1 (10)
14	Journal of Accounting and Public Policy	338	19615	58.03 (6)
15	European Accounting Review	332	14719	44.33 (12)
16	British Accounting Review	299	15407	51.53 (8)
17	Accounting Horizons	286	12272	42.91 (13)
18	Accounting Education	269	6695	24.89 (19)
19	Management Accounting Research	250	16225	64.9 (5)
20	Accounting Forum	235	9666	41.13 (14)

Prolific Authors

Table 3 shows the 20 most prolific authors in the field of accounting at Scopus. Ahsan Habib, Jeong-Bon Kim, and Khaled Hussainey are highly productive authors in accounting. Additionally, Ferdinand A. Gul, Jeong-Bon Kim, and Qingliang Tang have some of the highest average citation counts for their published works, indicating the significant impact of their research on the field. Notably, many of the most prolific authors in accounting are based in the United States and Australia.

Table 3
The 20 most prolific authors in accounting

Rank	Author	Institution (Country)	Document	Sum of Citation	Average Citation (Rank)
1	Habib A.	Massey University, (New Zealand)	52	1625	31.25 (19)
2	Kim J.-B.	City University of Hong Kong (Hong	47	4100	87.23 (2)

Rank	Author	Institution (Country)	Document	Sum of Citation	Average Citation (Rank)
		Kong)			
3	Hussainey K.	University of Portsmouth, (UK)	46	2018	43.87 (15)
4	Parker L.D.	RMIT University (Australia)	42	2156	51.34 (14)
5	Gendron Y.	University of Alberta (Canada)	40	2581	64.52 (10)
	Hope O.-K.	University of Toronto (Canada)	40	3113	77.82 (4)
7	De Villiers C.	The University of Auckland (New Zealand)	39	2975	76.28 (5)
	Wood D. A.	Brigham Young University (USA)	39	1685	43.20 (16)
9	Guthrie j.	Macquarie University (Australia)	36	2501	69.47 (8)
10	Lobo G.J.	University of Houston (USA)	35	2044	58.4 (12)
	Knechel W.R.	University of Florida (USA)	35	2197	62.77 (11)
12	Ahmed K.	La Trobe University (Australia)	31	852	27.48 (20)
13	Maroun W.	University of the Witwatersrand (South Africa)	30	1036	34.53 (18)
	Myers L.A.	University of Tennessee (USA)	30	2110	70.33 (7)
	Richardson G.	Macquarie Business School, Macquarie University (Australia)	30	2131	71.03 (6)
	Craig R.	University of Portsmouth (UK)	30	1177	39.23 (17)
	Gul F.A.	Deakin University (Australia)	30	3775	125.83 (1)
18	Hermanson D.R.	Kennesaw State University (USA)	29	1540	53.10 (13)
19	Tang Q.	Western Sydney University (Australia)	27	2179	80.70 (3)
20	Raghunandan K.	Florida International University (USA)	28	1836	65.57 (9)

Productive Institutions

Table 4 shows a list of the 20 most productive research institutes in the field of accounting. University of Texas (USA), Monash University (Australia), and Macquarie University (Australia) are the productive Institutions. Notably, most highly productive institutions in accounting research are located in the United States and Australia, with universities in Hong Kong, Singapore, the United Kingdom, and Canada also prominently featured in the list. Furthermore, the University of Chicago (USA), University of Pennsylvania (USA), and Stanford University (USA) have been found to have the highest average citation counts per document, indicating the significant impact of their research on the field. The findings suggest

that these institutions are at the forefront of accounting research, making significant contributions to the advancement of the field.

Table 4

The 20 most productive Institutions in accounting

Rank	Institution	Document	Sum of Citation	Average Citation (Rank)
1	University of Texas, (USA)	372	19437	52.25
2	Monash University, (Australia)	221	11884	53.77
3	Macquarie University, (Australia)	220	6880	31.27
4	University of California, (USA)	198	12054	60.88
5	University of Illinois at Urbana-Champaign, (USA)	189	8826	46.70
6	University of New South Wales, (Australia)	179	9430	52.68
7	RMIT University, (Australia)	177	6552	37.02
8	Deakin University, (Australia)	164	6094	37.16
9	University of Manchester, (UK)	163	8775	53.83
10	University of Sydney, (Australia)	162	8775	54.17
11	University of Melbourne, (Australia)	145	6423	44.30
12	University of Chicago, (USA)	141	17817	126.36 (1)
13	University of Toronto, (Canada)	140	10702	76.44 (5)
14	Stanford University, (USA)	136	12664	93.12 (3)
15	Hong Kong Polytechnic University (Hong Kong)	132	7595	57.54
16	City University of Hong Kong, (Hong Kong)	131	8920	68.09
17	Indiana University, (USA)	130	6848	52.68
18	University of Hong Kong, (Hong Kong)	127	10653	83.88 (4)
19	Nanyang Technological University, (Singapore)	127	7082	55.76
20	University of Pennsylvania, (USA)	124	13105	105.69 (2)

Productive countries

Table 5 lists the 20 most productive countries in accounting research. The United States is ranked first with 5601 records, followed by the United Kingdom and Australia. In addition to having many published documents in accounting research, the United States also tends to have the highest number of citations, indicating the significant impact of the research produced in this country on the field. Moreover, the difference between the number of citations in the United States and other countries is often substantial, highlighting the country's dominant position in accounting research.

Hong Kong, the United States, Canada, the Netherlands, and Singapore are among the top five countries with the highest average citation counts per document. This indicates that research conducted in these countries has significantly impacted the accounting field and highlights the contributions made by researchers from a diverse range of geographic regions. Figure 1 shows the distribution of accounting publications in different countries.

Table 5

The 20 most productive countries in accounting

Rank	Country	Document	Sum of Citation	Average Citation (Rank)
1	United States	5601	288843	51.57 (3)
2	United Kingdom	2472	109657	44.36 (8)
3	Australia	2308	91648	39.71 (12)
4	Canada	940	47835	50.89 (4)
5	China	657	21785	33.16 (19)
6	New Zealand	550	22285	40.52 (10)
7	Hong Kong	478	34926	73.07 (1)
8	Italy	452	17466	38.64 (14)
9	Germany	437	15247	34.89 (16)
10	Netherlands	391	18984	48.55 (5)
11	Spain	391	15550	39.77 (11)
12	France	385	17331	45.02 (7)
13	Malaysia	378	12604	33.34 (18)
14	Singapore	263	14018	53.30 (2)
15	Finland	231	10955	47.42 (6)
16	Taiwan	226	5888	26.05 (20)
17	Sweden	200	6891	34.46 (17)
18	South Korea	193	7604	39.4 (13)
19	Belgium	148	6211	41.97 (9)
20	south Africa	145	5376	37.08 (15)

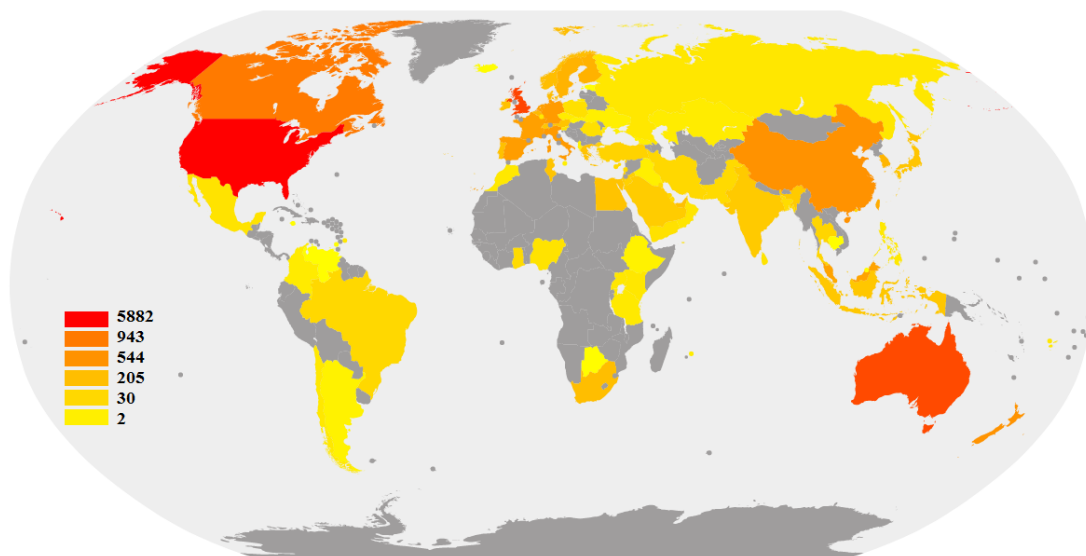


Figure 1: Distribution of publications of different countries in accounting

Common Keyword

Table 6 lists the top 20 frequently used keywords in accounting articles. Notably, “corporate governance”, “accruals and earning management”, “disclosure” and “accounting” were identified as the most common keywords used in accounting. Additionally, the keywords “earning and financial reporting quality”, “corporate social responsibility”, and “regulation” were found to have the highest citation counts per document. These findings suggest that these topics are of significant interest to researchers in the accounting field and that research in these

areas has had a notable impact on the field.

Table 6

The 20 most frequently keywords in accounting

Rank	Keyword	Occurrences	Average Citation (Rank)
1	Corporate Governance	905	53.19 (7)
2	Accruals and Earning Management	704	56.30 (5)
3	Disclosure	634	57.86 (4)
4	Accounting	572	38.95 (15)
5	International Financial Reporting Standards (IFRS)	341	39.48 (14)
6	Audit Quality	311	43 (11)
7	Sustainability Reporting	289	54.91 (6)
8	Corporate Social Responsibility	271	71.92 (2)
9	Auditing	262	35.27 (18)
10	Audit Fees	260	40.36 (13)
11	Financial Reporting	245	33.91 (19)
12	Firm Performance	204	42.49 (12)
13	Accountability	189	35.64 (17)
14	China	186	35.84 (16)
15	Accounting Education	172	23.99 (20)
16	Earning and Financial Reporting Quality	172	85.56 (1)
17	Information Asymmetry	164	43.05 (10)
18	Accounting Education	176	48.35 (8)
19	Regulation	164	65.34 (3)
20	Conservatism	161	46.56 (9)

Authors' Scientific Collaboration Network

Figure 2 shows the network of authors' scientific collaboration in accounting journals. Through co-authorship analysis, it was found that there were 985 co-authorships spread across 32 clusters. It is important to note that the mapping results only display co-authorships that have produced five or more documents. In addition, the total link strength was 5865. Total link strength shows the importance of authors in collaboration between them. Total link strength can help identify the most influential nodes in a network. Various colors characterize each cluster to facilitate the visualization of the network. These findings highlight the collaborative nature of accounting research and the importance of co-authorship in producing high-quality research. The size of the nodes indicates the frequency of collaboration for each author. Curves between nodes represent the collaboration between authors. The shorter the distance between the two nodes, the greater the number of collaborations between the two authors. Due to the authors' proximity, the names of some of them are not included in the network. The individuals with the highest link strength in the network are David A. Wood, with a link strength of 66 from cluster 6, Jeong-Bon Kim, with a link strength of 59 from cluster 1, and Linda A. Myers is associated with cluster 14 with a link strength of 59. This suggests that these individuals have

strong connections with other nodes in the network, which may indicate that they hold influential positions or have made significant contributions within their field of research.

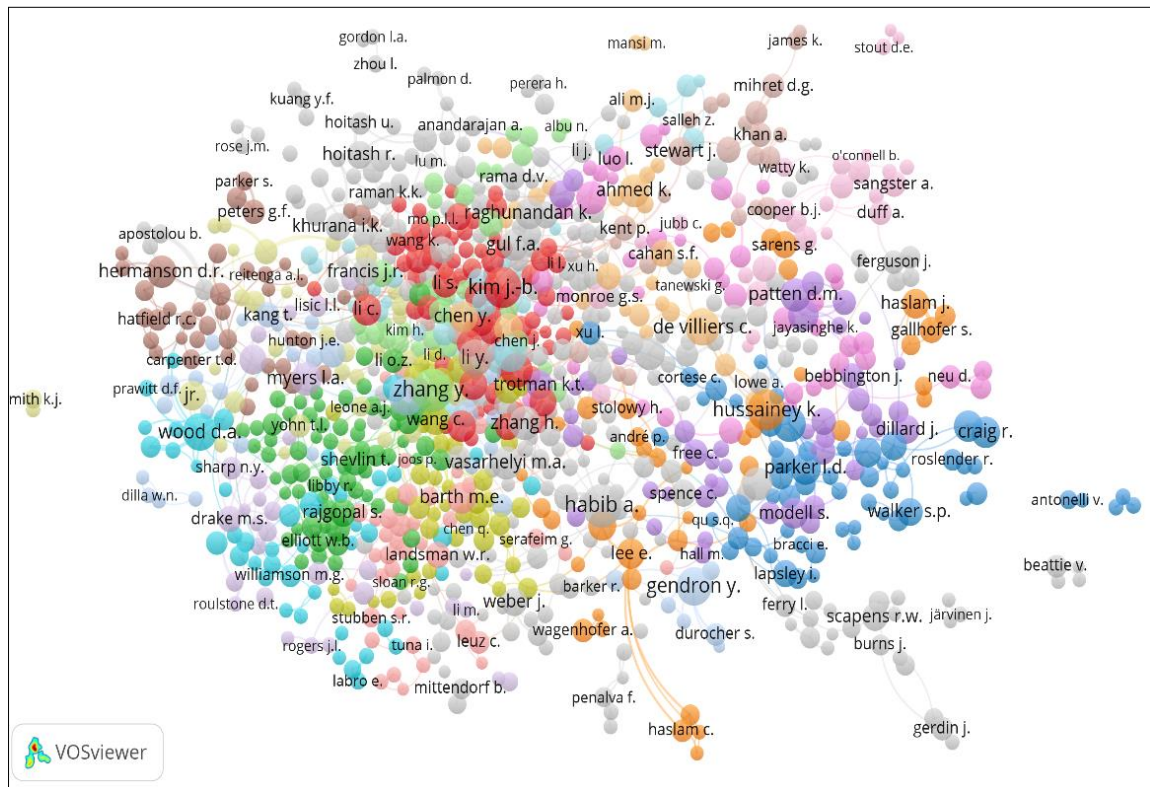


Figure 2: Co-Author Visualization

Collaboration Network of Institutions

Figure 3 depicts the co-authorship network among Institutions in the field of accounting. The total number of scientific institutions and centers collaborating is 17941. It was found that there were 635 co-authorships spread across 20 clusters. The total link strength across all collaborations was found to be 3968. The findings from mapping co-authorship networks among Institutions, akin to the co-authorship map of individual authors, only depict institutions that have generated five or more documents, as the software's default threshold limit for inclusion is set at five documents or more. Hence, it is crucial to note that the results are contingent on this threshold.

Brigham Young University stands out not only for having the highest number of publications but also for its impressive link strength of 105, indicating strong connections with other institutions in the co-authorship network of Institutions. Following closely behind is Arizona State University, with a link strength of 81, and Singapore Management University, with a link strength of 78. These institutions are also significant players in the network, suggesting a high degree of influence and importance. Node size indicates the frequency of institutions' publications. Curves between nodes represent a collaboration between institutions. The shorter the distance between the two nodes, the greater the number of collaborations between those institutions. Due to institutions' proximity, some names are not included in the network.

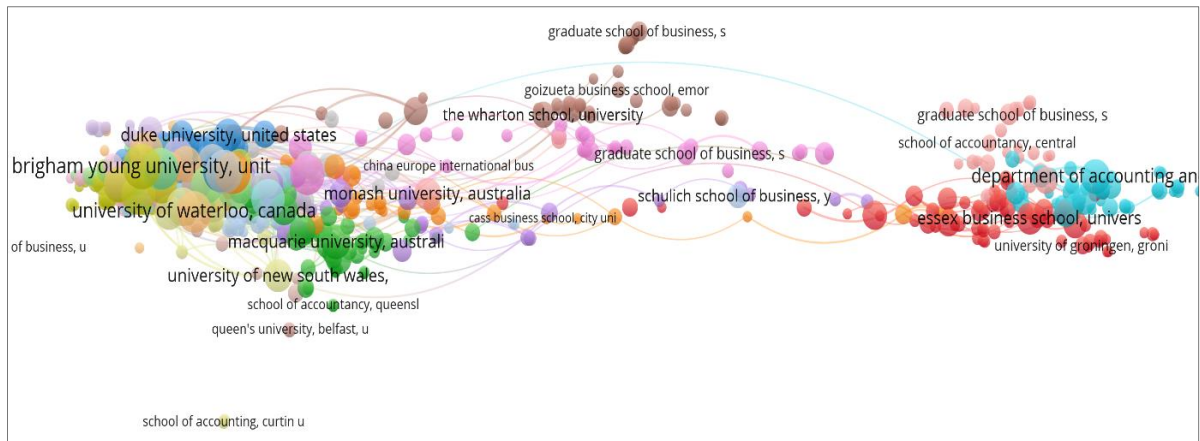


Figure 3: Co-authorship network between Institutions

Scientific Collaboration Network of Countries

Figure 4 shows the scientific collaboration network of countries involving 141 countries in writing and publishing works. However, only 77 countries met the threshold of producing at least 5 documents. The network consisted of 77 countries, 8 clusters, and 668 links, with a total link strength of 6188. The nodes' size corresponds to the documents' frequency, while the curves between nodes represent the collaboration between countries. The proximity of the nodes indicates the strength of collaboration between two countries, with shorter distances indicating greater collaboration. It is worth noting that due to the closeness of some countries, their names are not included in the network.

The United States stands out with a total link strength of 2006, indicating its significant influence on the network. In second place, the United Kingdom has a total link strength of 1596, while Australia, with 1220 link strength, is the most important in the scientific collaboration network of countries after the United Kingdom. Notably, the three countries with the highest number of citations, documents, and link strength in the scientific collaboration network are represented by large circles (nodes) in the network diagram. These circles reflect the countries' significance regarding the number of documents, citations, and link strength. Moreover, these countries have the most links with other nations, as evidenced by the curves emanating from each node. In the collaboration network of countries, specific patterns emerge. Australia primarily collaborates with Middle Eastern and African countries, while America shows a stronger tendency to collaborate with East Asian nations. Moreover, some Western and Northern European countries exhibit mutual collaboration among themselves. Additionally, Spain's collaboration is primarily observed with South American countries, driven by the proximity of their languages.

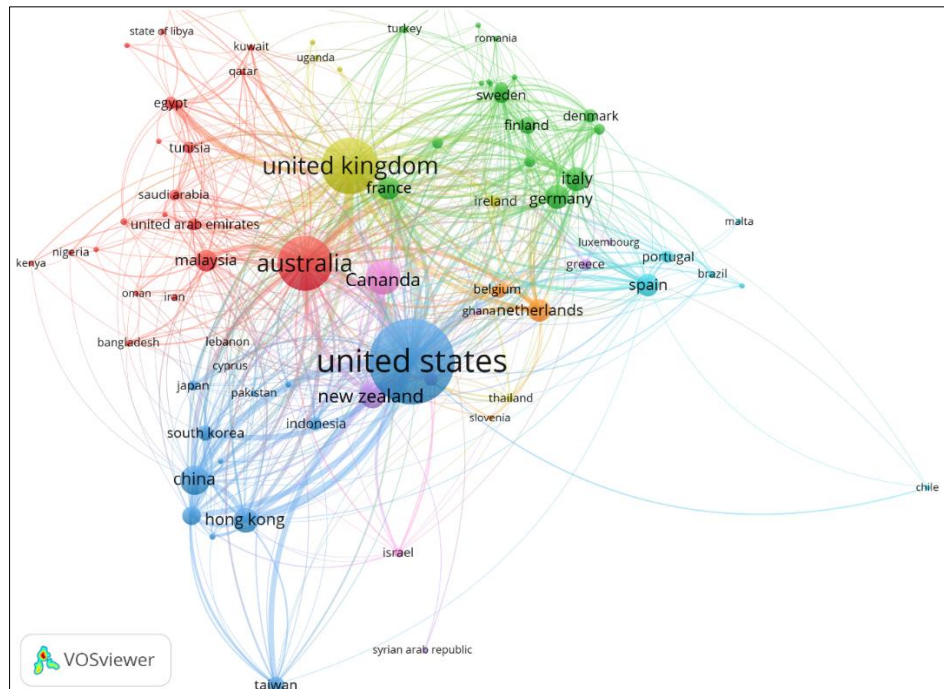


Figure 4: Co-authorship network of countries

Figure 5 displays the scientific collaboration network among countries, visualized based on a temporal trend. This diagram provides valuable information about which countries were the primary focus of accounting research in each year. The color spectrum of the nodes, ranging from blue to red, indicates the relative focus on accounting research in recent years, with redder nodes representing countries with a greater emphasis on this research area. According to this network, before 2013, accounting research was predominantly conducted in countries such as the United States, United Kingdom, Australia, Canada, and Hong Kong. However, more recently, there has been a growing interest in this field from other countries, including Malaysia, Germany, China, Italy, and Indonesia.

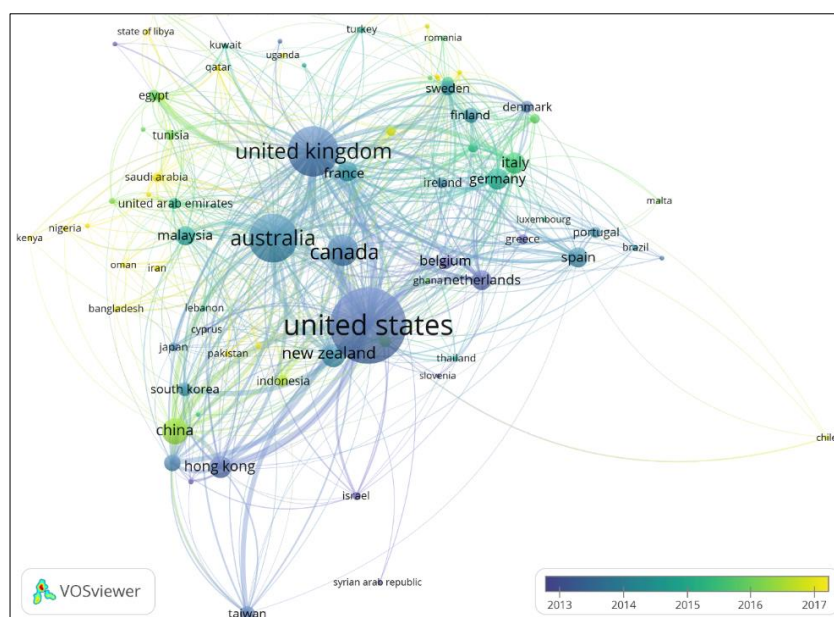


Figure 5: Overlay visualization of co-authorship network of countries

The co-occurrence network of keywords

Figure 6 shows the co-occurrence between keywords. In this network, co-occurrence between keywords that have at least 5 repetitions has been shown. In total, there are 20537 keywords in all research data, of which the threshold limit of 5 repetitions included 1762 keywords, of which 200 keywords had 21 or more occurrences. In this network, 6 clusters contain 200 keywords connected to 4466 links. The total link strength of this network is 11160. Some keywords may not be visible due to the overlap of terms. The concentration of colors and font size indicates the frequency of occurrence. The shorter the distance between the two keywords, the greater the number of co-occurrences between them. The topic of corporate governance has the highest frequency and is the largest node in the network, positioned at the center to indicate its strong association with over half of the other keywords in the network. Its significant number of links, totaling 169, further underscores its central position in the network. The total link strength of the corporate governance topic, which amounts to 1423, indicates its significant importance and substantial impact within the network.

The first cluster (Red) consists of 59 keywords, and it is related to "Emerging Trends in Accounting and Management Control". This cluster primarily focuses on various aspects of accounting and management control. It includes keywords such as accounting, management accounting, management control, performance measurement, balanced scorecard, management control systems, performance management, control, and performance measures. The cluster also covers related topics like accounting education, ethics, fraud, and accountability. Keywords like COVID-19, sustainable development, and climate change suggest a contemporary focus on the impact of global events and sustainability issues on accounting practices. The cluster also highlights the influence of institutional theory and gender considerations in accounting research. Overall, this cluster represents a broad range of topics and reflects the evolving nature of accounting practices in response to emerging challenges and societal concerns.

The second cluster (green) comprises 42 keywords and focuses on "Financial Reporting and Market Dynamics". This cluster revolves around financial reporting, market dynamics, and related concepts. It includes keywords such as accruals and earnings management, disclosure, financial reporting quality, conservatism, value relevance, earnings, market efficiency, firm value, analyst forecasts, and capital markets. The cluster also covers topics like tax avoidance, investment, cost of capital, and institutional investors. The presence of keywords like innovation and emerging markets suggests a focus on the relationship between financial reporting practices and the dynamics of evolving markets. Overall, this cluster highlights the importance of financial reporting quality, market efficiency, and investor decision-making in accounting and finance.

The third cluster (blue) consists of 30 keywords, which appear to focus on "Sustainability Reporting and Corporate Social Responsibility". This cluster primarily focuses on sustainability reporting, corporate social responsibility (CSR), and related topics. It includes keywords such as sustainability reporting, corporate social responsibility, integrated reporting, legitimacy theory, banks, annual reports, financial performance, and stakeholders. The cluster also covers specific geographical contexts such as the United Kingdom, developing countries, Bangladesh, Jordan, India, and South Africa. The presence of keywords like environmental performance, social responsibility, and Islamic banks indicates a focus on corporate behavior's environmental and social dimensions. The cluster also highlights the use of content analysis and textual

analysis in studying sustainability reporting practices. Overall, this cluster emphasizes the growing importance of CSR and sustainability reporting in organizational practices and stakeholder expectations.

The fourth cluster (yellow) consists of 27 keywords, and it was named "International Financial Reporting Standards and Accounting Regulation". This cluster centers around international financial reporting standards (IFRS), accounting regulation, and related topics. It includes keywords such as international financial reporting standards, financial reporting, regulation, fair value accounting, accounting standards, transparency, and enforcement. The cluster also covers specific geographical contexts like Germany and Greece. The presence of keywords like financial crisis and standard setting suggests a focus on the impact of regulatory frameworks on financial reporting quality and stability. The cluster also highlights the role of organizations such as the International Accounting Standards Board (IASB) and the Securities and Exchange Commission (SEC) in shaping accounting standards and practices. Overall, this cluster underscores the importance of global accounting standards and regulatory compliance in facilitating transparency and comparability in financial reporting.

The fifth cluster (purple) consists of 22 keywords related to "Corporate Governance and Firm Performance". This cluster primarily focuses on corporate governance, firm performance, and related concepts. It includes keywords such as corporate governance, firm performance, executive compensation, agency theory, ownership structure, board of directors, and capital structure. The cluster also covers specific geographical contexts such as China, Malaysia, Egypt, Indonesia, and Islamic banks. The presence of keywords like political connections, family firms, and gender diversity indicates a focus on the influence of governance structures and practices on organizational outcomes. The cluster highlights the role of boards of directors, ownership concentration, and executive compensation in shaping firm performance. Overall, this cluster emphasizes the importance of effective corporate governance mechanisms in promoting accountability and enhancing firm performance.

The sixth cluster (turquoise) consists of 20 keywords and focuses on "Audit Quality and Assurance". This cluster revolves around audit quality, assurance, and related topics. It includes keywords such as audit quality, auditing, audit fees, auditors, audit committee, risk management, internal control, and auditor independence. The cluster also covers specific geographical contexts, such as the United States of America. The presence of keywords like Sarbanes-Oxley Act, internal auditing, materiality, and audit risk suggests a focus on auditing practices, regulatory frameworks, and risk management. The cluster highlights the importance of audit quality, internal control systems, and independence in ensuring the reliability of financial information. Overall, this cluster underscores the significance of audit practices and assurance mechanisms in maintaining the integrity of financial reporting and enhancing stakeholder confidence.

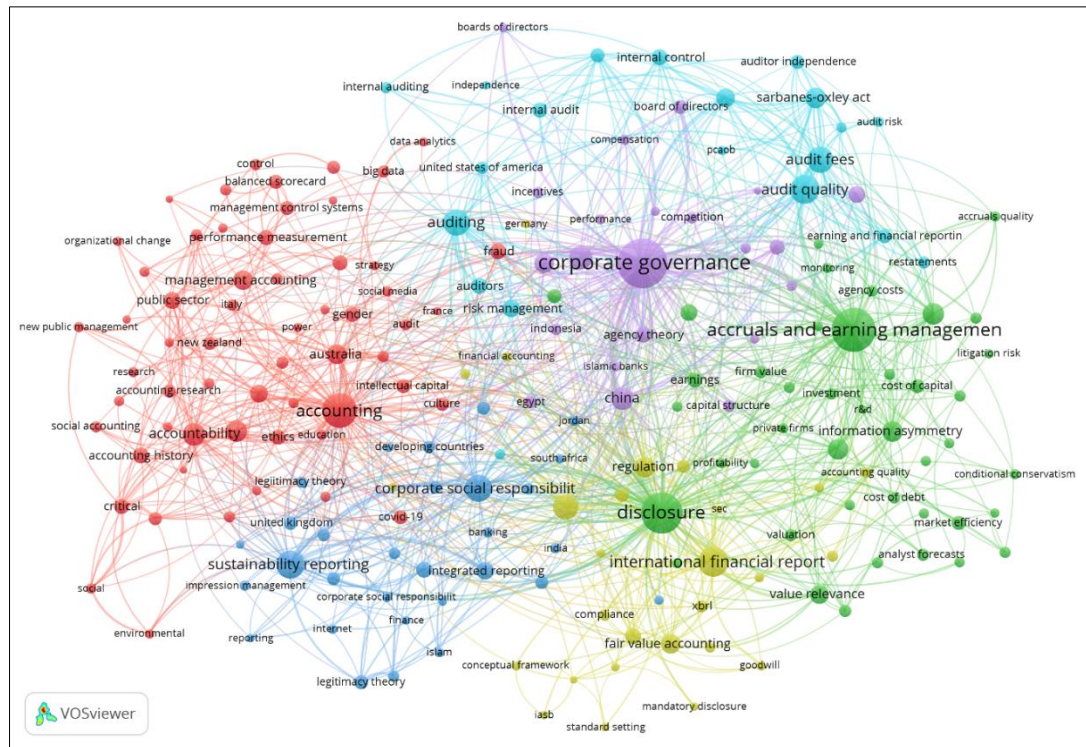


Figure 6: Co-occurrence keywords map of accounting

Figure 7 displays a co-occurrence map of keywords in accounting research based on their time trend. The map uses a color scheme from purple to red, with red indicating newer keywords and purple indicating older ones. The 10 new topics in accounting are: “covid-19”, “gender diversity”, “data analytics”, “social media”, “textual analysis”, “integrated reporting”, “big data”, “institutional logics”, “corporate social responsibility”, and “Islamic banks”. Track major trends and shifts in accounting research shows that the field has progressed from establishing foundational concepts and practices to focusing on financial reporting, auditing, corporate governance, international accounting, social and environmental considerations, technology integration, and specialized areas of interest. There is an increasing emphasis on studying the impact of financial practices on capital markets, the quality of financial information, and the role of governance mechanisms and stakeholders in organizations. Additionally, there is a growing recognition of the importance of integrating social and environmental factors into accounting practices and the influence of technology and data analytics. The field has diversified its research methodologies and is addressing contemporary issues such as gender diversity, sustainability, and emerging challenges in a global context.

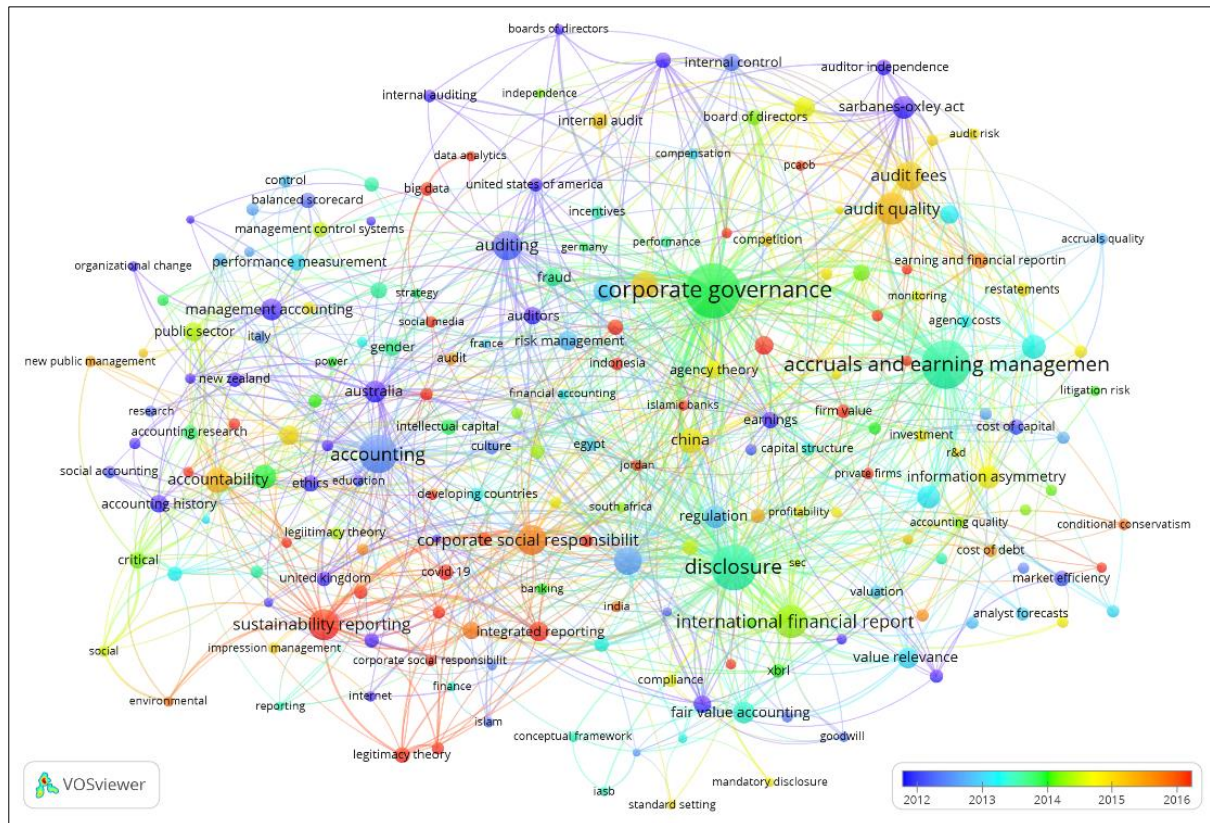


Figure 7: Overlay visualization of co-occurrence keywords

Discussion

For this study, we collected data from an extensive collection of accounting journals. We used the Scopus database for data collection, as it includes reputable journals that are well-regarded within the global academic community. This approach differs from many previous studies, which were based on a limited collection of journals and focused solely on the Web of Science database, which indexes fewer accounting journals. By utilizing bibliometric techniques, we gained a deeper understanding of scientific collaboration at the author, institution, and country levels. Additionally, we mapped the conceptual structure, subject areas, and emerging trends in the accounting field.

This study identified the top 20 accounting journals in Scopus by considering the number of published articles. By analyzing the number of articles and the highest average citations, four journals stood out as the leading publications in both aspects. These journals are *Accounting Review*, *Accounting, Organizations and Society*, *Journal of Accounting and Economics*, and *Journal of Accounting Research*. Their prominence regarding article counts and citation impact reinforces their position as the leading journals within the accounting field.

The study identified the top 20 authors, institutes, and countries that dominate the field of accounting publications. The United States, United Kingdom, Australia, Canada, and Hong Kong emerged as the leading countries in this domain, which aligns with previous research conducted by Enderich and Trapp (2015), Andrikopoulos and Kostaris (2017), and Uyar et al. (2020b). Furthermore, the majority of the top authors and institutions were found to be affiliated with the United States and Australia, further supporting the prominence of these countries in the field.

Findings showed that the term corporate governance was the most dominant theme during

the research period, which seems to be due to the much research that has been done on the disciplinary mechanisms of managers (Mehdi, Sahut & Teulon, 2017). Furthermore, this issue aligns with previous research findings (Ellili, 2023). After that, the words accruals, earning management, and accounting had the most occurrence in articles.

A comprehensive scientific collaboration network was constructed to visualize the relationship among authors, institutions, and countries involved in accounting. These social networks serve as a valuable guide for developing collaborations and advancements in the accounting domain. Notably, the analysis of country-level collaboration networks revealed distinct patterns. Australia was primarily inclined towards collaboration with Middle Eastern and African countries, whereas the United States demonstrated a stronger tendency to collaborate with East Asian nations. Furthermore, several Western and Northern European countries exhibited mutual collaboration, fostering a closely connected network. Additionally, Spain's collaboration efforts were primarily observed with South American countries.

The study's findings reveal a comprehensive network of keyword co-occurrences, providing valuable insights into the major research themes and trends in the accounting field. The analysis identifies six distinct clusters with varying focal areas. The first cluster, centered around "Emerging Trends in Accounting and Management Control," encompasses various topics, including accounting education, ethics, fraud, and the impact of global events and sustainability issues on accounting practices. The second cluster, focused on "Financial Reporting and Market Dynamics," emphasizes the importance of financial reporting quality, market efficiency, and investor decision-making. The third cluster, centered on "Sustainability Reporting and Corporate Social Responsibility," highlights the growing significance of CSR and sustainability reporting. The fourth cluster, "International Financial Reporting Standards and Accounting Regulation," underscores the importance of global accounting standards and regulatory compliance. The fifth cluster, related to "Corporate Governance and Firm Performance," emphasizes the role of effective governance mechanisms in promoting accountability and enhancing firm performance. Lastly, the sixth cluster, focused on "Audit Quality and Assurance," highlights the significance of audit practices and assurance mechanisms in maintaining the reliability of financial information. These clusters collectively provide a comprehensive overview of the key themes and areas of research in the field of accounting, reflecting the evolving nature of the discipline in response to emerging challenges and societal concerns. The analysis of keyword co-occurrence trends in accounting research provides valuable insights into the evolving landscape of the field. The top emerging topics in accounting, such as "COVID-19," "gender diversity," "data analytics," and "corporate social responsibility," highlight the changing research priorities. Accounting research has moved beyond establishing foundational concepts and now encompasses various areas, including financial reporting, auditing, corporate governance, international accounting, and social and environmental considerations. There is a growing emphasis on understanding the impact of financial practices on capital markets, the quality of financial information, and the role of governance mechanisms and stakeholders. Additionally, integrating social and environmental factors and the influence of technology and data analytics are gaining recognition. This analysis underscores the dynamic nature of accounting research and its ability to adapt to emerging trends and address contemporary issues, such as gender diversity and sustainability, in a global context.

Conclusion

This study aims to provide a comprehensive overview of published papers in accounting journals indexed in the Scopus database between 2006 and 2022 using co-word and social network analysis. In this study, we examined the networks of scientific collaboration among authors, institutions, and countries, as well as the co-occurrence network of words in accounting. Our research involved data from 14,461 articles published in accounting journals indexed in the Scopus citation database between 2006 and 2022.

The findings of this research underscore the global reach and impact of accounting research, with contributions from scholars across different regions and continents. These findings have important implications for students and researchers in accounting, as they highlight the authors, Institutions, and countries leading the way in this field. By understanding which countries and institutions produce the most high-quality research, students and researchers can make more informed decisions about where to pursue their studies or collaborations. The findings of this study can guide researchers in discovering the topics that have been studied the most and the topics that have been studied less. By understanding which areas are most heavily researched, scholars can identify gaps in the literature and areas where further investigation is needed. It will be interesting to see how these trends continue to evolve in the coming years and what impact they may have on the field as a whole. Overall, this study contributes to our understanding of accounting research's social networks and conceptual structure and highlights key areas of focus within the field. By building on these findings, researchers can continue to advance the discipline and contribute to our understanding of essential accounting issues.

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