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A bibliometric analysis of literature on accounting information systems: trends, future and direction

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Abstract

Research Questions: What has been the trend and development in research publications concerning Accounting Information Systems ***(***AIS) over the past decade? Which authors, countries, and scholarly journals have made significant contributions to the body of AIS literature? What are the key thematic trends and shifts within the literature on AIS, and what are the emerging research opportunities in the evolving field of AIS?

Motivation: Research shows that although there has been significant growth in the body of literature focusing on AIS, a comprehensive analysis of the literature surrounding this critical domain is limited. This research aims to provide valuable insights into current trends, guide future research agendas, and contribute to the advancement of scholarship and practice in AIS.

Data: Data for the current research were collected from 1760 articles published in Scopus databases.

Tools: The VOSviewer software tool was used to perform the graphical analysis of the sample's bibliometric data.

Findings: This research reveals a notable surge in publications, with the number of publications reaching an unprecedented peak in 2020. Research regarding AISs over the years

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relates to accounting, cost, and decision-making. However, there is a shift within the AIS literature towards blockchain, data analytics, artificial intelligence, digitalization, and sustainability issues.

Practical implications: By identifying influential publications, authors, and emerging topics, the study can guide researchers in prioritizing research agendas and collaborations while also assisting practitioners in understanding the latest developments in AIS theory and practice. Additionally, the results can assist policymakers in tailoring policies and regulations that align with the specific needs and challenges faced by different industries about AIS.

Keywords: Accounting; accounting information systems; bibliometric analysis; Scopus database; VOSviewer

JEL codes: M41; M410

1. Introduction

Accounting information systems (AIS) play an important role in modern business environments, serving as the backbone of financial data management and decision-making processes. The rise and sustained development of the AIS discipline stem predominantly from the utilization of information and communication technology within the accounting and business sectors (Monteiro & Catarina, 2021; Ardianto & Anridho, 2018). Boczko (2024) describes an AIS as a system that integrates accounting principles, information technology, and business processes to streamline financial operations, ensure regulatory compliance, and provide accurate and timely information to stakeholders for decision-making. Typically, an AIS has three main components: the Transaction Processing System (TPS), which supports daily operations with various reports and documents; the General Ledger/Financial Reporting System (GL/FRS) for producing financial statements and complying with legal requirements, and the Management Reporting System (MRS) for providing internal management with specialized financial reports, including budgets and variance reports essential for decision-making (Trigo *et al.,* 2016). AIS performs three core functions: efficient data collection and storage, provision of decision-making support, and enforcement of accurate data recording and processing controls (AccountingEdu, 2024).

The use of AIS has resolved several problems associated with the traditional method of recording and processing accounting data, which is not only paper-intensive and time-consuming but also frequently results in unreliable financial data, potentially leading to inappropriate financial decision-making by management and other users of accounting information (Fernando *et al.,* 2022; Jayawardane & Gamlath, 2020). According to Fachruzzaman *et al.* (2021), AIS empowers managers of businesses across all industries to maintain a competitive edge by effectively leveraging

financial data to make informed decisions, optimize resources, measure financial performance, and adapt strategies in real time. Undoubtedly, a well-functioning AIS is essential for a business's success, as it provides accurate financial information, streamlines operations, enhances decision-making, fosters innovation, and promotes competitiveness in dynamic markets.

As businesses contend with the complexities of digital transformation, there has been significant growth in the body of literature focusing on AIS (Monteiro & Catarina, 2021). Despite the fundamental role played by AIS in modern business operations (Ul-Huq *et al.,* 2020; Idris & Mohamad, 2017), the literature reveals that there is limited scope of attention given to bibliometric analyses of the vast body of literature surrounding this critical domain (Lidyah *et al.,* 2023; Ezenwoke *et al.,* 2019). This limitation is apparent in prior studies' focus solely on accounting articles and specific journals, including varied periods of analysis (Lidyah *et al.*, 2023; Chiu *et al.*, 2019; Ardianto & Anridho, 2018). Consequently, there is a lack of consensus regarding which research areas should be included or excluded from AIS studies, considering the multidisciplinary nature of the subject. This diversity in perspectives and methodologies has resulted in varied interpretations of the field's scope, making it challenging to establish a unified framework for AIS research. As a result, researchers, practitioners, and educators are unable to gain a holistic understanding of the prevailing trends, key contributors, and emerging themes within the AIS literature.

While previous studies (Lidyah *et al.,* 2023; Minovski *et al.,* 2020; Munim *et al.,* 2020) have conducted bibliometric analyses on AIS literature, there remains a need for further research to explore the progression of published AIS studies, especially when new technologies are emerging. Conducting additional bibliometric analyses would address this significant gap in the field. Bibliometric techniques offer unique insights beyond those provided by traditional literature reviews (Alayo *et al.*, 2020). Bibliometric analysis is an effective method for reviewing AIS literature, as it provides detailed mappings of the field's knowledge structure and uncovers prevailing research trends and future directions (Rousseau & Rousseau, 2021; Kraus *et al.,* 2020). This quantitative approach assesses the development, influence, and collaborative landscape of AIS research, thereby enhancing understanding and progression in the field (Munim *et al.,* 2020). Accordingly, this research aims to conduct a comprehensive bibliometric analysis of the literature on AIS from 2013 to 2023, focusing on the progress, influential works, core themes, and emerging areas in the Scopus database. The research is guided by the following set of research questions (RQs):

RQ1. What has been the trend and development in research publications concerning AIS over the past decade, as evidenced by bibliometric analysis of literature?

RQ2. Which authors, countries, and scholarly journals have made significant contributions to the body of literature regarding AIS, and how have their contributions shaped the direction of research?

RQ3. What are the key thematic trends and shifts within the literature on AIS?
RQ4. What are the emerging research opportunities in the evolving field of AIS?

By employing bibliometric techniques, this investigation seeks to unravel the intellectual structure of AIS research, identify prolific authors and journals, and discern the interconnectedness of ideas, fostering a deeper understanding of the current state and future directions of AIS research. This paper is structured as follows: Section two provides a comprehensive review of previous bibliometric studies on AIS. Section three outlines the methodology utilized in this research, while Sections four and five present the results and discussion of the results, respectively. The paper concludes with a summary, limitations of the current research and avenues for future research.

2. Literature review

Some publications (Lidyah *et al.,* 2023; Minovski *et al.,* 2020; Chiu *et al.,* 2019; Ezenwoke *et al.,* 2019; Ardianto & Anridho, 2018) have analyzed research on AIS. In 2018, Ardianto and Anridho carried out bibliometric analyses on all articles pertaining to accounting information systems in the International Journal of Digital Accounting Research (IJDAR) from 2001 to 2015. Utilizing content analysis, they analyzed the categorization of methodologies employed and the core accounting subject areas covered in these articles. They found that surveys were the most frequently employed methodology by authors, with AIS, accounting, auditing, and taxation emerging as the predominant research areas. Additionally, the majority of authors originated from developed nations such as the United States, Spain, Italy, Australia, and the United Kingdom.

Ezenwoke *et al.* (2019) employ a bibliometric technique to quantitatively analyze the volume and impact of publications in the AIS research domain from 1975-2017. The study's key findings highlighted a lack of consistent growth in the volume of AIS research publications. Additionally, the study underscored that the majority of research on AIS predominantly emanated from the USA, China, Indonesia, Australia, and the United Kingdom, focusing on issues pertaining to auditing and internal and management controls, including enterprise information systems. Among the top 10 national contributors to AIS research, Malaysia was the sole representative of a developing country, while China and Indonesia were the sole contributors to emerging economies.

Similarly, Chiu *et al.* (2019) conducted a comprehensive bibliometric and comparative analysis, examining methodologies employed and the thematic focus of accounting articles published across six AIS journals spanning 2004 to 2016. In terms of methodology, archival, experimental, and survey research methods predominate across these journals. The primary accounting areas of focus include

auditing, AIS, financial accounting, and managerial accounting, and the emerging technologies that are commonly studied include XBRL, online/e-reporting, and artificial intelligence.

In their study, Minovski *et al.* (2020) analyzed the influence of information technologies on AIS, considering the plethora of papers exploring the application of new technologies in the accounting profession amidst the context of Industry 4.0. The findings reveal that cloud computing and Big Data are the most familiar and frequently utilized technologies in practical AIS applications. Conversely, artificial intelligence and blockchain technologies are reported to have lower implementation rates and lesser familiarity with domestic practices. This is attributed to factors such as the nature of work in the country, the limited presence of advanced information technology companies, and the level of development within the country.

In another study, Lidyah *et al.* (2023) undertook a bibliometric analysis of AIS; their study concentrated solely on key concepts and prominent authors. Their findings revealed a prevailing trend in AIS research, with a notable emphasis on accounting journals and specialized information systems. They also discovered that the current trend in AIS research exhibits a stronger emphasis on accounting-related topics. Other recurring themes in the literature include discussions on quality, information and control systems.

Considering the multidisciplinary nature of AIS, Monteiro and Cepêda (2021) analyzed 144 articles from the Web of Science (WoS) database and identified key AIS research themes, including behavior, experience, system requirements, organizational culture, management accounting, and internal control. The authors highlighted future research opportunities in areas linking AIS to agency and contingency theories, such as AIS's impact on organizations, system construction, implementation in small and medium-scale enterprises (SMEs) and the public sector, and factors influencing AIS efficiency and quality. Kocsis (2019) reached similar conclusions regarding the key themes in AIS literature, emphasizing areas such as audit, enterprise resource planning (ERP), monitoring and control, and decision-making while highlighting a gap in studies evaluating the impact of automation, artificial intelligence, and cloud platforms on AIS. However, a study by Hutchison *et al.* (2018) utilized Latent Semantic Analysis to examine academic research themes in AIS journals. The authors found that topics such as XBRL, taxonomies, and financial reporting continued to receive strong attention while emerging areas like Big Data, blockchain, and ethics were gaining recent interest.

These studies suggest that efforts have been made to explore bibliometric analysis on AIS, which offers a framework for conducting the current research. However, there remains a lack of consensus regarding which research areas should be included or omitted from studies in the field of AIS. Authors of articles focused on identifying, analyzing, and systematizing research trends in the field of AIS employing diverse

approaches and methodological tools in their studies. Almost all the analyses were limited to articles published in specific journals from the late 90s to 2017 with varied emphases. Given the substantial growth in AIS literature (Monteiro & Catarina, 2021), it is likely that numerous articles have been published since then, presenting potential issues that can be explored further through bibliometric analysis. This research fills the gap by exploring broader AIS concepts from 2013 to 2023 using a multidisciplinary database−Scopus. This promises to unveil some insights into this important field of study, stirring some enthusiasm for further exploration.

3. Methods

Bibliometrics employs a quantitative method to evaluate the productivity, growth, and impact of academic literature (Quayson *et al.,* 2023; Donthu *et al.,* 2021). Primarily, it serves to provide information on contemporary literature within specific subjects while structuring and organizing it conceptually and intellectually. Bibliometric methods utilize bibliographic data from publication databases like Web of Science (WoS) and Scopus to visualize interconnections within and between research streams (Zupic & Carter, 2015). This study conducted a bibliometric analysis using the keyword "accounting information systems" in the Scopus database. Scopus is a widely utilized, comprehensive database encompassing scientific journals, conference proceedings, and books. Its content selection and continuous re-evaluation processes ensure the inclusion of high-quality and relevant materials. This meticulous approach maintains the integrity and reliability of the database, making Scopus a trusted resource for researchers worldwide (Rahman *et al.,* 2023; Singh *et al.,* 2021; Verma *et al.,* 2020). Due to the credibility of the Scopus database, several authors conducted bibliometric analyses using Scopus-based data. For example, Mysaka and Derun (2024) conducted a bibliometric analysis utilizing keyword clustering from AIS research publications indexed in Scopus. Also, Anriva and Hamidah (2024) conducted a bibliometric analysis using data from the Scopus database to provide an overview of global developments in AIS. Therefore, Scopus serves as an excellent platform to track the comprehensive development of AIS research.

We used the search string (Accounting information system) AND PUBYEAR > 2012 AND PUBYEAR < 2024 AND (LIMIT-TO (SUBJAREA, "BUSI") OR LIMIT-TO (SUBJAREA, "ECON")) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (PUBSTAGE, "final")) AND (LIMIT-TO (SRCTYPE, "j")) AND (LIMIT-TO (LANGUAGE, "English"))). We limited the search to journal and review articles, excluding book chapters and conference proceedings, following the recommendation of Wijesinghe *et al.* (2019). The search was carried out on 15/02/2024. A total of 3458 articles and review papers were identified covering the period from 2013 to 2023. We started the analysis in 2013 based on the observed resurgence in publication volume following a decline in 2012. According to

Ezenwoke *et al.* (2019), despite a downturn in 2012, there was a subsequent increase in AIS research publications. Starting the analysis in 2013 enables the capture of the latest developments and emerging themes in the field, providing a comprehensive understanding of the current state of AIS scholarship. Further restrictions were applied to focus on final papers, journals, and those in English, yielding 3,330, 3,142, and 1,760, respectively. In line with the multidisciplinary and comprehensive perspective of this article, all 1,760 final papers were included in the data analysis. Table 1 presents an overview of the sample selection process.

Table 1. Sample selection process

Step	Description	Number of documents
1. Initial search	Articles and review papers identified (2013–2023).	3,458
2. Final paper selection	Excluded 128 non-final papers	3,330
3. Journal articles only	Excluded 188 book chapters and conference papers	3,142
4. Language filter	Restricted to only English-language papers.	1,760
5. Final sample	Papers included in the analysis	1,760

The sample's graphical analysis was performed using VOSviewer (version 1.6.20), a software tool designed for constructing, visualizing, and conducting detailed analyses of diverse bibliometric data forms (Waltman & Van Eck, 2013). The tool retrieves essential data, including journal performance, prolific authors, and prominent countries. Gutiérrez and Gómez-Rudy (2024) highlight that the VOSviewer software enables the visualization of bibliometric networks using data extracted from diverse repositories like Scopus. This study employed the VOSviewer to extract detailed academic information from the Scopus database, enabling the analysis of research topics and illustrating the impact of AISs.

This study utilized five bibliometric methods: citation analysis, co-author analysis, co-occurrence analysis, bibliographic coupling, and co-citation analysis, each examining relationships based on citations, shared occurrences, shared references, and joint citations, respectively. The VOSviewer software is capable of providing these analyses. The process involved uploading the extracted data from the Scopus database after dealing with the inclusive and exclusive criteria in the software. After that, we created a map based on bibliometric data by choosing the specific analyses to be performed, such as citation analysis, co-author analysis, co-occurrence analysis, bibliographic coupling, and co-citation analysis. After accounting for the threshold, the results of the selected analyses appear as network visualization, overlay visualization, and density visualization. The following section provides the results derived from the analysis of the data.

4. Results

4.1 Trends of literature by year

RQ1. What has been the trend and development in research publications concerning AIS over the past decade, as evidenced by bibliometric analysis of literature?

Figure 1 illustrates the yearly progression of research articles published on AIS from 2013 to 2023. The graph highlights a notable surge in publications in 2019, with the number of publications reaching an unprecedented peak of 236 in 2020. It can be observed from Figure 1 that research interest in the field dropped to 172 in 2022 before it started increasing again to 201 in 2023.

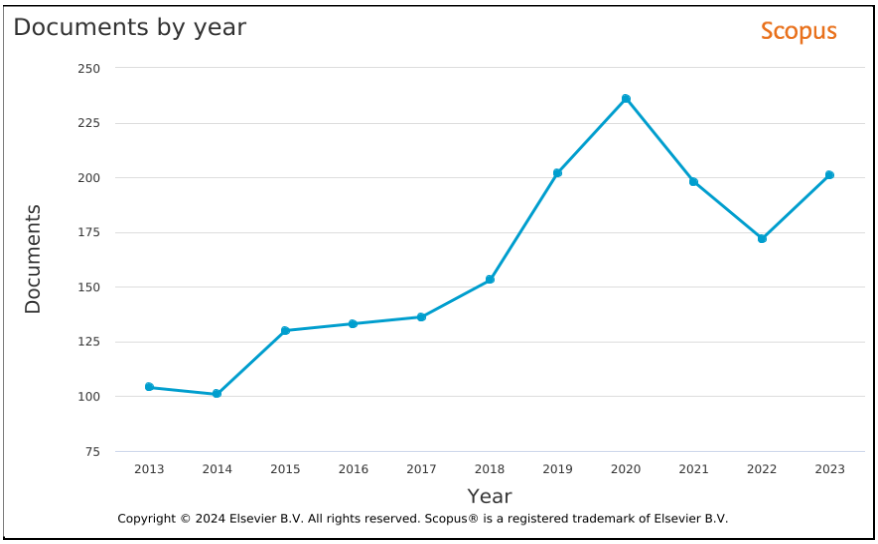

Figure 1. Documents trends by year

4.2 Most impactful authors

RQ 2. Which authors, countries, and scholarly journals have made significant contributions to the body of literature regarding AIS, and how have their contributions shaped the direction of research?

Table 2 depicts the number of research articles an author publishes annually (TP), total citations (TC), average citations per author (AV. CT), and rank. The table shows that Susanto, A. leads in publications on AIS with 16 articles, followed by Meiryani and S. Mulyani, each contributing 11 articles from 2013 to 2023. Napitupulu, I. H. has 7 articles, whereas Chiu, V., Janvrin, D. J and Liu, Q. published 6 articles each.

An increase in the number of authors publishing on AIS indicates growing interest and expansion within the field. This trend can lead to enhanced collaboration among the researchers, resulting in more comprehensive and interdisciplinary studies. Regarding average citation per author (AV. CT), Vasarhelyi, M. A has the highest average citation (105.50), followed by O'leary, DE (51.50), Jusoh, R (36.25), Mia, L (28.60), and Rubino, M. (27.75). Based on the average citation, Vasarhelyi, M. A is ranked the first most impactful author, followed by O'leary, D. E, Jusoh, R, Mia, L, and Rubino, M. It is important to note that while quantitative metrics provide insight into an author's impact, qualitative factors like the novelty of ideas and contributions to policy or practice are equally significant.

Table 2. Most impactful authors

Author Name	TP	TC	AV.AT	Rank
Susanto, Azhar	16	126	7.88	13
Meiryani	11	79	7.18	14
Mulyani, Sri	11	70	6.36	16
Napitupulu, Ilham	7	50	7.14	15
Hidayah				
Chiu, Victoria	6	86	14.33	12
Janvrin, Diane J.	6	14	2.33	19
Liu, Qi	6	105	17.50	10
Wang, Yunsen	6	163	27.17	8
Mia, Lokman	5	143	28.60	5
Sutton, Steve G.	5	81	16.20	11
Wang, Tawei	5	8	1.60	20
Asiaei, Kaveh	4	108	27.00	9
Chiu, Tiffany	4	14	3.50	18
Huy, Pham Quang	4	22	5.50	17
Jusoh, Ruzita	4	145	36.25	4
Muda, Iskandar	4	103	25.75	6
O'leary, Daniel E.	4	206	51.50	3
Rubino, Michele	4	111	27.75	6
Vasarhelyi, Miklos A.	4	422	105.50	1
Widener, Sally K.	4	213	53.25	2

Source: VOSviewer; Scopus database

4.3 Highly cited documents

An article's significance in a field is often evaluated by its citation count, which reflects how frequently other researchers reference it in their work. Highly cited documents typically serve as key references, indicating substantial contributions to the field's development. (Alayo *et al.*, 2020). Table 3 provides a compilation of the key publications that have significantly impacted the field of AISs from 2013 to 2023. The article by Hair *et al.* (2019) leads in terms of citations, totaling 730, followed by Dai and Vasarhelyi (2017) with 390 citations, and Min *et al.* (2019) with

255 citations. For example, Dai and Vasarhelyi (2017) examined the transformative capabilities of blockchain within the realm of accounting and established that blockchain technology can facilitate a transparent, verifiable, and real-time accounting ecosystem. Also, blockchain can transform auditing methodologies, leading to the development of a more precise and timely automated assurance framework. However, adapting blockchain, originally designed for peer-to-peer digital currency, to accounting and auditing requires careful consideration due to its potentially transformative impact.

In a thorough examination, Min *et al.* (2019) proposed a framework integrating petrochemical industrial IoT, machine learning, and a practice loop to build a digital twin. This twin facilitates information exchange between the physical factory and a virtual model, enabling optimization of production control. In addition, Bhimani and Willcocks (2014) investigated the impact of digitization and 'Big Data' on accounting information. The study revealed that digitization and Big Data have significantly transformed accounting information by enabling real-time data processing, enhanced analysis capabilities, and the integration of vast volumes of structured and unstructured data. This has led to improved decision-making, greater efficiency in financial reporting, and the ability to identify valuable insights for strategic planning and risk management. The high citation count of these articles reflects their fundamental focus on AIS issues, including themes such as accounting, decision-making, blockchain, Big Data, and Sustainable development.

Table 3. Top 10 cited documents.

Authors	Year	Title	Citations	DOI
Hair *et al.*	2019	Rethinking some of the rethinking of partial least squares	730	10.1108/EJM-10-2018-0665
Dai & Vasarhelyi	2017	Toward blockchain-based accounting and assurance	390	10.2308/isys-51804
Min *et al.*	2019	Machine learning-based digital twin framework for production optimization in the petrochemical industry	255	10.1016/j.ijinfomgt.2019.05.020
Bhimani and Willcocks	2014	Digitization, Big Data and the transformation of accounting information	230	10.1080/00014788.2014.910051
Warren *et al.*	2015	How Big Data will change accounting	229	10.2308/acch-51069
Gualandris *et al.*	2015	Sustainable evaluation and verification in supply chains: Aligning and leveraging accountability to stakeholders	228	10.1016/j.jom.2015.06.002
Appelbaum *et al.*	2017	Impact of business analytics and enterprise	220	10.1016/j.accinf.2017.03.003

Authors	Year	Title	Citations	DOI
		systems on managerial accounting		
Kirkeboen *et al.*	2016	Field of study, earnings, and self-selection	194	10.1093/qje/qjw019
Roetzel P.G.	2019	Information overload in the information age: a review of the literature from business administration, business psychology, and related	176	10.1007/s40685-018-0069-z
O'Leary D.E.	2017	Intelligent systems in accounting, finance and management	165	10.1002/isaf.1417

Source: VOSviewer; Scopus database

4.4 Article sources

Table 4 presents a compilation of the journal sources with the highest publication and citation counts in the field of AIS. The table reveals that the "Journal of Cleaner Production" and the "International Journal of Accounting Information Systems" hold the top positions in article publications, with a total of 76 articles (2495 citations) and 62 articles (2037 citations), respectively. Following closely is the "Academy of Accounting and Financial Studies Journal" and "Journal of Information Systems" publishing 42 articles (212 citations) and 37 articles (849 citations), respectively. Although the "Academy of Accounting and Financial Studies Journal" leads the "Journal of Information Systems" in the total number of article publications, it falls behind the "Journal of Information Systems" in terms of citation counts. These journals have been instrumental in advancing the body of knowledge in AIS.

Table 4. Most published journal sources in the field of AIS

Journal Source	No of Articles	Rank	Citations
Journal of Cleaner Production	76	1	2495
International Journal of Accounting Information Systems	62	2	2037
Academy of Accounting and Financial Studies Journal	42	3	212
Journal of Information Systems	37	4	849
International Journal of Scientific and Technology Research	27	5	39
Journal of Emerging Technologies in Accounting	27	6	195
Economic Annals Xxi	26	7	81
Journal of Accounting and Organizational Change	23	8	254
Accounting Auditing and Accountability Journal	20	9	538
Quality Access to Success	19	10	121

Journal Source	No of Articles	Rank	Citations
Issues In Accounting Education	18	11	116
Journal of Accounting Education	18	11	319
Mediterranean Journal of Social Sciences	18	11	45
International Journal of Applied Business and Economic Research	17	14	140
Eastern European Journal of Enterprise Technologies	16	15	40
International Journal of Supply Chain Management	16	16	38
Public Money and Management	16	17	107
International Journal of Accounting and Information Management	15	18	231
Accounting	14	19	150
European Research Studies Journal	13	20	121

Source: VOSviewer; Scopus database

4.5 Most influential countries

Table 5 provides information about the 20 leading countries actively contributing to research on AISs. It is clear that the United States ranked first by publishing 338 articles on AISs. Indonesia ranks second in terms of publications, with a total of 140 articles. Ukraine and the United Kingdom follow closely with 101 articles each. China followed with 98 articles.

Table 5. The leading 20 countries actively contributing to research on AISs.

Country/Territory	Number of Articles	Rank
United States	338	1
Indonesia	140	2
Ukraine	101	3
United Kingdom	101	3
China	98	5
Australia	94	6
Italy	90	7
Russian Federation	88	8
Malaysia	73	9
Spain	64	10
Jordan	62	11
Germany	55	12
Canada	54	13
Iraq	43	14
India	41	15
Portugal	41	16
Viet Nam	40	17
Poland	34	18
France	32	19
Romania	31	20

Source: VOSviewer; Scopus database

As noted by Idris and Mohamad (2017), the proliferation and success of AISs have captured the attention of scholars worldwide. The growing prevalence of empirical studies in developed nations has contributed to acknowledging AIS as a valuable tool for measuring financial performance and making informed financial decisions.

Figure 2 illustrates the collaborative connections among authors from different affiliated countries using different node sizes. The figure reveals a growing trend of collaboration in the field of AIS among countries. Thirteen nations are actively engaged in collaborative efforts. The co-authorship network highlights the prominence of authors from the United States, as evidenced by the largest node. This signifies that, among the collaborating nations in AISs, authors from the United States engage in the most extensive collaborations with authors from other countries, establishing a central role in co-authorship publications on AISs from 2013 to 2023. Authors from the United States, China, the United Kingdom, Indonesia, Canada, and Australia stand out as key collaborators, engaging prominently with authors from other countries. As depicted in Figure 2, the United States-China exhibited notable connections with a link strength of 21, while the United States-Canada and United States-United Kingdom collaborations demonstrated link strengths of 17 and 13, respectively. The United States leads in collaboration, contributing to 338 documents with 7398 citations and a total link strength of 164. Following closely is Indonesia, with 140 documents, 821 citations, and a link strength of 16. Refer to Table 6 for a comprehensive breakdown of co-authorship details for all 13 countries.

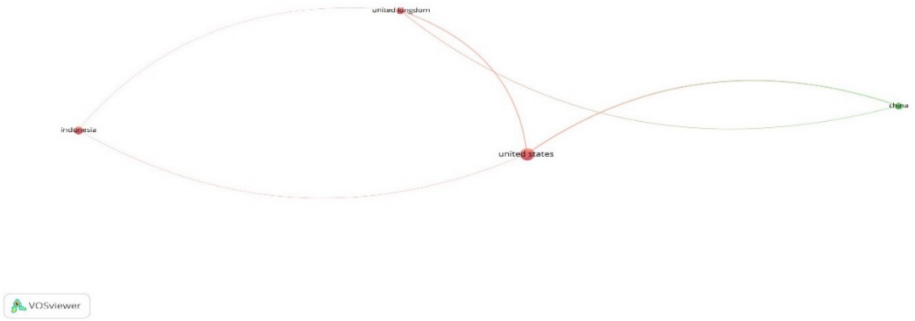

Figure 2. Co-authorship visualization analysis (4 out of 13 Countries).

Table 6. Top 13 collaborating nations

Country	Documents	Citations	Total link strength
United States	338	7398	164
Indonesia	140	821	16
Ukraine	101	229	15
United Kingdom	101	2120	88
China	98	2176	72
Australia	94	2053	60
Italy	90	1586	39
Russian federation	88	492	8
Malaysia	73	1552	41
Spain	64	1193	55
Jordan	62	429	23
Germany	55	1943	34
Canada	54	1226	46

Source: VOSviewer; Scopus database

4.6 Co-citation analysis

Co-citation analysis operates on the basic principle that items frequently cited together are more likely to have interconnected content (Cai *et al.,* 2024). Figure 3 depicts the co-citation of authors who have been referenced in the literature. Out of 93,664 authors mentioned, 282 have received at least 20 citations. The co-citation map presents a total of 835 entities categorized into 6 distinct clusters. It encompasses a network of 127,779 connections, with a cumulative link strength of 637121. Cluster 1, represented by the color red, comprises 286 items, led by Leuz, C. with 176 citations and a link strength of 539. Following closely, Shleifer, A. has accumulated 131 citations and a link strength of 426, while Wang, Y. has accumulated 130 citations with a link strength of 597, and Zhang, Y. with 122 citations and a link strength of 599.

Cluster 2, depicted in green, encompasses 218 entities. Hair, J.F. leads with 182 citations and a link strength of 648, followed by Sarstedt, M. with 182 citations and a link strength of 538, and Vasarhelyi, M.A. with 150 citations and a link strength of 536. Cluster 3, depicted in blue, comprises 139 items. Leading this cluster is Kaplan, R.S. with 289 citations and a link strength of 656. Following closely is Chenhall, R.H. with 201 citations and a link strength of 637, and Larcker, D.F. with 146 citations and a link strength of 728. Cluster 4, depicted in yellow, encompasses 137 items. At the forefront of this cluster is Scapens, R.W., with 149 citations and a link strength of 582. Following closely are Granlund, M. with 149 citations and a link strength of 609, and Miller, P. with 112 citations and a link strength of 426. Cluster 5, depicted in pink, consists of 52 items. Leading this cluster is Schalterger, S., with 169 citations and a link strength of 426. Following closely are Gray, R. with 97 citations and a link strength of 393, and Bebbington, J. with 76 citations and a link strength of 339. Cluster 6, depicted in light blue, comprises 3 items. Leading this

cluster is Drobyazko, S. with 41 citations and a link strength of 26, followed by Hilorme, T. with 32 citations and a link strength of 26, and Yan, Z. with 20 citations and a link strength of 278. Overall, the co-citation analysis of authors indicates that Kaplan, R.S., with 289 citations in cluster 3, emerges as the most frequently co-cited author.

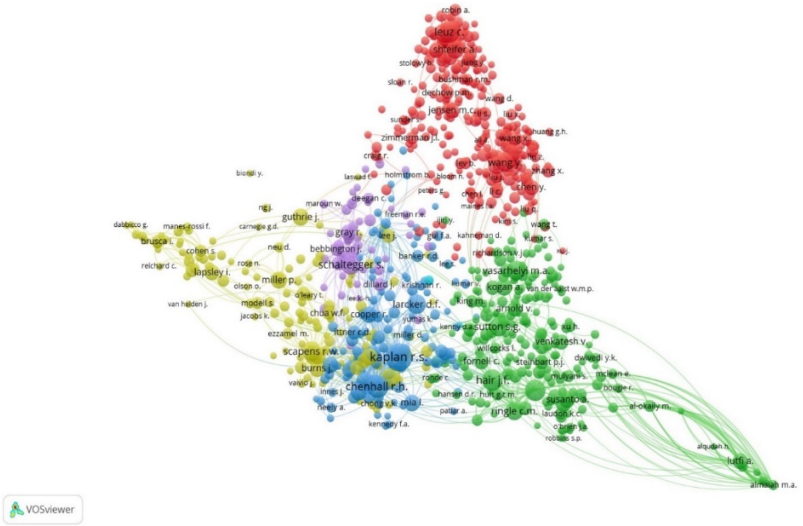

Figure 3. Co-citation of authors

4.7 Bibliographic coupling

Bibliographic coupling is defined as a method of evaluating the resemblance between two texts by calculating the shared references they contain. The extent to which the bibliographies of two articles overlap directly corresponds to the strength of their association (Zupic & Carter, 2015). According to Donthu *et al.* (2020), documents demonstrate bibliographic coupling when they cite identical sources and share a common intellectual theme. This approach is utilized to identify the thematic organization of journals.

Figure 4 illustrates the bibliographic connections among documents published on AIS from 2013 to 2023**.** Bhimani, A.; Willcocks, L. (2014) and Rikhardsson P.; Yigitbasioglu O. (2018) exhibit the strongest connection. This is followed by Warren, J. D.; Moffitt, K. C.; Byrnes, P. (2015) and Appelbaum, D.; Kogan, A.; Vasarhelyi, M.; Yan, Z. (2017), and Appelbaum, D.; Kogan, A.; Vasarhelyi, M.; Yan, Z. (2017) and Sledgianowski D.; Gomaa M.; Tan C. (2017) and Appelbaum, D.; Kogan, A.; Vasarhelyi, M.; Yan, Z. (2017). This information indicates an increase in collaborative efforts among authors in AIS research and publications.

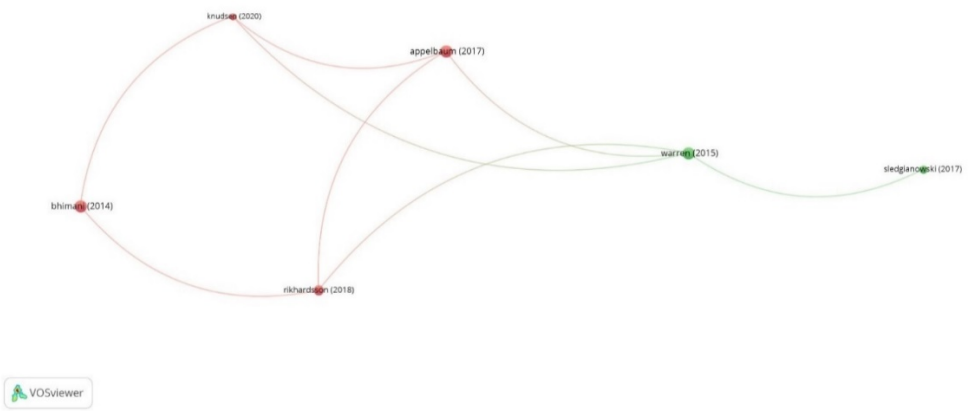

Figure 4. Co-citation analysis (Cited references, minimum citation of a cited reference = 75, 54 out of 1766 met the criteria)

4.8 Keyword co-occurrence - All keywords and author keywords

RQ 3. What are the key thematic trends and shifts within the literature on AIS?
Author keywords serve as indicators of an article's content and its pertinence to the subject of study (Strozzi *et al.,* 2017). The aim of this analysis is to define the research structure of a scientific field by examining the thematic clusters it generates (Alayo *et al*., 2020). When author keywords co-occur, it implies a shared thematic connection among the publications (Cai *et al.,* 2024). Table 7 displays the co-occurrence analysis of the predominant themes discussed in the context of AISs from 2013 to 2023.
The threshold limit for keyword occurrences was set at a minimum of 5 for the 7359 elements, and 355 elements met this criterion. As shown in Table 7, the author's keyword 'accounting' has the highest frequency, occurring 134 times and contributing to a total of 324 link strengths. Subsequently, 'accounting information systems' is the second most frequent keyword, with 94 occurrences and a link strength of 162, followed by 'management accounting' with 71 occurrences and 140 link strength. 'Information systems' follows with 64 occurrences and 194 link strength, while 'decision making' occurred 55 times with a link strength of 248.

Table 7. Keyword co-occurrence

Keyword	Occurrences	Total link strength
Accounting	134	324
Accounting information systems	94	162
Management accounting	71	140
Information systems	65	194

Keyword	Occurrences	Total link strength
Decision making	55	248
Sustainable development	48	241
Costs	42	214
Cost accounting	42	199
Information technology	37	92
Corporate governance	36	61
Information management	33	206
Financial reporting	33	71
Accounting information	32	50
Blockchain	30	74
IFRS	29	64
Management	29	93
Life cycle	27	209
Internal control	26	42
Accountability	24	47
Environmental management	24	174

Source: VOSviewer; Scopus database

Figure 5 presents the graphical representation of keywords through a network visualization. It effectively categorizes 335 items into 8 key clusters (A-H) based on significant keywords. In each cluster, specific terms emerged with the highest frequency. Cluster A is in red color, Cluster B is in green color, Cluster C is in blue color, Cluster D is in yellow, Cluster E in pink, Cluster F is in light-blue, Cluster G in turquoise, and Cluster H is in gray. The identified clusters imply the existence of eight distinct categories of distinct types of articles published from 2013 to 2023. Additional details can be found in Table 8.

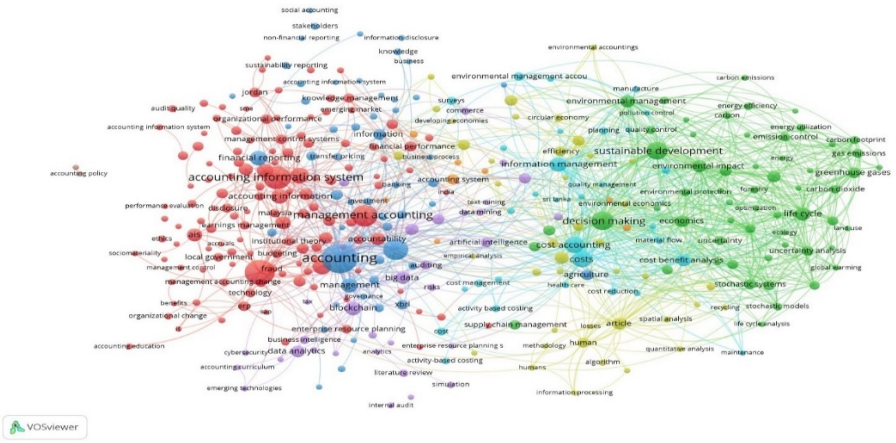

Figure 5. Network visualization of keywords

Table 8. Clusters and associated keywords

Clusters	Total items in a cluster	Most frequent keyword (occurrence)	Significant keywords
A	130	Accounting information systems (94)	Accounting information systems; information systems; Information technology and internal control
B	58	Decision making (55)	Decision making; sustainable development; environmental management; climate change
C	53	Accounting (134)	Accounting; financial reporting; management accounting; accounting information
D	41	Sustainability (22)	Sustainability; environmental accounting; investment; financial instruments
E	32	Blockchain (30)	Block chain; artificial intelligent; auditing; cryptocurrency; decision support system
F	31	Cost Accounting (42)	Cost; cost accounting; cost benefits analysis; information management
G	8	Accounting systems (16)	Accounting system; globalization; human capital; industry
H	2	Accounting policy (5)	Accounting policy; International accounting standards.

Source: VOSviewer; Scopus database

RQ 4. What are the emerging research opportunities in the evolving field of AIS?

Figure 6 offers an overlay of keyword occurrences, illustrating the evolving research trends surrounding AISs from 2013 to 2023. Clearly, the authors' key words that occurred mostly include, accounting, cost, cost accounting, information systems, management, and decision making. It is evident that there has been a shift in the terminology being employed in relation to AIS. The prominent terms that have emerged in the latest research are visually highlighted in a combination of light green and yellow. Among these terms are "blockchain," data analytics," "artificial intelligence", "digitalization," "sustainability" and "accounting information quality." Based on the keyword co-occurrence outlay (refer to Figure 6), research opportunities in the evolving field of AIS include exploring emerging technologies like artificial intelligence, blockchain, and cloud computing to improve efficiency, security, and adaptability. The analysis further reveals such key areas as cybersecurity, data privacy, and the integration of big data analytics for improved decision-making and financial reporting.

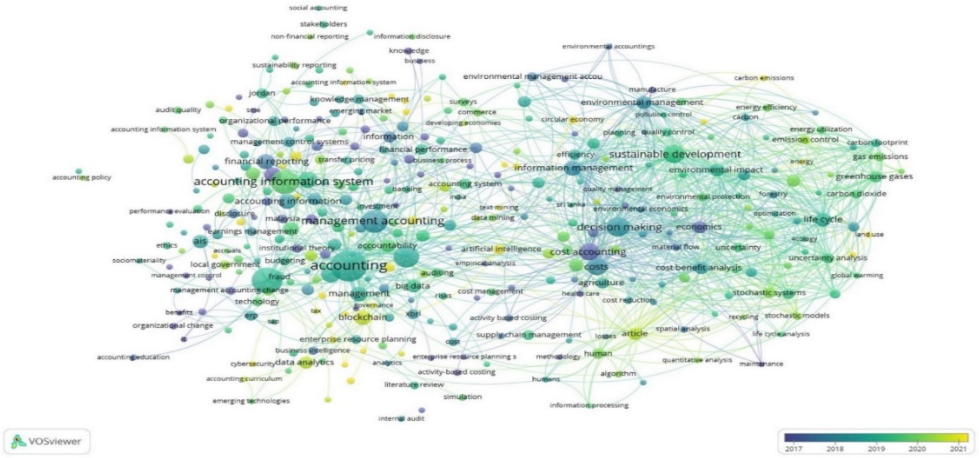

Figure 6. Keyword co-occurrence overlay (Minimum of 5 keyword occurrences; 355 met the criteria out of 7359).

5. Discussion

Although there has been significant growth in the body of literature focusing on AIS, a comprehensive bibliometric analysis of the vast body of literature surrounding this important domain is limited. This article reviewed AIS literature by conducting a bibliometric analysis on 1760 articles, out of a total of 3458 research articles published in Scopus journals from 2013 to 2023.

Regarding RQ1, we have had a notable surge in publications since 2019, with the number of publications reaching an unprecedented peak in 2020. However, research interest in the field dropped between 2021 and 2022 before it started increasing again. A bibliometric analysis of publications related to AISs in the Web of Science database conducted by İyibildiren *et al.* (2023) also revealed that the highest number of publications occurred in 2020. The increase in AIS-related research could be attributed to the dynamic advancements that information systems have had on the performance of businesses in the past decade (Saad, 2023), while the decrease in annual publication after 2020 could be ascribed to factors related to the COVID-19 pandemic, particularly from the United States, Europe and Asia (Zahid & Perna, 2021), where researchers made significant contributions to AIS research. During this period, researchers may have focused their attention more on their health and overall well-being instead of AIS-related research.

Regarding RQ2, the current research revealed Vasarhelyi, M. A; O'leary, D. E; Jusoh, R, and Mia, L. as the key contributors and influential authors in the field of AISs. In their study, Gray *et al.* (2014) identified O'Leary, D.E and Brown, C.E as the most prolific authors in AIS research. These authors are prominent in the field of

AIS due to their influential research contributions, high citation counts, and focus on critical topics, such as system design and performance impacts. Their work often intersects with related fields, enhancing its relevance and applicability, and bibliometric analyses frequently recognize their contributions, underscoring their lasting impact on AIS research and practice. The research outputs of these authors are valuable resources that other scholars can utilize to generate further knowledge and information.

Consistent with the literature, most articles have been published by authors in the United States. Ukraine, Indonesia, and China represent contributors from emerging economies, while Malaysia leads the representatives from developing countries (Mysaka & Derun, 2024; Monteiro & Cepêda, 2021; Ezenwoke *et al.,* 2019). In Aliusta's (2023) study, China leads in the total number of AIS research publications. However, China falls behind the United States in terms of citation counts. It is reasonable to conclude that the United States holds significant influence in this field, probably because accounting systems and standards originated in the United States and other Western countries due to the rise of modern capitalism and industrialization (Shareia, 2016). These early systems, shaped by strong economic and legal infrastructures, have had a significant global impact on financial reporting, corporate governance, and regulatory frameworks. The results also revealed strong collaborations among authors from the United States, China, Canada, and the United Kingdom in AIS research. International research collaborations have the potential to enhance the academic caliber of researchers substantially. Through partnerships with scholars across borders, there is a unique opportunity to combine resources, knowledge, and expertise, fostering an environment where the impact of each researcher is magnified exponentially.

Additionally, the results show that the documents entitled "Rethinking some of the rethinking of partial least squares" published in the European Journal of Marketing by Hair *et al.* (2019) and "Toward blockchain-based accounting and assurance" authored by Dai and Vasarhelyi (2017) and published in the Journal of Information Systems are the most cited documents relating to AIS. The frequent citations of these documents suggest recognition and validation of their importance and impact by other researchers in the field of AIS (Cooper, 2015).

Through the analysis, it emerged that three journals, "Journal of Cleaner Production", "International Journal of Accounting Information Systems" and "Academy of Accounting and Financial Studies Journal" are the most published journal sources with 2495, 2037 and 212 citations, respectively. These journals lead in AIS publications because they publish a wide array of topics and issues through a peer-review process, underscoring its prominence in the field. For example, the "Journal of Cleaner Production" and the "International Journal of Accounting Information Systems" emphasize interdisciplinary topics, including sustainability, artificial intelligence, and blockchain. Similarly, the "Academy of Accounting and

Financial Studies Journal" publishes a wide array of topics relating to accounting, auditing, finance, the influence of accounting on stock market prices, and AISs. The strong reputations, high impact factors, and global reach of these journals could make them preferred platforms for quality research.

In response to RQ3, the keyword occurrence overlay shows that research regarding AISs over the years relates to accounting, accountability, cost, and decision-making. This finding confirms the finding of Lidyah *et al.* (2023), who discovered that the research trend in AIS between 1961 and 2022 exhibits a stronger emphasis on accounting-related topics, including internal control systems. This is understandably so because, traditionally, most organizations employ manual accounting methods for financial reporting (Musah, 2017). However, with the advent of advanced information and communication technology, the use of AIS has made it possible for organizations to record and process reliable financial data to enhance decision-making by management and other users of accounting information (Isip, 2023; Sasadeeong, 2023; Monteiro & Catarina, 2021; Ardianto & Anridho, 2018). Consequently, academics would be interested in assessing the impact of AIS on the financial reporting of organizations and the decision-making of their stakeholders.

With regard to RQ4, we identified a shift within the literature on AIS towards blockchain, data analytics, artificial intelligence, digitalization, sustainability, and quality issues. The study by Anriva and Hamidah (2024) confirms that topics like artificial intelligence, Big Data, technology acceptance models, and information use remain underexplored, presenting opportunities for further research. Emerging technologies are significant in professional accounting practices and AIS research, a trend expected to persist due to the accounting profession's emphasis on understanding and applying these advancements (Igou, 2023; Atanasovski & Tocev 2022; Kroon *et al.,* 2021; Chiu *et al.,* 2019). Also, sustainability is gaining more prominence in AIS research as organizations actively incorporate sustainability principles to enhance operations, promote growth, and create value for both the organization and its stakeholders (Petrica *et al.,* 2024; Corsi & Arru (2018).

6. Conclusion

This paper utilized diverse bibliometric indicators to gain a holistic understanding of the prevailing trends, influential contributors, and emerging themes within the AIS literature. We delved deeply into various indicators, exploring the top-performing journals, leading countries in research output, collaborative authorship patterns, highly cited papers, and focal research themes. The current research revealed a consistent increase in the number of studies being published relating to AIS from 2013 to 2023. The evolution displayed variations in the number of studies over the 10 years, with the highest number of publications in 2020 because of researchers' interest in knowing how businesses are applying accounting systems to manage

financial data, report their financial performance, and make critical financial decisions in this era of a dynamic business landscape marked by heightened competition, globalization, and rapid technological advancements.

The current research holds significant implications for various stakeholders, including researchers, educators, practitioners, and policymakers in the field of AIS. For example, the findings can help researchers focus on underexplored topics, ensuring that future studies contribute meaningfully to the advancement of knowledge in AIS. Additionally, researchers can derive valuable insights from these articles to enhance the quality of their research endeavors. Educators can benefit from understanding the most influential works and key contributors, enabling them to incorporate relevant and impactful content into AIS curricula at various levels of education. Identification of emerging trends and methodologies can inform educators about the skills and knowledge that should be emphasized in educational programs to prepare students for the evolving landscape of accounting practices.

Practitioners in accounting and finance can use the findings to stay abreast of current trends and best practices in implementing AIS. The results can also assist policymakers in gaining insights into the geographic distribution and regional variations in AIS research, helping them tailor policies and regulations that align with the specific needs and challenges faced by different regions or industries.

Although the thoroughness in collecting, structuring, analyzing, and interpreting data enhances the credibility of the research, the research design is without constraints. The data sampling is solely dependent on the Scopus database, potentially leading to the exclusion of numerous impactful contributions from the analysis. Besides, the sampling process focuses solely on journal publications, deliberately excluding conference papers and book chapters. Therefore, future research could explore additional databases such as Web of Science, the Cochrane Library, and PubMed, acknowledging these limitations to gain a more comprehensive understanding of the AIS industry. Additionally, based on the key overlay map, future research can investigate the connection between blockchain and sustainable development, environmental accounting, sustainability reporting, accounting curriculum, and knowledge management.

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