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Exploring publication trends in accounting information systems and identifying research positions in Indonesia: a bibliometric analysis

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Abstract: Accounting information systems have become an increasingly important topic in business practice and academic research. This research uses a bibliometric analysis approach with data sources from the Scopus database to provide an in-depth understanding of AIS developments globally. Findings show that the USA significantly contributes to the volume of AIS research, reflecting its abundant research resources and central role in global AIS development. Indonesia also has a significant contribution to this research, reflecting increasing interest and awareness of the critical role of AIS in facing increasingly complex business challenges. In addition, topics such as technology acceptance models, artificial intelligence, big data, information use, and small and medium enterprises still require further exploration, offering opportunities for continued research. The position of research in Indonesia is becoming increasingly important because of the potential to contribute to developing discussions about AIS, especially in topics that have yet to be fully exposed globally.

Keywords: accounting information systems; IAS; technology acceptance model; TAM; accounting studies; financial information; accounting literature.

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1 Introduction

Accounting information systems (AIS) is an essential concept in the business world that integrates information technology with accounting practices to assist companies in collecting, processing, storing, and reporting financial data (da Costa Trigueiros and Alves, 2022; Qatawneh and Kasasbeh, 2022). In the increasingly developing digital era, AIS has become an essential foundation for companies to manage their financial information efficiently and accurately. The use of AIS brings significant benefits to companies, especially in terms of increasing productivity, increasing data accuracy, and providing relevant and timely financial information (Al-Hattami and Kabra, 2022; Alshawabkeh et al., 2022; Lutfi, 2022).

One of the main urgencies in discussing AIS is its ability to increase efficiency in the accounting process (Hamundu et al., 2021; Kareem et al., 2021b; Nguyen et al., 2021). With AIS, companies and other organisations can automate most routine accounting tasks such as recording transactions, calculating taxes, and preparing financial reports (Ali and Ouda, 2021; Kareem et al., 2021a; Khalid and Kot, 2021). This saves time and reduces the risk of human error that can occur in manual processes (Al-Fasfus and Shaqqour, 2021; Latifah et al., 2021). Apart from efficiency, AIS is also essential for increasing the accuracy of financial data (Al-Attar, 2021; Alawaqleh, 2021). Automating the accounting process can minimise errors that often occur due to manual recording. Accurate data is a critical basis for making appropriate business decisions (Abdullah et al., 2023; Urus et al., 2020).

AIS also allows companies quick and easy access to relevant financial information. This allows management to make better and faster decisions and respond to market changes more effectively (Susanto and Meiryani, 2018; Wan and Choo, 1988). Apart from that, SIA can also help companies achieve compliance with applicable financial and tax regulations. With automation in the accounting process, companies can more easily comply with applicable legal and regulatory requirements (Ibrada et al., 2022; Sumaryati et al., 2020). Thus, AIS is a crucial element in modern financial management. By integrating information technology with accounting practices, organisations can optimise efficiency, increase accuracy, speed up access to information, and better meet the demands of financial regulations.

Overall, AIS significantly impacts the business world, especially in the ever-growing digital era. By integrating information technology with accounting practices, AIS significantly improves the efficiency of accounting processes, reduces the risk of human error, and provides quick access to relevant financial information. These benefits are not just limited to operational efficiency but also involve improving the accuracy of financial data, speeding up decision making, and ensuring compliance with financial regulations. Therefore, SIA is an essential foundation in modern financial management and crucial in achieving company success and sustainability in this digital era.

Even though much research has been reviewing the topic of AIS, there needs to be more research that considers the evolution of published research documents, primarily through a bibliometric analysis approach. It is a research gap that needs to be filled. This kind of research will be incredibly precious when connected with developing AIS research in Indonesia. The reason for choosing Indonesia is because looking at comparative data regarding the use of AIS/IT in several countries in the world shows that developed countries such as the USA or other developed countries have adopted and integrated AIS well in their business practices (Al-Hattami, 2021; Esparza-Aguilar et al.,

2016). However, in Indonesia, despite the increase in the use of information technology in the accounting field, the level of AIS adoption is still considered low, especially among small and medium enterprises (Meiryani et al., 2019). Several previous studies remain relevant in this context. First, it is essential to acknowledge that AIS has become a significant focus for researchers and practitioners (Cram et al., 2023; Vosselman and De Loo, 2023). Second, AIS adoption is also increasing in Indonesia, reinforcing the urgency of a deeper understanding of the latest developments in this domain (Kantun et al., 2020). Third, it is essential to note that bibliometric analysis has been used in AIS research (Liu et al., 2021).

This research aims to fill this gap, which helps provide essential insights into the development of AIS and its impact in Indonesia and provides an empirical basis for a better understanding of research trends overlooked in the conventional literature. In addition, this research can also guide researchers, practitioners, and stakeholders in Indonesia to identify opportunities and challenges related to AIS in the local context. Understanding the evolution of AIS research and its position in Indonesia through bibliometric analysis can create a solid foundation for further development in this field, providing essential benefits for developing AIS globally, especially in Indonesia.

2 Method

This research uses a bibliometric analysis method, taking document sources from the Scopus database. The choice of using Scopus as a data source can be explained by the superiority of this database in covering a wide range of scientific publications, including international and multidisciplinary journals (Chakraborty and Yadav, 2023; Ibrahim et al., 2023). Therefore, Scopus is the right choice to see the comprehensive development of research on AIS. The filtering process in this research is mainly focused on selecting documents based on AIS-related keywords. This selection is based on previously determined keywords to ensure that all documents are closely related to the research topic. The keywords used are accounting information system and AIS. This option clarifies limiting the data to be analysed so that research results are more relevant and focused on the specified topic.

In this study, no additional filtering was done regarding publication year, publication type, or journal source. This decision allowed this research to cover the full spectrum of relevant documents without additional restrictions. However, this also means the analysis will include documents from various years, publication types, and journal sources. Next, after retrieving 316 AIS-related documents in the Scopus database, the data was exported into the VOSviewer analysis tool. This tool is commonly used in bibliometric research to analyse the relationships between keywords, authors, journals, and trends in scientific literature (Chhatoi and Bhattar, 2023; Malik et al., 2023). The results of this analysis will provide insight into the development and relationships between key elements in research on AIS and help identify key trends in the literature.

This research was validated by ensuring that all documents used in the analysis came from the Scopus database and were relevant to the keyword AIS. In addition, the analysis results obtained from the VOSviewer tool were tested for accuracy by comparing them with related academic literature to ensure that the identified trends and relationships reflect the reality in AIS research. Lastly, the analysis methods and findings of this

research can be cross-checked and verified by experts in the field of AIS to ensure the accuracy and validity of the findings produced. Overall, this research has a transparent methodology, starting from selecting data sources, filtering based on keywords, using the VOSviewer analysis tool, and finally, data analysis. With these steps, research can delve deeper into the evolution of research on AIS and its position in the research context in Indonesia, providing a valuable contribution to the understanding and development this field.

3 Results and discussion

In exploring the results and discussions regarding AIS, this study will explore several key metrics, including the number of documents, authors involved, affiliations, citations, and mapping of related topics. An in-depth analysis of these aspects will provide valuable insights into the current development, impact, and focus of research in the AIS domain.

3.1 Accounting information systems: number of documents, authors, affiliations, citations, related topics

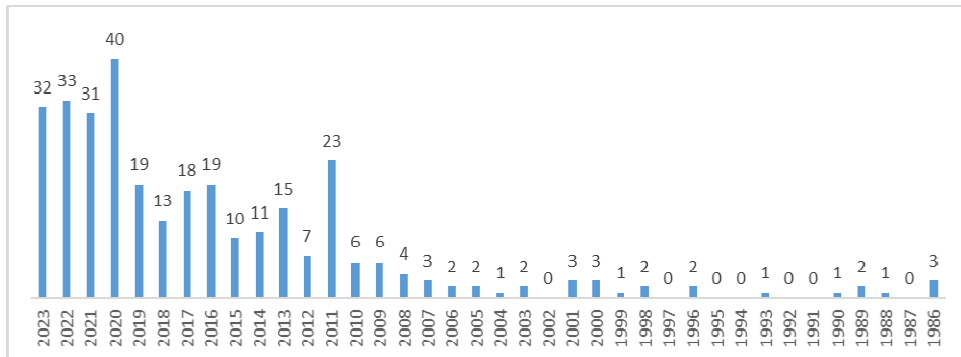
AIS is an essential domain in the accounting world that utilises information technology to manage and report financial data (Al-Attar, 2021; Latifah et al., 2021; Sumaryati et al., 2020). To gain deeper insight into the development of SIA research, this research uses a bibliometric analysis method by taking data from the Scopus database. Through this bibliometric analysis, the research aims to answer several key questions, such as the number of documents related to AIS, the most prolific authors, institutional affiliations active in this research, the number of citations to these documents, and related topics that often appear in the academic literature about DRAIN. Thus, this research will provide a holistic picture of the latest research trends and contributions in the field of AIS. The number of documents is currently shown in Figure 1.

Data on the number of documents related to AIS from 1986 to 2023 shows an interesting trend in developing research in this field. From 1986, when the first research related to AIS was recorded in the database, until 2023, the amount of documentation experienced significant variations. The early 2000s saw an increase in the amount of documentation reflecting increased interest in AIS. Especially in 2020, it jumped by 40 documents. 2020 was an interesting point because of the increase in AIS documentation, which was also influenced by the global COVID-19 pandemic. The COVID-19 pandemic has forced many organisations and companies to quickly evaluate and improve their information technology infrastructure, including accounting management and financial reporting. Many businesses have been forced to shift to a remote work model, creating a need for information systems that can support collaboration and efficient business operations remotely (Al-Okaily, 2024).

This development may align with developments in information technology and changes in accounting practices, which increasingly rely on information systems. Despite year-to-year fluctuations, the number of documents remains relatively stable. It is important to note that although the amount of documentation began to increase in the 2000s, in the 2010s, there was a significant increase in the number of AIS-related publications. This reflects a growing awareness of the importance of AIS in the business

and academic worlds and the need for more sophisticated information technology solutions in accounting practice.

Figure 1 Number of research documents 1986–2023 (see online version for colours)



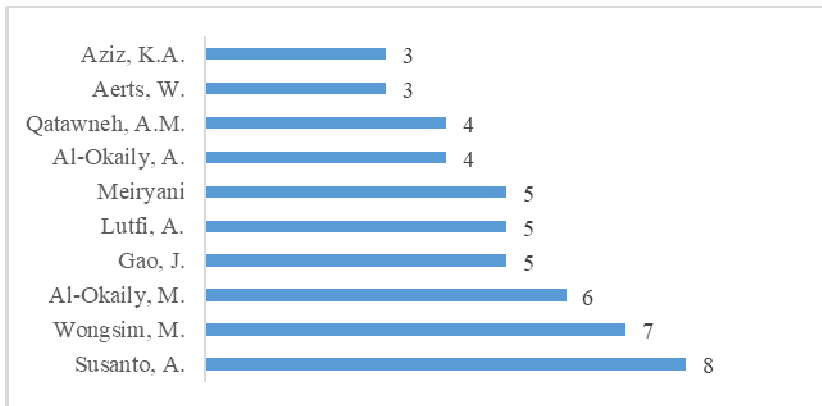
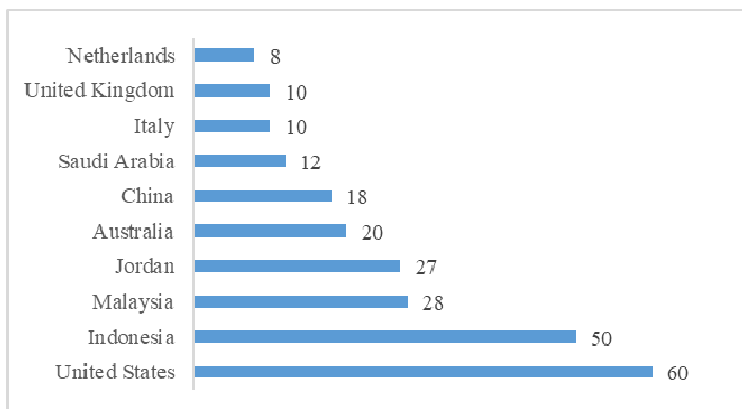
Over time, the increasing amount of documentation about AIS reflects that AIS has become an increasingly important issue in the academic and business worlds. The implication is increased interest and awareness of the critical role of AIS in managing financial information and supporting better decision-making. With more research, a deeper understanding of trends, challenges, and opportunities in AIS development will emerge. This can also encourage further collaboration between researchers, practitioners, and academics to address complex problems in the field of AIS and encourage innovation in information technology to support more efficient and accurate accounting practices. In other words, the growth in the number of documents illustrates the importance of AIS in facing the ever-changing challenges in the modern business world.

Apart from the research trends above based on the number of documents each year, there is another trend, namely regarding the number of published documents by authors.

From the data on the number of documents found in the database, several authors have contributed significantly to AIS research. The three most productive authors in terms of number of documents are Susanto, A. with eight documents, Wongsim, M. with seven documents, and Al-Okaily, M. with six documents. This shows that these three authors have been active in producing high-quality research in the field of AIS. This high contribution implies that the research conducted by the authors has a significant influence and impact on the development of AIS. Their work will likely be an essential reference for other researchers and practitioners.

In addition, collaboration and cooperation with these authors can be a good opportunity for other researchers interested in contributing their thoughts and research in the context of AIS. In academic research, the author's contribution to several documents is a critical indicator for evaluating the research impact and the researcher's reputation. However, it is also essential to look at other factors, such as the number of citations, the diversity of research topics, and the real impact of the research on business and financial practices. In this way, research in the field of AIS can continue to develop and provide more significant benefits to society and the business world.

In addition, the author's affiliation in the discussion of AIS identified in the publication document is also shown in Figure 3.

Figure 2 Number of published documents by author (see online version for colours)**Figure 3** Number of documents based on author's country affiliation (see online version for colours)

Data on the number of documents based on the author's country affiliation shows the distribution of research on AIS in various countries. The USA is the main contributor with 60 documents, followed by Indonesia with 50 documents. Malaysia and Jordan contributed significantly, with 28 and 27 documents, respectively. Countries such as Australia, China, Saudi Arabia, Italy, the UK, and the Netherlands also have sufficient studies, with ten or more documents each. As a leader in research volume, it is essential to note that the USA has a central role in leading the development of AIS globally.

This reflects the abundant research resources, solid academic institutions, and sophisticated industry in AIS in the USA. On the other hand, with a significant amount of research, Indonesia shows increasing interest and focus on AIS in the local context. This may indicate that AIS has become an increasingly important issue in Indonesian business and academic practices. Furthermore, this distribution also reflects the geographic diversity in AIS research. Southeast Asian countries such as Indonesia and Malaysia, and Jordan in the Middle East have made substantial contributions to this literature. It reflects developing countries' challenges and opportunities in adopting and developing AIS in a rapidly changing business environment.

In the Indonesian context, data on the number of documents based on the author's country affiliation shows that Indonesia has significantly contributed to research on AIS with 50 documents. This reflects the growing interest in Indonesia regarding the role of AIS in business and academic practices in Indonesia. The robust research contribution from Indonesia could indicate several things. One of them is increasing awareness of the importance of AIS in facing increasingly complex business challenges. AIS helps companies to manage financial information more efficiently and accurately, which is very important in making informed decisions.

Overall, this bibliometric analysis provides an in-depth understanding of research developments in the AIS domain. Several conclusions can be drawn from the description of the number of documents, the most productive authors, and the author's country affiliation. First, the significant increase in the number of AIS-related documents indicates that AIS has become an increasingly important research focus in the academic and business worlds, especially along with developments in information technology. Researchers, especially the most productive ones, such as Susanto, A., Wongsim, M. and Al-Okaily, M., have contributed valuable to enriching the literature and our understanding of AIS.

The implication is that this research can inspire other researchers to engage in collaboration or explore new topics that still need to be explored. Additionally, the distribution of research by the author's country affiliation indicates the central role of the USA in leading the development of AIS globally. In contrast, the significant contribution from Indonesia indicates growing interest and awareness in the local context. With this understanding, further research can focus more on overcoming challenges and taking advantage of existing opportunities in developing AIS, especially in developing countries such as Indonesia. In conclusion, this bibliometric analysis provides a comprehensive picture of the dynamics of AIS research, creating a solid foundation for further understanding and future innovation.

The number of frequently cited documents related to AIS is shown in Table 1.

In the context of research on AIS, several documents have become the primary references with numerous citations. First, documents discussing information technology governance (IT governance) offer a rich perspective on how IT governance can contribute to AIS development. Applying the IT governance concept can be a strong foundation in efforts to optimise AIS in organisations (Wilkin and Chenhall, 2010). Along with this, research that focuses on business intelligence (BI) and analytics has also become relevant, considering the crucial role of BI in understanding and making decisions based on financial information (Dhamija and Bag, 2020). In addition, research methodology based on design science offers an innovative approach to developing effective AIS (Geerts, 2011).

Then, the debate regarding contingency models that consider internal organisational factors about AIS effectiveness is also an essential part of this literature. Models such as these help illustrate the complexity of factors influencing AIS implementation and how these elements may interact in various organisational contexts (Nicolau, 2000). Finally, research examining the relationship between AIS performance, influencing factors, and the level of information system evolution provides valuable insight into how certain factors may shape and influence AIS development over time (Choe, 1996). These documents reflect various essential aspects of developing AIS. They contribute to theoretical understanding and provide practical insights that can be applied in the various

organisations' decision-making and management of financial information. By referring to these studies, we can continue to develop our understanding of AIS and how to apply these concepts in real-world contexts to achieve more efficient and accurate accounting practices.

Table 1 Frequently cited documents are related to AIS

<i>Document title</i>	<i>Authors</i>	<i>Citations</i>
A review of IT governance: a taxonomy to inform accounting information systems	Wilkin, C.L. and Chenhall, R.H.	154
Business intelligence & analytics in management accounting research: status and future focus	Rikhardsson, P. and Yigitbasioglu, O.	139
A design science research methodology and its application to accounting information systems research	Geerts, G.L.	133
A contingency model of perceived effectiveness in accounting information systems: organizational coordination and control effects	Nicolaou, A.I.	126
The relationships among performance of accounting information systems, influence factors, and evolution level of information systems	Choe, J.-M.	120

The high number of citations to AIS documents reflects that this research has become a strong foundation for further development and understanding in the AIS field. The implication is that the concepts, findings, and methodologies proposed in these documents have influenced continued research and business practice related to AIS. Researchers, practitioners, and academics have likely adopted these documents' approaches, frameworks, and recommendations in decision-making and AIS development in various organisational contexts. In other words, this high number of citations reflects the positive impact that these studies have had in supporting the efficiency, accuracy, and effectiveness of AIS in various business sectors and financial institutions.

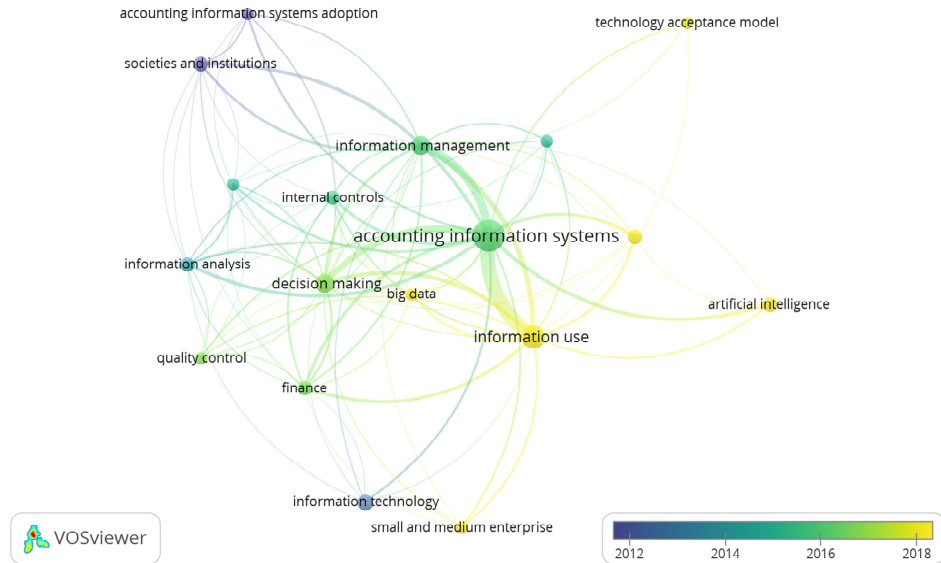
Furthermore, this study also mapped several topics related to AIS among currently available published documents.

A related topic in AIS that attracts attention is the technology acceptance model (TAM). This technology acceptance model has become a significant theoretical foundation in understanding how individuals and organisations adopt and accept information systems, including in the AIS context. TAM provides a systematic view of the factors influencing technology acceptance, such as perceived usefulness and ease of use. In the context of AIS, applying TAM helps explain why and how users accept accounting information systems, be they management, accountants, or other related parties. By understanding technology acceptance factors, organisations can identify more effective AIS implementation strategies, increase technology adoption, and achieve more successful AIS integration in the modern, technology-driven business environment (Al-Okaily, 2022; Benzine and Tiar, 2022; Ramayani et al., 2023).

As technology develops, the role of artificial intelligence in AIS is becoming increasingly prominent. AI has significantly contributed to providing automation solutions for routine accounting tasks, such as recording transactions and calculating taxes. More than just automation, artificial intelligence also opens the door to more sophisticated and in-depth data analysis, enabling companies to extract strategic insights from their financial data. With its ability to recognise patterns, trends, and anomalies in

data quickly and accurately, AI provides added value in accounting decision-making. Additionally, big data strengthens the role of AI in AIS, as ever-increasing data volumes demand more advanced analytical approaches. Big data provides opportunities to detail financial information better, strengthen data integrity, and support timely and relevant accounting decisions. With the integration of AI and big data in AIS, companies can be more adaptive to changes in the business environment, minimise risks, and exploit growth opportunities more effectively (Chowdhury, 2023; Haddad, 2021; Solikin and Darmawan, 2023).

Figure 4 Related topics about accounting information systems (see online version for colours)



Big data has become a central pillar in AIS, changing the traditional paradigm in managing and analysing financial data. With its ability to handle large, complex, and varied data volumes, big data allows companies to extract deeper insights from their financial information. Extensive data analysis in AIS includes recording daily transactions and allows the identification of complex patterns, market trends, and consumer behaviour that can provide added value in strategic decision-making. In addition, big data strengthens the validity and accuracy of financial data, reduces the risk of human error, and speeds up the reporting process. By utilising this technology, companies can respond more quickly to market changes, increase the accuracy of financial predictions, and gain a competitive advantage in a rapidly changing business era. Extensive data integration in AIS is about managing data and embracing digital transformation to achieve operational efficiency and strategic advantage (Nurhayati et al., 2023; Qataweh et al., 2023).

One other related topic that is important in AIS is information use. This concept highlights how financial information produced by AIS is utilised in business decision making. An in-depth analysis of how accounting information is used by management, stakeholders, and various departments within an organisation provides critical insight into the effectiveness and impact of AIS (Jarrah et al., 2023). A better understanding of how

accounting information is integrated into the decision-making process opens up opportunities to increase users' relevance, accuracy, and engagement in using financial information for the company's strategic interests. A deep understanding of information used in the AIS context can also help improve the design of accounting information systems to make them more responsive to user needs and support the achievement of business goals more effectively (Aboagye-Otchere et al., 2023; Zhu et al., 2023).

In the context of AIS, an important related topic is the application and adaptation of AIS among SMEs, known as small and medium enterprises. Applying AIS in the SME environment brings unique challenges and particular opportunities, given the different characteristics of scale and resources SMEs possess. A study of the use of AIS in SMEs can provide a better understanding of how information technology can be a catalyst in improving the efficiency, accuracy, and affordability of accounting among small and medium-sized businesses. Analysis of the factors influencing the adoption and implementation of AIS in SMEs can help design solutions that better suit the needs and limitations of the SME sector. Additionally, research on AIS in SMEs can provide valuable insights into how information technology can be a democratising tool, helping to increase competitiveness and economic sustainability at the local level by empowering the SME sector (Al-Okaily, 2023; Alawaqleh, 2021; BinSaeed et al., 2023).

Related topics in AIS, namely the technology acceptance model (TAM), the role of artificial intelligence and big data, and the application of AIS in SMEs, show high complexity and relevance in the era of digital transformation. Combining TAM, AI, and big data in AIS provides a holistic view of technology acceptance factors and unlocks the potential for more intelligent decision making and further innovation. Furthermore, understanding how accounting information is used, especially in SMEs, highlights the unique challenges and opportunities in dealing with different scales and resources. Thus, further exploration and in-depth research on these topics will enrich the academic literature and provide practical guidance for organisations in optimising the benefits of AIS. A combination of interdisciplinary and contextual understanding will be the key to exploring the full potential of information technology integration in modern accounting.

3.2 Accounting information systems: research positions in Indonesia

Data on the number of documents based on the author's country affiliation provides a fascinating picture of the position of research on AIS at the global level, especially in Indonesia. At the global level, the USA stands out as the leader in the number of studies with 60 documents, reflecting the country's central role in leading the development of AIS globally. Meanwhile, with 50 documents, Indonesia shows a significant increase in interest and focus on AIS in the local context. This reflects increasing awareness of the importance of AIS in facing increasingly complex business challenges in Indonesia. This increased interest could also be the result of encouragement from the government and academic institutions to support SIA research as part of efforts to develop information technology and accounting capacity in Indonesia. In addition, the relatively even distribution of research in various countries such as Malaysia, Jordan, Australia, China, Saudi Arabia, Italy, the UK, and the Netherlands reflects the geographic diversity in SIA research.

In particular, Southeast Asian countries such as Indonesia and Malaysia, along with Jordan in the Middle East, have made substantial contributions to this literature. This reflects developing countries' challenges and opportunities in adopting and developing

AIS in a rapidly changing business environment. In conclusion, these data illustrate the position of research on AIS at the global level and indicate that AIS has become an increasingly important topic in business and academic practice, both at the international and local levels, especially in Indonesia. In the AIS context, several topics, such as technology acceptance models, artificial intelligence, big data, information use, and SMEs, are still relatively new and require further exploration and development. Further exploring these topics is critical because they reflect significant trends and changes in modern accounting practices driven by technology and the ever-evolving business environment. This is where the critical role of research from Indonesia in the global contribution to discussions about AIS becomes apparent.

Recommendations for academics and practitioners in the field of AIS are to continue to deepen their understanding of crucial topics such as the TAM, artificial intelligence, big data, information use, and the application of AIS in SMEs. Some of these topics are topics that are influencing current global research trends and require deeper exploration. For academics, exploring further the phenomenon of technology adoption, integration of artificial intelligence, and use of big data in AIS can significantly contribute to academic literature and support the development of curricula more responsive to modern business dynamics. Meanwhile, practitioners in business and accounting can utilise these findings as strategic guidance in implementing and optimising AIS in an organisational context.

Indonesia has significant potential to contribute to developing SIA discussions, especially in topics that have yet to be fully exposed globally. With increasing interest and robust research on AIS in local contexts, Indonesian researchers can provide valuable insights, best practices, and innovative solutions in addressing challenges that may be unique to the country. Increased investment in AIS research, cross-sector collaboration, and active involvement in international research networks can strengthen Indonesia's position in developing new and relevant topics in AIS. As technological developments and business transformation continue, research on AIS will continue to develop, and research initiatives from various countries will play an essential role in shaping the direction of its development. Indonesia, with its increasingly robust research contribution, can play a significant role in designing a more innovative and relevant future for AIS, both locally and globally. This is an essential step in supporting financial information's efficiency, accuracy, and reliability in business and academic contexts in Indonesia and worldwide.

4 Conclusions

Research on AIS has become a significant topic, increasing the number of documents. Data shows that the USA is the main contributor to the research, while Indonesia also has a significant contribution. The increasing number of these documents reflects the importance of AIS in global business and academic practice, with the USA playing a central role in leading this development. In addition, several topics, such as technology acceptance models, artificial intelligence, big data, information use, and small and medium enterprises, still require further exploration, offering opportunities for further research.

Further exploration of topics such as the TAM, artificial intelligence, big data, information use, and small and medium enterprises offers significant opportunities for

more in-depth research that can provide further insight into the interactions between information technology and AIS. The implication is a better understanding of how accepting technology, artificial intelligence, and big data can be applied effectively in an accounting context while considering the use of information and the specific challenges faced by small and medium-sized businesses. Further research in this area can provide practical guidance for organisations in optimising the implementation of AIS and information technology holistically, creating significant added value in financial management and decision making.

Research positions in Indonesia are becoming increasingly important due to increasing interest in AIS at the local level. This reflects increasing awareness of the critical role of AIS in facing increasingly complex business challenges. Indonesia has the potential to contribute to developing discussions about AIS, especially on topics that have yet to be fully exposed globally. With increased investment in AIS research and active involvement in international research networks, Indonesia can play a significant role in designing a more innovative and relevant future for SIA, both locally and globally. This is an essential step in supporting financial information's efficiency, accuracy, and reliability in business and academic contexts in Indonesia and worldwide.

More in-depth research is needed regarding trends and developments in AIS literature in Indonesia. Bibliometric analysis can help identify existing research gaps in the Indonesian AIS literature, including topics not thoroughly touched upon. Additionally, through bibliometric analysis, we can identify research contributions from Indonesia globally, highlighting areas where Indonesia has advantages or special knowledge that can contribute to AIS discussions globally. Thus, comprehensive bibliometric research can provide a deeper understanding of the status quo of AIS research in Indonesia, strengthen the basis for further research development, and open up opportunities for Indonesia to play a more active role in defining the future of AIS locally and globally.

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