Information systems development in accounting: A systematic network study

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Abstract

The research methodology is based on scientometric analysis of scientific publications related to information systems in accounting. This research paper discusses how accounting information systems (AIS) are transforming the business environment recently, with rapid advancements in technology and changing regulatory requirements. The current study will present the key trends, methodologies, and themes that have shaped AIS development and application through a scientometric review of 5,442 scholarly publications, highlighting the evolution of research in the field, identifying major areas of focus, and examining the factors driving innovation and change in accounting information systems. The sample was formed using data from the scientometric database Web of Science, where a search was conducted using the keywords "information", "system", and "accounting". To ensure the accuracy and relevance of the analysis, the sample was limited to five categories: "Computer Science Interdisciplinary", "Management", "Business Finance", "Economic", and "Business". These categories best reflect the interdisciplinary nature of the use of information systems in accounting, encompassing technical, economic, and managerial aspects. Done through the "bibliometrix" package in R, this analysis has brought to the fore how cutting-edge technologies, including artificial intelligence, machine learning, and blockchain, are regarded as integral in improving financial transparency, decision-making processes, and organizational efficiency. Big data analytics and sustainable development were emerging research areas identified as crucial in the future direction of AIS. While these innovations have many benefits, the study highlights important challenges, such as integration into traditional systems, data security, and a gap in expertise among professional accountants. This research contributes to the more excellent discourse on AIS through an interdisciplinary approach that stresses the AIS's critical role in making business practices both sustainable and transparent in this digital age.

Keywords

accounting information systems, artificial intelligence, blockchain technology, big data analytics, sustainable development

1. Introduction

Rapidly changing technology, continuously emerging regulatory and compliance requirements, and increasingly complex management structures significantly reshape how information systems are employed in accounting. By infusing information technology into accounting work processes, organizations attain increased transparency, better-informed decision-making, and improved performance tracking and compliance with regulations. Modern enterprises aim to use data strategically while establishing information systems as significant tools for upgrading reporting processes and supporting managerial decisions. These trends are reflected in scholarly research and real-world applications across different management areas.

The scope of the studies in information systems within accountancy is broad. It focuses on developing traditional subjects, financial reporting, managerial frameworks, decision-making practices, newly important strategic information systems, machine learning, big data analytics, and blockchain technology. This is expected to drive this innovation of methodologies within accounting systems to complete digital transformation. Emerging state-of-the-art technologies such as artificial intelligence

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and machine learning encourage research in predictive models, automation, and intelligent decision support systems that revolutionize both ways of processing financial data and carrying out audits.

This research paper aims to critically review scientific knowledge and unfolding trends in accounting information systems. It seeks to explore the core themes, methodologies, and technological progressions defining the field. The findings contribute to ongoing discussions about how businesses deploy information systems to streamline accounting functions in support of managerial decision-making. Ultimately, this adoption of information systems pursues increased accountability, efficiency, and sustainability in today's digital era.

2. Literature review

Research on accounting information systems shows rapid evolution. The growth in the number of research works reflects the increasing interdependence between accounting practices and the organization of accounting processes through information systems. An analysis of the most cited publications highlights the interdisciplinary nature of research on accounting information systems and the emphasis on technological innovations.

The study by Vial [1] provides significant theoretical and empirical evidence on how information systems influence accounting practices and managerial decision-making. This research addresses critical aspects of digital transformation, the strategic use of information systems, and frameworks that ensure financial transparency and performance measurement. Similarly, Sullivan et al. [2] underscores the importance of information systems in decision-making processes and evaluating economic efficiency. Modern information systems play a crucial role in processing financial data and integrating financial management with overall management systems within accounting information frameworks.

The diversity of research on accounting information systems cuts across applied contexts, as contained in the works of Díaz et al. [3] and Dai and Vasarhelyi [4]. These studies emphasize practical integration in networked environments and accounting systems. The authors highlight that network applications facilitate efficient information exchange and are critical to organizing and maintaining accounting practices. Real-time data streams further enhance this importance. Dai's research contributes to developing tools and models to improve data processing, reporting accuracy, and financial control in organizations.

Indeed, research by Adamopoulou and Moussiades [5] reveals a growing interest of accounting scholars and practitioners in artificial intelligence and machine learning. These advanced solutions are seen as drivers of evolution in information systems about predictive analytics, automation, and intelligent decision-support systems. Such development directly improves accounting and reporting processes.

Nitzl [6], Huang and Watson [7] investigate the integration of information systems in financial reporting, management, and decision-making. The findings indicate that the integrated nature of information systems brings accountability, transparency, and efficiency to the management of organizations. Other important results of the research studies are the implications of integration for the modernization of management structures, accelerating finance processes, and presenting accurate and reliable information.

Song et al. [8], Moody et al. [9] affirm the three-faced nature of research on accounting information systems, with concentrations on technological innovations, forecasting, and societal implications of information systems. Accordingly, research in accounting information systems crosses the technical and managerial dimensions to social, economic, and organizational contexts.

Jasim and Raewf [10] stated that information systems are highly significant in facilitating accounting practices more efficiently and effectively. These enhancements offer various business expansion opportunities for companies and increase public confidence. In addition, information technology reduces unintentional errors, enhances information flows, and supports managerial decisions that help companies achieve strategic and operational goals. Nevertheless, the researchers also note some disadvantages, claiming that while technological innovations increase the quality of accounting operations,

improve business performance, and promote cloud accounting development, the absence of technology standardization leads to a lack of transparency. To improve, companies have to invest extensively in developing, updating, and effectively using software for the accounting system.

The research by Ghanem and Al-Shammari [11] showed that internal controls, technological equipment, software, and information security have a statistically significant positive effect on improving financial data quality and enhancing banking operations and trust in financial reporting.

The study by Widiasalwa et al. [12] explores the factors that influence the quality of financial reporting at Akebono Brake Astra Indonesia. It showed that information systems positively affected accounting organizations, especially in the quality of financial reporting, by improving data accuracy and reliability. Meanwhile, internal control systems and human resource competency did not significantly affect reporting quality because process automation is already sufficient to support processes, and there is no pressing need for a more advanced internal audit system. Tahar and Oktiyani [13] noted the correlation between the quality of accounting information systems and organizations' financial and non-financial performance.

Islam [14] points out that AIS significantly enhances companies' internal control and auditing processes regarding the accuracy of financial reporting, regulatory compliance, resource management, and integration with other management systems. A comparative study of internal auditors in Bangladesh and Turkey showed a similar positive assessment of the effectiveness of AIS despite cultural and regulatory differences. This underlines the general applicability of AIS as a tool for improving managerial processes and internal control, which is usable in different economic and legal settings.

Raji and Dagunduro [15] indicated that big data in accounting information systems can potentially enhance efficiency and decision-making. However, technology complexities, a lack of accountant expertise, and challenges in system integration diminish their positive impacts on accounting functions. Properly implemented big data tools can significantly enhance reporting accuracy, optimize processes, and make business management more strategic and data driven.

Research by Sadiyah et al. [16] focuses on the factors that influence the quality of accounting information systems. Their findings reveal that the effective use of technologies like ERP systems, strong internal controls, and high employee engagement contribute to improving the quality of accounting information. Neglecting these factors may lead to errors, inaccuracies, and reduced system efficiency. Regular training, system optimization, and internal controls will help minimize errors and increase data accuracy, which enhances decision-making through trust in financial information.

Duong et al. [17] show that integrating blockchain into accounting systems may significantly impact the storage and processing of financial data. Using blockchain increases the efficiency of business activities and decreases the risk of fraud and errors. However, blockchain's implications for business functions and system design must be analyzed carefully.

Ayinla et al. [18] mention that RPA significantly enhances the efficiency of accounting, automating routine tasks while enhancing the accuracy and compliance of the process. However, implementing RPA faces system integration and data security concerns. The authors have highlighted the requirement for further research on the long-term implications of automating business processes. Similarly, Dumitru et al. [19] confirm that the integration of RPA/IPA into accounting systems significantly enhances accuracy, efficiency, and transparency, supporting the sustainable development of financial reporting. Companies must allocate adequate resources and acquire specialized expertise to leverage these technologies effectively.

Analysis of recent literature underlines the interdisciplinary applications and technological innovations in accounting information systems, emphasizing the direct influence of information systems on accounting practices and their organization. Integrating emerging technologies into accounting systems reflects a forward-looking approach, underlining their critical role in modernizing and improving accounting processes.

3. Method

The research methodology is based on the scientometric analysis of scientific publications on information systems in accounting. The data for forming the sample were obtained from the scientometric database Web of Science, in which a search was made using the keywords "information", "system", and "accounting" in the search line. In this regard, 39,257 publications from different research areas were obtained. In order to avoid diffuse and unclear analysis, this sample was restricted to five categories, namely: "Computer Science Interdisciplinary", "Management", "Business Finance", "Economic", and "Business". The identified categories demonstrate the interdisciplinary nature of research on information systems in accounting. In the bibliographic analysis, 5,442 publications correspond to the research objectives. A selection of bibliographic sources was imported into the R software product for analysis in the "bibliometrix" package. R combined with the "bibliometrix" package provides a platform for quantitative analysis in scientometrics and bibliometrics. It represents an integrated toolbox for performing various bibliometric analyses, such as co-citation networks, keyword trends, co-authorship analysis, and thematic mapping. Its features allowed an in-depth view of the selected data that were useful to identify key topics under research and new trends in information systems in accounting.

Despite its contribution, the research has certain limitations. The focus on publications is confined to the Web of Science database, which potentially excluded relevant publications from other databases, limiting the completeness of the dataset. The sample was restricted to five categories, reflecting the interdisciplinary nature of the topic, but may not account for research in related fields that could offer valuable insights and new trends. The methodological tools used in the analysis, particularly the "bibliometrix" package in the R environment, provide extensive opportunities for analysis, but may have certain limitations in interpreting qualitative aspects of the data. While the study highlights interdisciplinary connections and development trends, it does not assess the practical implementation of information systems, thus opening avenues for future empirical research and supplementation of the presented findings.

4. Results

Figure 1 represents the key research topics and their interrelationships in information systems in accounting (ISA). This map was created using the multiple correspondence analysis (MCA) method, which visually clusters related concepts based on their co-occurrence and frequency in the literature.

Dim 1 reflects the primary dimension accounting for 37.65% of the variance. This dimension opposes themes related to "information systems", "technology", and "optimization" against those relating to "revenue management", "corporate governance", and "disclosure". In its turn, topics of Dim 2 (20.84% variance) discuss "management", "control systems", and "optimization".

The combination of the words "corporate governance", "determinants", "disclosure", and "earnings management" within the same quadrant is representative of the research focus on mechanisms within corporate governance and the place of information systems in matters of transparency and financial efficiency. Research in this cluster examines how information systems contribute to improved management efficiency and revenue management strategies.

The central cluster contains the terms "information", "systems", "management", and "influence", which directly form the key direction of information systems research in accounting. Topics in the central cluster connect specialized fields, indicating their broad relevance and frequency of use in scientific research.

The conceptual structure indicates that the analyzed studies focus on integrating information systems in the organization and management of management accounting and control. In this respect, the importance of information systems in financial activities, earnings management, and corporate governance during the last 10 years shows a positive growth.

The research subjects have been typologized according to relevance-centrality and development-density strength. According to this measure, the degree of relevance denotes that this research topic

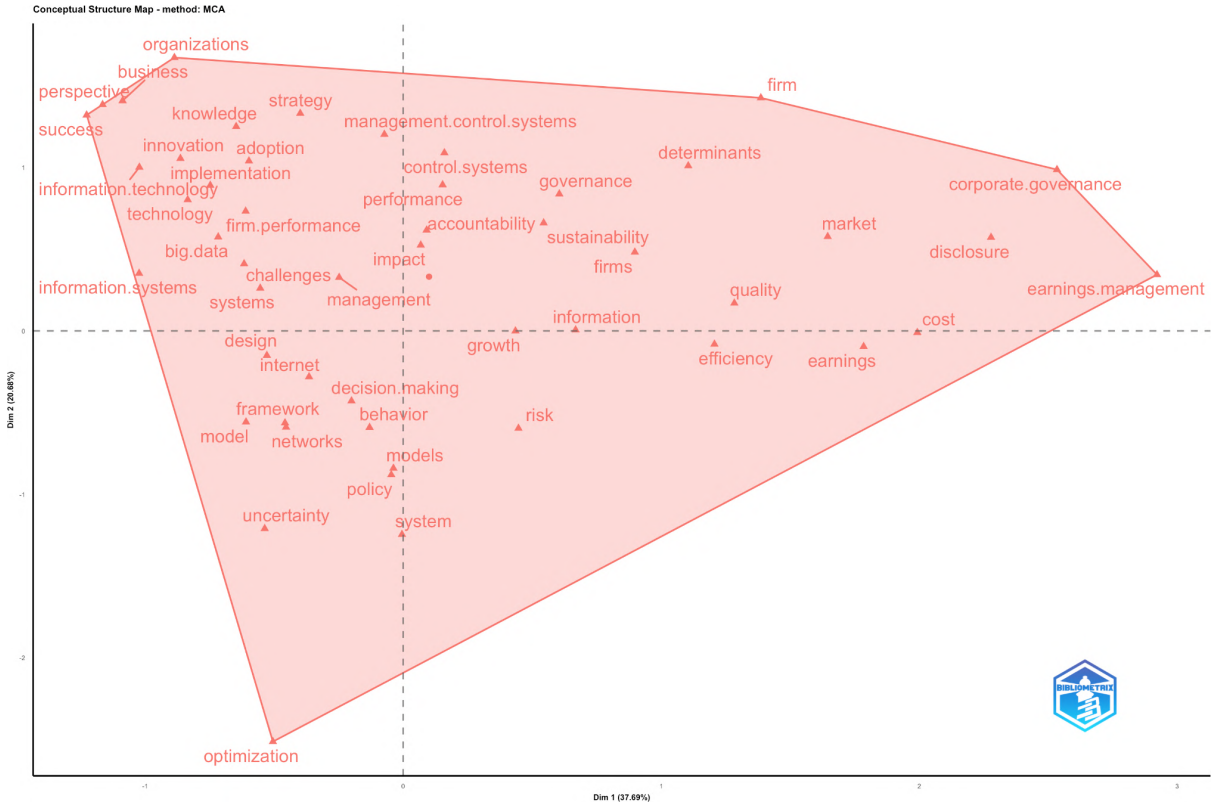

Figure 1: Conceptual structure map of the key research topics in information systems in accounting.

is more linked with other topics, but it is nevertheless fundamental for the structure. The degree of development demonstrates that the topic is well-developed and has a coherent research base.

The top right quadrant should reflect well-researched and industry-relevant topics. In this graphical display, the quadrant of the leading topics does not contain data, which may indicate either the fragmentation of the conducted research on information systems in accounting or that the researched topic is still at the stage of its development and does not contain a dominant paradigm. The absence of unique or niche topics on the graph shows that most research topics are not specialized and generally are in interrelation with other research topics of information systems in accounting.

Topics that arise or lose relevance are shown in the lower left quadrant. In this quadrant, the topics “disclosure”, “firm” and “expenses” are presented. The specified topic can represent new research areas of information systems in accounting.

In figure 2, a topic fundamental to the field is formed but needs to be sufficiently developed in scientific and practical literature. Thus, research on “information” and “management” form the basis of the research of information systems in accounting and serve as fundamental elements. Although this topic is important, there is room for further research and development

This network is divided into two significant clusters. The cluster-colored blue in the figure is distinguished by such keywords as “systems”, “management”, “performance”, and “technology” (figure 3). That is, research focuses on implementing solutions to enhance productivity and approaches to its measurement, as well as the strategic impact of information systems in management. Moreover, the interrelation between the terms “innovation”, “big data”, “information systems”, “framework” and “management systems” reflects how information systems and technologies are implemented and used in order to manage organizational processes and achieve improved performance. The blue cluster represents the core of information systems research in accounting, which researches the technical and strategic aspects of integrating information systems within different organizational contexts. In red is highlighted the cluster combining the terms: “information”, “quality”, “corporate management”, and “disclosure”. The links in this cluster directly show the relationship of information systems with financial

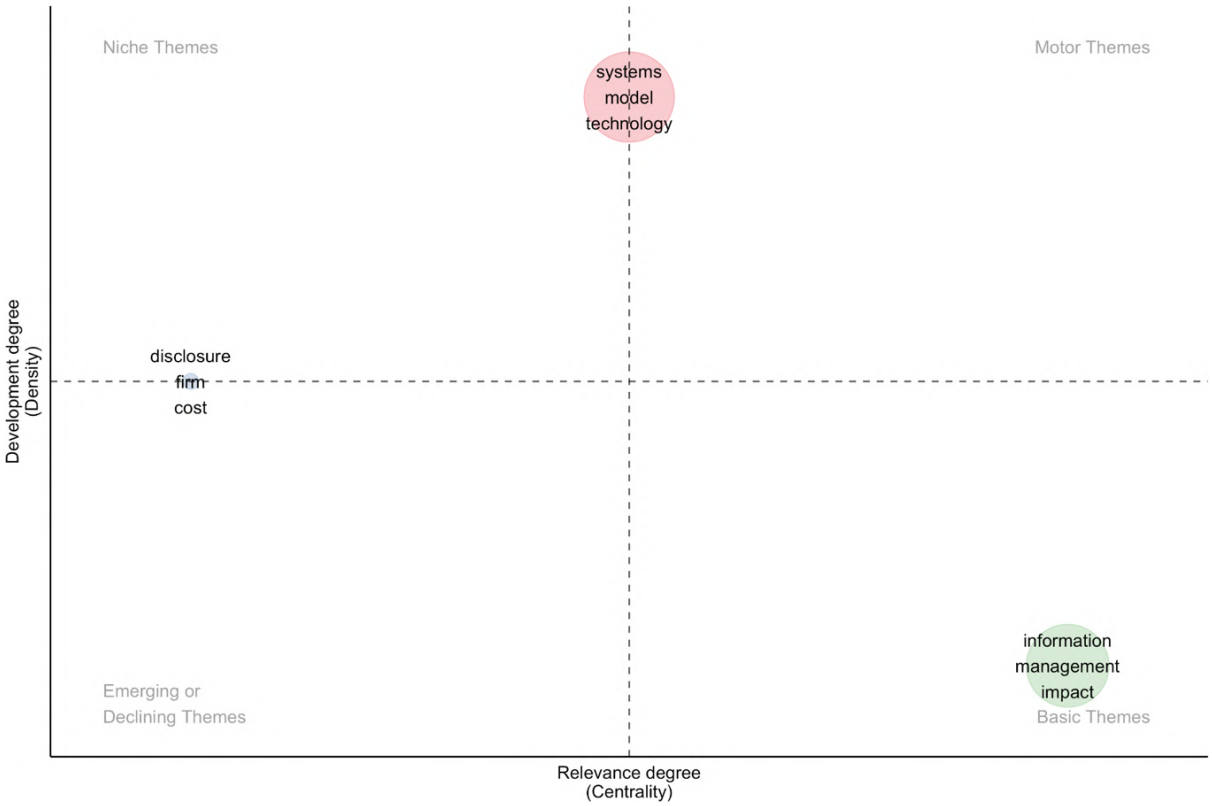

Figure 2: Graphical representation of the diverse research themes in information systems in accounting.

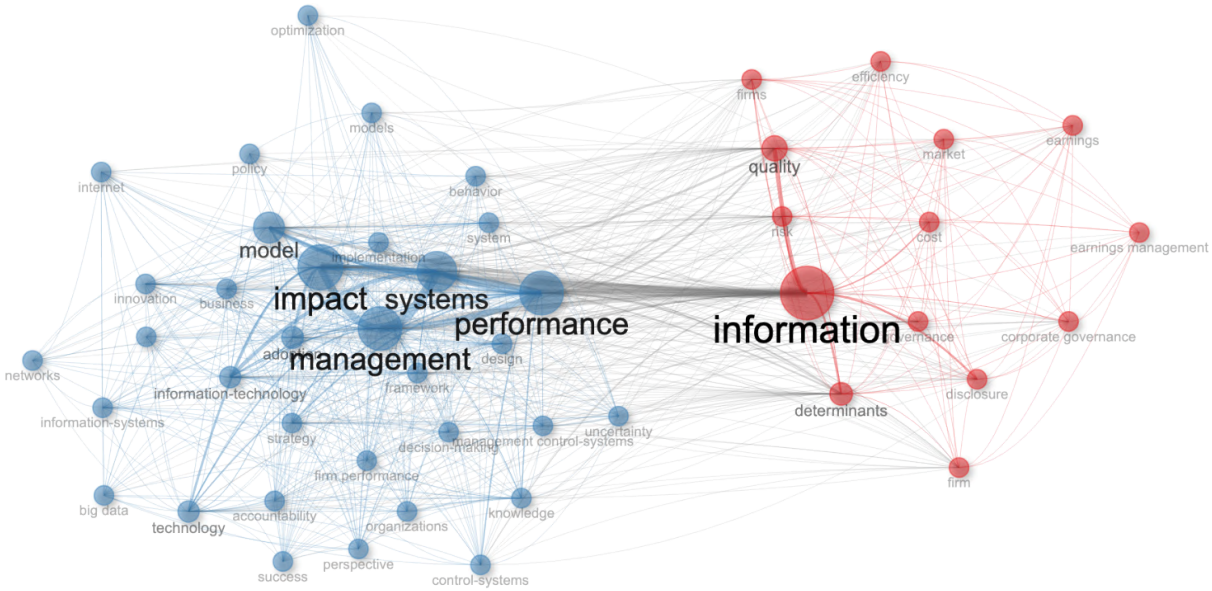

Figure 3: Network map of accounting information systems research keywords.

business activities and management. Therefore, such research has distinguished a separate stream that studies the problems and consequences of information systems concerning financial transparency, information disclosure, and income management.

The division into only two clusters shows that the research in the direction of information systems in accounting is concentrated around two main areas: technological implementation, a measure of the productivity of IS and their influence on organization and record-keeping, implementation of management, and improvement of efficiency of activities.

The concept of "information" among all the formed nodes is the most prominent in the whole network and connects the blue and red clusters. In other words, information combines technical and managerial, accounting, and financial aspects. It was stressed that the concept of "information" is important for both clusters, which once more emphasized its duality, referring to the technological and financial directions of information systems research in accounting.

Blockchain, rights, and artificial intelligence are the most discussed topics in recent years. Research on this topic is observed only during 2020-2024. Such trends could have been explained by widely developed digitization and the introduction of technological solutions for the organization and management of accounting, finance, and management. "Big data", "big data analytics", and "information technologies" can already be considered essential technological topics of research in the direction of information systems in accounting, having existed for several years and showing constant growth. Growing interest in these topics reflects the integration of advanced analytics and data-based decision-making in information systems. It agrees with the broader adoption of the trends in data analytics and machine learning within accounting to enhance financial reporting, risk management, and business intelligence.

Figure 4 Illustrates that significant research on information systems in accounting is conducted in the trends of "management", "productivity", "impact", "information", and "systems". Research in these trends was conducted throughout the research period. The high frequency of these terms confirms their relevance to the field since they form a critical mass of research queries and analyses.

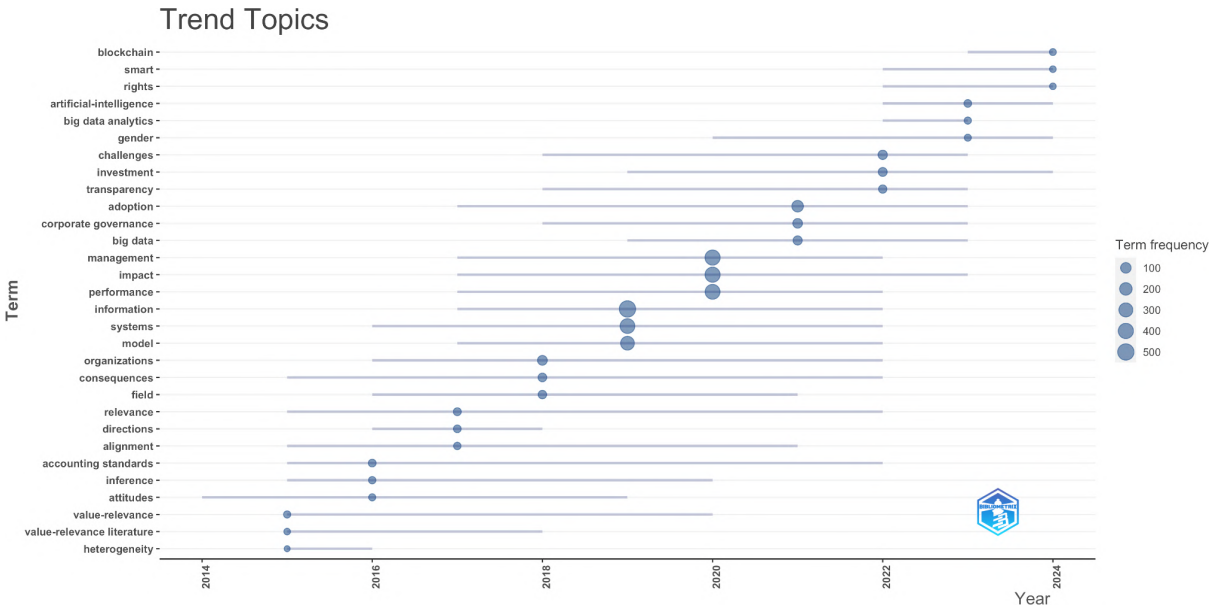

Figure 4: Trends dynamics in accounting information systems research areas.

From figure 5, the topic of research on "information" is highlighted; in turn, "management", "Impact", and "Efficiency" confirm the importance of research that focuses on the assessment of productivity and the impact of information systems on management processes. In turn, future research issues will be targeted along such vectors as "big data" and "sustainability".

Analysis of the data presented in figure 6 confirms the importance and meaning of "information" in this area of research. This role of "information" reflects the internal relationship between information systems and the broader context of accounting, ranging from information management and information quality to strategic use of information. The terms "management" and "influence" provide a research trajectory that argues the impact of information systems on management decision-making and overall business performance. In addition, the word "systems" points out the significance of different information systems for research in accounting information systems. Here, research on the impact of technologies on the implementation of the system, the study of factors for the successful implementation of business systems, and their various configurations become more relevant. Therefore, information systems research is focused on the problems of integration and effectiveness of information systems

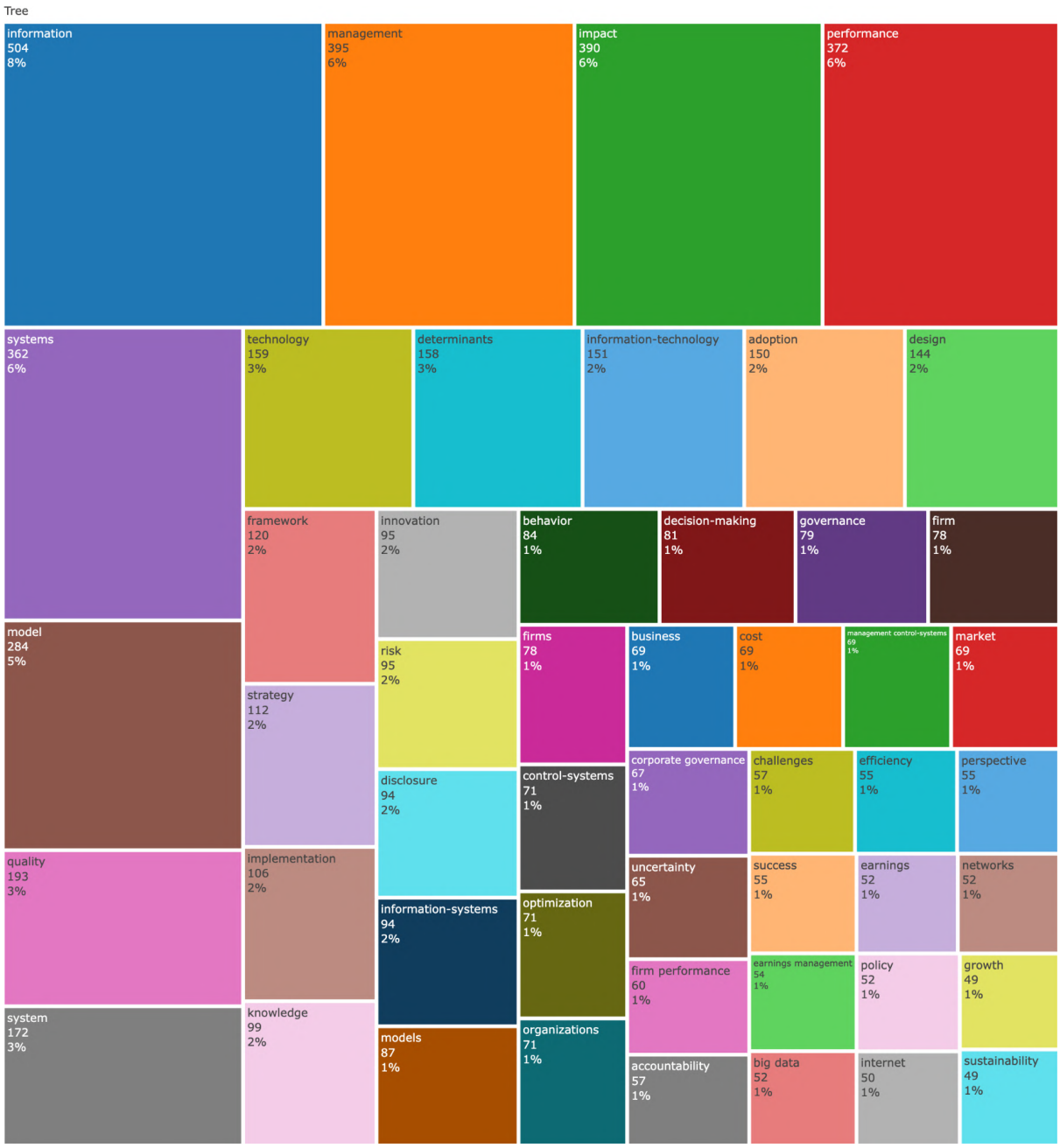

Figure 5: "Treemap" visualization of key accounting information systems research topics.

at all levels of business activity. The frequent use of such terms as "systems" and "model" reflects the ongoing research into system design and theoretical developments and the role these systems play in facilitating business processes.

In figure 7, the given bibliometric visualization is provided, which shows three object relationships: countries (left column), primary research topics (central column), and related research topics/subtopics right column. In such a way, the visualization represents how the research contributions from various countries are related to research topics and how these, in turn, are related to specific subtopics. Each line in the graph depicts a relationship between entities along adjacent columns and shows how research topics flow and interrelate across countries and subfields.

According to the data presented in figure 7, Ukraine, the USA, and China carry out the most significant number of accounting information systems studies. The presence of countries such as Indonesia, Malaysia, and Brazil indicate increased interest in researching information systems in developing

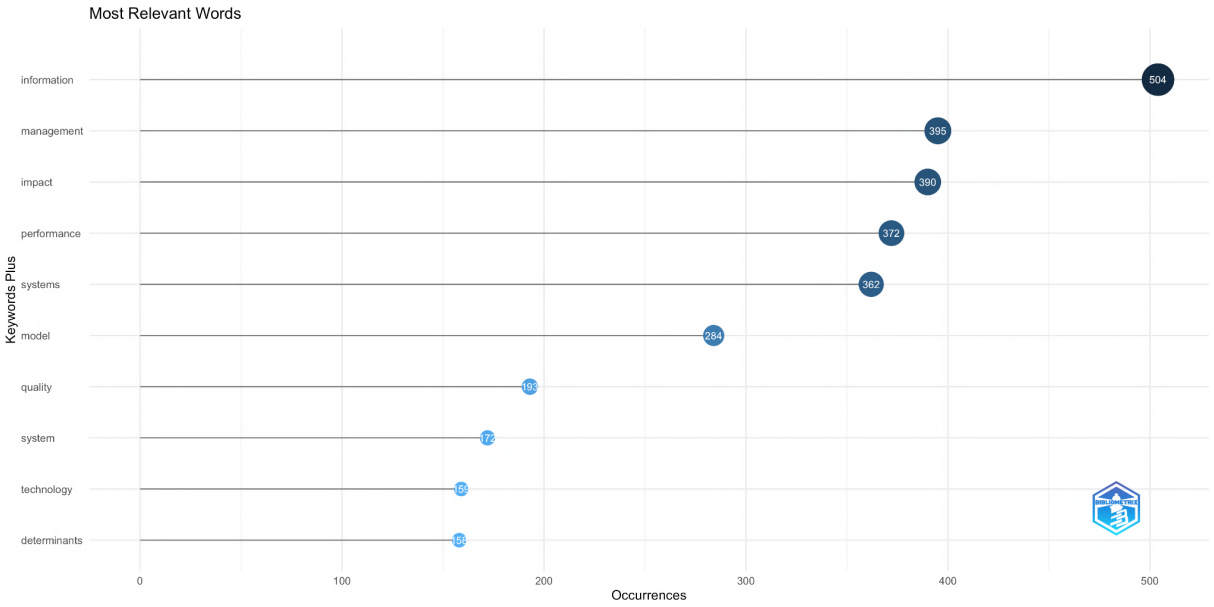

Figure 6: Keywords distribution in accounting information system research.

economies. Thus, ISA research is not only limited to traditionally strong economies but also extends to regions where the implementation of information systems in accounting is becoming increasingly important due to the development of the economic and regulatory environment. It is expected that the main topics of research will be related to "accounting", "management", and "information", and promising research directions for "machine learning" and "blockchain" will be followed. The combination of significant directions and trending topics allows seeing that future innovations in artificial intelligence and blockchain technologies can transform traditional accounting processes, making them more transparent and secure. This suggestion is supported by accompanying research themes ("performance", "systems", "technologies", "implementation") reflecting the detailed research areas.

Notably, there is an increased interest in information systems research in "sustainable development". This suggests that modern development and implementation of information systems correspond to the global goals of sustainable development and reflect the broad trend of integrating environmental, social, and governance issues (ESG) into accounting practice.

The most significant development happened between 2014 and 2017, showing expansion and growth in research interest in accounting information systems. The peak of research in 2018 and 2020 is explained by the emergence of artificial intelligence and blockchain technologies, which have created new research opportunities and directions. The decrease in publications over the past 3 years may be related to the COVID-19 pandemic, negatively affecting publishing activity and research worldwide. A decrease may also indicate the maturity phase of certain research areas.

The trends in the annual scientific output table have various implications for researchers and stakeholders in the field of ISA. For one, the growth period until the year 2018 indicated a very robust research environment and increased involvement and contribution from the academic community. Researchers who aim to understand the historical development of ISA can analyze this growth phase to identify the factors generating scholarly interest and publications.

5. Conclusions

The scientometric review carried out within the framework of the accounting information system revealed that the thematic areas of integration of information systems, performance measurement, management, and increased use of new technologies in this field are at a critical stage – main trends of the research of information systems in accounting: machine learning, artificial intelligence, and

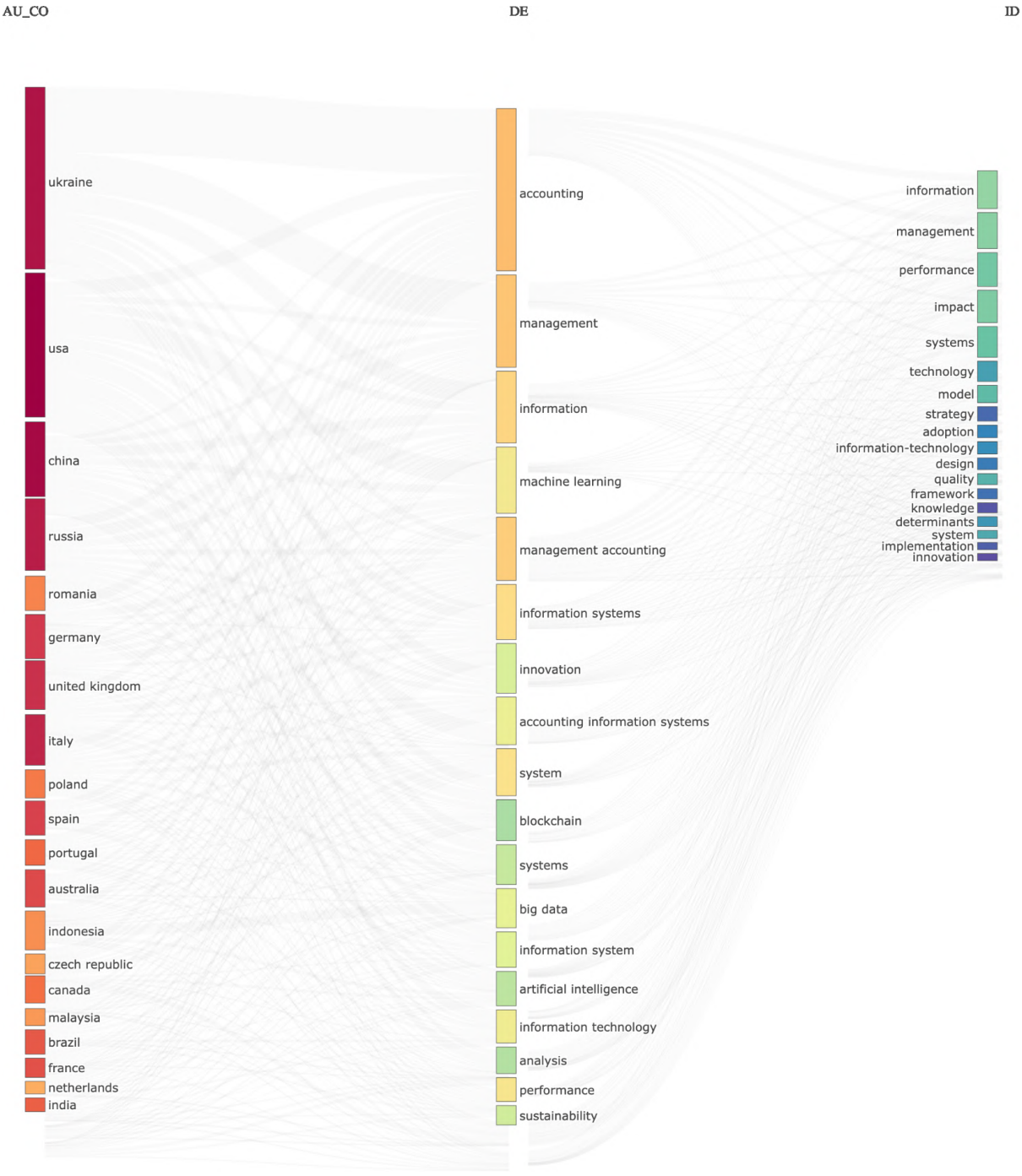

Figure 7: Bibliometric visualization based on countries, primary research topics and related research topics.

blockchain. Most of the publications focus on methodological advances, interdisciplinary applications, and practical innovations related to the organization and management of accounting. Most of the results underline the integration processes of information systems and accounting. Also, standard is the interest in data analytics for improving transparency, decision-making, and financial control. In particular, AI solutions and machine learning are increasingly used for analytics.

The results obtained demonstrate the trend and further prospects for research. The results show the importance of information systems in accounting as one dynamic and constantly developing field at the crossroads between traditional accounting and modern information systems. Some of the significant challenges are, among others, related to how modern technologies need to be integrated into currently operating accounting systems, assurance of data security, and addressing the skills gap for the use

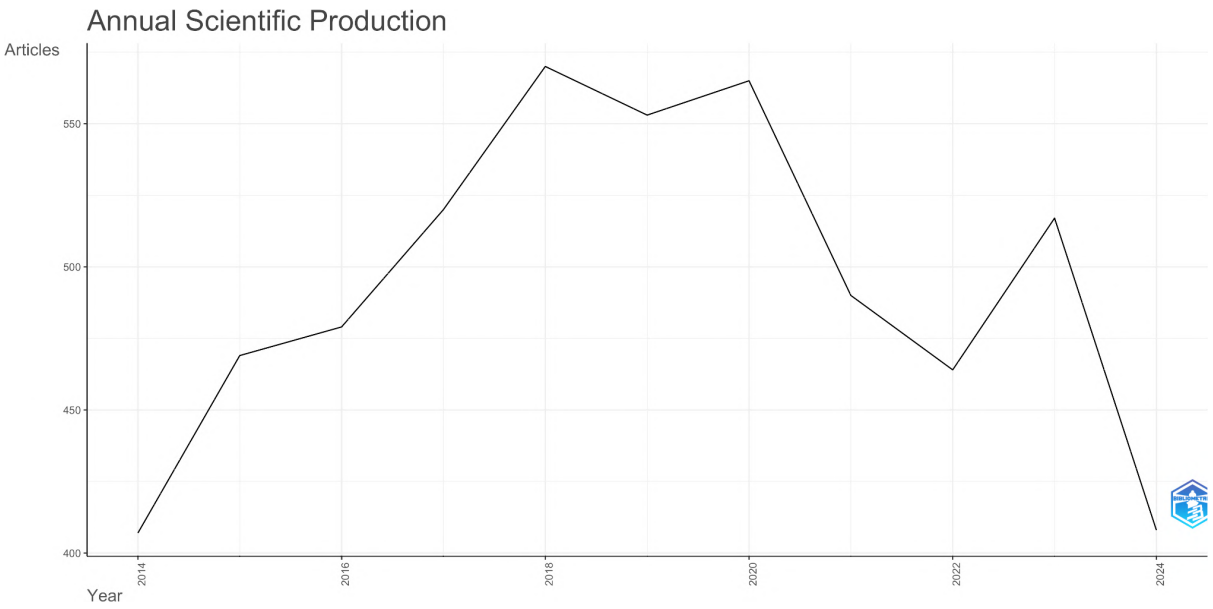

Figure 8: Number of published studies in the accounting information systems field during 2023-2024.

of new tools such as AI and blockchain. In this vein, the research contributes to extended studies on new technologies and interdisciplinary connections to solve potential problems of organization and accounting, reporting, and management, considering the goals of sustainable development.

Future research may focus on the practical application and implementation strategies of AIS technologies in various organizational environments. Additionally, it is necessary to explore and assess the effectiveness of integrating artificial intelligence, machine learning, and blockchain into accounting systems, particularly in terms of data security, transparency, decision-making, and their long-term impact. An important area for further research is the role of AIS in promoting sustainable development, especially in light of the increasing demands for ESG reporting.

Declaration on Generative AI: During the preparation of this work, the authors used Grammarly in order to: Grammar and spelling check. After using this service, the authors reviewed and edited the content as needed and takes full responsibility for the publication's content.

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