Jurnal Akuntansi dan Bisnis
Vol 25, No. 1, Februari 2025: 87-109
https://jab.fe.uns.ac.id/

Uncovering the Potential of Blockchain Technology in the Accounting Domain: A Bibliometric Analysis and Recent Research Trends

Evy Nurhayati Sri Hardini
Blasius Erik Sibarani (blasius.erik@mncu.ac.id)

Department of Accounting, Faculty of Economics and Business, University of Gadjah Mada, Indonesia
Department of Accounting, Faculty of Business and Finance, MNC University, Jakarta Barat, Indonesia

ABSTRACT

Research addressing the use of blockchain in accounting has gained momentum, the field presents a disconnected overview of the scope and limits of current knowledge. There is a lack of literature reviews that address blockchain technology in the accounting domain. This is important because blockchain technology facilitates record-keeping, increases organizational transparency, streamlines hierarchical structures, aids market disintermediation and source tracking, builds corporate trust, encourages rapid internationalization, and improves accounting functions. This research addresses the gap using bibliometric analysis to synthesize previous literature and 229 scholarly articles based on the Scopus database. The findings show a well-developed research focus on blockchain technology in specific managerial areas, like finance and supply chain management. However, the conceptual development of the field is still in its early stages. Additionally, a thematic analysis of the existing literature reveals four key research themes: strategy and regulation, enablement and implications, multi-domain deployment, and Bitcoin inefficiency. These themes are crucial as they highlight the main areas of focus within the field of blockchain technology in accounting. The study's findings highlight an urgent need for additional research in these areas of accounting, as current knowledge does not address issues like awareness and consensus on blockchain technology, nor the roles of regulators, auditors, and public administrators in its development and use. This call for further research is crucial and prompts the academic and professional community to take action.
Keywords: Accounting, bibliometric analysis, blockchain technology, VOSviewer

Penelitian yang membahas penggunaan blockchain dalam akuntansi telah mendapatkan momentum, bidang ini menyajikan gambaran umum yang terputus dari cakupan dan batasan pengetahuan saat ini. Ada kekurangan tinjauan pustaka yang membahas teknologi blockchain dalam domain akuntansi. Ini penting karena teknologi blockchain memfasilitasi pencatatan, meningkatkan transparansi organisasi, menyederhanakan struktur hierarkis, membantu disintermediasi pasar dan pelacakan sumber, membangun kepercayaan perusahaan, mendorong internasionalisasi yang cepat, dan meningkatkan fungsi akuntansi. Penelitian ini membahas kesenjangan tersebut menggunakan analisis bibliometrik untuk mensintesis literatur sebelumnya dan 229 artikel ilmiah berdasarkan basis data Scopus. Temuan tersebut menunjukkan fokus penelitian yang dikembangkan dengan baik pada teknologi blockchain di area manajerial tertentu, seperti keuangan dan manajemen rantai pasokan. Namun, pengembangan konseptual bidang ini masih dalam tahap awal. Selain itu, analisis tematik dari literatur yang ada mengungkapkan empat tema penelitian utama: strategi dan regulasi, pemberdayaan dan implikasi, penerapan multi-domain, dan inefisiensi Bitcoin. Tema-tema ini penting karena menyoroti area fokus utama dalam bidang teknologi blockchain dalam akuntansi. Temuan studi ini menyoroti kebutuhan mendesak untuk penelitian tambahan di bidang akuntansi ini, karena pengetahuan saat ini tidak membahas isu-isu seperti kesadaran dan konsensus tentang teknologi blockchain, maupun peran regulator, auditor, dan administrator publik dalam pengembangan dan penggunaannya. Seruan untuk penelitian lebih lanjut ini sangat penting dan mendorong komunitas akademis dan profesional untuk mengambil tindakan.
Kata kunci: Akuntansi, analisis bibliometrik, teknologi blockchain, VOSviewer

Received:
17 Juli 2024
Revised:
9 Agustus 2024
20 November 2024
Accepted:
30 Desember 2024

INTRODUCTION

The appearance of Bitcoin in 2008 (Nakamoto, 2008) marked the beginning of blockchain technology being presented to the world. Initially, blockchain was used as a cryptographic mechanism to secure

Bitcoin and other cryptocurrency transactions (Naughton, 2016; Xu et al., 2019). However, entering the last five years, the utilization of blockchain technology has multiplied in various fields, such as supply chain management (Kshetri, 2018) and the Internet of Things (IoT) (Reyna et al., 2018; Zhu et al., 2022). The expansion of blockchain technology, fueled by its ability to create a transparent and trustworthy platform for digital transactions and transaction-oriented processes without intermediaries, presents a promising future for the accounting field. The potential of blockchain technology to transform the accounting domain is significant, and this reassurance about the security of their transactions should make the audience feel confident about the future of their field. Previous research shows that the global market for blockchain technology experienced significant growth over the past three years, projected to reach more than USD 39 billion by 2025 (Kroon et al., 2021; Zhu et al., 2022).

The growth of blockchain technology is driven by the ability to build a transparent and trusted stakeholder platform for digital transactions and transaction-oriented processes without the need for intermediaries (Shinde et al., 2021; Soleymani & Paquet, 2020; Zheng et al., 2017). Researchers revealed blockchain as a fundamental technology. Since then, research by academics and practitioners on blockchain and its potential is expected to continue expanding (Tandon et al., 2020, 2021). Swan, (2015) has categorized the blockchain development process into three levels. Blockchain 1.0 technology is centered around Bitcoin, as cryptocurrencies for digital payments rely on the cryptocurrency ecosystem. Blockchain 2.0 extends this to new financial applications like bonds, stocks, and smart contracts, which demand high security and data integrity. Blockchain 3.0 builds on these earlier applications by expanding into areas such as government, healthcare, science, culture, and the arts, aiming to popularize the technology beyond digital currency and finance and address a broader range of business and societal needs (Swan, 2015).

Studies reveal that blockchain technology has a significant operational impact as it reduces information processing costs and eliminates the need for third-party involvement when verifying transactions in business, management, and accounting (Faccia & Mosteanu, 2019; Thies et al., 2023). It allows both parties to conduct transactions using a triple-entry bookkeeping system that provides independent verification and increases trust in the system (Dai & Vasarhelyi, 2017a; Han et al., 2023), thereby increasing the speed and security of transactions. Thus, blockchain technology offers many informational opportunities, such as sharing, accessing, and distributing data within the network, improving information quality transparency, and reliability (Tyagi et al., 2023; Wu et al., 2019). Blockchain technology has significant implications for accounting and auditing processes, especially record-keeping processes, including how transactions are initiated, processed, recorded, reconciled, audited, and reported (Bellucci et al., 2022).

Blockchain technology has a substantial impact on accounting, and recently, the Big Four accounting firms have shown considerable interest in this technology. (EY, 2017; H. Li et al., 2018). Several studies reveal that blockchain technology offers opportunities to improve accounting information systems for the reliability and timeliness of information (Alkhudary et al., 2020; Arshad et al., 2023). This has an effect on the quality of information as required by IFRS (International Financial Reporting Standards) (Anis, 2023; Bonsón & Bednárová, 2019; Sheela et al., 2023), covering aspects such as completeness (information can be verified); clarity (each entry has a pre-defined structure with specific columns to be filled); relevance (verification of information); timeliness (instant updates and continuous timely reporting); and fairness (absence of manipulation as permissions are required as well as blocks that are cryptographically locked and cannot be altered). This

potential impact of blockchain on accounting reassures the audience about the reliability and timeliness of the information, thereby enhancing the quality of accounting practices and the auditing profession (Akter et al., 2024; Huang et al., 2024; Sinha, 2020).

Currently, there is a shortage of literature reviews focusing on blockchain technology within the accounting domain. This is important because blockchain technology facilitates record-keeping, increases organizational transparency, streamlines hierarchical structures, aids market disintermediation and source tracking, builds corporate trust, encourages rapid internationalization, and improves accounting functions (Lardo et al., 2022). Schmitz & Leoni, (2019) focused the study on the accounting function, analyzing academic and professional literature. They identified key themes emerging in accounting and auditing studies: governance; transparency and trust; continuous auditing; smart contracts; and the role of auditors. Recent systematic literature reviews (Kummer et al., 2020; Wannenwetsch et al., 2023) shifted the focus from operational to theoretical aspects. This review identified the most relevant organizational theories of blockchain literature related to supply chain management and logistics. Six organizational theories emerged as a framework for understanding blockchain technology and facilitating future research: information theory, institutional theory, agency theory, network theory, resource-based view theory, and transaction cost analysis theory (Kummer et al., 2020).

There has been more study on blockchain technology in the management domain compared to the accounting domain. Experts focus on the opportunities and changes blockchain technology brings to management (Mendling et al., 2018). Research on blockchain in accounting needs to cover several important aspects, including the impact of blockchain technology on the accounting function and the accounting profession, financial reporting for crypto assets, as well as other aspects of the recordkeeping process such as authorization, recording, transaction reporting, and data storage (CPA Canada et al., 2017; Pimentel & Boulianne, 2020). The tie and potential application of blockchain in accounting highlights the need for a literature analysis to grasp recent advancements in the maturity of blockchain technology research in this field. This analysis can reveal new opportunities for future research. Although some studies have offered insights into the accounting aspects of blockchain technology, particularly regarding its impact and research trajectory, a systematic and objective review of the literature on blockchain technology in accounting is still lacking. Existing research has mostly focused on the field of auditing (Garanina et al., 2022, 2022; Pimentel & Boulianne, 2020).

This research aims to explore literature related to the application of blockchain in accounting through bibliometric and thematic analysis. This method will be used to identify trends, topics, and research questions of interest, as statistical and mathematical approaches to provide an objective picture of various aspects of the literature, as shown in recent research (Agrifoglio & de Gennaro, 2022; Thies et al., 2023; Tiron-Tudor et al., 2021). This research aims to map the current knowledge landscape about blockchain in accounting and identify exciting topics and research questions that can be explored in the future. Bibliometric methods offer many advantages, such as identifying trends and patterns in academic publication activity, mapping relationships between countries and authors in research fields, tracking the growth of knowledge of specific topics, and providing information about the productivity of researchers and institutions. Firdaus et al., (2019) identified several main benefits of bibliometric analysis, including (1) validating the importance of publications, exploration, and research for authors; (2) helping institutions assess the quality and impact of their publications; (3) allowing scientists to predict future research directions and their impact on a particular field; (4) as well as providing tools for analysts to

evaluate the development of knowledge in a scientific discipline. Bibliometric analysis can be used to identify the productivity of researchers and institutions in publishing work on blockchain technology and accounting, the geographic distribution of research with a focus on countries and journals where research is published, temporal trends in publications, researcher performance, and collaboration between researchers.

In line to provide a comprehensive overview of the blockchain research landscape in the field of accounting, this study seeks to answer the following descriptive questions: 1) What are the trends in scientific publications related to blockchain technology in the field of accounting over the past few years?, 2) What are the most frequently discussed themes and topics in the literature on blockchain in accounting?, 3) How are research studies distributed based on authors, institutions, countries, and journals in blockchain studies in accounting?, 4) What research topics have the potential to be further developed in studies on the application of blockchain technology in accounting?

The rest of the study: Section 2 presents the methodology. Section 3 presents the descriptive bibliometric analysis. Section 4 analyzes the co-occurrence of keywords and the main topics investigated in the data set, analyzing the identified clusters. Section 5 concludes this research against theory and practice, limitations, and suggestions for future research.

METHOD

This research used a hybrid literature review approach that combines bibliometric methods, data visualization with VOSViewer, and thematic analysis to examine blockchain studies in accounting deeply. The bibliometric method was applied to measure research publication trends and map phenomena in accounting and blockchain (Sellen et al., 1999). This research followed a cycle of defining blockchain-related keywords, data collection, and data analysis. The bibliometric method combined performance analysis and knowledge mapping (Tiron-Tudor et al., 2021). Performance analysis generates data on the volume and impact of research through word frequency analysis, citation analysis, and calculation of publications by unit of analysis. Based on relational indicators, science mapping is also used to visualize spatial relationships between different elements in the literature (Jin et al., 2019). A research protocol has been developed to avoid misidentification of scientific products, as shown in Figure 1.

Keyword Selection and Data Gathering

This study used the Scopus database as a data source because it is the largest database covering various types of publications, an analytical tool launched by Elsevier in November 2004 (Aghaei Chadegani et al., 2013). Data search in Scopus was collected on June 24, 2024. To select appropriate keywords, researchers reviewed previous bibliometric studies and literature reviews on blockchain technology (Cordery et al., 2023; Kroon et al., 2021b; Marrone & Hazelton, 2019). Based on the review, keyword queries were performed with TITLE-ABS-KEY using the following search string: (("blockchain" OR "ethereum" OR "cryptocurrency" OR "bitcoin" OR "distributed ledger technology" OR "smart contracts" AND ("accounting*")) (Lardo et al., 2022; Tandon et al., 2021). The query search results were filtered for articles, conference papers, books, and conference reviews. This query yielded 1,042 documents, including articles and conference papers.

After selecting the data, we applied exclusion criteria. First, we only considered articles published in business studies, management, and accounting on Scopus. This restriction was necessary to focus on the impact and relevance of blockchain technology on these disciplines. Second, we only included articles written in English. After applying the exclusion criteria, we conducted a preliminary data analysis. First, it removed duplicate data. Second, manually refining the data set. This process resulted in 229 relevant scientific

articles consistent with the sample used in the previous bibliometric study. This study analyzed data for the period 2015 to June 24, 2024. The selection of this period is based on the growth trend of blockchain technology publications, which started when Satoshi Nakamoto published the Bitcoin whitepaper in 2008. However, this study focuses on the period from 2015 onwards, as it is during this period that researchers' attention to blockchain technology began to increase rapidly compared to other periods (Dabbagh et al., 2019; López-Sorribes et al., 2023).

Data Analysis

Data analysis was conducted two stages: descriptive bibliometric analysis and analysis of the main topics under study of the data set. In particular, statistical analysis was performed based on spatial and temporal dimensions to understand the scope of the literature and answer the first research question. This study used R studio analysis and VOSViewer software (van Eck & Waltman, 2010), allowing for bibliometric network design and visualization. R studio analysis in research aims to comprehensively describe the current state of research, identify hot topics, reveal potential trends and patterns, and establish relationships between scientific publications (Akrami et al., 2023). VOSviewer can also enrich the exploration of leading contributors (Van Eck & Waltman, 2019). Combined, this method can summarize the contributions to the research topic. The software refined the dataset to generate network, overlay, and density visualizations. Thematic analysis was conducted to analyze the content of the articles within each cluster of scientific literature.

DESCRIPTIVE BIBLIOMETRIC ANALYSIS

The purpose of the descriptive analysis is to describe the main characteristics of the data set. The analysis focuses on several aspects that indicate academics' interest in blockchain in the accounting domain and provides a clear picture of the production of scholarly articles on this theme.

Publication by Year

Blockchain is a new topic that has begun to attract the attention of

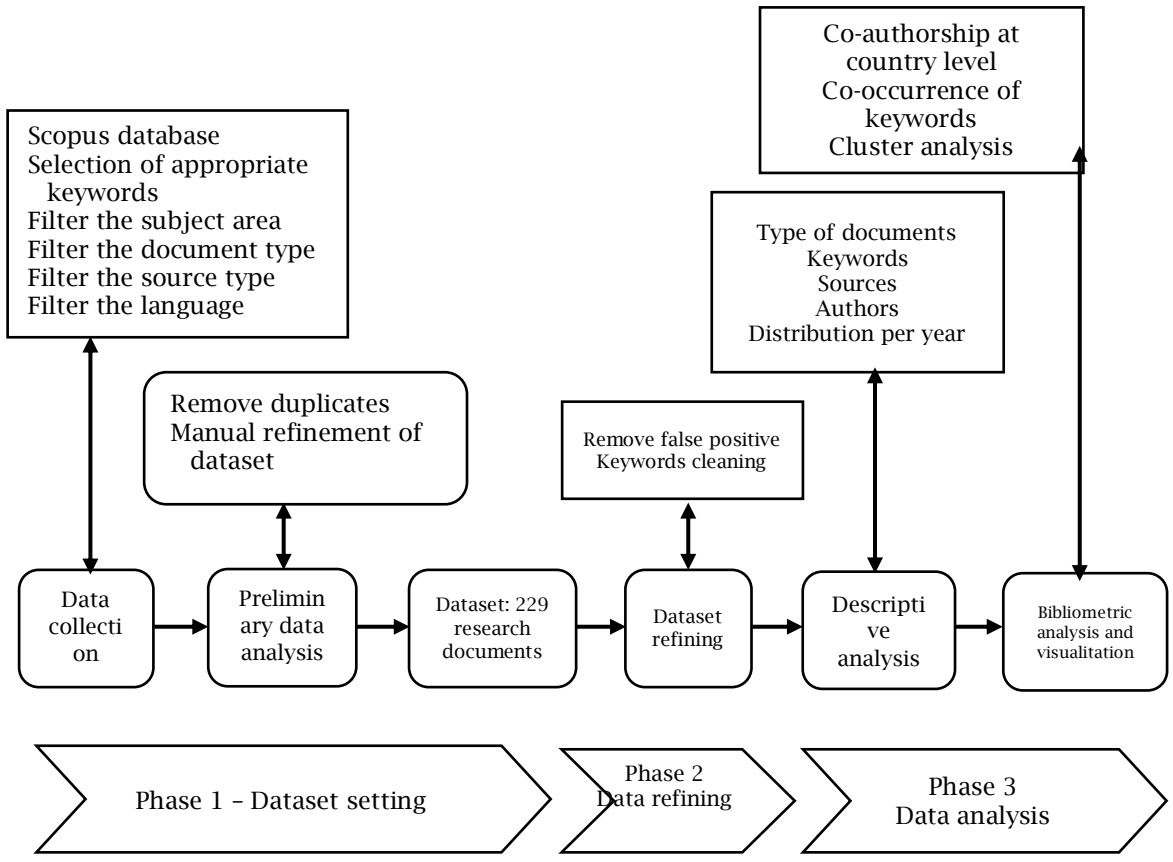


Figure 1.
Research Framework

accounting researchers in recent years, particularly since 2015. Figure 2 shows a significant increase in publications related to blockchain in the fields of management and accounting over the past three years. More than 91% of scientific articles in this dataset are concentrated in this period.

Substantially, this increase in the number of publications can be attributed to several important factors. First, since the early 2020s, advancements in blockchain technology have become increasingly evident, such as the adoption of smart contracts and the expanding application of blockchain in financial systems and audits, thereby generating more academic research. Second, awareness of blockchain's potential to enhance transparency and data security in accounting has driven research interest in this field.

In 2022, the number of published documents reached 41 articles, increasing to 49 articles in 2023. This increase also coincided with more collaboration between academics and practitioners, as well as encouragement from large institutions such as public accounting firms and regulatory bodies that began to study the impact of this technology on the accounting profession. The decline in the number of publications observed in 2024 should not be cause for concern, as the data used only goes up to June 2024 and is likely to increase as the year progresses. Overall, this trend reflects the rapid development of blockchain as a relevant and evolving research topic in the field of accounting.

Next, Table 1 shows the ten most cited articles in blockchain-related research in the field of accounting. The first article by Dai and Vasarhelyi (2017) with 435 citations discusses the use of blockchain in the scope of accounting and assurance. This article is a key reference because it emphasises how blockchain technology can transform accounting systems to be more real-time, independently verified, and transparent, thereby improving the reliability and efficiency of transaction recording processes. The triple-entry bookkeeping concept proposed in this article is considered revolutionary and paves the way for further research in the field of digital accounting.

The second article by Moll and Yigitbasioglu (2019) with 240 citations examines the relationship between blockchain technology and big data in accounting. Published in the British Accounting Review, this article is important because it combines two major technological trends, showing how blockchain can support the secure and reliable management of big data in financial reporting processes. This research highlights the role of blockchain in addressing the challenges of large-scale data processing and verification often



Figure 2.
Publication by Year

faced by organisations.

Furthermore, the third article by Le, Abakah, and Tiwari (2021) with 221 citations discusses fintech and cryptocurrency, with a focus on blockchain applications in the accounting and auditing domain in Australia. This article provides insights into how blockchain can improve financial reporting and audit functions related to cryptocurrency assets, which are increasingly relevant with the growing use of digital financial technology. This article

Table 1.
Top Ten Cited Articles

Author/Year	Topic	Journal	Institution	Country	Citation Frequency
Dai J. and Vasarhelyi M.A. (2017)	Blockchain; accounting; assurance	Journal of Information Systems	University of New Jersey	USA	435
Moll J. and Yigitbasioglu O. (2019)	Accounting; cloud; big data; blockchain	British Accounting Review	University of Manchester, United Kingdom	UK	240
Le T.N.L., Abakah E.J.A., and Tiwari A.K. (2021)	Fintech; green bonds; cryptocurrencies	Technological Forecasting and Social Change	University of Sydney	Australia	221
Schmitz J. and Leoni G. (2019)	Accounting; auditing; blockchain	Australian Accounting Review	RMIT University, Melbourne	Australia	197
Kokina J., Mancha R., and Pachamanova D. (2017)	Blockchain; accounting	Journal of Emerging Technologies in Accounting	Babson College	USA	182
Wang Y. and Kogan A. (2018)	Blockchain; transaction process system	International Journal of Accounting Information Systems	State University of New Jersey	USA	148
Coyne J.G. and McMickle P.L. (2017)	Accounting; blockchain	Journal of Emerging Technologies in Accounting	University of Memphis	USA	137
Kshetri N. (2021	Blockchain; sustainable supply chain management	International Journal of Information Management	University of North Carolina	USA	126
Kwilinski A. (2019)	Blockchain; accounting; transaction; cloud storage	Academy of Accounting and Financial Studies Journal	London Academy of Science and Business	London	122
Mosteanu N.R. and Faccia A. (2020)	Financial management; fintech, XBRL, blockchain; cryptocurrencies	Quality - Access to Success	American University of Malta	USA	114

shares a similar focus with the research by Schmitz and Leoni (2019), but places greater emphasis on the implications of blockchain for modern auditing and accounting.

Other articles have relatively fewer citations, ranging from 120 to 140 citations, but still make important contributions. For example, Wang and Kogan (2018); Kwilinski (2019) discuss blockchain applications in transaction processing systems, showing how blockchain can enhance the efficiency and security of business transaction processes. Meanwhile, Kshetri (2018); Mosteanu and Faccia (2020) from the United States focus on the use of blockchain in supply chain management and finance, highlighting blockchain's ability to improve transparency and accountability in complex, multi-party business processes.

Overall, these articles form an important foundation for understanding the impact of blockchain technology on various aspects of accounting, from transaction recording, financial reporting, and auditing to supply chain management and digital finance.

Author Productivity

Table 2 shows some significant findings, namely that there are many authors involved in the analyzed documents, with a total of 580 authors. The number of articles written by a single author is much less than that of articles written by multiple authors. This indicates high collaboration in blockchain technology and accounting research and reinforces the importance of network analysis to understand the dynamics of research in accounting. The annual growth rate of articles is 49.81 or 50%, this will continue to increase as blockchain technology develops and the average citations per document is 22.49.

Table 3 presents the most prolific authors in blockchain technology and accounting research. Smith is the most active author with six recently published scientific articles, which amount to one document in 2024, one document in 2022, one document in 2021, two documents in 2020, and one scientific article document in 2019. The six scholarly articles are 'The development of a new type of crypto assets, namely non-fungible tokens (NFTs), and relevant accounting and auditing issues' (2024); 'emphasizing the importance of management accountants to understand and study payments with blockchain technology and cryptocurrencies as they are integrated into major financial markets' (2022); 'the hyperledger composer case study method allows practitioners and researchers to learn blockchain concepts firsthand through interactive demonstrations that can be integrated with accounting for intangible assets' (2021); 'the growing use of blockchain and cryptocurrencies over digital payment systems, as well as the need for management accountants to study

Table 2.
Author Productivity

Author	580
Authors of single-authored document	38
International co-authorship	26.72
Annual growth rate	49.81
Co-authors per document	2.74
Average citation per document	22.49

Table 3.
List of Most Productive Authors

Author	Document
Smith S.S.	6
Appelbaum D.	3
Church K.S.	3
Kinory E.	3
Pimentel E.	3
Secinaro S.	3
Al-hawamleh A.	2
Al-zaqeba M.A.A.	2
Alharasis E.E.	2
Almatarneh Z.	2

trends in their use' (2020); 'blockchain and accounting governance: Emerging issues and considerations for accounting and assurance professionals' (2020); 'exploring the playground: blockchain prototyping with hyperledger composer' (2019). Smith researches the impact of blockchain technology on the fields of finance, law, and accounting. In addition, in his latest research, Smith emphasizes the importance of education and training to introduce how to use and understand blockchain technology. This aims to prepare future practitioners to adapt to the evolving work environment. Although Smith is a prolific author, he is not the most cited author. Dai and Vasarhelyi, with one paper, fall into the most cited category (Dai & Vasarhelyi, 2017), as shown in Table 1.

Document Types and Sources

Research on blockchain technology in accounting shows a diversity of editorial positions. The most prolific scholarly article is the "Journal of Emerging Technologies in Accounting," which has a strong focus on topics relevant to this research, with 20 articles, accounting for 83% of all articles published in scholarly journals). Then the journals "Accounting, Auditing and Accountability Journal" and "Journal of Risk and Financial Management" have a frequency of 10. This shows that blockchain technology related to sustainability issues in accounting is currently relevant, as seen in Table 4.

Country Publishing and Co-authoring Activities

Research on blockchain technology in accounting has a broad global scope, not limited to a single region. Based on the affiliation of the first author of the dataset, the research was conducted in 43 different countries, with the number of scholarly

Table 4.
Collocation of Editorial Documents

Document Editor Collocation	Frequency
Journal of Emerging Technologies in Accounting	20
Accounting, Auditing and Accountability Journal	10
Journal of Risk and Financial Management	10
International Journal of Digital Accounting Research	9
Financial and Credit Activity: Problems of Theory and Practice	8
International Journal of Accounting Information Systems	8
Australian Accounting Review	7
Journal of Financial Reporting and Accounting	7
Journal of Information Systems	7
Academy of Accounting and Financial Studies Journal	6

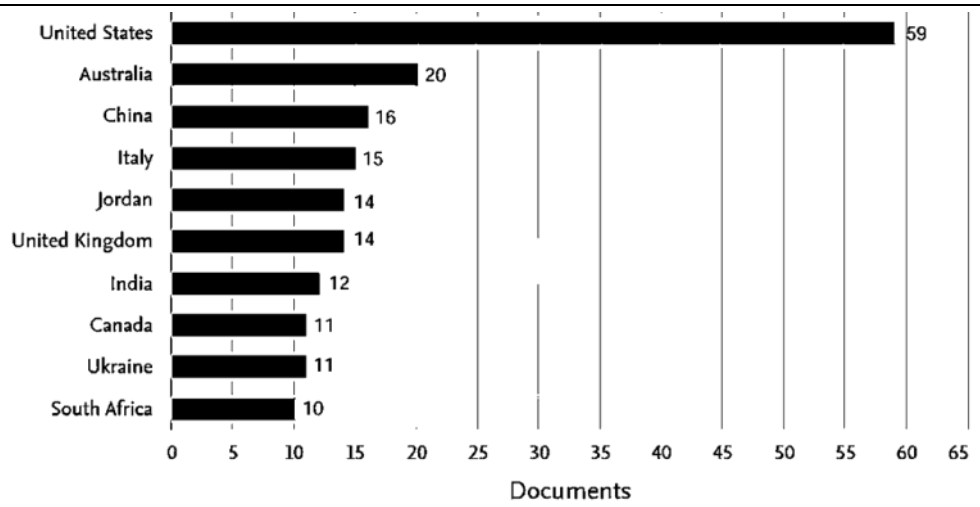


Figure 3.
Publishing Activities by Country

articles produced by each country varying. Figure 3 shows the most productive countries in terms of blockchain technology research in accounting, with at least 59 scholarly articles published. The United States was the most productive, with continuous publications since the early years of the study. In 2015, the United States published two scholarly articles that were early works in accounting. This provides an opportunity for other countries to develop blockchain technology in accounting so as not to fall behind developed countries like the United States.

To better understand blockchain technology research in accounting, researchers used a bibliometric *co-authorship* indicator at the country level. This indicator takes into account inter-country collaboration and the spatial distribution of research. Analysis using VOSviewer shows that the United States is the most active country in blockchain research in the field of accounting, as shown in Figure 4. Other countries that also show high activity are the United Kingdom, Australia, and China.

Substantially, the high concentration of research in the United States can be explained by several factors. First, the United States is known as a hub of technological innovation with a strong research and development ecosystem, supported by renowned educational institutions, research laboratories, and advanced technology industries. Second, government and private sector support for new technology research, including blockchain, has accelerated the emergence of various studies and publications. Additionally, the financial markets and accounting services in the United States are large and complex, driving the need for cutting-edge technological solutions like blockchain.

Meanwhile, the United Kingdom, Australia, and China also show significant activity, as each of these countries has a strategic focus on the digitalisation of financial services and regulatory reforms that support the implementation of blockchain in the accounting and auditing sectors. For example, China has made significant investments in blockchain technology (e.g., mBridge, China's CBDC) and aggressive government programmes, while Australia and the United Kingdom are active in developing digital technology-based accounting and auditing standards (e.g., UK Financial Reporting Council (FRC), Digital Reporting Framework (Australian Securities and Investments Commission - ASIC).

It should be noted that these results may be influenced by the language filters used in data collection, resulting in a dominance of English-language

Table 5.
Frequency of Authorship by Country

Country	Frequency
United States	98
Ukraine	37
Australia	31
Italy	26
China	24
Jordan	21
Canada	20
India	20
England	16
Malaysia	14



Figure 4. Network Visualization by Country

publications. However, in terms of substance, the concentration of research in these countries reflects the readiness of technological infrastructure, policy support, and market demand driving the development of blockchain research in the accounting field.

The country clusters of blockchain technology research in accounting show that besides the central cluster of the United States, there are other relevant clusters such as the United Kingdom, China, and Italy. Other small but significant clusters include Malaysia, Jordan, and South Africa. Network analysis allows researchers to identify countries with similar research. For example, Germany, Switzerland, and the Russian Federation have similar research to each other, while the Netherlands has similar research to Belgium and Hungary. China, Hong Kong, Norway, Bangladesh, Japan, and the United Kingdom have similar research topics. On the other hand, the United States, Italy, India, Australia, Indonesia, and the United Kingdom have also researched similar topics. The mentioned countries are assumed to be the most significant contributors in the accounting domain of blockchain technology research.

BIBLIOMETRIC ANALYSIS BASED ON MAIN TOPICS

This section aims to identify the important topics covered by the research dataset on blockchain in accounting. This objective was achieved by analyzing the keywords most frequently used by the authors of the 229 scholarly articles studied. This keyword analysis provides insight into the main content and issues related to blockchain in accounting.

Co-occurrence Keywords

Keyword analysis to understand the main topics of blockchain research in accounting (Ji et al., 2018). This method examines keywords that frequently co-occur in the research dataset. Table 6 shows information about the topics related to blockchain research in accounting, including frequently occurring keywords. Keywords that appear at least five times

Table 6.
Ten Co-occurring Keywords

Keywords	Co-occurrence
Blockchain	128
Accounting	46
Bitcoin	32
Cryptocurrency	29
Blockchain technology	26
Auditing	20
Artificial intelligence	16
Cryptocurrencies	14
Smart contract	12
Big data	10

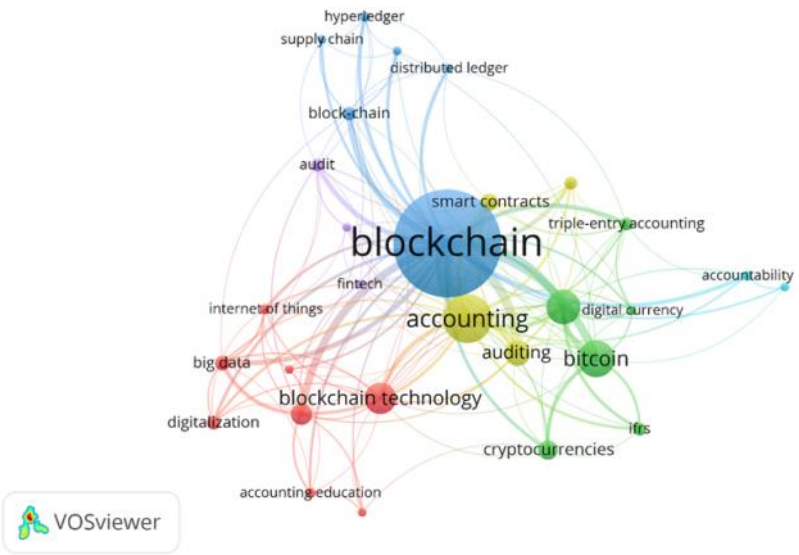


Figure 5.
Keyword Co-occurrence Network Visualization

are shown in the table. Blockchain is the most prominent keyword related to accounting, bitcoin, smart contracts, and digital currency.

The co-occurrence keyword analysis in Figure 5 shows the relationship between several keyword pairs, such as blockchain and accounting, blockchain and Smart Contract, and blockchain and bitcoin. Smart contracts and bitcoin are technologies that are closely related to blockchain. Smart contracts are computer programs stored on the blockchain, while cryptocurrencies like Bitcoin use the blockchain to record transactions. In addition, blockchain has a strong connection to accounting. Blockchain can be used to secure transaction data. These findings show that blockchain has broad and promising applications in various fields, including smart contracts, cryptocurrencies, and accounting.

The linkage of keywords to the research objectives shows strong relevance. Keywords such as "accounting" and "accounting education" reflect the focus of this research on analyzing future trends toward the abilities and skills required by accounting professionals in the digital and blockchain era. The distribution of keywords used by authors is important for understanding the popular topics among researchers, which significantly contribute to the advancement of science (Li et al., 2009).

Cluster Analysis

Analyze the co-occurrence keywords based on their relationships in Figure 5, to recognize four main groups marked with different colors.

Yellow Cluster

The yellow cluster consists of the following keywords: accounting and auditing. This scientific article discusses the advantages and challenges of blockchain technology in the accounting field and is divided into two sub-groups: accounting and auditing. The first stream of research, focused on a narrow aspect of accounting, Dai & Vasarhelyi, (2017) investigated the potential use of blockchain in accounting and auditing, contributing to the formation of a new accounting ecosystem. This research explores a blockchain-based accounting ecosystem that is real-time, verifiable, and transparent. In this system, blockchain functions as an accounting information system, distributing transaction verification authority, storage, and network management to prevent unauthorized data modifications. It enables the automatic recording and measurement of business performance. The study also examines the relationship between ERP (Enterprise Resource Planning) systems and the implementation of blockchain technology. Large organizations using multiple ERP systems must dedicate substantial resources to integrating blockchain applications across each system. Regulatory pressure greatly influences the acceptance and use of ERP systems. Thus, regulators are anticipated to play a crucial role in the adoption of blockchain in accounting. They need to thoroughly understand this technology and its business implications, offering guidance and oversight to prevent misuse and irregularities.

Moll & Yigitbasioglu (2019) suggest that the creation of a new accounting ecosystem facilitates the widespread adoption of transactional reporting. This allows stakeholders to integrate data into actionable information and visualize it on financial statements. Moll & Yigitbasioglu, (2019) also suggest that increased transparency of data and information can be the basis for revising accounting standards. In addition, Dai & Vasarhelyi, (2017) proposed that accounting standards can be adapted to a transparent accounting ecosystem. Furthermore, research by Huang et al., (2024) and Pimentel & Boulianne, (2020), many initiatives have been implemented by the Big 4 accounting firms (EY, 2017) to establish a consortium within the accounting industry. They formed five working groups to work with regulatory standards and help develop accounting standards governing the use of blockchain. Huang et al., (2024) and Pimentel & Boulianne, (2020) also sought to develop insurance and consulting needs as

technology evolves into the accounting profession.

Alkhudary et al. (2020) describe various blockchain configurations, namely centralized versus decentralized; public versus private; and *peer-to-peer* versus *cloud-based*, as well as suitability to accounting needs. Alkhudary et al. (2020) question whether blockchain offers a cheaper, better, or faster solution than traditional accounting information technology. Garanina et al. (2022) propose using blockchain to replace traditional accounting ledgers, recognizing the potential for blockchain innovation in accounting and emphasizing some of the challenges that must be overcome. They question how to ensure the same level of reliability on private blockchains compared to public blockchains and how to increase the flexibility of blockchains to meet current accounting needs. Nezhyva et al. (2021) classify the advantages of blockchain for managing accounting procedures into five categories: organizational, economic, professional, qualitative, and technological. These advantages include increased efficiency and transparency, reduced costs and improved control, strengthened auditing and compliance, increased trust and data security, and provision of secure infrastructure. Researchers see great potential for blockchain to revolutionize accounting by offering increased efficiency, transparency, security, and control. However, they also emphasize the need to overcome several challenges, such as ensuring reliability and flexibility, before blockchain can be widely adopted in accounting.

The application of blockchain to accounting requires accountants to develop new skills (Silva et al., 2022). To address this need, universities should update accounting courses to train students in relevant knowledge and skills. Desplebin et al., (2024) and Qasim & Kharbat, (2020) suggest courses that teach digital business and accounting technologies, including XBRL, big data analytics, artificial intelligence, and blockchain. In addition, Han et al. (2023) and Sheela et al. (2023) propose using blockchain to collect and share information related to accounting professional misconduct to increase accountants' transparency and accountability. Blockchain can help manage incentives and punishments, and ensure objective reputation measurement. Many studies, including Dai & Vasarhelyi, (2017) and Rodríguez-Espíndola et al., (2020), discuss how blockchain can facilitate automatic insurance and continuous auditing. According to Dai & Vasarhelyi, (2017), blockchain can be the foundation for more agile and timely audits. They propose a new audit paradigm that consists of two main components: the physical world, which includes actual business activities and conditions, and a virtual model that replicates the physical world through IoT and other technologies.

Green Cluster

The green cluster includes the following keywords: bitcoin, digital currency, cryptocurrencies, IFRS, and triple-entry accounting. These keywords indicate that the main topic of this cluster is the investigation of the relationship between triple-entry accounting and the use of the cryptocurrency bitcoin as a currency to complete secure money transactions.

Two main streams of research in accounting reveal different but interrelated focuses. The first stream focuses on the increasing use of Bitcoin and its accounting implications. In their literature review, Apatu & Goudar, (2024) and Holub & Johnson, (2018) described bitcoin as a multidisciplinary phenomenon with the accounting category accounting for only 1.1% of the scholarly articles analyzed. Nonetheless, they emphasize that blockchain, as a permanent transaction recording technology, creates new financial innovations relevant to the accounting and tax fields. The second stream addresses cybercrime associated with Bitcoin. Broadhead, (2018) and Ratten, (2019) define cybercrime as any illegal behavior committed with computer systems or networks. This research emphasizes how blockchain can facilitate illegal activities such as those occurring on the darknet.

Thus, these two streams of research illustrate the complexity and diverse impact blockchain has on the accounting domain ranging from financial innovation to security-related challenges and cybercrime.

Lardo et al.'s (2022) and López-Sorribes et al.'s (2023) approaches to *Bitcoin* propose an accounting framework for transactions and events not yet regulated under international financial reporting standards (IFRS), grounded in theories of neoliberalism and stewardship. The research identifies two accounting methods for *bitcoin*: cost and fair value. The cost method records *Bitcoin* based on the purchase cost and amortizes it over its useful life. In contrast, the fair value method records *Bitcoin* at its current market value, reflecting its volatility and nature as a financial asset. The choice of accounting method depends on the use of *Bitcoin*. The fair value method is preferable as it reflects the volatility of the *bitcoin* value. Conversely, if *bitcoin* is used for the production or supply of goods or services, the cost method is preferred as it provides accurate information on the allocation of *bitcoin* costs.

Morozova et al. (2020) examined methods for the fair assessment of crypto assets and introduced a model grounded in current practices for managing their value. They revealed that cryptocurrencies have all the attributes that fit the IFRS conceptual framework, such as rights, control, and economic benefits on cost formation, classification, and revaluation after the recognition of cryptographic assets. Scholarly articles on the green cluster focus on the second tier of blockchain as categorized by Swan, (2015). This research explores the implications of cryptocurrencies as a tool for the management of money transfers and digital payments. Furthermore, the research in the green cluster adopts a comprehensive approach to blockchain, taking into account both technological and accounting aspects to develop an in-depth investigation of blockchain's implications on cybercrime and darknet, cryptocurrency accounting principles, and fair value valuation of crypto assets.

Blue Cluster

The blue cluster includes the following keywords: blockchain, accountability, supply chain, hyperledger, and distributed ledger. These keywords indicate that the cluster's main topic may relate to the blockchain's distributed ledger features. This cluster, there are three scholarly articles on the effect of blockchain technology on managing operational processes and financial/accounting transactions, and how blockchain reflects business models. Rashideh (2020) and Sarnacchiaro et al., (2024) explain the effect of blockchain technology on the tourism industry that involves many stakeholders and intermediaries such as tour operators, travel agents, and insurance companies. The adoption of blockchain technology enables direct communication between parties and reduces the number of intermediaries, resulting in reduced costs and increased payment security. This entails a redefinition of business models as blockchain technology increases disintermediation and reduces barriers for new entrants, thereby increasing efficiency and reducing time and costs for travelers.

Afanasyev et al. (2020), Dutta et al. (2020), and Xia et al. (2023) reached similar conclusions in the Russian electric energy market: blockchain technology can improve grid efficiency, billing processes, supply chains, and support innovations that reflect changing business models. In particular, blockchain supports modern meter installation programs to monitor companies' and individuals' electrical energy consumption. Agrawal et al. (2021), Javaid et al. (2022), and Lardo et al. (2022) explore the relevance of blockchain technology to the shared services industry, revealing the potential to transform business foundations, especially trust-based finance and accounting functions, and audit trails, as well as supply chain management with faster and automated procurement, billing, and payments through blockchain. Blockchain technology

is changing how financial and accounting transactions are recorded, processed, and accessed, enabling decentralized transaction processing at lower speed and cost.

Finally, Cagigas et al. (2021) and Govindan et al. (2024) reveal the benefits of blockchain technology in preventing procurement corruption in Indonesia, where fraudulent behavior is rampant and has a significant impact. They emphasize blockchain technology's important role in preventing corruption and data manipulation, thereby increasing trust and efficiency in public procurement. The scientific articles in the blue cluster relate to the second tier of blockchain, discussing distributed ledger technology to manage different types of finance transactions, not just simple cash transactions. Blockchain technology is seen as a tool to ensure the trust and integrity of business transactions.

Red Cluster

The red cluster includes the following keywords: blockchain technology, digitization, big data, and the *Internet of Things*. Scholarly articles in the red cluster view blockchain technology as a service that offers opportunities to apply various applications to simplify transactions and interactions between humans and machines. Some researchers, such as Agrawal et al. (2021) and Kumar et al. (2020) seek to apply blockchain technology and *smart contracts* to find new alternatives for tracking and managing data-sharing agreements. The scientific articles in the red cluster are related to the third blockchain level (Swan, 2015).

In addition, research in the red cluster has focused heavily on finding technological and system solutions to expand the use of blockchain technology in addressing social and humanitarian issues. However, the aspects of accounting and accountability have not been thoroughly addressed. Consequently, it is necessary to further investigate these issues to develop new methods for tracking and managing data sharing from an accounting standpoint.

Blockchain technology is one of the most important industry 4.0 capabilities (Lardo et al., 2020, 2022). Since its emergence in the *bitcoin* realm for *online* financial transactions, blockchain technology has played an important role in the technological infrastructure for reliable and trustworthy business transactions and other economic actors such as *smart contracts*. Today, ledger accounting is considered a relevant support for efficient and timely management and recording of business transactions.

Blockchain technology has emerged as an important concern for businesses seeking to understand the full potential of this technology in accounting (EY, 2017; PwC, 2017). Moreover, scientific studies on blockchain technology are expanding from its initial focus on technology and engineering to a wide range of disciplines including law, economics, public administration, healthcare, auditing, and accounting (Alkhudary et al., 2020; Arshad et al., 2023). Further research is particularly needed in accounting (Bonsón & Bednárová, 2019; Huang et al., 2024; S. Kumar et al., 2023; Tiron-Tudor et al., 2021). These studies should focus on how blockchain technology affects accounting and auditing procedures and work, how blockchain technology can be used against the existing ecosystem, and how stakeholders and other ecosystem actors such as regulators, auditors, and public administrators can push to realize and reach consensus. In addition, Garanina et al. (2022), Huang et al. (2024), and Pandl et al. (2020) called for more research on blockchain technology in accounting and auditing to investigate blockchain applications, given blockchain's potential to completely change the environment for more professionals.

CONCLUSION

Based on the findings, this study conducted a bibliometric analysis using a dataset of 229 research publications and the Scopus database to examine the relationship between blockchain and accounting research. The study's main objective was to map the existing level of

knowledge about blockchain technology applied in accounting and suggest interesting research subjects and issues. This research aims to determine the main study areas of the relationship between accounting and blockchain technology. This research sought to answer the initial research question that was the focus of the investigation, the researcher revealed that the number and timing of scientific publications from 2015 showed an increase in interest in this area over the previous three years. Additionally, the findings showed that as the number of authors involved and more scientific articles grew, the research became increasingly interrelated.

Considering sources and countries, we looked at the geographical distribution of blockchain technology research in accounting. Journals with higher publication volumes tend to have a strong focus on computers and technology. The United States is the most significant country in terms of publications and co-authorship when considering the geographical distribution of scientific articles. On the one hand, it is followed by Ukraine, Jordan, and China. On the other hand, other Anglo-Saxon countries such as the United Kingdom and Australia. It is important to note that the United States and Ukraine are the most productive and connected countries in this field of study. In addition, the ten most cited documents and authors come from two global economies. This data suggests that related research institutions and academics are the most significant contributors to knowledge about blockchain technology and accounting.

The most documents were published between 2022 and 2023, a bibliometric analysis that considers the temporal structure of studies on blockchain technology and accounting knowledge institutions. It can be said that 2023 is the most relevant year due to the number of publications, which is likely to inspire 2024 scientific articles on blockchain technology in accounting. The study also revealed co-occurrence based on keywords and examined the clusters found to answer the second research question. The current focus of blockchain technology research in accounting is the use of the technology for insurance, auditing, and accounting information systems. Blockchain is closely related to the following keywords: IoT, smart contracts, bitcoin, and cryptocurrencies. From a technology perspective, blockchain is usually associated with these domains. A thematic analysis covering various topics at different levels of blockchain technology can be conducted based on cluster analysis.

The subject of ongoing research is the historical background of cryptocurrencies, particularly Bitcoin and its blockchain technology level 1.0. From this point of view, blockchain technology allows for different approaches to transaction management that are closely related to financial accounting. The first relates to a lower level of intermediaries, affecting how processes are managed, and business models are redesigned. The second directly affects financial statements as new methods for valuing cryptocurrency transactions are required. There have been many requests for the IASB to release specific standards that modify accounting models as they are outdated to account for these new types of transactions.

The second subject, connected to the level of blockchain technology 2.0, is about the capabilities of the new technology and how it affects the effectiveness of information systems and the accounting domain connected to bookkeeping records. Improved information security, transparency, and control significantly impact auditing, which can be done with blockchain technology. This study's accounting domain research framework on auditing appears to be an issue that initially attracted the interest of academics. Nonetheless, the issue of accountant skills education is still quite fragmented (Garanina et al., 2022; Tiron-Tudor et al., 2021). These findings also considering the keyword analysis suggest that research on accounting competencies and skills is still at an early stage and encourages more investigations on the

function of education and training in preparing future practitioners to face the demands of the modern workplace.

In addition, the unfinished theme is related to new and upcoming blockchain technology applications of blockchain 3.0 technology that can help account for various problems and help society by promoting human and machine connections. The studies by Kumar et al. (2020), Kumar et al. (2023), and Tyagi et al. (2023) look at new ways to manage and track data-sharing agreements, especially those relevant to specific applications in various industries. It is worth noting that these studies examine the problem from multiple perspectives: the public sector to cut costs and free up resources for core activities; records of medical services, insurance payments, and insurance agreements against immutable and distributed ledgers (Li et al., 2018); tourism that minimizes the role of intermediaries (Sarnacchiaro et al., 2024); reliable multi-utility management for energy services (Afanasyev et al., 2020) and shared services (Sadri et al., 2023).

Finally, the findings of this study suggest that more research is needed in the accounting domain as the current state of knowledge does not cover subjects such as awareness and consensus around blockchain technology and the involvement of regulators, auditors, and public administrators in the development and use of blockchain technology. This research presents (see **table 7**) summarized key research directions and research agendas relevant to the extent of blockchain technology in the accounting domain to guide academic researchers, according to the researchers' bibliometric analysis discussion.

This study has some limitations. First, this study may not cover all the literature on blockchain technology and

Table 7.
Key future research areas and research agenda

Future Research Fields	Research Agenda
Cryptocurrency accounting and crypto asset valuation	How do traditional accounting standards fit with cryptocurrency recognition in financial statements?
	How can traditional valuation models for assets be applied to cryptocurrencies?
Cryptocurrencies and crypto-assets and against financial reporting	What information do companies disclose in their financial reporting?
	How do blockchain technology and XBRL relate to financial reporting?
Performance measurement and impact of blockchain technology	To what extent do traditional managerial accounting techniques apply to blockchain technology?
	What key indicators are useful for evaluating the sustainability of blockchain technology?
The potential and risks of blockchain technology in automating financial and administrative processes in some organizations	Can blockchain technology accounting information systems improve the reliability of financial information?
	What are the risks and barriers to using blockchain in finance and administration?
Blockchain technology and accounting education	What skills are essential for accountants' readiness to embrace blockchain technology?
	How can universities play an important role in the new blockchain technology accounting ecosystem?
Continuous auditing and *smart contracts*	How can the use of blockchain technology prevent financial statement fraud?

accounting as the researchers only considered the Scopus database. The research analysis was limited to business, management, and accounting and thus did not cover other fields such as engineering, computer science, and information systems. There are several theoretical and practical consequences of the findings of this study. This research is the first step to conceptualizing the knowledge related to blockchain technology in accounting; this analysis helps researchers determine the direction of future research to meet the increasing demand from businesses and deal with practical difficulties over the implementation of blockchain technology.

This study sees that the application of blockchain technology to cost accounting and management control has not received much attention. Internal transaction measurement has received less attention than supply chain and process management, which are the subjects of numerous studies. Based on this analysis, the researcher thinks that future study directions should focus on the application of management accounting methods to determine the direction of some of the most appropriate applications of blockchain technology for companies to use. Second, this research shows that to ensure transactions are reliable, efficient, timely, and effective in the new economic ecosystem, there need to be significant efforts made by international political and professional institutions to cooperate between countries and research centers to encourage the adoption of blockchain technology. From this point of view, case studies on the use of blockchain technology in commercial networks or multinational corporations to evaluate and report transactions would go a long way in encouraging the adoption of blockchain technology.

REFERENCES

Afanasyev, V. Y., Lyubimova, N. G., Ukolov, V. F., & Shayakhmetov, S. R. (2020). Impact of blockchain technology for modification of the supply chain management in energy markets. *International Journal of Supply Chain Management*, *9*(3), 757–762.

Aghaei Chadegani, A., Salehi, H., Md Yunus, M. M., Farhadi, H., Fooladi, M., Farhadi, M., & Ale Ebrahim, N. (2013). A comparison between two main academic literature collections: Web of science and scopus databases. *Asian Social Science*, *9*(5), 18–26. https://doi.org/10.5539/ass.v9n5p18

Agrawal, T. K., Kumar, V., Pal, R., Wang, L., & Chen, Y. (2021). Blockchain-based framework for supply chain traceability: A case example of textile and clothing industry. *Computers and Industrial Engineering*, *154* (January). https://doi.org/10.1016/j.cie.2021.107130

Agrifoglio, R., & de Gennaro, D. (2022). New Ways of Working through Emerging Technologies: A Meta-Synthesis of the Adoption of Blockchain in the Accountancy Domain. *Journal of Theoretical and Applied Electronic Commerce Research*, *17*(2), 836–850. https://doi.org/10.3390/jtaer17020043

Akrami, N. El, Hanine, M., Flores, E. S., Aray, D. G., & Ashraf, I. (2023). Unleashing the Potential of Blockchain and Machine Learning: Insights and Emerging Trends from Bibliometric Analysis. *IEEE Access*, *June*, 78879–78903. https://doi.org/10.1109/ACCESS.2023.3298371

Akter, M., Kummer, T. F., & Yigitbasioglu, O. (2024). Looking beyond the hype: The challenges of blockchain adoption in accounting. *International Journal of Accounting Information Systems*, *53*(January), 100681. https://doi.org/10.1016/j.accinf.2024.100681

Alkhudary, R., Brusset, X., & Fenies, P. (2020). Blockchain in general management and economics: a systematic literature review. *European Business Review*, *32*(4), 765–783. https://doi.org/10.1108/EBR-11-2019-0297

Anis, A. (2023). Blockchain in accounting and auditing: unveiling challenges and unleashing opportunities for digital transformation in Egypt. *Journal of Humanities and Applied Social Sciences*, *5*(4), 359–380. https://doi.org/10.1108/jhass-06-2023-0072

Apatu, E., & Goudar, P. (2024). Bitcoin Use Cases: A Scoping Review. *Challenges*, *15*(1), 15. https://doi.org/10.3390/challe15010015

Arshad, A., Shahzad, F., Ur Rehman, I., & Sergi, B. S. (2023). A systematic literature review of blockchain technology and environmental sustainability: Status quo and future research. *International Review of Economics and Finance*, *88*(July), 1602–1622. https://doi.org/10.1016/j.iref.2023.07.044

Bellucci, M., Cesa Bianchi, D., & Manetti, G. (2022). Blockchain in accounting practice and research: systematic literature review. *Meditari Accountancy Research*, *30*(7), 121–146. https://doi.org/10.1108/MEDAR-10-2021-1477

Bonsón, E., & Bednárová, M. (2019). Blockchain and its implications for accounting and auditing. *Meditari Accountancy Research*, *27*(5), 725–740. https://doi.org/10.1108/MEDAR-11-2018-0406

Broadhead, S. (2018). The contemporary cybercrime ecosystem: A multi-disciplinary overview of the state of affairs and developments. *Computer Law and Security Review*, *34*(6), 1180–1196. https://doi.org/10.1016/j.clsr.2018.08.005

Cagigas, D., Clifton, J., Diaz-Fuentes, D., & Fernandez-Gutierrez, M. (2021). Blockchain for Public Services: A Systematic Literature Review. *IEEE Access*, *9*, 13904–13921. https://doi.org/10.1109/ACCESS.2021.3052019

Cordery, C. J., Goncharenko, G., Polzer, T., McConville, D., & Belal, A. (2023). NGOs' performance, governance, and accountability in the era of digital transformation. *British Accounting Review*, *55*(5). https://doi.org/10.1016/j.bar.2023.101239

CPA Canada, AICPA, & UWCISA. (2017). *Blockchain technology and its potential impact on the audit and assurance profession*.

Dabbagh, M., Sookhak, M., & Safa, N. S. (2019). The evolution of blockchain: A bibliometric study. *IEEE Access*, *7*, 19212–19221. https://doi.org/10.1109/ACCESS.2019.2895646

Dai, J., & Vasarhelyi, M. A. (2017). Toward blockchain-based accounting and assurance. *Journal of Information Systems*, *31*(3), 5–21. https://doi.org/10.2308/isys-51804

Desplebin, O., Lux, G., & Petit, N. (2024). Inclusion of blockchain in university accounting curricula: an overview of practices and strategies. *Accounting Education*, 1–22. https://doi.org/10.1080/09639284.2024.2321125

Dutta, P., Choi, T. M., Somani, S., & Butala, R. (2020). Blockchain technology in supply chain operations: Applications, challenges and research opportunities. *Transportation Research Part E: Logistics and Transportation Review*, *142*(September), 102067. https://doi.org/10.1016/j.tre.2020.102067

EY. (2017). *How blockchain will revolutionize finance and auditing*.

Faccia, A., & Mosteanu, N. R. (2019). Accounting and blockchain technology: from double-entry to triple-entry. *The Business and Management Review*, *10*(2), 108–116. https://cberuk.com/cdn/conference_proceedings/2019-07-12-18-10-20-PM.pdf

Firdaus, A., Razak, M. F. A., Feizollah, A., Hashem, I. A. T., Hazim, M., & Anuar, N. B. (2019). The rise of "blockchain": bibliometric analysis of blockchain study. In *Scientometrics* (Vol. 120, Issue 3). Springer International Publishing. https://doi.org/10.1007/s11192-019-03170-4

Garanina, T., Ranta, M., & Dumay, J. (2022). Blockchain in accounting research: current trends and emerging topics. *Accounting, Auditing and Accountability Journal*, *35*(7), 1507–1533. https://doi.org/10.1108/AAAJ-10-2020-4991

Govindan, K., Jain, P., Kr. Singh, R., & Mishra, R. (2024). Blockchain technology as a strategic weapon to bring procurement 4.0 truly alive: Literature review and future research agenda. *Transportation Research Part E: Logistics and Transportation Review*, *181*(December 2023), 103352. https://doi.org/10.1016/j.tre.2023.103352

Han, H., Shiwakoti, R. K., Jarvis, R., Mordi, C., & Botchie, D. (2023). Accounting and auditing with blockchain technology and artificial Intelligence: A literature review. *International Journal of Accounting Information Systems*, *48*(April 2022), 100598. https://doi.org/10.1016/j.accinf.2022.100598

Holub, M., & Johnson, J. (2018). Bitcoin research across disciplines. *Information Society*, *34*(2), 114–126. https://

doi.org/10.1080/01972243.2017.1414094

Huang, F., Wang, T., & Yen, J. C. (2024). Opportunities or Challenges? Audit Risk and Blockchain Disclosures in 10-K Filings. *Auditing*, *43*(2), 131–158. https://doi.org/10.2308/AJPT-2021-045

Iansiti, M., & Lakhani, K. (2017). The Truth About Blockchain. *Annals of Tourism Research*, *33*(2), 360–381. https://hbr.org/2017/01/the-truth-about-blockchain

Islam, A. K. M. N., Mäntymäki, M., & Turunen, M. (2019). Why do blockchains split? An actor-network perspective on Bitcoin splits. *Technological Forecasting and Social Change*, *148*(December 2018), 119743. https://doi.org/10.1016/j.techfore.2019.119743

Jaoude, J. A., & Saade, R. G. (2019). Blockchain applications - Usage in different domains. *IEEE Access*, *7*(c), 45360–45381. https://doi.org/10.1109/ACCESS.2019.2902501

Javaid, M., Haleem, A., Singh, R. P., Suman, R., & Khan, S. (2022). A review of Blockchain Technology applications for financial services. *BenchCouncil Transactions on Benchmarks, Standards and Evaluations*, *2*(3), 100073. https://doi.org/10.1016/j.tbench.2022.100073

Jin, R., Yuan, H., & Chen, Q. (2019). Science mapping approach to assisting the review of construction and demolition waste management research published between 2009 and 2018. *Resources, Conservation and Recycling*, *140*(October 2018), 175–188. https://doi.org/10.1016/j.resconrec.2018.09.029

Kroon, N., Do Céu Alves, M., & Martins, I. (2021a). The impacts of emerging technologies on accountants' role and skills: Connecting to open innovation-a systematic literature review. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(3). https://doi.org/10.3390/joitmc7030163

Kroon, N., Do Céu Alves, M., & Martins, I. (2021b). The impacts of emerging technologies on accountants' role and skills: Connecting to open innovation-a systematic literature review. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(3), 163. https://doi.org/10.3390/joitmc7030163

Kshetri, N. (2018). 1 Blockchain's roles in meeting key supply chain management objectives. *International Journal of Information Management*, *39*, 80–89. https://doi.org/10.1016/j.ijinfomgt.2017.12.005

Kumar, A., Liu, R., & Shan, Z. (2020). Is Blockchain a Silver Bullet for Supply Chain Management? Technical Challenges and Research Opportunities. *Decision Sciences*, *51*(1), 8–37. https://doi.org/10.1111/deci.12396

Kumar, S., Lim, W. M., Sivarajah, U., & Kaur, J. (2023). Artificial Intelligence and Blockchain Integration in Business: Trends from a Bibliometric-Content Analysis. *Information Systems Frontiers*, *25*(2), 871–896. https://doi.org/10.1007/s10796-022-10279-0

Kummer, S., Herold, D. M., Dobrovnik, M., Mikl, J., & Schäfer, N. (2020). A systematic review of blockchain literature in logistics and supply chain management: Identifying research questions and future directions. *Future Internet*, *12*(3). https://doi.org/10.3390/fi12030060

Kwiliński, A. (2019). Implementation of blockchain technology in accounting sphere. *Academy of Accounting and Financial Studies Journal*, *23*(25).

Lardo, A., Corsi, K., Varma, A., & Mancini, D. (2022). Exploring blockchain in the accounting domain: a bibliometric analysis. *Accounting, Auditing and Accountability Journal*, *35*(9), 204–233. https://doi.org/10.1108/AAAJ-10-2020-4995

Lardo, A., Mancini, D., Paoloni, N., & Russo, G. (2020). The perspective of capability providers in creating a sustainable I4.0 environment. *Management Decision*, *58*(8), 1759–1777. https://doi.org/10.1108/MD-09-2019-1333

Le, T. L., Abakah, E. J. A., & Tiwari, A. K. (2021). Time and frequency domain connectedness and spill-over among fintech, green bonds and cryptocurrencies in the age of the fourth industrial revolution. *Technological Forecasting and Social Change*, *162*, 120382. https://doi.org/10.1016/j.techfore.2020.120382

Li, H., Dai, J., Gershberg, T., & Vasarhelyi, M. A. (2018). Understanding usage

and value of audit analytics for internal auditors: An organizational approach. *International Journal of Accounting Information Systems*, *28* (December 2016), 59–76. https://doi.org/10.1016/j.accinf.2017.12.005

Li, L. L., Ding, G., Feng, N., Wang, M. H., & Ho, Y. S. (2009). Global stem cell research trend: Bibliometric analysis as a tool for mapping of trends from 1991 to 2006. *Scientometrics*, *80*(1), 39–58. https://doi.org/10.1007/s11192-008-1939-5

López-Sorribes, S., Rius-Torrentó, J., & Solsona-Tehàs, F. (2023). A Bibliometric Review of the Evolution of Blockchain Technologies. *Sensors*, *23*(6), 1–16. https://doi.org/10.3390/s23063167

Marrone, M., & Hazelton, J. (2019). The disruptive and transformative potential of new technologies for accounting, accountants and accountability: A review of current literature and call for further research. *Meditari Accountancy Research*, *27*(5), 677–694. https://doi.org/10.1108/MEDAR-06-2019-0508

Mendling, J., Weber, I., Van Der Aalst, W., Brocke, J. Vom, Cabanillas, C., Daniel, F., Debois, S., Di Ciccio, C., Dumas, M., Dustdar, S., Gal, A., García-Bañuelos, L., Governatori, G., Hull, R., La Rosa, M., Leopold, H., Leymann, F., Recker, J., Reichert, M., … Zhu, L. (2018). Blockchains for business process management - Challenges and opportunities. *ACM Transactions on Management Information Systems*, *9*(1). https://doi.org/10.1145/3183367

Moll, J., & Yigitbasioglu, O. (2019). The role of internet-related technologies in shaping the work of accountants: New directions for accounting research. *British Accounting Review*, *51*(6), 100833. https://doi.org/10.1016/j.bar.2019.04.002

Morozova, T., Akhmadeev, R., Lehoux, L., Yumashev, A., Meshkova, G., & Lukiyanova, M. (2020). Crypto asset assessment models in financial reporting content typologies. *Entrepreneurship and Sustainability Issues*, *7*(3), 2196–2212. https://doi.org/10.9770/jesi.2020.7.3(49)

Mosteanu, N. R., & Faccia, A. (2020). Digital systems and new challenges of financial management–FinTech, XBRL, blockchain and cryptocurrencies. *Quality–Access to Success*, *21*(174), 159-166.

Nakamoto, S. (2008). *Bitcoin: A Peer-to-Peer Electronic Cash System*. https://doi.org/10.1108/TG-06-2020-0114

Naughton, J. (2016). *Is Blockchain the Most Important IT Invention of Our Age. In: Is Blockchain the Most Important IT Invention of Our Age*.

Nezhyva, M., Zaremba, O., & Nehodenko, V. (2021). Application of blockchain technology in accounting and audit: international and domestic experience. *SHS Web of Conferences*, *107*, 02001. https://doi.org/10.1051/shsconf/202110702001

Pandl, K. D., Thiebes, S., Schmidt-Kraepelin, M., & Sunyaev, A. (2020). On the Convergence of Artificial Intelligence and Distributed Ledger Technology: A Scoping Review and Future Research Agenda. *IEEE Access*, *8*, 57075–57095. https://doi.org/10.1109/ACCESS.2020.2981447

Pimentel, E., & Boulianne, E. (2020). Blockchain in Accounting Research and Practice: Current Trends and Future Opportunities*. *Accounting Perspectives*, *19*(4), 325–361. https://doi.org/10.1111/1911-3838.12239

PwC. (2017). *Auditing blockchain: a new frontier*.

Qasim, A., & Kharbat, F. F. (2020). Blockchain technology, business data analytics, and artificial intelligence: Use in the accounting profession and ideas for inclusion into the accounting curriculum. *Journal of Emerging Technologies in Accounting*, *17*(1), 107–117. https://doi.org/10.2308/jeta-52649

Rashideh, W. (2020). Blockchain technology framework: Current and future perspectives for the tourism industry. *Tourism Management*, *80* (March), 104125. https://doi.org/10.1016/j.tourman.2020.104125

Ratten, V. (2019). The effect of cybercrime on open innovation policies in technology firms. *Information Technology and People*, *32*(5), 1301–1317. https://doi.org/10.1108/ITP-03-2018-0119

Reyna, A., Martín, C., Chen, J., Soler, E., & Díaz, M. (2018). On blockchain and its integration with IoT. Challenges and opportunities. *Future Generation Computer Systems*, *88*(2018), 173–

190. https://doi.org/10.1016/j.future.2018.05.046

Rodríguez-Espíndola, O., Chowdhury, S., Beltagui, A., & Albores, P. (2020). The potential of emergent disruptive technologies for humanitarian supply chains: the integration of blockchain, Artificial Intelligence and 3D printing. *International Journal of Production Research*, *58*(15), 4610–4630. https://doi.org/10.1080/00207543.2020.1761565

Saberi, S., Kouhizadeh, M., & Sarkis, J. (2018). Blockchain technology: A panacea or pariah for resources conservation and recycling? *Resources, Conservation and Recycling*, *130*(November 2017), 80–81. https://doi.org/10.1016/j.resconrec.2017.11.020

Sadri, H., Yitmen, I., Tagliabue, L. C., Westphal, F., Tezel, A., Taheri, A., & Sibenik, G. (2023). Integration of Blockchain and Digital Twins in the Smart Built Environment Adopting Disruptive Technologies—A Systematic Review. *Sustainability (Switzerland)*, *15*(4). https://doi.org/10.3390/su15043713

Sarnacchiaro, P., Luongo, S., Sepe, F., & Corte, V. Della. (2024). The role of blockchain technology in the tourism industry: analyzing the factors affecting its adoption. *Quality and Quantity*, *0123456789*. https://doi.org/10.1007/s11135-024-01836-7

Schmitz, J., & Leoni, G. (2019). Accounting and Auditing at the Time of Blockchain Technology: A Research Agenda. *Australian Accounting Review*, *29*(2), 331–342. https://doi.org/10.1111/auar.12286

Sellen, M. K., Hérubel, R. J. V. M., Fall, N., & Herubel, V. M. (1999). Historical Bibliometrics: Its Purpose and Significance to the History of Disciplines Dictionary of Bibliometrics by Virgil Diodato; Bibliometrics: An Annotated Bibliography by Historical Its Purpose and Bibliometrics: to the History of Disciplines Sig. *Libraries & Culture*, *34*(4), 380–388.

Sheela, S., Alsmady, A. A., Tanaraj, K., & Izani, I. (2023). Navigating the Future: Blockchain's Impact on Accounting and Auditing Practices. *Sustainability*, *15*(24), 16887. https://doi.org/10.3390/su152416887

Shinde, R., Patil, S., Kotecha, K., & Ruikar, K. (2021). Blockchain for securing ai applications and open innovations. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(3). https://doi.org/10.3390/joitmc7030189

Silva, R., Inácio, H., & Marques, R. P. (2022). Blockchain implications for auditing: a systematic literature review and bibliometric analysis. *International Journal of Digital Accounting Research*, *22*(September), 163–192. https://doi.org/10.4192/1577-8517-v22_6

Sinha, S. (2020). Blockchain—Opportunities and challenges for accounting professionals. *Journal of Corporate Accounting and Finance*, *31*(2), 65–67. https://doi.org/10.1002/jcaf.22430

Soleymani, F., & Paquet, E. (2020). Financial portfolio optimization with online deep reinforcement learning and restricted stacked autoencoder—DeepBreath. *Expert Systems with Applications*, *156*, 113456. https://doi.org/10.1016/j.eswa.2020.113456

Swan, M. (2015). *Blockchain: Blueprint for a New Economy*. O'Reilly Media, Sebastopol, California.

Tandon, A., Dhir, A., Islam, N., & Mäntymäki, M. (2020). Blockchain in healthcare: A systematic literature review, synthesizing framework and future research agenda. *Computers in Industry*, *122*. https://doi.org/10.1016/j.compind.2020.103290

Tandon, A., Kaur, P., Mäntymäki, M., & Dhir, A. (2021). Blockchain applications in management: A bibliometric analysis and literature review. *Technological Forecasting and Social Change*, *166* (October 2020). https://doi.org/10.1016/j.techfore.2021.120649

Thies, S., Kureljusic, M., Karger, E., & Kramer, T. (2023). Blockchain-Based Triple-Entry Accounting: A Systematic Literature Review and Future Research Agenda. *Journal of Information Systems*, *37*(3), 101–118. https://doi.org/10.2308/ISYS-2022-029

Tiron-Tudor, A., Deliu, D., Farcane, N., & Dontu, A. (2021). Managing change with and through blockchain in accountancy organizations: a systematic literature review. *Journal*

of Organizational Change Management, *34*(2), 477–506. https://doi.org/10.1108/JOCM-10-2020-0302

Tyagi, A. K., Dananjayan, S., Agarwal, D., & Ahmed, H. F. T. (2023). Blockchain — Internet of Things Applications: Opportunities. *Multidisciplinary Digital Publishing Institute*.

van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, *84*(2), 523–538. https://doi.org/10.1007/s11192-009-0146-3

Van Eck, N. J., & Waltman, L. (2019). VOSviwer Manual version 1.6.10. *CWTS Meaningful Metrics*, *January*, pp.1-53. https://www.vosviewer.com/documentation/Manual_VOSviewer_1.6.10.pdf

Wang, Y., & Kogan, A. (2018). Designing confidentiality-preserving Blockchain-based transaction processing systems. *International Journal of Accounting Information Systems*, *30*, 1-18. https://doi.org/10.1016/j.accinf.2018.06.001

Wannenwetsch, K., Ostermann, I., Priel, R., Gerschner, F., & Theissler, A. (2023). Blockchain for Supply Chain Management: A Literature Review and Open Challenges. *Procedia Computer Science*, *225*, 1312–1321. https://doi.org/10.1016/j.procs.2023.10.119

Wu, J., Xiong, F., & Li, C. (2019). Application of internet of things and blockchain technologies to improve accounting information quality. *IEEE Access*, *7*, 100090–100098. https://doi.org/10.1109/ACCESS.2019.2930637

Xia, J., Li, H., & He, Z. (2023). The Effect of Blockchain Technology on Supply Chain Collaboration: A Case Study of Lenovo. *Systems*, *11*(6). https://doi.org/10.3390/systems11060299

Xu, M., Chen, X., & Kou, G. (2019). A systematic review of blockchain. *Financial Innovation*, *5*(1). https://doi.org/10.1186/s40854-019-0147-z

Zheng, Z., Xie, S., Dai, H., Chen, X., & Wang, H. (2017). An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends. *Proceedings - 2017 IEEE 6th International Congress on Big Data, BigData Congress 2017*, 557–564. https://doi.org/10.1109/BigDataCongress.2017.85

Zhu, X. N., Peko, G., Sundaram, D., & Piramuthu, S. (2022). Blockchain-Based Agile Supply Chain Framework with IoT. *Information Systems Frontiers*, *24*(2), 563–578. https://doi.org/10.1007/s10796-021-10114-y