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RESEARCH ARTICLE

Mapping the landscape of blockchain technology: a bibliometric analysis

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Abstract

Blockchain technology has experienced a meteoric rise in popularity, revolutionising industries and igniting intense research efforts around the world. The intellectual environment surrounding research on blockchain technology has been meticulously analysed in this bibliometric paper. We seek to shed light on the major trends, research themes, and key contributors influencing the blockchain research domain by utilising comprehensive bibliometric data from Dimension.ai (An Open Access Database). Our analysis spans between the year 2019 to July 2023 and includes a wide range of scholarly articles. Initially, a screening process was employed to assess 16,479 published articles against our inclusion criteria based on keyword search. Finally, 11,593 articles met the criteria and were included in our analysis. We offer a thorough overview of the development and dynamics of blockchain research using bibliometric indicators like publication counts, citation counts, co-authorship networks, and patterns of international collaboration, with visualizations generated using VOSviewer. Furthermore, our analysis highlights the distribution of research efforts distributed globally, demonstrating the participation of various nations and institutions. We investigate the degree of international cooperation, illuminating the global interconnectedness of researchers in the advancement of blockchain knowledge. In conclusion, this paper provides a thorough overview of the state of the research on blockchain technology, offering insightful information to both academics and business stakeholders. This paper elucidates the evolution of research on blockchain technology by outlining the intellectual landscape, and it also provides a road map for future efforts to realise the transformative potential of blockchain technology.

Keywords Bibliometric analysis · Blockchain technology · Citation analysis · Dimensions · VOSviewer

Mahima Habil, Saransh Kumar Srivastav, and Pooja Thakur have contributed equally to this work. They have collaborated closely throughout the research process, sharing responsibilities and making significant contributions to the manuscript.

Extended author information available on the last page of the article

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Introduction

Few innovations in the quickly changing field of technical innovation have profoundly captivated the interest of scholars and the public like blockchain technology [1]. Its rise has signalled revolutionary opportunities in a multitude of industries, from supply chain management to banking and healthcare, among others [2]. As blockchain's appeal spreads throughout several fields, academics and researchers are attempting to decipher its many facets in order to comprehend its theoretical foundations, practical uses, and evolutionary paths [3].

The history of blockchain technology is a fascinating journey marked by innovation, collaboration, and transformative potential. Its foundations can be found in a ground-breaking document written under the pseudonym Satoshi Nakamoto and published by an individual or group in 2008. In this article, titled "Bitcoin: A Peer-to-Peer Electronic Cash System," the idea of a decentralized digital currency and the underlying technology that would become known as blockchain were presented [4]. Blockchain technology served as the foundation for Bitcoin, the first cryptocurrency, enabling safe and transparent transactions without any requirement for middlemen like banks or other financial organizations [5]. The longstanding issue of double-spending in digital money systems was resolved by this innovation.

Blockchain technology was put into practice by developers all around the world after the Bitcoin whitepaper was published. A new era in digital banking began with the creation of the Bitcoin network in January 2009 [6]. The Bitcoin ecosystem grew over the ensuing years as enthusiasts experimented with blockchain's potential uses outside of cryptocurrency. But at first, only IT aficionados and those in the encryption world really used it. Vitalik Buterin proposed Ethereum, a blockchain platform, in 2015 [7]. Smart contracts, which are self-executing contracts with the terms of the agreement explicitly put into code, were first introduced by Ethereum [8]. This feature allowed developers to create decentralized applications (DApps) for a variety of use cases, such as supply chain management, identity verification, and decentralized finance (DeFi), broadening the usage of blockchain technology beyond financial transactions [9].

In the present scenario, blockchain technology holds immense significance across various domains. Blockchain has the potential to provide financial services worldwide by enabling access to digital currencies and decentralized financial tools [10, 11]. Blockchain's most popular and praised feature is its improved security and anonymity, making it perfect for storing sensitive data such as personal information, medical history data records and intellectual property [12–14]. Blockchain, by enabling transparent and immutable tracking of commodities along the supply chain, can aid in the combat against evil practices like counterfeit products, food fraud, and unethical labor practices [15–17]. Blockchain based governance models allow communities to make collective choices without relying on centralized authorities, resulting in increased openness and inclusivity [18–20].

Over time Blockchain technology has been used for other purposes as well. Voting systems and real estate is just a few of the industries that have started

investigating how blockchain technology might improve operational efficiency, security, and transparency [21–23]. Blockchain is also gaining traction in key areas such as insurance. Blockchain technology has the potential to change insurance operations by increasing transparency, efficiency, and security [24]. Blockchain allows for quicker claims processing, fraud detection, and safe management of policyholder information, ultimately enhancing customer trust and lowering administrative expenses [25, 26]. Blockchain technology represents a fundamental shift in stock market architecture, introducing a decentralized ledger system with the potential to revolutionize transaction settlement methods [27, 28]. Blockchain's immutable and transparent nature offers the ability to expedite procedures, reduce counterparty risk, and improve market efficiency, altering the landscape of financial transactions with unparalleled security and trust [29, 30]. Because of its intrinsic characteristics of decentralization, transparency, and security, blockchain technology has emerged as a key driver of innovation across a wide range of businesses as seen in Fig. 1.

Blockchain technology has emerged as a pivotal force driving innovation across diverse industries, owing to its inherent features of decentralization, transparency, and security. As blockchain continues to evolve, its adoption is poised to proliferate further, shaping the future of numerous sectors and unlocking unprecedented levels of efficiency, transparency, and trust.

Consequently, conducting a bibliometric study becomes imperative to elucidate the current state of blockchain research, serving as a valuable resource for stakeholders seeking insights into the diverse disciplines engaged in this field [31, 32].

Fig. 1 Blockchain technology in different sector

Such an endeavour not only sheds light on the prolific contributors and emerging trends but also highlights the pivotal role of academic journals in disseminating knowledge about this transformative technology. Moreover, understanding the geographic distribution of research activity offers valuable insights for global collaboration and resource allocation. By identifying influential authors and researchers, this study aims to facilitate knowledge dissemination and inspire further scholarly inquiry. Thus, this research endeavours to fulfil the imperative need for comprehensive insights into the multifaceted landscape of blockchain research, catering to the informational needs of diverse stakeholders. The aim of this paper is to perform bibliometric analysis on scholarly literature available on "Blockchain technology". The paper intents to provide answers (A) to following questions (Q):

Q1. What is the publications trend in the field of blockchain technology? How has the research output grown over the years? This research question sheds light on the number and percentage growth in publications of scholarly article in the field.

Q2. Which countries have highest number of publications on blockchain technology? Furthermore, which countries' articles have received the most citations, suggesting their impact in blockchain research publications? To address this question, co-citation analysis was employed to determine the most productive country based on the number of publications and citations received.

Q3. Who are the most influential authors in the field of blockchain technology? Co-citation analysis used to answer this question enables scholars and professionals to locate the key authors and their contributions in the field.

Q4. How many articles have been published on blockchain technology in different fields of disciplines? The analysis indicates a substantial number of articles on blockchain technology across diverse disciplines, revealing its interdisciplinary significance and potential areas for future research.

Q5. Which journals are the most active in publishing articles on blockchain technology? Which publications contribute significantly to the dissemination of research in this field?

The remainder of the paper is organized as follows: "Methodology" presents the methodology, data sources, and extraction process. "Results and discussion" interprets the results and discusses the findings of the bibliometric analysis. Finally, "Conclusion" provides the conclusion and discusses future trends identified in the study.

Methodology

To explore the full potential of existing literature on the blockchain technology, bibliometric analysis was used. It is a quantitative method for evaluating and quantifying scientific material, specifically academic articles [31, 33]. The purpose of

bibliometric analysis is to acquire insight into academic communication and the influence of scientific activity within a certain subject, discipline, or research area. It is extensively used in academic and research environments to measure researcher productivity, influence, and cooperation [34–37].

Data source

Data was scrapped from Dimensions (https://www.dimensions.ai/) an open access database for bibliometric analysis of blockchain technology due to its comprehensive database, advanced analytical tools, and intuitive UI. Dimensions offers access to an extensive library of academic publications covering all facets of blockchain technology research, including journals, conference proceedings, preprints, and patents. Its robust bibliometric analysis capabilities allow us to uncover meaningful insights, such as trends in publication output, citation patterns, collaboration networks, and emerging research themes. This comprehensive database provides a wider perspective of influence than just citations and does not impose limitations on users. Dimensions provides visualisation options, making it an effective tool for navigating and comprehending the literature on blockchain technology.

The choice of Dimensions for analysing blockchain technology literature was based on its unparalleled breadth of resources, providing a more comprehensive view compared to traditional databases such as WOS, Scopus, or Google Scholar. Additionally, previous bibliometric studies on blockchain technology literature have predominantly focused on traditional databases such as SCOPUS, Web of Science, and Google Scholar. For instance, studies by [38–42] have utilized these databases. It is important to acknowledge that using different databases can indeed yield different results, particularly concerning countries or researchers with significant contributions.

Data extraction

For the purpose of the data extraction as shown in Fig. 2. Data Extraction Process, the search string consisted of the term “Blockchain Technology”, which should be either present in the title or abstract of the document published. The study period was limited to 5 years, from January 2019 to July 2023, with 16,479 documents. Further, the search is limited to Publication type (i.e., Articles) and language (i.e., English), with a total of 15,527 published articles based on our research area (Fig. 3). For the purpose of bibliometric mapping, we have selected 2500 most popular articles on the basis of citations in each respective year. However, in the year 2019, a total of 1593 articles were published, so we have selected all the articles (Table 1). Finally, we have total of 11,593 articles which came under the study.

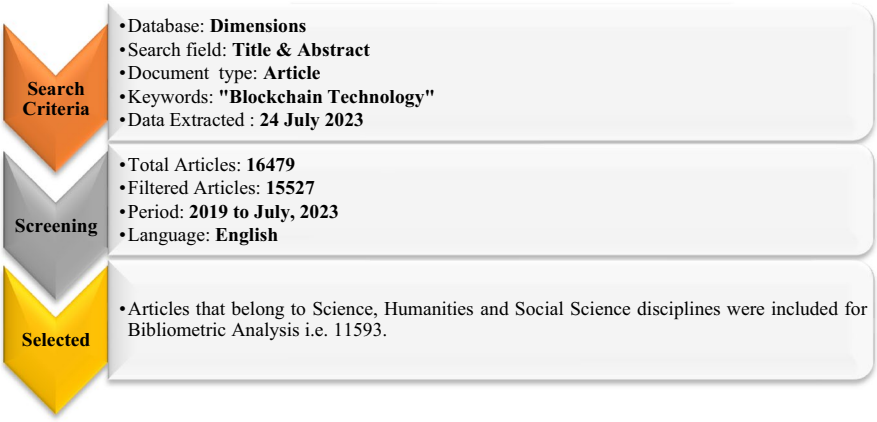

Fig. 2 Data extraction process

Results and discussion

Publications trend

A1. In order to understand the growth of publications on blockchain technology we have taken the data of yearly publications from Dimensions. Figure 3 explains the yearly growth in the publications.

The Fig. 3 data indicates a clear upward trend in the total number of blockchain publications throughout the years. Each year, the number of publications has increased over the previous year. This indicates an increasing interest and research effort in blockchain technology between 2019 and 2020 in which most articles were published [36, 41, 43–46]. During this time, the number of articles nearly doubled, demonstrating a spike in research and interest in blockchain technology.

In the years following 2019, the number of publications has consistently increased compared to the previous year. Taking 2019 as the base year, the growth in publications was approximately 66% in 2020, 132% in 2021, and 195% in 2022. If we compare the growth year by year, the year 2020 exhibited a growth of 66% (as mentioned above) compared to the base year (2019). Similarly, there was an approximate 40% increase in publications in 2021 when compared to 2020, and a 27% increase in 2022 when compared to 2021.

The subsequent drop in publications is not indicative of a decline in output but rather results from our data collection ending in July 2023, up until July, there is a visible growth of approximately 81% compared to 2019. It's important to note that this growth is only for the first half of 2023, and the overall growth for the entire year is expected to be higher. The data indicates a positive trend in the number of publications on the topic of interest, with significant growth observed over the years, especially from 2019 to 2022. The growth trend in 2023 suggests continued interest and research activity in the field, with potential further increases expected for the full year. Indeed, that expanding trend in blockchain research articles emphasizes

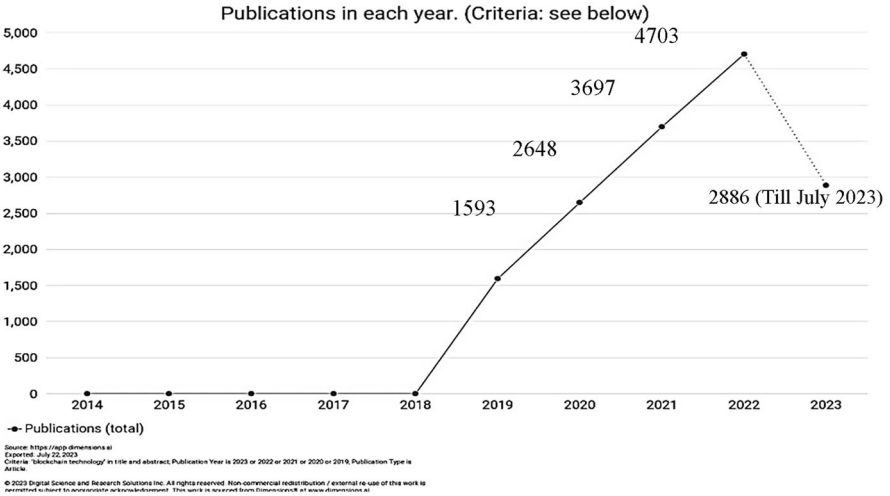

Fig. 3 Number of articles published on blockchain technology per year

Table 1 Number of yearly published and selected articles

Years	No. of published articles per year	No. of selected articles per year
2023	2886	2500
2022	4703	2500
2021	3697	2500
2020	2648	2500
2019	1593	1593
Total	15,527	11,593

the technology's significance, continued growth, and potential to revolutionized many industries from finance to healthcare [34, 36, 39–63]. This underscores the enduring significance of blockchain technology, portraying it as a domain with far-reaching implications and a vibrant landscape of ongoing research and discovery.

Most productive countries

A2. In order to find out top countries in relation to the no. of published (Table 2) as well cited articles (Table 3), we have extracted country wise data from Dimensions.

The country with the most publications (2628) is China, followed by India (1260) and the United States (1225). This indicates that these countries are actively involved in scientific research and academic publishing of articles in the field of blockchain technology. Asian countries that are actively contributing in this topic of research include India, China, South Korea, Taiwan, and Saudi Arabia. The United

Kingdom and Italy are notable European countries among those listed. When compared to Italy, the United Kingdom has a greater number of publications. China, the United States, and India have a total of 5113 publications. This indicates that these top three countries have actively implemented blockchain technology across a wide range of innovative fields. These countries account for roughly 64.5% of all publications. These findings are supported by [34, 45, 64]. Furthermore, the average number of publications per country is 792. The range between highest publishing country China (2628) and lowest publishing countries Taiwan (282) which is 2346, visibly represents the huge difference in research contribution between top most and lowest contributing country in the list.

The above Table 3 depicts that China has the most citations (63,665), exhibiting that Chinese research is widely cited by others. In terms of citations, USA (44,371), UK (33,579) & India (30,666) is close behind. The combined influence of the total no. of publications and citations is represented by total link strength. While the no. of publications is an important statistic, the total link strength and citation count provide more nuanced insights into the quality and impact of research contributions. Countries with high citation rates and link strength produce research that has a greater impact on the scientific community.

China leads the way in this category, with the total link strength of 38,145. The United States (26,475), India (25,582) and United Kingdom (23,489) are second, third and fourth respectively. While China leads in both publications and citations, the United States retains a strong position in terms of influence, as evidenced by its high citation count compared to publication count.

United Kingdom and India emerge as a key player in the global research environment, India placing second in publication count (1260) and United Kingdom at fourth place (839). On the other hand, in case of citation count United Kingdom stays at third spot (33,579) while India stays at fourth place (30,666). Italy, as well as countries like South Korea, Taiwan, and Saudi Arabia, all make significant contributions to research. While the United Kingdom and Italy hold prominent positions among European countries, the Asian nations are actively contributing to the global research output.

Figure 4 depicts Co-citation analysis among countries considers the total number of citations and computes how many times an article has been cited by the author of another country. This visualization was generated using VOSviewer software, popular for its proficiency in data visualization and information extraction [65, 66]. The study conducts a performance analysis to determine the productive trends among countries through citation analysis. Citation analysis is the widely adopted metric in scholarly research [36, 67, 68], in which a publication's impact is determined by how frequently it is cited by others [31, 36, 37, 69]. The network was found between 77 countries with minimum citation number of three and minimum document contribution per country was ten in number. The bibliometric analysis reveals China as the foremost nation in terms of the impact of research, with the highest no. of citations & the total link strength. The United States follows closely with a massive number of citations. India, the United Kingdom, and other countries also exhibit strong research output and influence in the academic world. This analysis highlights

Table 2 Most productive countries on the basis of article publications

Country	China	India	USA	UK	Saudi Arabia	Australia	Canada	South Korea	Italy	Taiwan
No. of articles published	2628	1260	1225	839	520	509	410	417	394	282

Table 3 Most productive countries on the basis of citations

Country	No. of citations	Total link strength
China	63,665	38,145
USA	44,371	26,475
UK	33,579	23,489
India	30,666	25,582
Australia	17,944	13,048
Canada	14,663	9678
South Korea	11,715	7881
Saudi Arabia	11,611	10,357
Taiwan	9297	7102
Italy	9179	8261

the countries with significant research contributions and offers insights into the global research landscape.

Most influential authors

A3. The third question helps us to identify the most popular authors based on citations. This answer would acknowledge the authors who have made significant contribution in the domain of blockchain technology. Popular authors are more likely to have written high-quality and influential research papers on blockchain technology.

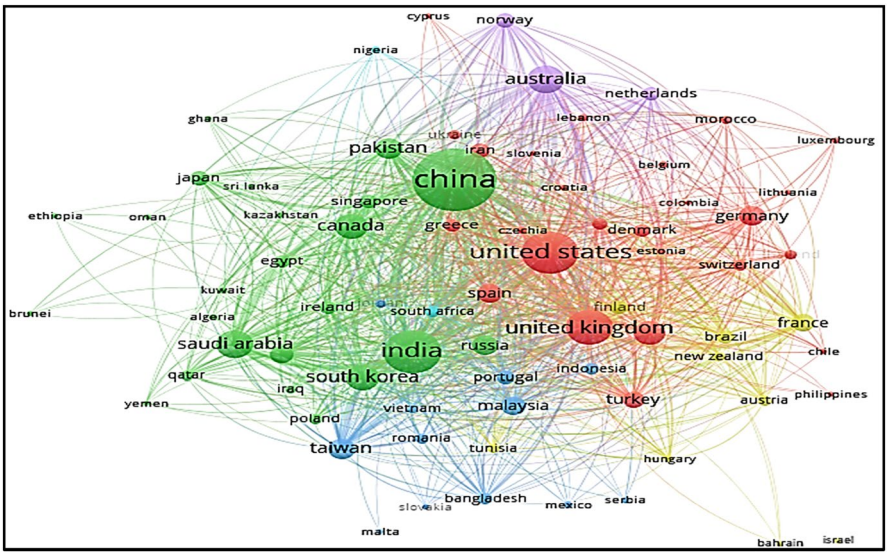

Fig. 4 Co-citation analysis among countries from 2019 to 2023

Academics, experts, and amateurs who want to learn more about the subject can all rely on their publications.

The information in Table 4 Most Influential Authors is derived from the VOSviewer software. The table lists the top 10 authors by overall number of citations. The writers were chosen based on a minimum of fifty citations and at least five papers published per author between January 2019 and July 2023. The number of times an author's work has been cited by other researchers, indicates the significance and influence of their research [67, 68]. The most citations are ascribed to Neeraj Kumar, Nirma University, India who has 3391 citations. In the second place we have Khaled Salah from Khalifa University of Science & Technology, UAE with 3065 citations. Sudeep Tanwar from Thapar University, India is on third spot with 2848 citations.

The third column represents link strength which measures the total influence of an author's publications based on both the no. of publications & the no. of citations. The highest link strength is 875, associated with Sudeep Tanwar, followed by Neeraj Kumar with total link strength of 803 & on the third place we have Khaled Salah with link strength of 768. The data includes information about the institutions with which the authors are linked. This helps to identify academic and research organisations that are involved in blockchain technology development.

With the most citations, Neeraj Kumar of Nirma University in India appears to be the most cited and influential author on the list [45]. Many studies revealed that there is potential for blockchain to act as a common platform to facilitate interoperability across networks and systems. Every node of blockchain has to perform a similar task for the authentication of each transaction at the same time; thus, incurring a high computation cost. Hence, there is a need to design a lightweight blockchain model, particularly for applications with certain constraints [70, 71]. The author contributed to the different streams of the blockchain technology, its uses, and future trends [70–80]. Sudeep Tanwar of Thapar University in India has the strongest relationship, indicating a major impact on the field of blockchain technology. The authors' frequent collaboration on several publications highlights the broad spectrum of studies done on blockchain technology in a variety of sectors, highlighting its multidisciplinary character and the depth of exploration into its implications and uses.

Figure 5 co-citation network explains the relationships and patterns of citations between various authors in study subject blockchain technology. Bibliometric Map is used to visualization the network that aids to understand author's influence based on their citation linkages. This map was created using VOSviewer software. This map identifies emerging authors who are gaining attention and citations from established researchers. There are 12 clusters with total link strength of 47,562. The map reveals the presence of research clusters of authors who frequently cite each other's work.

This bibliometric map of author-wise citation networks is a useful tool for scholars and other interested parties to study the structure and dynamics of scholarly communication in the blockchain technology research area. This map will assist academics and decision-makers in gaining useful insights into the intellectual landscape, collaboration patterns, and research trends, allowing for more informed decision-making and future research paths. It is observed that "Neeraj Kumar", "Khaled

Table 4 Most influential authors

Authors	University/institution	No. of published articles	Citations	Total link strength
Neeraj Kumar	Nirma University, India	51	3391	803
Khaled Salah	Khalifa University of Science & Technology, UAE	47	3065	768
Sudeep Tanwar	Thapar University, India	50	2848	875
Vinay Chamola	BITS Pilani, India	20	2724	427
Kim-Kwang Raymond Choo	The University of Texas, US	32	2565	420
Mohsen Guizani	University of Artificial Intelligence, United Arab Emirates	35	2129	628
Mohamed Bin Zayed				
Dusit Niyato	Nanyang Technological University, Singapore	31	2121	672
Zibin Zheng	Sun Yat-sen University, China	22	2066	604
F. Richard Yu	Carleton University, Canada	27	2054	736
Raja Jayaraman	Khalifa University of Science & Technology, UAE	39	1966	574

Salah", "Sudeep Tanwar", and "Kim-Kwang Raymond Choo" are the largest nodes indicating that they have been cited more by the other authors in the research related to blockchain technology. The clusters distinguished by different colours indicate more citations between them. For example, "Yu. F. Richard" has articles which have cited more papers of "Neeraj Kumar" or "Khaled Salah", hence their network shows strong link strength. Most of the authors of different countries collaborate with each other to contribute in the field of knowledge. This visualisation reveals the collaborative networks influencing discussions on blockchain technology, in addition to highlighting the frequency of citations among various authors. Understanding the collaborative dynamics within the research community, promoting information exchange, encouraging multidisciplinary discourse, and eventually increasing our collective understanding of this rapidly evolving subject that can greatly benefit all from such insights.

Most prominent disciplines

A4. This answer will furnish information about the papers published on blockchain technology across various disciplines. Analyzing publication trends across disciplines assists in identifying the most active and fast expanding areas of blockchain technology research. The quantity of papers published in each area provides for an assessment of the overall research impact of blockchain technology. By looking at which disciplines have the most publications, one may see where technology is making the most significant contributions.

In Table 5, Information and Computer Science emerges as the most prominent discipline for blockchain technology research, with a total of 9398 papers. This finding is consistent with the earlier investigation conducted by [39]. This demonstrates a strong desire to investigate the use of blockchain in computer science-related disciplines. Commerce Management and Tourism comes in second place with 3058 blockchain-related papers. Blockchain integration in the business and tourist industries is clearly a popular subject of study. With 1904 papers, engineering is another important subject for blockchain research. This represents blockchain's technological implications and advancements in engineering applications.

According to the previous studies, blockchain technology is not limited to a single domain but has a multidisciplinary impact [34, 36, 39–63, 81]. Blockchain technology research is being explored and contributed by researchers from numerous areas. The vast distribution of papers across numerous disciplines highlights blockchain's versatility and capacity to handle diverse challenges and possibilities in various domains [1, 2, 20, 56, 57, 76, 77, 82]. It also shows that blockchain technology has piqued the interest of numerous research communities, resulting in a thorough examination of its uses and consequences.

Researchers can foresee potential future paths of blockchain technology research and prepare for upcoming possibilities and problems by tracking publication trends.

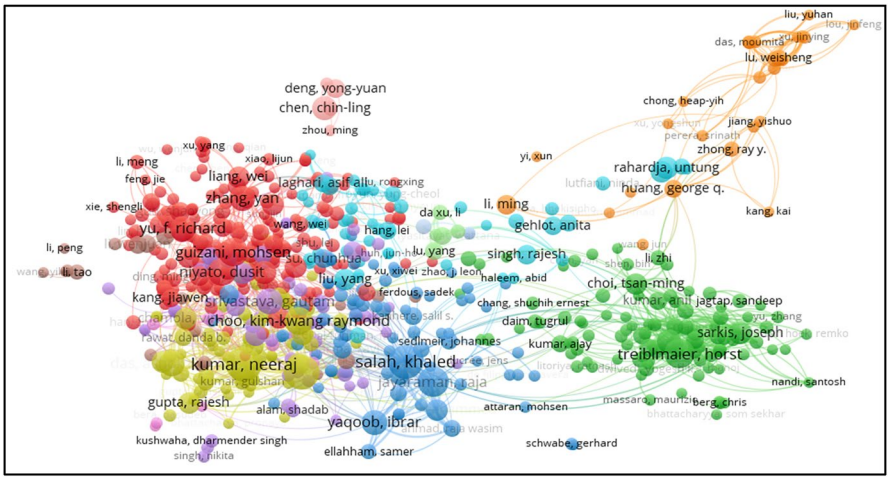

Fig. 5 Co-citation analysis among authors from 2019 to 2023

Knowledge of publication distribution can help academics and policymakers focus their research and funding efforts on underrepresented or developing areas in blockchain technology.

Observing publication distribution can promote collaboration among researchers from other fields, boosting information exchange and the use of blockchain technology in fresh and inventive ways. This data can be used by universities and educational institutions to create relevant curriculum and educational programmes that are designed to satisfy the needs of the expanding blockchain technology research in numerous areas. Policymakers and regulators can utilise this data to better understand the broader impact of blockchain technology in numerous industries and develop appropriate policy and regulatory actions.

Most productive journals

A5. Identifying these top publications ensures access to high-quality and credible blockchain research articles. These journals provide accurate and peer-reviewed information to researchers and professionals. By following these esteemed journals, individuals can remain informed about the latest findings,

Table 5 Most prominent disciplines

Discipline	Total publications
Information and computer science	9398
Commerce management and tourism	3058
Engineering	1904
Law and legal studies	762
Human society	603
Economics	420
Built environment and design	400
Health science	354
Physical sciences	321
Agriculture, veterinary and food science	259
Mathematical sciences	249
Creative art and writing	184
Language, communication and culture	182
Biomedical and clinical sciences	180
Environmental science	174
Education	172
Earth sciences	151
Philosophy and religious studies	121
Biological sciences	46
Psychology	44
History, heritage and archaeology	31
Chemical sciences	20

patterns, and innovations in the realm of blockchain technology. Top journals can assist academics in identifying the most important and relevant areas of attention in blockchain technology research. Knowing the top journals can help authors select the best venue for their own research, boosting the likelihood of publication acceptance.

Table 6 Most Productive Journals presents the top ten journals that have been publishing the greatest number of articles related to blockchain technology from 2019 to 2023. The information is retrieved from the Dimensions database with the term "Blockchain Technology" present in the title or abstract of articles published. IEEE Access is the journal that topped the list with a significant number of publications of 606 article, this finding aligns with the prior study conducted by [40, 44]. Additionally, its high citation counts of 22,562 indicates that the research published in this journal is widely recognized and cited by other researchers, making it a significant contributor to the dissemination of research in the field. Second place was acquired by journal Sustainability with 309 published articles pertaining to blockchain technology. While its citation count is relatively lower than some other journals in the field.

Sensors journal has published 272 articles and has a notable citation count of 5529, indicating its significant impact in the field. The IEEE Internet of Things Journal has also been active in publishing articles related to blockchain technology. With 219 publications and a significant citation count of 7280, it plays a crucial role in disseminating research in this area. The International Journal for Research in Applied Sciences and Technology has published 202 articles on blockchain technology, while its citation count is comparatively lower. It is also important to note that the remaining journals listed in the data published a lower number of articles, but their citation counts were comparatively higher.

So, approximately 55.96% of the articles are published by the top four journals only. IEEE Access emerges as the most active journal among others, and its publications have a high impact based on their significant citation count. Researchers and stakeholders interested in the field can refer to these journals for recent advancements and insights.

Conclusion

The findings derived from this investigation demonstrated a consistent upward trajectory in the quantity of scholarly works pertaining to blockchain technology. This phenomenon underscores the escalating reservoir of expertise within this domain, while also signaling the potential for future expansion and advancements. The technology is being adopted and will continue to be adopted across various fields to address challenges in multiple domains. The existing and future trends in the field of blockchain technology will be Internet of Things (IoT), digital space, healthcare, security and privacy of data, and machine learning. Industry 4.0 is being driven by technologies like blockchain and artificial intelligence. These game-changing technologies have the potential to spark widespread digital revolutions in conventional industries, creating a bridge between the digital and

Table 6 Most productive journals

Name of the journals	Publications	Citations
IEEE Access	606	22,562
Sustainability	309	4523
Sensors	272	5529
IEEE Internet of Things Journal	219	7280
Journal of Physics Conference Series	216	629
International Journal for Research in Applied Sciences & Technology	202	18
Applied Sciences	192	2503
Electronics	176	2399
Security and Communication Networks	140	879
Procedia Computer Science	140	1331

real economies. Using these fundamental technologies will promote creativity and make integrated development easier, both of which are necessary for negotiating the complexity of the quickly changing digital ecosystem of today.

This study identified China, India, United States, United Kingdom, and Saudi Arabia as the foremost contributors on a global scale in terms of disseminating articles concerning blockchain technology. In terms of most citations received nations (countries), China, USA, UK, India, and Australia emerged as the primary frontrunners. The study also reveals a trend where authors from Asia are more interested to combine blockchain with healthcare and IoT, whereas the United States demonstrates a stronger focus on employing blockchain for data security purposes.

Eminent figures in the realm of blockchain technology, distinguished by their substantial citation counts, encompass Neeraj Kumar (Nirma University, India), Khaled Salah (Khalifa University of Science & Technology, UAE), and Sudeep Tanwar (Thapar University, India). The investigation further ascertained that the domains of Information and Computer Science, Commerce Management & Tourism, Engineering, Law and Legal Studies, as well as Human Society, constitute the most active and rapidly expanding disciplines, showcasing the highest volume of publications in the realm of blockchain technology research. Of note, IEEE Access, Sustainability, Sensors, and IEEE Internet of Things emerged as the most prolific journals in terms of publishing articles centered around blockchain technology. It is evident that as the blockchain technology develops, interdisciplinary study will be essential for unlocking full potential of blockchain technology. By understanding the past and present landscape of blockchain research, we are better equipped to navigate the future of this transformative technology, paving the way for innovative solutions and real-world applications.

Author Contributions Mahima Habil: Data curation, Methodology, Writing-Original draft preparation, Writing-Reviewing and Editing. Saransh Kumar Srivastav: Conceptualization, Methodology,

Visualization, Writing-Original draft preparation, Software. Pooja Thakur: Visualization, Methodology, Data curation, Software, Writing-Reviewing and Editing.

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Data availability The data utilized in our study was retrieved from the open access platform Dimensions.ai (https://app.dimensions.ai/discover/publication), as explicitly mentioned in the research methodology section. Given that the data is sourced from open access platform, it is readily available to the public without restrictions. Interested parties can access the data directly through Dimensions.ai (https://www.dimensions.ai/), in accordance with the platform's terms of use and data sharing policies. However, information on how to obtain it and reproduce the analysis is available from the corresponding author on reasonable request.

Declarations

Conflict of interest The authors declare no conflict of interest.

Ethical approval Not applicable.

Informed consent Not applicable.

Author's Google Scholar Mahima Habil—https://scholar.google.com/citations?hl=en&user=jPISuWwAAAAJ&view_op=list_works&gmla=AH70aAUv9zIxfXL2XQ_t2gu6BiNHgesg_rclFUf3BWt472sG9vIus9f5Tm0JzRF2DnjBWsQKE1l0UlogbVgltpFJ. Saransh Kumar Srivastav—https://scholar.google.com/citations?user=yl-0qrUAAAAJ&hl=en. Pooja Thakur https://scholar.google.com/citations?user=Y6YU0AEAAAAJ&hl=en.

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