

Research on Blockchain Technology: A Bibliometric Analysis of the Contributions of India

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Abstract

A blockchain is a ground-breaking technique for connecting computer networks in a decentralised and distributed manner. It is a relatively new technology with many applications that could eventually affect the entire economy and be acknowledged as the most up-to-date general-purpose technology. This study aims to look at the growth and trends of blockchain technology research literature from 2011 to 2020 across various perspectives. The aim is to assist researchers in developing theoretical frameworks, understand future research directions and serve as a primary source of references for research mapping in the subject. We investigated the top-cited papers, most productive countries, most prolific journals, and most prolific authors based on a comprehensive review of the literature gathered from the Scopus database. According to the findings, the first publication using blockchain technology was in 2011, and the peak year for blockchain research was in 2020.

Furthermore, the statistics revealed that China and the United States (US) are now the most productive countries in research on blockchain technology. Furthermore, our research demonstrated that India is one of the most active producers of blockchain-related research. This outcome is unsurprising, given that the Indian economy has proved its ability to follow best practices in encouraging technology growth in recent years. According to this survey, the topic of blockchain technology has gotten much attention from researchers all over the world.

Introduction

In recent years, mainstream media has been paying more attention to “blockchain” technology (Alacam & Sencer, 2021; Dinh et al., 2018; Dubey et al., 2020; Nofer et al., 2017; Philipp et al., 2019). A blockchain is a data structure or ledger that records all transactions (not just bitcoin). It is a revolutionary system that connects computer networks decentralized and distributed (Rosyidiana et al., 2019). Without relying on a single server, blockchain allows current transactions to be peer-to-peer (P2P). Information can never be deleted after it has been entered. Every transaction ever made is recorded in the blockchain, which is specific and provable. Nothing can be updated or modified once it has been saved. Blockchain is very secure because of its feature. It is decentralized and establishes a peer-to-peer network, obviating the need for a middleman. Blockchain is made up of chronologically ordered blocks. On average, each block can handle roughly 500 transactions. These blocks are particularly secure due to the cryptography used. In a blockchain network, each block stores some information and the hash of the preceding block. A hash is a one-of-a-kind mathematical code that identifies a particular block. If the information within the block is changed, the block's hash will be changed as well. Blockchain is secure because it connects blocks using unique hash keys.

Blockchain is significantly more than the Bitcoin cryptocurrency, which it is sometimes mistaken with. Some hailed it as the fourth wave of computer technology, with consequences possibly as far-reaching as the birth of modern property rights. Blockchain is nothing more than a new sort of data structure in its most basic form. On the other hand, Blockchain technology guarantees the integrity of a network by

combining a variety of existing technologies in a novel way, effectively codifying 'truth' and eliminating the need for 'trust' (Fuchs, 2019). "To understand the power of blockchain systems, and the things they can do, it is important to distinguish between three things that are commonly muddled up, namely the bitcoin currency, the specific blockchain that underpins it and the idea of blockchains in general (The Trust Machine, THE ECONOMIST, 2015)."

In today's world, computer security is a critical component. It is used to thwart and defeat an impending attack that could cause significant damage to the computer system or mobile devices (Firdaus et al., 2019). To process electronic payments, a trusted third party is usually required. To overcome this problem, Satoshi presented Bitcoin, a peer-to-peer electronic payment system based on cryptographic proof rather than faith (Nakamoto, 2008). Bitcoin is gaining traction as a digital currency, but the blockchain technology that underpins it has the potential to be far more significant (Yuan & Wang, 2016a). Blockchain is a system for decentralized transaction and data management. It is still a developing field of study and practice (Yuan & Wang, 2016b). Recently, blockchain technology has played a significant role in developing a programmable monetary system, financial system, and macroscopic societal system (Gupta & Dhawan, 2020).

A literature review shows that bitcoin pioneered the cryptocurrency markets, both in terms of market value and scientific curiosity, as the first decentralized cryptocurrency (Aysan et al., 2021). However, several studies abound in the literature exploring broader topics around the development and application of blockchain technology beyond cryptocurrencies. For instance, the application of blockchain technology to the automotive industry, according to Meyliana et al. (2021), is one of the applications used to improve firm system performance with customer relationship management (CRM) and supply chain management (SCM). They discovered that research is scarce in this subject. Thus, this study will examine and synthesize research topic trends as part of a more extensive study on the evolution of blockchain technology in the automotive industry. A comprehensive literature review and bibliometric analysis utilizing Publish and Perish software and analysis with VOS viewer software were used in the cited study. The terms "blockchain technology," "vehicle," "automotive," and "vehicle industry" were used. The authors discovered 40 relevant papers and trends in research in this subject from 2017 to the present, based on their findings. This study examined the state of blockchain in the automotive industry and discussed hot topics.

In 2021, Guo et al. conducted "a bibliometric study and visualization of blockchain" to have a complete picture of blockchain technology and grasp the present research concentration; this work used CiteSpace and VOSviewer as bibliometric analysis tools. Information was gathered from 3826 publications published between 2013 and 2020 in the Web of Science core collection database. This bibliometric analysis included the most influential and productive authors, institutions, countries, and publications. Theoretical understanding and hot research subjects on blockchain mainly included "smart contract," "bitcoin," "security," "Ethereum," and "cryptology." A cluster analysis was performed from a keyword perspective to determine upcoming trends and blockchain frontiers. According to the findings, the authors explained that future research should focus on management, blockchain technology, energy, machine

learning, and smart homes. In line with the suggestions of the cited study, the present study was undertaken to address some of the matters arising from the study of Guo et al. (2021).

In another development, the report of Ante (2020) reviewed 468 papers on the issue of smart contracts and associated 20,188 references, offering a summary and analysis of the current state of research on smart contracts and identifying intellectual structures and developing trends. For co-citation analysis, he employed exploratory factor analysis, identifying six main strands of research in the technological, social, economic, and legal areas. Individual high-impact publications are shown using social network analysis, as Ante defined the interrelationships between these groups. The study also discovered starting areas for future research, providing researchers and practitioners with a solid foundation for their intelligent contract work.

According to Rouzbahani et al. (2020), power systems are quickly expanding due to rising electrical power consumption. These systems require new approaches, modern tools, and technology, notably for communication between different elements to function better. As a result, new difficulties such as energy trading and marketing and cyber threats face power systems. One of the newest methods is to use blockchain in power systems as a solution. Many publications have been published to support research activities, but no bibliometric study that identifies research trends has been done. The paper gave a bibliographic analysis of blockchain use in power systems related literature found in the Web of Science (WoS) database between January 2009 and July 2019. This work also looked at the number of publications published, citations, institutions, research areas, and authors and performed a detailed analysis. According to the findings, there are various notable implications of research efforts in China and the United States compared to other countries.

The massive death and disruption caused by the COVID-19 pandemic, according to Kurshid (2020), has shown flaws in existing organizations that preserve human health and well-being. The author's goal was to explain how blockchain, with its distributed trust networks and cryptography-based security, may help solve data-related trust issues. The study's findings illustrate how blockchain has distributed governance structure and privacy-preserving capabilities that can be utilized to construct "trustless" systems to help overcome the tension between keeping privacy and meeting public health needs in the fight against COVID-19. This study also stated that a coordinated national effort to investigate blockchain to address the shortcomings of existing systems and cooperation of academia, researchers, business, and industry is recommended to speed up blockchain adoption in health care.

The study of Xu, Chen, and Kou (2019) examined current academic research on blockchain, particularly in business and economics. The top-cited publications, most prolific countries, and most general keywords were investigated based on a comprehensive evaluation of the literature acquired from the Web of Science service. They also did a clustering analysis and found five research themes: "economic advantage," "blockchain technology," "initial coin offerings," "fintech revolution," and "sharing economy." This report also includes recommendations for future research directions and practical applications.

Research by Dabbagh et al. (2019) was a bibliometric analysis of all Blockchain conference papers, articles, and review papers that were indexed by WoS between 2013 and 2018 in this work. They compared the publications they gathered to five research topics. The findings revealed helpful information, such as yearly publishing and citation patterns, the most popular study areas, the top ten influential papers, preferred publication venues, and the most supporting funding sources. The study's findings have various implications that can be utilised as a baseline by both new and experienced researchers when starting a blockchain research project in the future.

In another study, Yaga et al. (2019) investigated how Blockchains are tamper-obvious and tamper-resistant digital ledgers built in a distributed and usually decentralized manner. At their most basic level, they allow a group of users to record transactions in a shared ledger within that group, with the result that no transaction can be modified once it has been published, as long as the blockchain network is operational. According to the authors, this document gives a high-level technical overview of blockchain technology. The goal of this study, according to the findings, is to assist readers in understanding how blockchain technology works.

The authors undertook a bibliometric analysis of the Bitcoin-related literature in the current study. Using the Scopus database, they created a sample of 4495 publications authored between 2011 and 2020. Furthermore, they supplied information on factors such as the number of publications produced throughout time, the preliminary study topics, the types of published documents, the most important platforms and sources of Blockchain technology publications, highly cited studies, prolific authors, author's nations, and, finally, the primary sponsors of blockchain-related research. The bibliometric study shows blockchain literature's current status and future course from several viewpoints. The evolution of research articles in the implementation process and future trend of Blockchain Technology were evaluated in this study. Through the gaps revealed by the bibliometric analysis, future researchers can venture into studies to develop theoretical frameworks and models to expand the frontiers of knowledge and further developments in this sector.

Objectives Of The Study

This study was designed specifically to:

1. determine the research contributions on the subject of blockchain technology based on the leading countries;
2. rank the years with the most research contributions to blockchain technology in India;
3. analyze the contribution of India to blockchain technology research, based on the number of authors by year of publication;
4. quantify the degree of collaboration among Indian authors with other scholars in the area of blockchain technology research;
5. determine the aggregate number of citations received by blockchain technology research papers and identify the top ten most cited articles in India;

6. identify and rank the top ten journals publishing scholarly work on blockchain technology;
7. reveal the most prolific Indian researchers/authors/contributors writing on blockchain technology;
8. reveal the number of other countries whose authors have partnered with Indian authors to research/write on blockchain technology;
9. rate the extent to which research on blockchain technology has been published across different types of documents;

Methods

This study used a bibliometric approach in reviewing research works focusing on Blockchain technology. Data were collected using the Scopus database, using different keywords to obtain relevant information. First, the researchers were interested in determining the overall research contributions on Blockchain technology. For this, we used keywords and search strings "Blockchain", with 31,651 results revealed. We further sought to identify the contributions of India across different years specifically. For this, we used keywords such as "blockchain India" filtered from 2014-2019 (with a total of 1126 results); "blockchain India" filtered for the year 2020 (with a total of 1549 search results). We further search for India's contribution to the subject of blockchain without any year, including 2021 (with a total of 3,036 search results) and filtered by country. The results of the data collected were sorted, organized, prepared and processed for further analysis to meet the study's objectives.

Results

The first objective was to determine the research contributions on blockchain technology generally and to identify the leading countries. The result of our analysis indicates that from 2010 (when the subject of blockchain first emerged) to 2020, a total number of 29,682 scholarly documents on blockchain technology has been published and indexed in the Scopus database globally. Our country-wise analysis revealed that the top leading countries with research on blockchain technology include China (24.05%), the USA (16.06%), India (9.01%), the UK (7.49%), Germany (5.05%), Australia (4.43%), Italy (4.13%), Canada (3.93%), South Korea (3.73%), and Russia (3.37%). Other countries whose contributions are below the top ten jointly accounted for 18.76% of the total publications on blockchain technology (See Table 1).

Table 1
Country-wise contribution to blockchain technology research

S/N	Country	No. of articles	%
1	China	7140	24.05
2	USA	4767	16.06
3	India	2673	9.01
4	UK	2223	7.49
5	Germany	1498	5.05
6	Australia	1316	4.43
7	Italy	1225	4.13
8	Canada	1166	3.93
9	South Korea	1108	3.73
10	Russian federation	999	3.37
	Other countries	5567	18.76
Total		(24117 + 5567) = 29682	100

The study's second objective was to rank the years with the most Indian research contributions to blockchain technology. The analysis in Figure 1 shows that year 2020 has the most contribution (57.88%). This is trailed by 2019 (32.17%), 2018 (8.68%), 2017 (0.97%), 2016 (0.15%), 2014 (0.11%), and 2015 (0.04%). This implies that research on blockchain technology started gaining attention in India in 2014.

In the third aspect of the research, our all-time analysis revealed that single Indian authors published 125 papers (4.68%); two authors published 813 papers (30.42%); three authors published 639 papers (23.91%); four authors published 514 papers (9.23%); 345 (12.91%), 147 (5.50%), and 47 articles (1.76%) were published by five, six, and seven authors respectively. However, 43 articles, representing 1.61% of the total publications involving an Indian, were published by eight or more articles. We further analyzed the contribution of India to blockchain technology research based on the number of authors by year of publication. Our results in Table 2 highlight that of the three publications recorded in 2014, one was a single-authored paper, and two were co-authored by three scholars, respectively. A single author published the only paper recorded for 2015. In 2016, four papers were noted on blockchain technology, out of which one paper each was published by two, three, five and seven authors, respectively.

In 2017, no single-authored paper was recorded; however, 12 of the papers were co-authored by two scholars. Furthermore, nine papers were published by three authors, and one paper was published by four authors, three papers by five authors, and another one by six authors (See Table 2). For 2018

publications, 11 were single-authored; two scholars co-authored 66; three authors published 57; four authors published 51; 21 by five authors; 13 and 4 were published by six and seven authors, respectively; while eight or more authors published nine. For 2019 publications, it was discovered that 53 papers were single-authored; 278 were papers published by two authors; three authors published 208; four authors published 155; five authors published 116 articles; 36 and 6 works were published by six and seven authors, respectively; while eight papers were by eight or more authors. For 2020, single-author papers were 59; papers by authors were 456; papers by three, four and five authors were 362, 307, and 204 respectively; papers published by six and seven authors are 97 and 36 respectively; while those having eight or more authors are 26.

Table 2
Number of authors by year of publication crosstab of the contribution of India to blockchain technology research

Number of Authors									
Year	Single	Two	Three	Four	Five	Six	Seven	Eight ⁺	Total
2020	59	456	362	307	204	97	36	26	1547
2019	53	278	208	155	116	36	6	8	860
2018	11	66	57	51	21	13	4	9	232
2017	0	12	9	1	3	1	0	0	26
2016	0	1	1	0	1	0	1	0	4
2015	1	0	0	0	0	0	0	0	1
2014	1	0	2	0	0	0	0	0	3
Total	125	813	639	514	345	147	47	43	2673

In determining the degree of collaboration among Indian authors with other scholars in blockchain technology research, we sorted out all single-authored papers from the ones with two or more authors. We computed the extent of collaboration from the multiple-authored papers as a degree of the total articles published by Indian authors from 2014 (where the first Indian paper was noticed) to 2020. Our analysis presented in Table 3 reveals that in the highest degree of collaboration occurred in 2020 (210.24°), followed by 2019 (114.02°), 2018 (31.22°), 2017 (3.67°), 2016 (0.57°), and 2014 (0.28 °).

Table 3
Degree of collaboration among Indian researchers with other scholars

Year	Multiple authored articles	%	Degree of collaboration
2020	1488	58.40	210.24°
2019	807	31.67	114.02°
2018	221	8.67	31.22°
2017	26	1.02	3.67°
2016	4	0.16	0.57°
2015	0	0.00	0.00°
2014	2	0.08	0.28°
Total	2548	100	360°

Regarding the aggregate number of citations received by blockchain technology research, the result of our analysis revealed that of the 2673 articles featuring an Indian author on blockchain technology, a total of 9,478 citations were recorded. In terms of the top ten most-cited research on blockchain technology in India, Table 4 presents the summary.

Table 4
Top ten most cited articles by Indian Authors on Blockchain technology

S/N	Article Titles	Citation counts
1	A survey on security and privacy issues of bitcoin	220
2	A Survey on IoT Security: Application Areas, Security Threats, and Solution Architectures	149
3	A decentralized privacy-preserving healthcare blockchain for IoT	137
4	Survey of consensus protocols on blockchain applications	122
5	Performance benchmarking and optimizing hyper ledger fabric blockchain platform	117
6	Blockchain research, practice and policy: Applications, benefits, limitations, emerging research themes and research agenda	108
7	Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy	108
8	A survey on privacy protection in a blockchain system	105
9	Industry 4.0: A bibliometric analysis and detailed overview	103
10	Understanding the Blockchain technology adoption in supply chains-Indian context	93
All time citation counts for Indian Authors = 9478; Number of articles = 2673 articles		

In terms of ranking the top ten journals publishing scholarly work on blockchain technology, our analysis presented in Figure 2 revealed that Advances in Intelligent Systems and Computing is the most productive at the time of writing, with 70 articles published. This is followed closely by the International Journal of Innovative Technology and Exploring Engineering (with 67 articles), International Journal of Recent Technology and Engineering (with 60 articles), IEEE Access (with 51 articles). Other journals in the top ten chart can be seen in Figure 2.

Information regarding the most cited authors from India contributing research to Blockchain technology is depicted in Figure 3. As shown in Figure 3, the top ten authors are arranged in descending order of their contributions.

Regarding the number of other countries whose authors have partnered with Indian authors to research blockchain technology, our analysis revealed that a total of 93 other countries had collaborated with India. Of the partnering countries, Figure 4 reveals that the United States of America is leading the top 10 countries, with 149 publications with Indian authors. This is followed by China (113), the United Kingdom (103), Australia (72), Saudi Arabia (61), South Korea (45), Taiwan (43), Canada (38), UAE (29) and France (28).

In rating the extent to which research on blockchain technology has been published across different types of documents by Indian authors, the result of our analysis in Figure 5 ranked conference papers at the first position. This is because conference papers constituted 45.45% of the total publication on blockchain technology by Indian authors. At second position is original research articles constituting 44.44% of the total publication by Indian authors on blockchain technology (See Fig. 5). At third, fourth, fifth, sixth, seventh and eighth positions are review papers (4.79%), book chapters (4.23%), editorial releases (0.45%), books (0.34%), notes (0.15%), articles in press (0.11%), and letters (0.07%).

Discussion Of Findings

This study discovered that the subject of blockchain technology had received serious research attention among scholars worldwide. More so, our analysis revealed that India is among the leading forces in producing research on the subject of blockchain technology. This result is not surprising because the Indian economy has demonstrated the capacity to follow global best practices in promoting technological advancement in recent years. Little wonder the country ranked among other highly developed nations such as China, USA, UK, Germany, Australia, etc. Admittedly, Indians were not the first to publish research on blockchain technology; scholars in the country have made notable efforts four years after the first work on blockchain technology was published. Chinese scholars were found to be the leaders in terms of the number of research produced; however, our research did not consider the quality of the research output across countries, a limitation that future bibliometric studies may consider. Nevertheless, by using a well-respected database as Scopus for the bibliometric analysis, it is arguable that all research publications that found their way to the database are not "pushovers." This means that the Chinese efforts must be appreciated because they have yet again proven that their quest to become one of the world's most vital civilizations should not be downplayed.

This study also discovered an increasing trend in collaboration among Indian scholars, particularly for blockchain technology research. This finding is attributed to the growing need for interdisciplinary, transdisciplinary and multidisciplinary research, which fosters collaboration among scholars from different fields, employing diverse theories, tools and methodology to tackle a complex problem. This explains why Risius and Spohrer (2017) developed a framework for research in blockchain technology, an effort aimed at addressing the question "What We (do not) Know, Where We Go from Here, and How We Will Get There?" The revelation of the present study is a testament that research around blockchain technology transcends disciplinary boundaries due to its vast application in tackling security-related problems across different sectors of man's existence. This finding corroborates the position of Gupta and Dhawan (2020) that blockchain technology has played a significant role in developing a programmable monetary system, financial system, and macroscopic societal system. Thus, it is no surprise that collaboration among scholars beyond disciplinary and national lines is becoming pervasive.

This study also showed that there is relatively a great extent of citations to articles published by Indian scholars on blockchain technology. This implies that Indian researchers and scholars are producing research that others within the country and beyond have found helpful in the build-up to further studies,

highlighting the contribution of India to the literature. The finding also strengthens that many scholars are interested in researching blockchain technology, perhaps to understand its workings and applications better. This aligns with the views of Yuan and Wang (2016b) that blockchain technology is still developing as a field of study and practice. Among the chief producers of blockchain technology knowledge are the following outlets -Advances in Intelligent Systems and Computing, International Journal of Innovative Technology and Exploring Engineering International Journal of Recent Technology and Engineering, IEEE Access, etc.

As earlier reported, many Indian authors partner with scholars in other countries such as the United States of America, China, United Kingdom, Australia, Saudi Arabia, South Korea, Taiwan, Canada, UAE, France and beyond. This result is similar to the one obtained by the patent-based analysis of Nan et al. (2021) that there is a strong research collaboration between China and the United States of America in blockchain technology. This finding suggests that the Indians have mostly partnered with prominent actors and players in the production, distribution, and communication research on blockchain technology. This finding follows the positions of a growing body of studies revealing that blockchain technology offers a platform for collaboration among other benefits (e.g., Alacam & Sencer, 2021; Coelho et al., 2021; Dubey et al., 2020; Philipp et al., 2019; Rejeb et al., 2021; Wang et al., 2021).

This study also documented that scholarly works on blockchain technology have been primarily published in conference proceedings. This is not surprising because, at conferences, emerging technologies and innovations can be discussed among seasoned and early career researchers. Such discussions may reveal insights that can enable us to appreciate and understand the technology (e.g., Abodei et al., 2019; Chou et al., 2021; Coelho et al., 2021; Liang et al., 2017; Tan et al., 2020). Research articles may have been ranked second, perhaps due to the increasing awareness among scholars that may have led to more original researches being conducted. A look at the gap between the number of works published in conference proceedings and journals revealed a negligible difference. This suggests that the number of research articles may surpass conference proceedings in the future. This aligns with the evidence earlier presented by Aysan et al. (2021) that the current status of literature on bitcoin is well documented, and the future is bright, as many more scholars are likely to delve into further research. The positions of review papers, book chapters, editorial releases, books, notes and articles in the press seem to be justified. The reason is that some of them are not considered when making appraisal and funding decisions and are often not included in the computation of metrics such as impact factors, except for review articles, books, chapters in book and articles in press (when they are eventually accepted).

Conclusion

Generally, the conclusion reached in this study is that blockchain technology has gained remarkable attention in the literature. Researches on blockchain technology are at the moment focusing on innovative approaches to optimize the technology, maximize its potentials and apply it in different facets of life. Indian researchers have contributed substantially to the literature surrounding blockchain technology and are among the major players in the area of research. While further developments are

plausible and anticipated, future research around blockchain technology should be aimed at developing models, frameworks and theories on the practical aspects and application of the technology. One approach to reach this goal is for scholars across disciplines, institutions, and regions to continually collaborate and build research bonds. By implication, the more scholars publish and collaborate, the more likely we will understand the technology and maximize its potentials.

Declarations

We declare that the Submitted Research Paper is our original work and no part of it has been published anywhere else in the past. Whenever we have used materials (data, theoretical analysis, and text) from other sources, we have given due credit to them in the text of the report and given their details in the references. We declare no competing interests.

References

1. Abodei, E., Norta, A., Azogu, I., Udokwu, C., & Draheim, D. (2019, September). Blockchain technology for enabling transparent and traceable government collaboration in public project processes of developing economies. In *Conference on e-Business, e-Services and e-Society* (pp. 464-475). Springer, Cham. https://doi.org/10.1007/978-3-030-29374-1_38
2. Alacam, S., & Sencer, A. (2021). Using Blockchain Technology to Foster Collaboration among Shippers and Carriers in the Trucking Industry: A Design Science Research Approach. *Logistics*, 5(2), 37. <https://doi.org/10.3390/logistics5020037>
3. Ante, L. (2020). Smart contracts on the blockchain—a bibliometric analysis and review. *Telematics and Informatics*, 101519. <https://doi.org/10.2139/ssrn.3576393>
4. Aysan, A. F., Demirtaş, H. B., & Saraç, M. (2021). The Ascent of Bitcoin: Bibliometric Analysis of Bitcoin Research. *Journal of Risk and Financial Management*, 14(9), 427. <https://doi.org/10.3390/jrfm14090427>
5. Blockchain vs Bitcoin. Retrieved from: <https://www.geeksforgeeks.org/blockchain-vs-bitcoin/?ref=lbp>
6. Chou, H., Lin, D., Nakaguchi, T., & Ishida, T. (2021). A Blockchain-based Collaboration Framework for Teaching Material Creation. In *International Conference on Human-Computer Interaction* (pp. 3-14). Springer, Cham. https://doi.org/10.1007/978-3-030-77889-7_1
7. Coelho, R., Braga, R., David, J. M., Dantas, M., Stroele, V., & Campos, F. (2021, January). Integrating blockchain for data sharing and collaboration support in scientific ecosystem platform. In *Proceedings of the 54th Hawaii International Conference on System Sciences* (p. 264). <https://doi.org/10.24251/HICSS.2021.031>
8. 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>

9. Dinh, T. T. A., Liu, R., Zhang, M., Chen, G., Ooi, B. C., & Wang, J. (2018). Untangling blockchain: A data processing view of blockchain systems. *IEEE Transactions on Knowledge and Data Engineering*, 30(7), 1366–1385. <https://doi.org/10.1109/TKDE.2017.2781227>
10. Dubey, R., Gunasekaran, A., Bryde, D. J., Dwivedi, Y. K., & Papadopoulos, T. (2020). Blockchain technology for enhancing swift trust, collaboration and resilience within a humanitarian supply chain setting. *International Journal of Production Research*, 58(11), 3381–3398. <https://doi.org/10.1080/00207543.2020.1722860>
11. Firdaus, A., Ab Razak, M. F., Feizollah, A., Hashem, I. A. T., Hazim, M., & Anuar, N. B. (2019). The rise of “blockchain”: A bibliometric analysis of blockchain study. *Scientometrics*, 120(3), 1289–1331. <https://doi.org/10.1007/s11192-019-03170-4>
12. Fuchs, P. (2019). Blockchain: Everything you need to know about how this is remarkable technology will impact you, your organisation and society. *Mercer*, 1–22. <https://bit.ly/3wRWBZc>
13. Guo, Y. M., Huang, Z. L., Guo, J., Guo, X. R., Li, H., Liu, M. Y., ... Nkeli, M. J. (2021). A bibliometric analysis and visualisation of blockchain. *Future Generation Computer Systems*, 116, 316–332. <https://doi.org/10.1016/j.future.2020.10.023>
14. Gupta, B., & Dhawan, S. (2020). Blockchain research: A scientometric assessment of global literature during 2010 to 2018. *DESIDOC Journal of Library & Information Technology*, 40(01), 49–57. <https://doi.org/10.14429/djlit.40.01.14721>
15. Khurshid, A. (2020). Applying blockchain technology to address the crisis of trust during the COVID-19 pandemic. *JMIR medical informatics*, 8(9), e20477.
16. Liang, X., Zhao, J., Shetty, S., Liu, J., & Li, D. (2017, October). Integrating blockchain for data sharing and collaboration in mobile healthcare applications. In *2017 IEEE 28th annual international symposium on personal, indoor, and mobile radio communications (PIMRC)* (pp. 1-5). IEEE. <https://doi.org/10.1109/PIMRC.2017.8292361>
17. Meyliana, M., & et.al. (2021, August). Bibliometric Study and Systematic Literature Review of Blockchain Technology in Vehicle Industry. In *2021 International Conference on Information Management and Technology (ICIMTech)*, 1, 171-176. IEEE.
18. Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system. *Decentralised Business Review*, 21260. <https://bit.ly/3nh7Tmx>
19. Nan, J., Xing, L., & Ming, X. (2021). Measuring Technological Collaboration on Blockchain-Based on Patents: A Social Network Analysis Approach. *Science, Technology and Society*, Article 09717218211032902. <https://doi.org/10.1177/09717218211032902>
20. Nofer, M., Gomber, P., Hinz, O., & Schiereck, D. (2017). Blockchain. *Business & Information Systems Engineering*, 59(3), 183–187. <https://doi.org/10.1007/s12599-017-0467-3>
21. Philipp, R., Prause, G., & Gerlitz, L. (2019). Blockchain and smart contracts for entrepreneurial collaboration in maritime supply chains. *Transport and Telecommunication*, 20(4), 365–378. <https://doi.org/10.2478/ttj-2019-0030>

22. Pratap, M. (2018). **Blockchain Technology Explained: Introduction, Meaning, and Applications**. <https://hackernoon.com/blockchain-technology-explained-introduction-meaning-and-applications-edbd6759a2b2>
23. Rejeb, A., Keogh, J.G., Simske, S.J., Stafford, T. & Treiblmaier, H. (2021). Potentials of blockchain technologies for supply chain collaboration: a conceptual framework. *The International Journal of Logistics Management*, 32(3), 973–994. <https://doi.org/10.1108/IJLM-02-2020-0098>
24. Risius, M., & Spohrer, K. (2017). A blockchain research framework. *Business & Information Systems Engineering*, 59(6), 385–409. <https://doi.org/10.1007/s12599-017-0506-0>
25. Rosyidiana, R. N., Soemarsono, P. N., & Raharjo, D. E. (2019). A Bibliometric Analysis on Blockchain Technology Literature in Academic Journals. *TIJAB (The International Journal of Applied Business)*, 3(2), 107–117. <https://doi.org/10.20473/tijab.V3.I2.2019.107-117>
26. Rouzbahani, H. M., Karimipour, H., Dehghantanha, A., & Parizi, R. M. (2020). Blockchain Applications in Power Systems: A Bibliometric Analysis. An arXiv Preprint. https://doi.org/10.1007/978-3-030-38181-3_7
27. Tan, M., Li, G. H., Wei, M., Huang, F., Zhang, L., & Hu, X. (2020, March). Research on Application of Blockchain Technology in Cloud-Network Collaboration. In *Proceedings of the 2nd International Conference on Blockchain Technology*, 140-143. <https://doi.org/10.1145/3390566.3391675>
28. The Trust Machine (October 2015). The technology behind bitcoin could transform how the economy works. *The Economist*. <https://econ.st/3qKxKFE>
29. Wang, M., Wu, Y., Chen, B., & Evans, M. (2020). Blockchain and supply chain management: a new paradigm for supply chain integration and collaboration. *Operations and Supply Chain Management: An International Journal*, 14(1), 111–122. <https://doi.org/10.31387/oscm0440290>
30. Xu, M., Chen, X., & Kou, G. (2019). A systematic review of blockchain. *Financ Innov*, 5, Article 27. <https://doi.org/10.1186/s40854-019-0147-z>
31. Yaga, D., Mell, P., Roby, N., & Scarfone, K. (2019). Blockchain technology overview. arXiv preprint arXiv:1906.11078.
32. Yuan, Y., & Wang, F. Y. (2016). Blockchain: The state of the art and future trends. *Acta Automatica Sinica*, 42(4), 481–494.
33. Yuan, Y., & Wang, F. Y. (2016). Towards blockchain-based intelligent transportation systems. In *2016 IEEE 19th international conference on intelligent transportation systems (ITSC)*, 2663-2668). IEEE. <https://doi.org/10.1109/ITSC.2016.7795984>

Figures

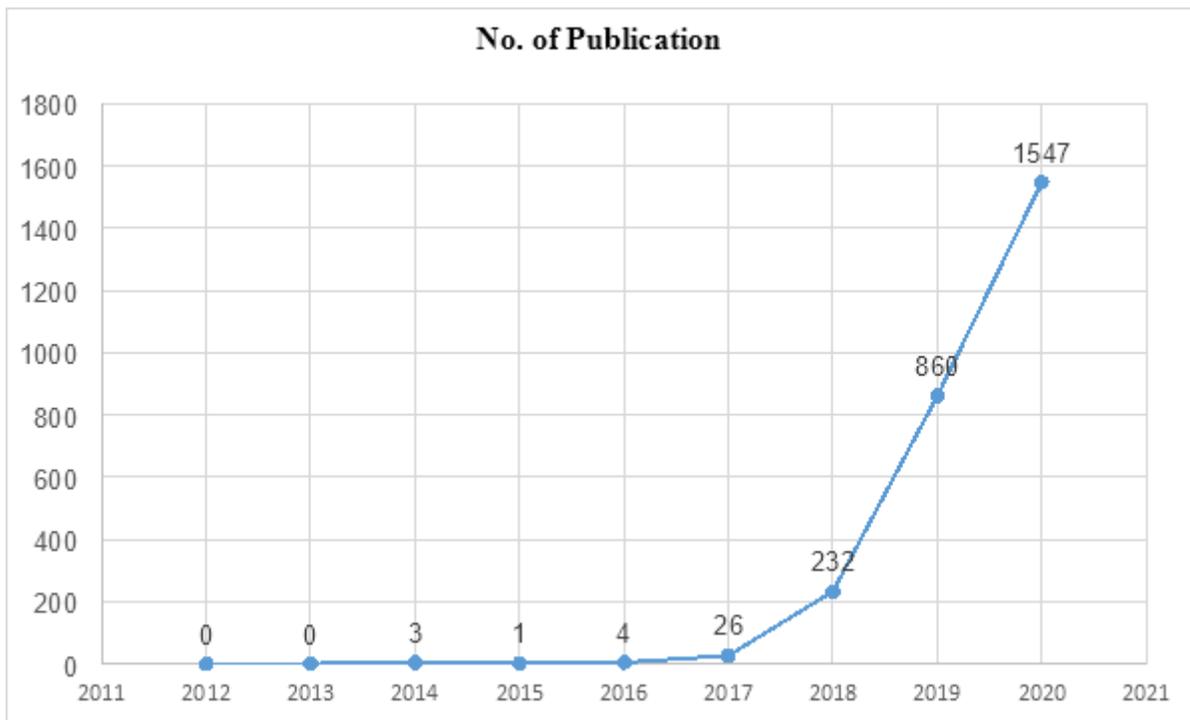


Figure 1

Year-wise Publication of Indian Authors on Blockchain Technology

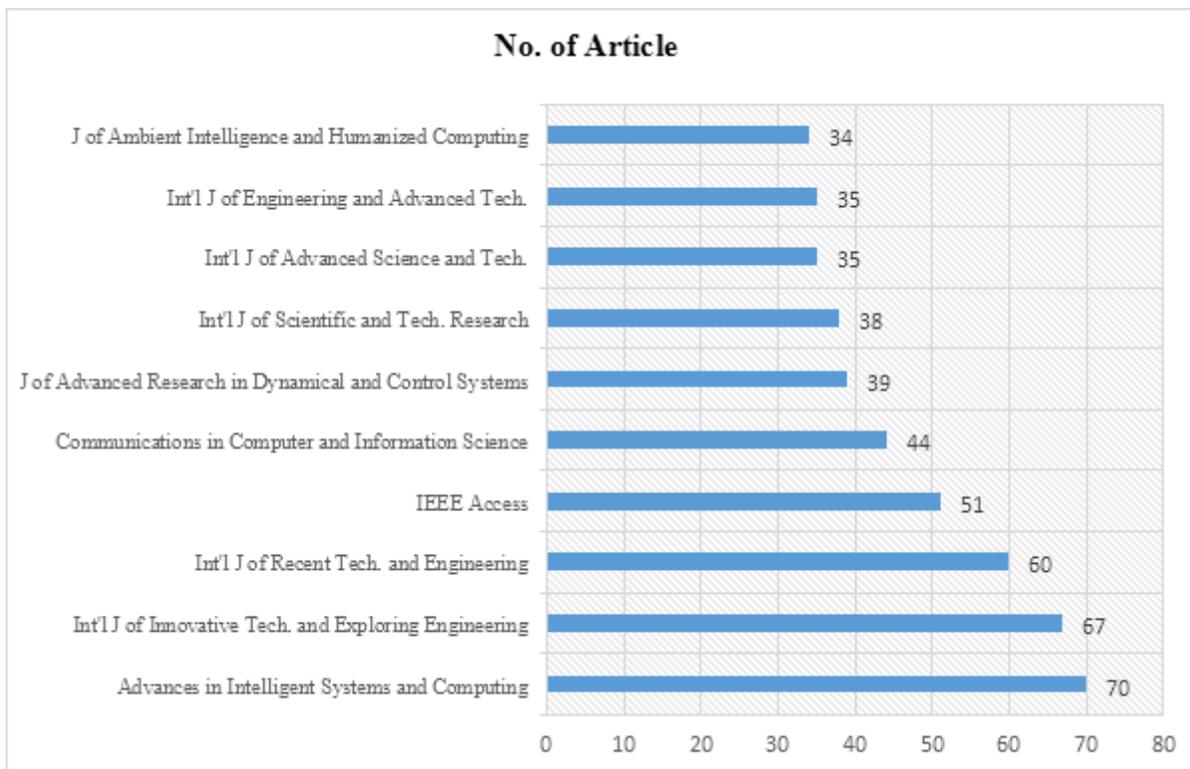


Figure 2

Top ten prolific journals in the field

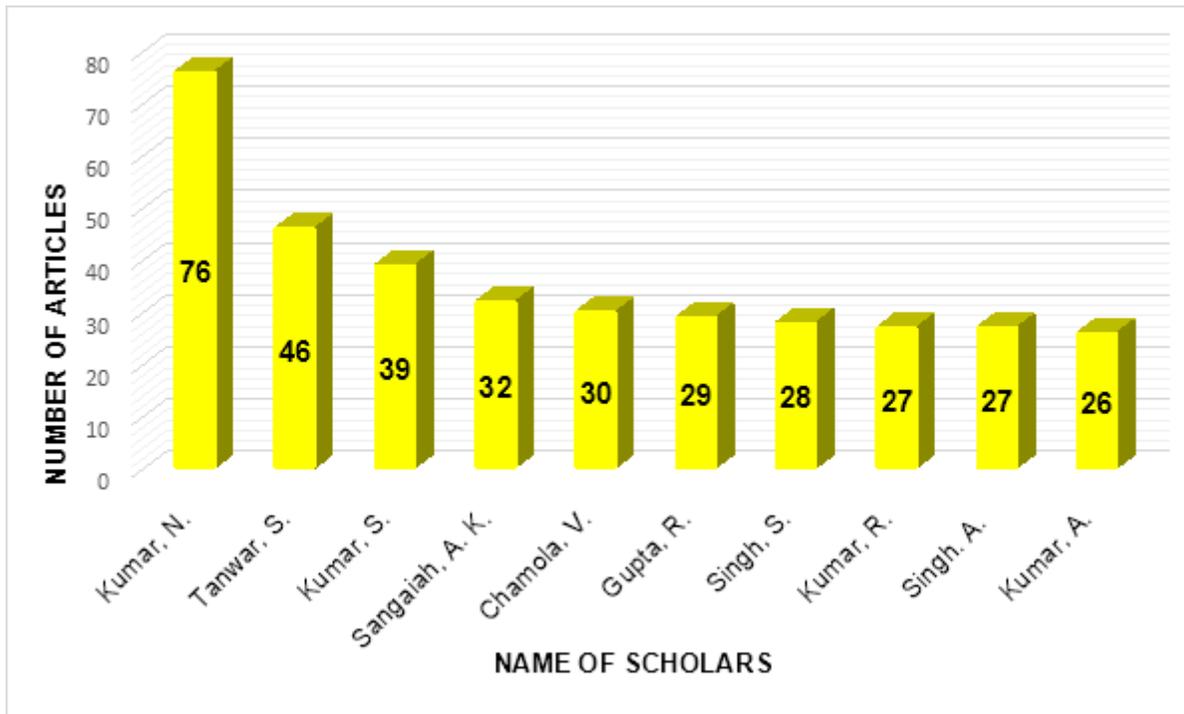


Figure 3

Top ten most prolific authors

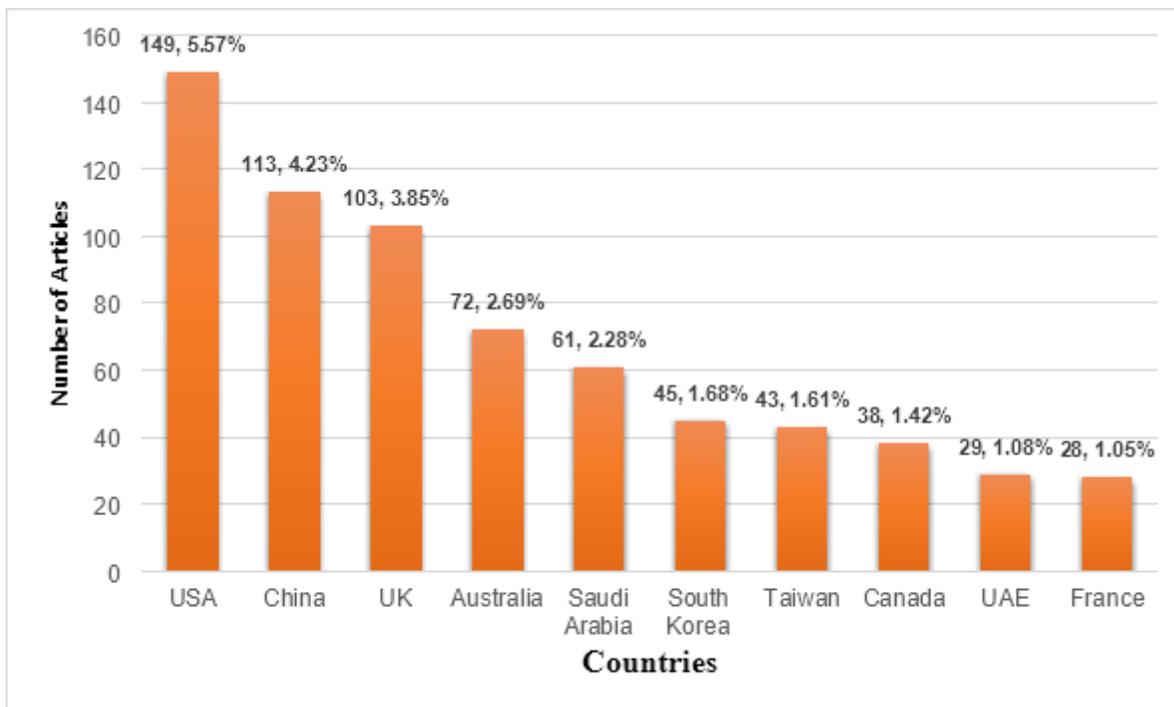


Figure 4

Country ranking based on collaboration with Indian authors for research on blockchain technology

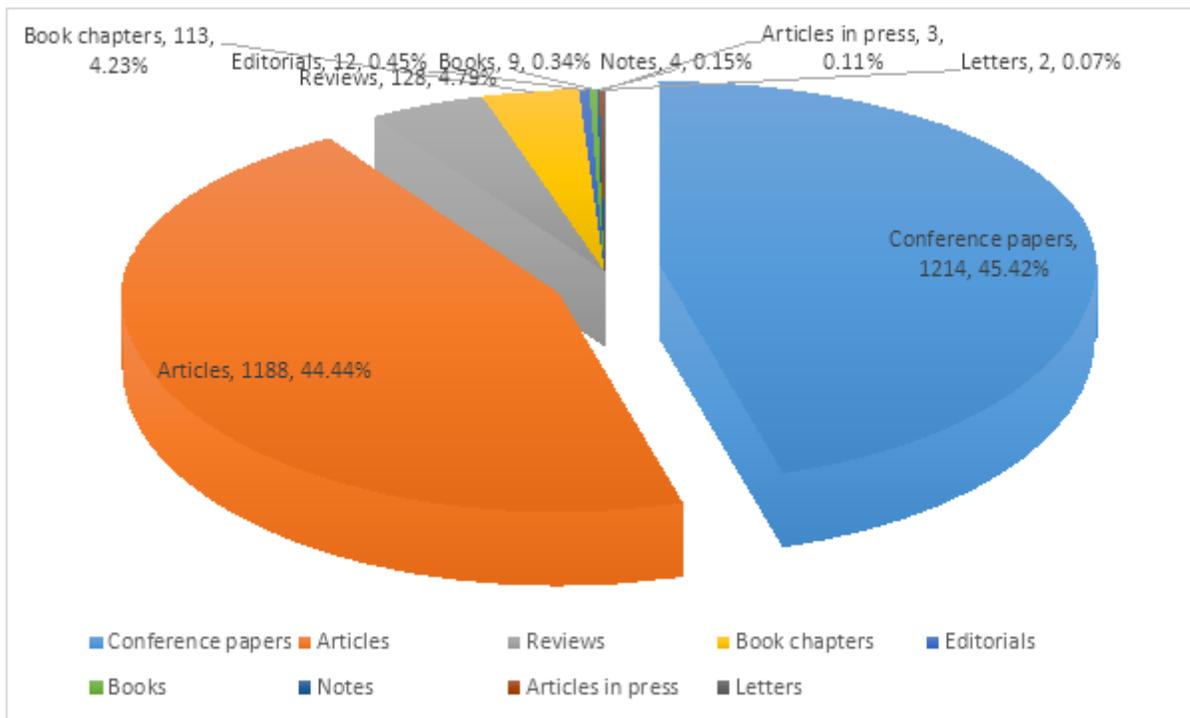


Figure 5

Different types of published documents by Indian authors