Bitcoin

by Sugiantoro Sugiantoro

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A Study of Bitcoin using Scientometric Analysis from 2011-2019

Agung Purnomo[1,a)], Anita Kartika Sari[2], Abdul Aziz[2], Dasapta Erwin Irawan[3], Sugiantoro Sugiantoro[4]

[1] *Bina Nusantara University, Jakarta, Indonesia*
[2] *Sekolah Tinggi Ilmu Ekonomi Mahardhika, Surabaya, Indonesia*
[3] *Institut Teknologi Bandung, Bandung, Indonesia*
[4] *IKIP Widya Darma, Surabaya, Indonesia*

[a)]Corresponding author: agung.purnomo@binus.ac.id

Abstract. Bitcoin in the last decade, has become increasingly popular as a form of electronic currency. This paper aims to review the status and visual map position of research in the internationally Bitcoin studies indexed Scopus that used a bibliometric positioning overview. The research was carried out using bibliometric techniques. Data analysis as well as visualization utilizing VOS Viewer program and the Scopus function for analyze search results. In this review, the details collected applied to 3,281 documents issued from 2011 through 2019. The study reveals that Bouri, E. and Chinese Academy of Sciences, Studies were the most active individual scientists and affiliated institutions in Bitcoin studies. In bitcoin studies, the Computer Science and Lecture Notes in Computer Science Including Subseries Lecture Notes In Artificial Intelligence And Lecture Notes In Bioinformatics were the most areas of study and dissemination sources. There were one worldwide group maps with collaborative researchers. In order to identify the body of knowledge created from eight years of publication, this study constructed a convergence axis grouping comprising of bitcoin studies: Bitcoin, E-Finance, Blockchain, Privacy, Cybercrime, Computation, and Systems, abbreviated as the theme BFBPCCS.

INTRODUCTION

In general, financial markets tend to react to new information with respect to political events that may have a significant influence on macroeconomic policy [1]. Bitcoin can be considered money in several small domains [2] pricing and predictability, substantial price volatility, efficiency price [3]. Great price volatility and contagion of risk have frequently been observed in global financial and energy markets due to increased uncertainty in real economic developments, international geopolitical conflicts and discontinuity of economic policies, etc. When facing increased volatility/risk stemming from financial and energy markets, investors usually choose various hedging assets to offset market risk and lock in profits [4]. Investors might assume that buying a digital currency that is in limited supply allows them to sell later at a higher price and this in turn could cause a speculative bubble [5], and would increase the predictability of cryptocurrencies from traditional assets, such as stock returns. Minimizing risk and uncertainty and increasing return on investment [6].

Bitcoin can be considered as a substitute for traditional currency [7]. The Bitcoin market offers a unique opportunity to test several constructs in microstructural theory in terms of similarity, liquidity, and price discovery [8]. Importantly, this role is strongest in a short period of time, and is particularly evident during periods of crisis. Like gold, the term supply of Bitcoin, the most well-known and valuable cryptocurrency available globally, has the characteristics of limited supply and short inelasticity [9]. Bitcoin is becoming increasingly popular as a form of electronic currency [10]. Over the last few years, the cryptocurrency market has grown significantly. Amid immense public interest, the use of cryptocurrencies has increased in response to the perceived problems of existing monetary and payment systems that were exposed during financial market turmoil but also because the unprecedented increase in cryptocurrency prices gave its users the potential to achieve significant profits. very high in just a few weeks or

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months [11]. The rapid development of cryptocurrencies has caught the attention of investors, speculators, regulators, and academics in recent years [12]. An example is a large company that recognizes its potential for real-world solutions [13]. Managers can take advantage of the asymmetric multiplicity to predict future prices and generate profits [14]. Bitcoin and Cryptocurrency price movements are the latest additions to financial instruments, and others have garnered increased attention over the past few times that price movements of other cryptocurrencies are independent of one another [15] good for the government or any agency [16]. Due to various innovations in the design of the decentralized system, cryptocurrencies have shown dramatic developments. Currently, there are thousands of cryptocurrencies on the market [17].

Bitcoin has attracted a lot of attention from practitioners, academics and the media because of its unique decentralized payment or belief system that does not depend on third parties (e.g., financial institutions), many people use Bitcoin as a safe haven or a hedge asset to avoid risk and uncertainty market [18]. In research conducted by the U.S. Kumar argues that the correlation follows the nature of an aperiodic cycle, and cryptocurrency prices are driven by Bitcoin's price movements [15]. In general, previous research related to bitcoin has been limited to researching only one research topic, such as one country [19] and one institution [8]. Unfortunately, despite presenting a broad image map visualized year over year with details from several published studies at the global scale, there has not been much publication on Bitcoin. The strong positive relationship regarding affiliation, scholars, and the impact of scholarly studies has also not been explicitly discussed by any publication. This paper aims to review the status and visual map position of research in the internationally Bitcoin publication indexed Scopus that used a bibliometric perspective. We monitor the increase in the number of Bitcoin related scholarly documents published as well as indexed by Scopus since 2011 through 2019.

RESEARCH METHODS

This review mapped the status of study conducted in the last eight years at global level on the basis of Bitcoin. In April 2020, this study collected data from the Scopus utilizing document search queries [20]. The research was carried out using bibliometric techniques. Data analysis as well as visualization utilizing VOS Viewer program and the Scopus function for analyze search results [21][22].

This study identifies Bitcoin keywords to recognize and look for Scopus database publications with 3,281 globally published documents from 2011 through 2019. The research confined collection of data to 2019 and excluding 2020. In order to reflect the state of the study over the entire year, the annual academic data collected from January to December. TITLE-ABS-KEY (bitcoin) AND PUBYEAR <2020 AND (EXCLUDE (PUBYEAR, 1984)) is the query input command which is implemented while mining academic publication data on online database of Scopus.

The research applies a co-authorship analysis with authors' analysis units and full calculation systematic techniques utilizing VOS Viewer to gain the collaboration research network of the international researcher. The research conducted an in-depth co-occurrence analysis with keyword relation analysis as well as a full systematic technique of calculation utilizing VOS Viewer to generate a keyword map network.

RESULTS AND DISCUSSION

Bitcoin studies appear to be likely to increase and grow per year. The tallest point for international publication was 1,355 papers in 2019. Since 2011, publishing on Bitcoin has already started.

Bitcoin Studies Most Common Organizational Affiliations

The leading research organizations in Bitcoin publication was the Chinese Academy of Sciences with 49 papers, followed by ETH Zürich with 43 papers, UCL and Research with 37 papers, CNRS Center National de la Recherche Scientifique with 31 papers, Cornell University with 30 papers, Massachusetts Institute of Technology with 25 papers, The University of Chinese Academy of Sciences with 25 documents, Montpellier Business School with 25 papers, and Università degli Studi di Cagliari with 24 papers.

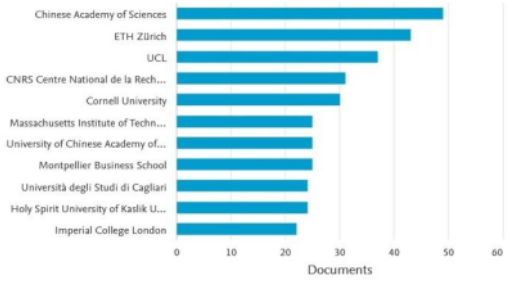

FIGURE 1. Organizational Affiliation Number of Annual Publication of Bitcoin Studies

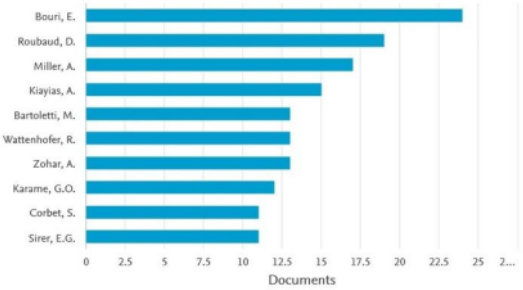

FIGURE 2. Number of Documents by Researcher of the Bitcoin Studies

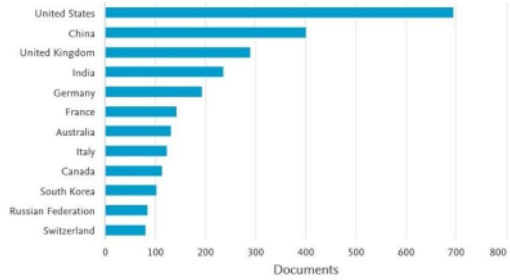

FIGURE 3. Number of Documents by Nation from the Bitcoin Studies

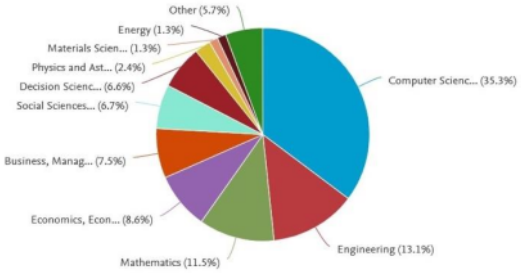

FIGURE 4. Most Frequent Type Document of Bitcoin Studies

Bitcoin Studies Most Individual Researcher

The researcher in the area of Bitcoin studies to the most writings was Bouri, E. with 24 papers. Followed by Roubaud, D. with 19 papers, Miller, A. with 17 papers, Miller, A. with 15 papers, Bartoletti, M. with 13 papers, Wattenhofer, R. with 13 papers, Zohar, A. with 13 papers. Karame, G.O. with 12 papers, Corbet, S. with 11 papers, and Sirer, E.G. with 11 papers.

Nation Number of Annual Publication of Bitcoin Studies

In Bitcoin publications, the United States with 694 papers. Followed by, China with 400 papers, United Kingdom with 289 papers, India with 235 papers, Germany with 192 papers, France with 141 papers, Australia with 131 papers, Italy with 122 papers, Canada with 113 papers, South Korea with 102 papers, Russian Federation with 84 papers, and Switzerland with 80 papers.

The Largest Frequency of Publication of Bitcoin Studies by Subject Area

With 2,182 documents (35.3 percent), Computer Science in the subject area was the most frequent subject area in international publications on Bitcoin. Followed by Engineering (13.1%) with 809 documents; Mathematics (11.5%) with 709 documents; Economics, Econometrics and Finance (8.6%) with 532 documents; in the field of Business, Management and Accounting (7.5%) with 466 documents; Social Sciences (6.7%) with 415 documents, Decision Sciences (6.6%) with 411 documents; Physics and Astronomy (2.4%) with 149 documents; Materials Science (1.3%) with 83 documents; and Energy (1.3%) with 82 documents.

Year Documents of Bitcoin Studies Sources

The leader in the annual number of sources of Bitcoin Studies publications is the "Lecture Notes In Computer Science Including Subseries Lecture Notes In Artificial Intelligence and Lecture Notes In Bioinformatics" with 367 documents, followed by "ACM International Conference Proceeding Series" with 72, Finance Research Letters with 64 documents, "Physica A Statistical Mechanics and Its Applications" with 45 documents, and IEEE Access with 40 papers.

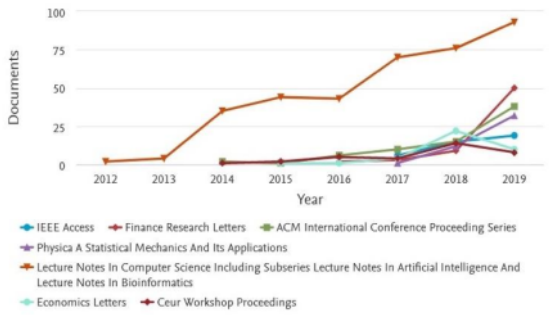

FIGURE. 5. Number of Annual Documents Based on the Bitcoin Studies Sources

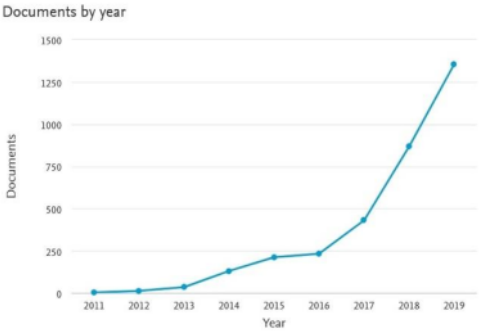

FIGURE 6. Number of Documents Per Year from Bitcoin Studies

Map of Study Themes

With analysis and visualization of the VOS Viewer program, construction was developed on the Bitcoin keyword framework for the Bitcoin research of publication theme map. Eleven repetitions were the criterion for the minimum number of keyword-related documents. Therefore, 327 keywords among 11,517 keywords reached the thresholds. From Figure. 7. there were nine publication theme groups dependent on study keywords regarding the international academic publication of Bitcoin Publication, simplified as well as abbreviated as BFBPCCS themes.

1. Bitcoin Cluster (Red). The keywords bitcoin, cryptocurrencies, investments, data mining, market efficiency, and forecasting dominated in this cluster. Most of these keywords relate to bank themes.
2. E-Finance cluster (yellow). We can find finance themes in this cluster. This cluster was related by the keywords Money, virtual currency, digital currency, gold, and commerce.
3. Blockchain cluster (Green). We can find blockchain themes in this cluster. This cluster was related by the keywords blockchain, Ethereum, consensus algorithms, and decentralised.
4. Privacy cluster (blue). The keywords privacy, cryptography, block-chain, data privacy, and private key dominated in this cluster.
5. Cybercrime cluster (orange). The keywords cybercrime, Computer crime, crime, malware, ransomware and scalability dominated in this cluster. Most of these keywords relate to Cybercrime themes.
6. Computation cluster (Light Blue). The keywords computation approach, computation theory, mining, mining process, miners, consensus protocol, and incentive mechanism dominated in this cluster.

Systems cluster (Purple). The keywords system approach, open systems, internet of thing (IoT), smart city, IoT, and fault tolerance dominated in this cluster.

Researcher Collaboration Network

With the VOS Viewer program, construction was developed on the Bitcoin studies publication framework for the authorship network map. Five documents were one of the requirements for the minimum collection of publications per author. Thus, out of 6,237 researchers, 204 researchers who reached the thresholds were recognized. There is three collaborative patterns of researchers in the Bitcoin field as seen in Figure 8.

1. Green Cluster: Li, X., Liu, J., Yu, H., Chu, J., Zhang, L., Liu, X., Khazraee, M..
2. Blue Cluster: Urquhart, A., Wang, P.
3. Red Cluster: Li, Q., Wang, Y., Wang, H., Liu, Z., Xu, M.
4. Yellow Cluster: Miller A., Bonneau J., Mccoy, D., Kate, A., Kumar, S.
5. Orange Cluster: Xu, L, Gao, Z., Karame, G.O.
6. Purple Cluster: Hao, F., Moser, M., Moore, T.
7. Light Blue Cluster: Yuan, Y., Li, J., Bouri, E., Molnar, P.
8. Brown Cluster: Zhanf, F., Li, Y., Zhao, Y., Green, M.
9. Pink Cluster: Shi, E., Juels, A., Wattenhofer, R., Sirer, E.G., Saxena, P.

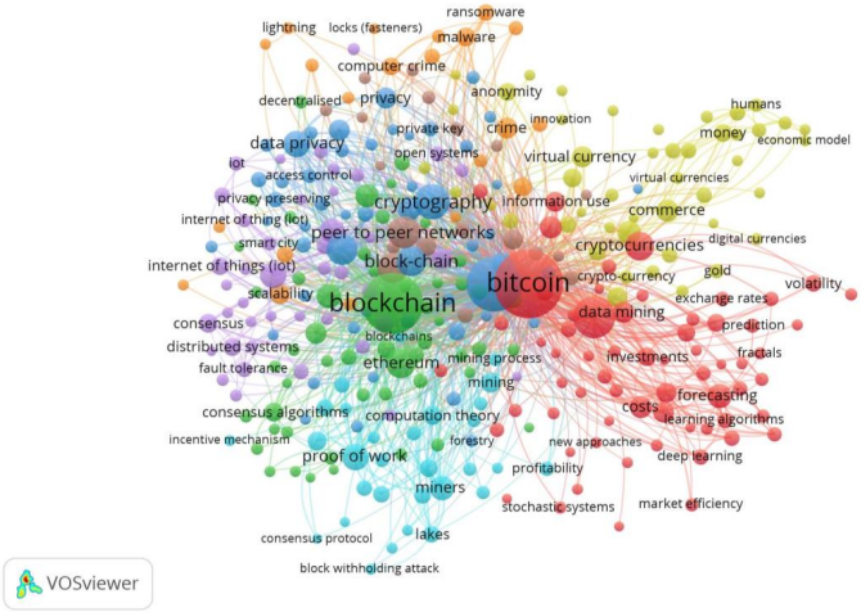

FIGURE 7. Map of Study Themes

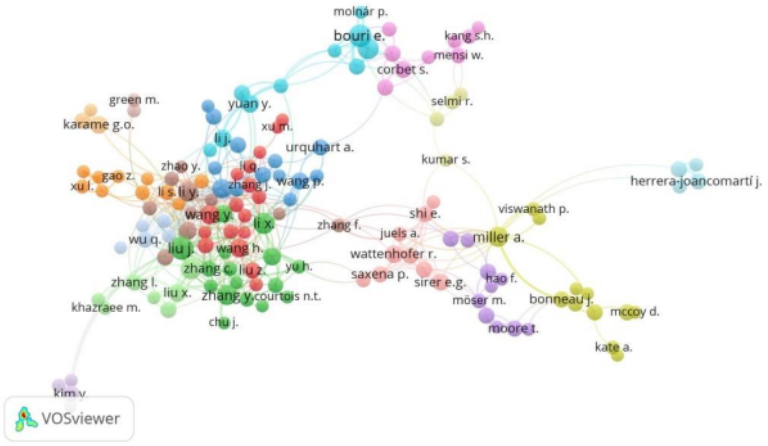

FIGURE 8. Researcher Collaboration Network

CONCLUSION

The results of this research revealed that there is an annual trend towards a spike in the amount of international publications on Bitcoin, there were maps and visual patterns. In the publication of the Bitcoin Studies, Chinese Academy of Sciences was the most active research institution with 49 papers. Meanwhile, In the Bitcoin Studies, the individual academic researcher with the most prolific publications was Bouri, E., 24 papers with it. With 694 papers, the United States was the country with the greatest contribution to publications in Bitcoin Studies. With 2,182 papers (35.3 percent), the most intensively studied areas published in the Bitcoin Studies publication were Computer Science. The "Lecture Notes In Computer Science Including Subseries Lecture Notes In Artificial Intelligence And Lecture Notes In Bioinformatics" with 367 documents was the majority of annual documents by the source in the Bitcoin Studies publication. With 1,355 papers, the highest publication of worldwide scholarly publications in Bitcoin Studies was in 2019. The study of Zyskind, G., Nathan, O., and Petland, A.S was the most widely cited publication on Bitcoin Studies Publication. The most number cited was in 2015 entitled "Decentralizing privacy: Using blockchain to protect personal data", which cited 768 papers. There were nine researcher partnership groups linked to the publication of Bitcoin Studies publication.

In terms of contributing knowledge implications, this study recommends a classification of the convergence axis comprising of publication in Bitcoin Studies publication to classify the body of knowledge created from eight years of academic publication: Bitcoin, E-Finance, Blockchain, Privacy, Cybercrime, Computation, and Systems, abbreviated as the BFBPCCS theme. The identification of key themes in the Bitcoin leads, as practical implication, contributes to an awareness of the creation of practical studies to clarify general contexts and topics, as well as research gaps. All this will lead to fresh research addressing a lack of study and specialized expertise in the disciplines. The most studied themes often reflect the ability to contribute of Bitcoin to finance, technology, e-commerce and payment.

REFERENCES

1. J. Bouoiyour, R. Selmi, and M. E. Wohar, "Safe havens in the face of Presidential election uncertainty: A comparison between Bitcoin, oil and precious metals," Appl. Econ., vol. 51, no. 57, pp. 6076–6088, 2019, doi: 10.1080/00036846.2019.1645289.
2. N. Cachanosky, "Can Bitcoin become money? The monetary rule problem," Aust. Econ. Pap., vol. 58, no. 4, pp. 365–374, 2019, doi: 10.1111/1467-8454.12158.
3. S. Corbet, V. Eraslan, B. Lucey, and A. Sensoy, "The effectiveness of technical trading rules in cryptocurrency markets," Financ. Res. Lett., vol. 31, pp. 32–37, 2019, doi: 10.1016/j.frl.2019.04.027.
4. S. Zeng, X. Liu, X. Li, Q. Wei, and Y. Shang, "Information dominance among hedging assets: Evidence from return and volatility directional spillovers in time and frequency domains," Phys. A Stat. Mech. its Appl., vol. 536, 2019, doi: 10.1016/j.physa.2019.122565.
5. J. Geuder, H. Kinateder, and N. F. Wagner, "Cryptocurrencies as financial bubbles: The case of Bitcoin," Financ. Res. Lett., vol. 31, pp. 179–184, 2019, doi: 10.1016/j.frl.2018.11.011.
6. K. O. Isah and I. D. Raheem, "The hidden predictive power of cryptocurrencies and QE: Evidence from US stock market," Phys. A Stat. Mech. its Appl., vol. 536, 2019, doi: 10.1016/j.physa.2019.04.268.
7. Ł. Goczek and I. Skliarov, "What drives the Bitcoin price? A factor augmented error correction mechanism investigation," Appl. Econ., vol. 51, no. 59, pp. 6393–6410, 2019, doi: 10.1080/00036846.2019.1619021.
8. P. K. Jain, T. H. McInish, and J. L. Miller, "Insights from bitcoin trading," Financ. Manag., vol. 48, no. 4, pp. 1031–1048, 2019, doi: 10.1111/fima.12299.
9. S. H. Kang, R. P. McIver, and J. A. Hernandez, "Co-movements between Bitcoin and Gold: A wavelet coherence analysis," Phys. A Stat. Mech. its Appl., vol. 536, 2019, doi: 10.1016/j.physa.2019.04.124.
10. Y. Wu, A. Luo, and D. Xu, "Identifying suspicious addresses in Bitcoin thefts," Digit. Investig., vol. 31, 2019, doi: 10.1016/j.fsidi.2019.200895.
11. P. Katsiampa, "An empirical investigation of volatility dynamics in the cryptocurrency market," Res. Int. Bus. Financ., vol. 50, pp. 322–335, 2019, doi: 10.1016/j.ribaf.2019.06.004.
12. J. Kurka, "Do cryptocurrencies and traditional asset classes influence each other?," Financ. Res. Lett., vol. 31, pp. 38–46, 2019, doi: 10.1016/j.frl.2019.04.018.

13. A. O. J. Kwok and S. G. M. Koh, "Is blockchain technology a watershed for tourism development?," Curr. Issues Tour., vol. 22, no. 20, pp. 2447–2452, 2019, doi: 10.1080/13683500.2018.1513460.
14. W. Mensi, Y.-J. Lee, K. H. Al-Yahyaee, A. Sensoy, and S.-M. Yoon, "Intraday downward/upward multifractality and long memory in Bitcoin and Ethereum markets: An asymmetric multifractal detrended fluctuation analysis," Financ. Res. Lett., vol. 31, pp. 19–25, 2019, doi: 10.1016/j.frl.2019.03.029.
15. A. S. Kumar and T. Ajaz, "Co-movement in crypto-currency markets: evidences from wavelet analysis," Financ. Innov., vol. 5, no. 1, 2019, doi: 10.1186/s40854-019-0143-3.
16. S. Wu, M. Tong, Z. Yang, and A. Derbali, "Does gold or Bitcoin hedge economic policy uncertainty?," Financ. Res. Lett., vol. 31, pp. 171–178, 2019, doi: 10.1016/j.frl.2019.04.001.
17. Z. Tu and C. Xue, "Effect of bifurcation on the interaction between Bitcoin and Litecoin," Financ. Res. Lett., vol. 31, pp. 382–385, 2019, doi: 10.1016/j.frl.2018.12.010.
18. G.-J. Wang, C. Xie, D. Wen, and L. Zhao, "When Bitcoin meets economic policy uncertainty (EPU): Measuring risk spillover effect from EPU to Bitcoin," Financ. Res. Lett., vol. 31, pp. 489–497, 2019, doi: 10.1016/j.frl.2018.12.028.
19. P. Giudici and P. Pagnottoni, "High frequency price change spillovers in bitcoin markets," Risks, vol. 7, no. 4, 2019, doi: 10.3390/risks7040111.
20. A. Purnomo and A. Aziz, "Dataset of Bitcoin Publication (2011-2019)," Mendeley Data, vol. 1, 2020, doi: 10.17632/vckvvjk8hy.1.
21. A. Purnomo, A. K. Sari, E. Mufidah, N. Asitah, and A. Aziz, "Digital Business: A Scientific Publication Positioning using Scientometric Analyze," Proc. - 2020 ICIMTech, vol. 1, 2020, doi: 10.1109/ICIMTech50083.2020.9211174.
22. A. Purnomo, E. Rosyidah, M. Firdaus, N. Asitah, and A. Septianto, "Data Science Publication: Thirty-Six Years Lesson of Scientometric Review," Proc. - 2020 ICIMTech, vol. 1, 2020, doi: 10.1109/ICIMTech50083.2020.9211192.

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