



To The Study of Bibliometric Analysis for Block Chain Technology in Banking Sector

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Abstract – Bibliometric analysis is used across a wide range of disciplines to provide insights into research productivity, the influence of specific authors or institutions, and the overall growth of scientific knowledge. It helps identify leading scholars, influential works, and collaborative networks, as well as forecast future research directions. This study conducts a comprehensive bibliometric analysis of scholarly research using 1,286 articles from the Dimensions database. The analysis explores four key dimensions: citation networks, co-authorship patterns, bibliographic coupling by institutions, and co-citation of references. The citation network reveals 85 sources in 11 clusters, highlighting prominent themes such as technological forecasting, social sustainability, and international business research. Co-authorship analysis identifies 73 authors, with the largest connected network featuring 31 authors across six clusters, emphasizing collaborative dynamics. Bibliographic coupling maps 224 institutions, with central nodes like Malaviya National Institute of Technology and Symbiosis International University. Finally, co-citation analysis identifies thematic clusters around journals such as Journal of Business Research and Scientometrics, offering insights into intellectual structures. This study provides a detailed map of academic interactions, shedding light on influential works, contributors, and institutional collaborations.

Keywords – Bibliometric analysis, Blockchain, Banking, Citation networks, Co-authorship, Bibliographic coupling, Co-citation, Scholarly collaboration.

I. INTRODUCTION

Block chain is a revolutionary technology that emerged with the launch of Bitcoin in 2008. It is a decentralized, distributed ledger system that enables secure, transparent, and immutable recording of transactions across a network of computers. The unique feature of block chain is that it operates without the need for a central authority, relying on consensus algorithms to validate and record data. Once information is added to the block chain, it is virtually impossible to alter or tamper with, providing a high level of security and trust. Key concepts like smart contracts self-executing contracts with the terms of the agreement directly written into code and decentralized applications, have expanded block chain's utility by allowing automated and Transparent processes.

The technology's decentralized nature, transparency, and security features have made it a subject of extensive research. Its potential to disrupt traditional systems and create new models for business, governance, and digital interactions continues to fuel interest in both academia and industry. In summary, block chain is a transformative technology that offers innovative solutions for ensuring trust, transparency, and security in digital interactions, with the potential to reshape numerous industries and sectors globally.

II. BIBLIOMETRIC ANALYSIS

Bibliometric analysis is a quantitative method used to evaluate and analyze the impact, structure, and trends of scientific literature. By examining patterns in academic

publications, citations, co-authorship, and keyword usage, bibliometric analysis provides a systematic way to assess research outputs, identify influential works and authors, and uncover emerging areas of study. This method has become an essential tool for researchers, institutions, and policymakers to measure the impact of research and track the evolution of specific fields or topics. The key components of bibliometric analysis include:

1. **Citation Analysis:** This assesses the influence of research by counting the number of times a particular paper, author, or journal has been cited in other works. High citation counts typically indicate that a paper has made a significant contribution to its field.
2. **Co-authorship Analysis:** This looks at collaboration networks between researchers and institutions, helping to map out relationships and understand how knowledge is shared across different geographical and academic contexts.
3. **Keyword Analysis:** By studying the frequency and evolution of specific keywords in published papers, bibliometric analysis can identify key themes and emerging trends in a research field.
4. **Co-citation and Bibliographic Coupling:** These methods examine how frequently two papers or authors are cited together, offering insights into how research areas are interconnected.

III. LITERATURE REVIEW

The rapid growth of blockchain technology has led to an increasing volume of academic literature exploring its applications, implications, and development across various



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fields. This literature review examines the current body of work that applies bibliometric methods to blockchain research, highlighting key trends, influential publications, collaborative networks, and emerging topics. Numerous studies have examined the growing volume of blockchain-related publications.

According to Liu et al. (2019), blockchain research has experienced exponential growth since 2015, coinciding with the surge in interest in cryptocurrencies like Bitcoin and Ethereum. This growth is not limited to computer science and finance but has spread to a wide range of fields, including healthcare, supply chain management, and law. Bibliometric analysis, such as that conducted by Ante (2020), shows that blockchain research has expanded globally, with contributions from both developed and developing countries, signifying its broad appeal and relevance.

Co-word and co-citation analyses conducted by Zhang et al. (2020) further highlighted how blockchain research is structured. They found that while crypto currency remained a central theme, emerging topics such as blockchain in Internet of Things (IoT), cyber security, and block chain's environmental impact are gaining traction. The analysis shows that block chain research is evolving from a technology-focused discourse to one that includes interdisciplinary applications and societal implications.

Identifying the most influential publications and authors is a key focus of bibliometric analysis. Citation analysis by Ante (2020) identified the most impactful papers in terms of citations and journal influence, noting that leading blockchain research is frequently published in high-impact journals like 'IEEE Access', 'Journal of Business Research', and 'Expert Systems with Applications'. Bibliometric analysis has also been used to study collaboration patterns among blockchain researchers. A study by Casino et al. (2019) used co-authorship analysis to identify key collaboration networks in blockchain research.

One of the key contributions of bibliometric analysis is its ability to identify emerging trends and research frontiers. Several studies have used citation bursts and keyword trends to forecast future directions in blockchain research. Bibliometric studies by Zhang et al. (2020) highlight the increasing integration of blockchain with IoT, artificial intelligence, and cybersecurity. These hybrid technologies are expected to form the backbone of future blockchain systems, addressing current limitations and enabling new, innovative applications in sectors such as smart cities, digital identity, and supply chain transparency. This study is done to find out the citation analysis, co-citation, co-authorship, coupling analysis.

IV. RESEARCH METHODOLOGY

Bibliometric analysis is a widespread and accurate method for examining and analyzing large volumes of scientific data. This technique is intended to comprehend

interconnectedness among journal citations and sum up the up-to-date situation in terms of a current or rising research topic. In the research, the data used in a bibliometric analysis is retrieved from Dimension database. A total of 1496 articles were extracted from the dimension database with the use of following keywords "BIBLIOMETRIC ANALYSIS" AND "BLOCKCHAIN" AND "BANKING". The latest five year were considered from 2020 to 2024 and the articles from UGC CARE I & II list were taken. The received results have been downloaded in CSV format. The next step is to clean the data. 146 articles from other languages and 64 articles from author were found irrelevant. So, a total of 210 irrelevant articles were removed. After that a total of 1286 articles were processed using VOS viewer to do perform bibliometric analysis.

Result & Analysis

The study examines four key aspects of scholarly research networks. It first analyzes the citation network of sources, mapping out the influence and connections between different works by examining how sources cite each other. Secondly, it investigates the co-authorship of publications by authors, highlighting patterns of collaboration and joint research efforts among researchers. Thirdly, it assesses the bibliographic coupling of publications by organizations, focusing on shared references in publications to understand the research links between various institutions. Lastly, it evaluates the co-citation of publications by cited references, revealing related research themes, and identifying influential works based on how frequently two publications are cited together.

Citation Analysis

Citation analysis of the cited source is conducted to reveal the structure of research and presented in this in figure. The minimum number of citations of source was kept at 2, only 85 sources met this criterion and the network formed was thus based on 11 clusters having 423 links and total link strength of 626. Three clusters out of eleven, yellow, orange, and red ones are more extensive than the rest. The yellow area consists of topic related technological forecasting and social, sustainability and research in international business.

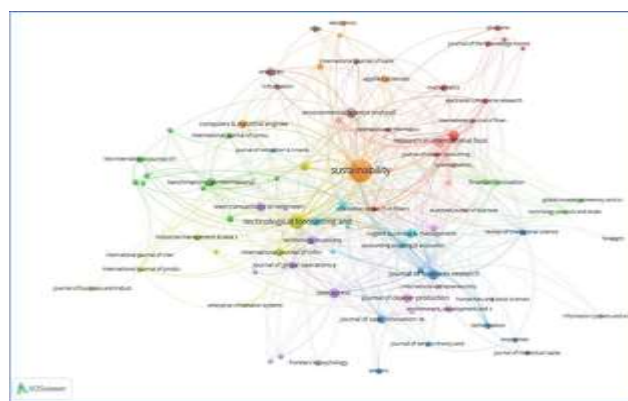


Figure2: The citation network of source



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Co- authorship analysis

Co-authorship analysis examines the interactions among scholars in a research field. Since co-authorship is a formal way of intellectual collaboration among scholars it is therefore Minimum number of document of authors is 4. Minimum number of co-authorship of authors is 2 For each 73authors the total number of co- authorship link with other authors will be calculate the authors with the greatest total link strength will be selected.

Some of the 73 items of in my network are not connected to each other largest of connected consist of 31 items. thenet Minimum number of document of authors is 4. Minimum number of co-authorship of authors is 2 For each 73authors the total number of co- authorship link with other authors will be calculate the authors with the greatest total link strength will be selected. Some of the 73 items of in my network are not connected to each other largest of connected consist of 31 items.

Three cluster out of six, blue and green ones are more extensive than the rest. The largest cluster of thenetwork (blue) is made up authors, the prominent authors in this cluster are Kumar Satish, Lin, Wen Marc etc. In figure3 we use overlay visualization to set overlay color range. So, the minimum score in2021.5 and maximum score in 2023. The second cluster green is made up authors work formed was thus based on 6 clusters having 55 links and total link strength of 100.

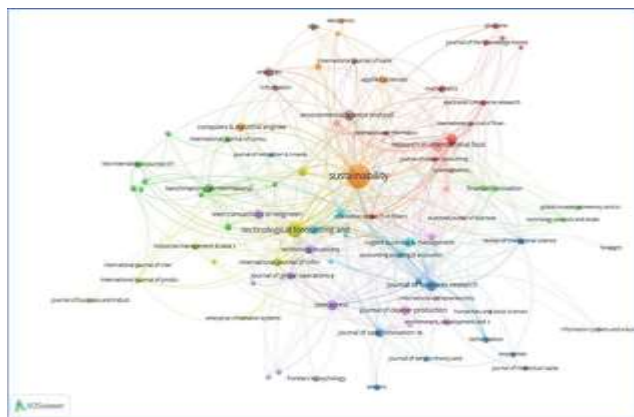


Figure 3: Co- authorship of publications by author (VOSviewer)

Bibliographic coupling of publications by organisations
Bibliographic coupling is a technique for science mapping that operates on the assumption that two publications sharing common references are also similar in their content. Here, the thematic clusters are formed based on the citing publications, and thus, recent and niche publications can gain visibility through bibliographic coupling (unlike co-citation analysis). In that sense, bibliographic coupling is suitable for business scholars who wish to uncover a broad spectrum of themes and its latest developments. The network formed was thus based on10 clusters having 22597 links and total link strength of 1.

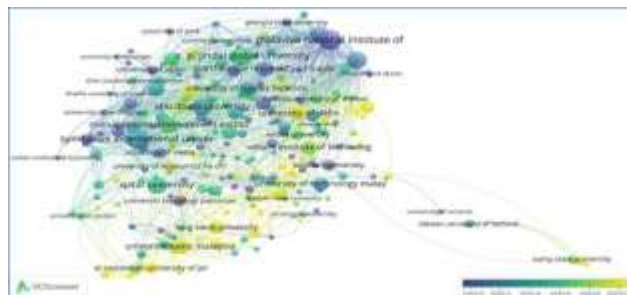


Figure 4: Bibliographic coupling of publications by organisations

Minimum number of documents of organization is 4. Minimum number of Bibliographic coupling of authors is 2. For each of 224 organizations' the total strength of Bibliographic coupling link with other organization will be calculate the organization with the greatest total link strength will be selected. In figure 3 we use overlay visualization to set overlay color range. The results showed that after computing the bibliographic coupling links for all organizations, one organization emerged with the greatest total link strength. This organization serves as a central node in the bibliographic coupling network, indicating a high level of interconnectedness and influence in the research community.

The overlay visualization provided a clear representation of the bibliographic coupling network. Malaviya National Institute of Technology, positioned centrally within the green cluster, indicated strong bibliographic coupling with multiple organizations, suggesting a significant collaborative footprint in their research publications. Swinburne University of Technology, represented in the blue cluster, showed extensive research collaborations and shared citations with other institutions, highlighting influential research outputs. Symbiosis International University, in the red cluster, demonstrated strong bibliographic connections, indicating the university's active participation in collaborative research and substantial research links contributing to its high coupling strength.

The analysis revealed significant insights into the research collaborations and influence of these institutions. The overlay visualization provided an intuitive understanding of the bibliographic coupling network, highlighting the interconnectedness and research influence of Malaviya National Institute of Technology, Swinburne University of Technology, and Symbiosis International University. Each of these institutions showed substantial bibliographic coupling, indicating their active and influential roles in the academic community.

Co- citation of publications by cited reference

In a co-citation network, two publications are connected when they co-occur in the reference list of another publication. Minimum amount of co- citation of cited reference is 20 For each 113authors the total number of the co- citation link with other cited reference will be calculate the reference with the greatest total link strength will be



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selected. the network formed was thus based on 4 clusters having 3796 links and total link strength of 11450. The red area consists of topics related to journal of business research (Donthu, Ect et al (2021)), and the blue area is consists for scientometrics On other hand green area consists of topic related internation journal (saber, s, et al (2018))

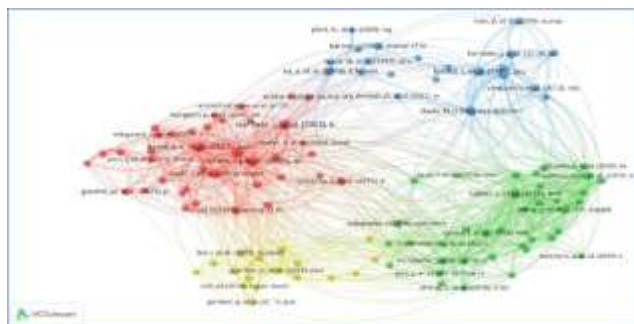


Figure5: Co- citation of publications by cited reference

V. CONCLUSION

The bibliometric analysis conducted on 1286 articles retrieved from the Dimension database regarding "Bibliometric Analysis," "Blockchain," and "Banking" offers valuable insights into scholarly research networks. The study provides a comprehensive examination of four key aspects of scholarly research networks, each revealing distinct insights into the patterns and influences within academic research. Firstly, the citation network of sources uncovers the intellectual linkages between publications. By setting a minimum citation threshold, the analysis identifies 85 sources that meet the criteria, organized into 11 clusters. The most extensive clusters yellow, orange, and red highlight significant areas such as technological forecasting, social sustainability, and international business research. This analysis emphasizes the intricate web of citations that reflect the interdependencies among documents and sources, mapping out a structure that reveals prominent research themes and influential works. Secondly, the co-authorship analysis delves into the collaborative efforts among researchers.

With criteria set for a minimum number of documents and co-authorships, the study identifies 73 authors, although not all are interconnected. The largest connected network consists of 31 authors, forming six clusters with the blue and green clusters being the most extensive. Notable authors like Kumar Satish and Lin Wen Marc are prominent in these clusters. This analysis underscores the importance of intellectual collaboration and how co-authorships shape the landscape of scholarly research, highlighting key contributors and their collaborative networks.

Thirdly, the bibliographic coupling of publications by organizations explores the connections between institutions based on shared references. This analysis, focusing on 224 organizations, reveals thematic clusters and significant collaborative footprints. Institutions like Malaviya National Institute of Technology, Swinburne University of

Technology, and Symbiosis International University emerge as central nodes within their respective clusters, indicating strong research linkages and influence. The bibliographic coupling analysis offers insights into the present state of research fields, uncovering broad themes and recent developments, and showcasing the pivotal role of certain institutions in fostering collaborative research efforts. Lastly, the co-citation analysis of publications by cited references reveals the thematic similarity between frequently co-cited publications. With a minimum co-citation threshold, the study identifies 113 authors and forms a network with four clusters.

The red area, focusing on the Journal of Business Research, and the blue area, concentrating on scientometrics, are prominent, while the green area relates to the International Journal. This analysis elucidates the intellectual structure of research fields by highlighting the underlying themes and identifying influential works based on their co-citation frequencies. In conclusion, the study's multifaceted analysis of scholarly research networks through citation networks, co-authorship patterns, bibliographic coupling, and co-citation analysis provides a detailed map of academic research interactions and influences. It highlights significant areas of research, key contributors, and influential institutions, offering valuable insights into the collaborative and intellectual dynamics that drive scholarly advancements.

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