SMART CONTRACTS, CRYPTOCURRENCIES, AND DONATION SYSTEMS: A BIBLIOMETRIC ANALYSIS OF BLOCKCHAIN IN CHARITY

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Abstract:This bibliometric study explores the landscape of blockchain technology applications within charitable donation ecosystems through an analysis of scholarly publications indexed in the SCOPUS database. Drawing on 44 articles published between 2016 and 2024, the study identifies key trends, research patterns, and recommendations for researchers and practitioners. The analysis, conducted using Biblioshiny (a Shiny app for the Bibliometrix R package), presents findings through various visualisations. Notable insights include the role of smart contracts and cryptocurrencies in enhancing transparency, security, and sustainability in donation processes. The study highlights the importance of cross-disciplinary collaboration among charitable organisations, donors, and technologists to harmonise blockchain applications for improved donation systems. Ultimately, this analysis provides a foundation for strategic research developments in the field of blockchain-enabled philanthropy.

Keywords: Blockchain, Bibliometrics, Charitable giving, Financial technology, Smart contracts

1. Introduction

In the past decade, the world has witnessed numerous disasters and crises, including natural disasters, financial upheavals, and most recently, the Covid-19 pandemic, which has affected populations globally. In such times, appeals for donations are critical in providing immediate and long-term support to affected communities. The pandemic, in particular, has underscored the vital role of donations and crowdfunding platforms in channelling financial assistance to those in need. Donations are essential in crises for several reasons. They help mitigate shortfalls in state resources during emergencies (Addison & Rubin, 2023) and are integral to recovery efforts, enabling timely responses to various challenges (Mandeep Kaur et al., 2024). Contributions address critical needs such as food, shelter, and medical care for vulnerable populations (Penta et al., 2020). As disasters become increasingly complex, the effective mobilisation and management of donations have emerged as pressing global concerns.

2. Research Problem

Despite the vital role of donations in providing financial assistance to those in need, nonprofit organizations have consistently reported a decline in donations. Similarly, donation-based crowdfunding platforms often struggle to attract sufficient donor support, with many campaigns failing to reach their funding targets (DongIl, & JaeHong, 2020). This downward trend is alarming, as reduced donations can significantly affect the provision of basic necessities, well-being, and opportunities for beneficiaries. Prior research attributes this decline to a "trust crisis" in charitable organizations (Jihye et al., 2023), primarily caused by a lack of transparency and accountability. While donors were once primarily motivated by religious or spiritual fulfillment, contemporary donors are increasingly concerned about the effective and meaningful use of their contributions. To address these concerns, there is a pressing need for more transparent and accountable donation mechanisms to build systems capable of tracking, monitoring, and recording the use of funds (Mandeep Kaur et al., 2024). Charitable organizations, therefore, must uphold principles of efficiency, effectiveness, and ethical responsibility in managing donations.

In response, researchers have recently begun exploring the potential of blockchain technology to mitigate the trust deficit in charitable giving (Buzhen et al., 2023). Blockchain offers transparency, traceability, and immutability, which can help rebuild donor confidence. It minimizes the risk of unethical financial practices while also improving operational efficiency. Notably, Sirisawat et al. (2022) argue that blockchain technology can be leveraged as a strategic tool to strengthen donor relationships by offering greater assurance and potentially incentivizing giving (Howson, 2021). While existing studies acknowledge the theoretical potential of blockchain in enhancing trust within donation systems, a significant gap remains in understanding the practical applications, implementation challenges, and broader implications of its adoption. Much of the current literature is limited to conceptual discussions or isolated case studies, lacking a comprehensive analysis of global trends and research gaps in this domain. To address this shortfall, the present study conducts a bibliometric analysis of the existing literature on blockchain technology in charitable giving systems. By mapping the landscape of current research, this study aims to identify key patterns, challenges, and opportunities. The findings are expected to inform scholars, practitioners, and policymakers seeking to adopt blockchain solutions to enhance trust, accountability, and effectiveness within the nonprofit sector.

3. Literature Review

Charitable donations serve as a vital lifeline during times of crisis, providing essential resources for disaster relief, recovery, and community support. A diverse range of stakeholders are involved in the donation ecosystem, including charitable foundations, non-profit organisations, corporate sponsors, and individual donors. This ecosystem thrives on the altruistic impulses of individuals and the social responsibility initiatives of corporations, collectively mobilising resources to address urgent humanitarian needs (Costa et al., 2022). The impact of charitable donations extends beyond immediate relief efforts, often contributing to long-term sustainable development and resilience-building within affected communities (Eun-Jung et al., 2020). However, some scholars argue that the efficacy of

altruism is diminished in the presence of systemic issues such as governance, which in turn affects institutional trust towards charitable organisations (Baudier et al., 2023). This view aligns with Social Exchange Theory (SET), which posits that relationships, including those between donors and charities, are sustained when the perceived benefits outweigh the costs (Cook et al., 2013). Therefore, when governance issues arise and transparency is lacking, donors may perceive the social "exchange" as no longer favourable, leading to a deterioration in trust.

Despite their critical role, charitable organisations face multifaceted challenges in effectively soliciting donations. One of the most significant difficulties is the widespread issue of donor mistrust and trust deficits, driven by concerns regarding the accountability and transparency of non-profit organisations (Jaekyu et al., 2018). In the charitable context, trust is understood as a multifaceted concept encompassing procedural trust (trust in how decisions are made), competence trust (trust in the outcomes to be delivered), and moral trust (trust in adherence to ethical standards) (Eun-Jung et al., 2020). Although transparency is crucial (Jaekyu et al., 2018), a lack of trust often stems from poorly managed communications and delayed responses to crises (Cerf et al., 2020). This indicates that building trust requires more than transparent financial reporting; it also involves adaptability and the demonstration of responsive governance.

Moreover, Trust Theory particularly cognitive and institution-based trust (McKnight et al., 1998; 2002) helps explain donor behaviour in this context. Donors who are unfamiliar with specific charitable organisations may rely on cognitive-based trust, formed through initial impressions or the perceived credibility of the platform. Conversely, institution-based trust develops when structural safeguards, such as regulations or technologies like blockchain, are in place to ensure the integrity of donations. In addition, one of the most pressing issues is how effectively humanitarian organisations manage the donation supply chain (Anup Kumar, 2021). Baudier et al. (2023) argue that distrust often extends beyond individual charitable institutions, affecting entire networks within humanitarian ecosystems. This broader mistrust underscores the systemic nature of the trust crisis, which may not be fully resolved through technological solutions alone. In this context, the trust crisis is not merely a matter of perception, but rather a governance failure where blockchain technology is frequently proposed to address.

Donors are increasingly demanding greater transparency regarding the allocation and impact of their contributions, prompting organisations to adopt more robust accountability mechanisms (Cerf et al., 2020). Nevertheless, academics remain divided on the definition of accountability within charitable organisations. Cerf et al. (2020) emphasise the importance of real-time financial reporting, whereas Rangone and Busolli (2021) advocate for broader definitions that include outcome evaluation, stakeholder engagement, and ethical stewardship. This divergence highlights the lack of consensus on how philanthropic accountability should be operationalised and the challenges it poses for setting universal standards.

In response to these challenges, blockchain technology has been increasingly proposed for managing financial donation systems, particularly within charitable organisations. The application of blockchain in donation systems seeks to improve

transparency, accountability, and security in tracking the flow of funds or materials (Cerf et al., 2020; Meng et al., 2023). Unlike traditional systems, blockchain's distributed ledger ensures that every transaction is both visible and immutable indicating an attribute that resonates with donors who seek verifiable evidence of impact.

Blockchain technology enhances the donation ecosystem by decentralising fundraising and ensuring transparent, accountable tracking of contributions. Its intrinsic attributes such as efficiency and immutability make it a powerful solution for addressing issues related to data traceability, fraud, and information security within the donation framework. However, decentralisation also presents governance challenges, particularly in the absence of a central authority to enforce ethical standards or adjudicate conflicts. The literature highlights an imbalance between blockchain's technological capabilities and the interactions among stakeholders in the donation framework, revealing a significant research gap that warrants further multidisciplinary investigation.

In addition, blockchain has been regarded as a promising solution to challenges related to data traceability, fraud prevention, and information security. Nonetheless, the assumption that blockchain inherently fosters trust is increasingly subject to academic scrutiny. While trust may shift from traditional institutions to algorithmic systems, it is important to recognise that algorithmic trust is not immune to bias, manipulation, or misuse (Marmolejo-Ramos et al., 2025). Therefore, the effective implementation of blockchain must be accompanied by clear governance models, regulatory oversight, and donor education to realise its full potential.

Despite the growing interest in applying blockchain technology to donation systems, a comprehensive understanding of the scholarly discourse surrounding charitable donations, donor scepticism, trust deficits, and blockchain's role in governance and accountability remains underdeveloped. Although various studies explore individual elements such as donor behaviour (Jaekyu et al., 2018), donation supply chain logistics (Anup Kumar, 2021), or blockchain traceability (Meng et al., 2023), there is a pressing need to synthesise these strands to better understand the intersection of technological tools like blockchain with persistent concerns around trust and institutional legitimacy.

Through a bibliometric analysis, this study systematically maps the intellectual landscape, identifies key trends, gaps, and future opportunities, and informs evidence-based strategies to address challenges in donation management. This methodology is particularly useful in elucidating the dimensions of blockchain most prominently addressed within the existing literature. Furthermore, to the best of our knowledge, a thematically integrated analysis of blockchain in the context of donation systems is currently lacking. Previous bibliometric studies (Nasir et al., 2021; Aqilah Yaacob & Gan, 2021) have examined "blockchain" and "donation" as distinct research areas, without exploring the convergence of these two domains. This represents a missed opportunity to interrogate how blockchain might reshape donation ecosystem dynamics, redefine accountability, and reconfigure trust within the philanthropic sector

4. Method

This research employed a bibliometric approach to examine the body of literature on blockchain technology within the context of donation-related studies. Bibliometric methodology involves the use of quantitative techniques to estimate, analyse, and visualise patterns and trends within academic publications (Koskinen et al., 2008). It is particularly effective for assessing the development of a research domain through key indicators such as publication trends, citation patterns, authorship, publishing sources, and geographical distribution (Docampo & Cram, 2019). This method is especially suitable for exploring interdisciplinary or fragmented fields, as it facilitates the identification of knowledge structures, intellectual trajectories, and thematic shifts over time (Aria & Cuccurullo, 2017). Given that the intersection between blockchain technology and the donation ecosystem remains underdeveloped and fragmented, bibliometric analysis provides a systematic means to map scholarly output, trace evolving research priorities, and identify gaps in the literature.

The bibliometric analysis was conducted using journal articles retrieved from the Scopus database. Scopus was selected as the primary data source due to its comprehensive journal coverage, rigorous indexing criteria, and compatibility with standard bibliometric software (Vivek Kumar Singh et al., 2021). Additionally, Scopus includes nearly all journals indexed by the Web of Science (WoS), making it a reliable and representative database for analysis (Martín-Martín et al., 2020). In contrast, alternative sources such as Dimensions index a broader range of documents, including non-peer-reviewed materials, which may introduce citation bias and compromise data quality (Orduña-Malea & Delgado-López-Cózar, 2018). A comparative study by Martín-Martín et al. (2020) reported that overall journal coverage between Scopus, WoS, and Dimensions varies by only 10–20%, further supporting the selection of Scopus as a comprehensive and robust data source for this study.

This study followed the four-stage bibliometric methodology outlined by Hafizah Omar Zaki et al. (2023), which offers a structured and replicable framework for topic identification, article screening, and inclusion criteria, thereby ensuring methodological rigour. As illustrated in Figure 1, the article selection process comprised three key stages: (1) identification of the research topic, scope, and eligibility criteria; (2) screening of articles; and (3) application of exclusion and inclusion criteria. The analysis began by defining the research scope as the application of blockchain technology in donation systems. Data collection was conducted using the Scopus database, focusing on the fields of article title, abstract, and keywords. The search was limited to the period from 2016 to 2024. A search query was formulated using the terms: TS = (block-chain OR blockchain OR "blockchain technology") AND (donation), which initially yielded 222 records. A series of filters were then applied to refine the results, limiting the selection to English-language, peer-reviewed journal articles. Following this screening process, 178 records were excluded, resulting in a final dataset of 44 articles for bibliometric analysis.

| Topic | Blockchain Technology in |

Scope & Coverage

Database: SCOPUS
Search Field: Article Title, Abstract, Keywords
Time Frame: 2016 – 2024
Language: English
Source Type: Journal

Keyword & Search String

TS = (block-chain OR blockchain OR "blockchain technology") AND (donation OR charit* OR philanthroph*)

Date Extracted — 7 February 2024

Record Identified & Screened — n = 222

Record Removed — n = 44

Record Included for Bibliometric Analysis — *n* = 44

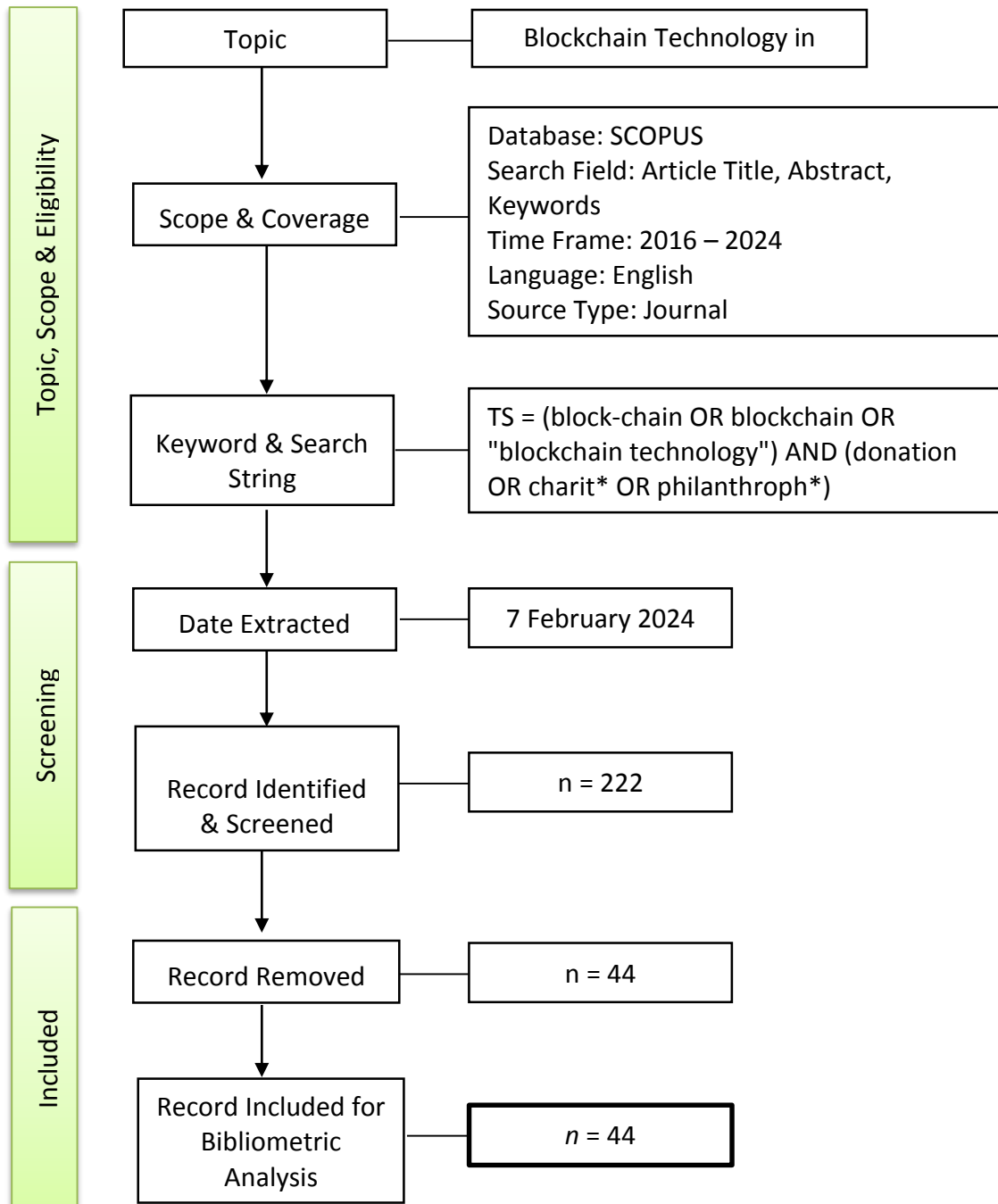Topic, Scope & Eligibility

Screening

Included

Figure 1. Flow diagram of the search strategy

The analysis was carried out using *Bibliometrix* (via the Biblioshiny web interface), an R-based open-source tool that enables data cleaning, bibliometric analysis, and visualisation. This tool offers transparency and supports the reproducibility of results. However, it is important to acknowledge the limitations of bibliometric indicators. Citation counts, for example, can be affected by citation bias, where not all citations reflect positive scholarly impact. Citation practices also vary significantly across disciplines, making direct comparisons difficult. Furthermore, newer publications may receive fewer citations due to time lags, and citation metrics can be artificially inflated through self-citations or citation networks. These limitations may influence data quality and should be considered when interpreting the findings.

5. Analysis and Results

5.1 Performance Analysis

This research examined the application of blockchain technology in the context of donations over the period from 2016 to 2024. As presented in Table 1, the dataset comprises a total of 44 documents, reflecting a diverse body of research produced across the selected timeframe. The annual growth rate of publications is approximately 9.05%, indicating a steady increase in scholarly output and suggesting that this is an active and expanding area of academic inquiry. The average age of the documents is 2.86 years, implying that the literature is relatively recent and thus, likely relevant to current trends and developments. On average, each document has received approximately 8.73 citations, highlighting a growing level of interest and engagement from the academic community. In total, the dataset includes 1,868 references, demonstrating a well-established foundation of prior knowledge and extensive research underpinning these studies. This volume of references underscores the depth and breadth of the field, as well as the rigor of the work published.

The analysis also includes a focus on "Keywords Plus" and "Author's Keywords," with 227 and 181 instances respectively. The distinction between indexed terms and author-selected keywords offers valuable insights into the thematic direction and terminological accuracy of the literature, facilitating a more nuanced understanding of the subject matter covered. A total of 153 authors contributed to the collection, reflecting a diverse and collaborative authorship base. Of these contributions, five documents were single-authored, indicating that both individual and group efforts have shaped the field. This diversity in authorship reflects a wide range of perspectives, expertise, and research approaches.

The average number of co-authors per document is 3.52, and the rate of international co-authorship stands at 22.73%. These figures point to a collaborative and increasingly global research environment. The presence of cross-border collaborations further enriches the research with varied insights, cultural contexts, and methodological approaches. Although the average citation rate per document is moderate (8.73), this must be interpreted in light of the relatively young average age of the publications (2.86 years). Given that the field is still emerging, the citation figures are consistent with expectations and reflect the nascent yet promising nature of this area of study. Innovative ideas often require time to gain wider recognition, particularly in newly developing research domains. The consistent annual growth

rate of 9.05% signals increasing academic and practical interest in blockchain applications for donation systems.

Table 1. Publication and citation matrix

Description	Results
Main Information About Data	
Timespan	2016:2024
Sources (Journals, Books, etc)	35
Documents	44
Annual Growth Rate %	9.05
Document Average Age	2.86
Average citations per doc	8.727
References	1868
Document Contents	
Keywords Plus (ID)	227
Author's Keywords (DE)	181
Authors	
Authors	153
Authors of single-authored docs	5
Authors Collaboration	
Single-authored docs	5
Co-Authors per Doc	3.52
International co-authorships %	22.73
Document Types	
article	44

5.2 Most Productive Stakeholders

5.2.1 MostPproductive Authors

Table 2 presents a comprehensive overview of the 20 most productive authors in the field, highlighting their influence and academic output using several key bibliometric indicators. These metrics include the h-index, g-index, and m-index, along with total citations (TC) and the number of publications (NP). Together, they provide a multifaceted perspective on each author's scholarly impact. The h-index and g-index are commonly used to assess the depth and breadth of an author's contribution. Authors such as Irwin A.S.M. and Milad G., each with an h-index and g-index of 1, may represent emerging scholars or researchers operating within niche areas. Despite having published only a single paper, these authors have garnered 45 citations each, suggesting strong interest and influence in the academic

community. This rapid citation accumulation may indicate that their work introduced novel or highly relevant insights within the domain.

In terms of the m-index which accounts for the number of years since the first publication by Irwin A.S.M. and Milad G. each hold a value of 0.111, indicating a relatively recent emergence in the academic scene, with publishing activity beginning around 2016. Similarly, authors such as Abid A. and Farooq M.S., who began publishing in 2020, possess an h-index and g-index of 1, with an m-index of 0.2. Although their m-indices remain modest due to the recency of their involvement in this field, such figures are typical for early-stage researchers and point to their potential for future scholarly impact. When contextualised by the publication start year (PY_start), these metrics illustrate the varying trajectories of academic development among contributors. While some authors have shown early influence with a single impactful publication, others are steadily building their research profiles over time. Collectively, these scholars are making meaningful contributions to a growing and dynamic field, with expectations for further impactful research to emerge in the coming years.

This analysis reflects a research landscape where emerging authors are gaining traction, as evidenced by citation patterns and productivity indices. The combination of traditional metrics with newer ones such as the m-index provides a nuanced view of academic influence, capturing both the intensity of engagement with an author's work and their potential future trajectory. The findings not only highlight individual accomplishments but also shed light on the evolving dynamics of scholarly communication and recognition within this domain.

Table 2. Top 20 Productive Authors

Element	h_index	g_index	m_index	TC	NP	PY_start
Irwin Asm	1	1	0.111	45	1	2016
Milad G	1	1	0.111	45	1	2016
Abid A	1	1	0.2	38	1	2020
Farooq, M. S	1	1	0.2	38	1	2020
Khan M	1	1	0.2	38	1	2020
Wu H	1	1	0.2	32	1	2020
Zhu X	1	1	0.2	32	1	2020
Bae K	1	1	0.2	28	1	2020
Kang H-G	1	1	0.2	28	1	2020
Eun-Jung, S	1	1	0.2	28	1	2020
Anup Kumar	1	1	0.25	21	1	2021
Lee J-S	1	1	0.2	21	1	2020
Obi T	1	1	0.2	21	1	2020
Ohyama N	1	1	0.2	21	1	2020
Suzuki H	1	1	0.2	21	1	2020
Taira N	1	1	0.2	21	1	2020
Tith D	1	1	0.2	21	1	2020
Wijesundara Wmab	1	1	0.2	21	1	2020
Li Y	1	1	0.25	19	1	2021

5.2.2 Most Productive Articles

Table 3 presents the most productive articles in the field, with a focus on those published in recent years. The Total Citations per Year (TCpY) metric is particularly useful in identifying articles that have garnered sustained attention over time. For instance, the article by Abid A., published in 2020, has received 38 citations and has a TCpY of 7.6. This indicates not only the article's popularity but also its continued relevance in ongoing research. Conversely, articles from 2023 and 2024 that currently have zero citations are likely too recent to have been cited. A low citation count in this context does not reflect lower quality; rather, it suggests that these articles have not yet had sufficient time to be integrated into subsequent research. Their academic influence is expected to grow as they become more widely disseminated and cited in the future.

Table 3. Most Productive Articles

Author	year	freq	TC	TCpY
Abdullah NSN	2023	1	0	0
Abhyankar H	2023	1	0	0
Abid A	2020	1	38	7.6
Aguilera RC	2021	1	1	0.25
Ahmed I	2024	1	0	0
Aishwarya R	2020	1	1	0.2
Alassaf Aoak	2021	1	2	0.5
Alexakis C	2024	1	0	0
Alhogail A	2022	1	10	3.333
Almaghrabi A	2022	1	10	3.333
Ammi C	2023	1	0	0
Anselmi G	2024	1	0	0
Arjomandi-Nezhad A	2021	1	7	1.75
Arshad J	2020	1	13	2.6
Arunachalam P	2023	1	0	0
Assaf M	2020	1	18	3.6
Baber H	2019	1	6	1
Bae K	2020	1	28	5.6
Jeong J	2018	1	15	2.143
Jeong J	2022	1	1	0.333
Seo A	2018	1	15	2.143
Seo A	2022	1	1	0.333

The frequency (freq) column in Table 3, with a value of 1 across the listed articles, may indicate that selection criteria were based on distinct benchmarks such as productivity, novelty, or the contextual relevance of their contribution to the field. This uniform frequency implies that each article meets a baseline of significance, with differentiation in impact shown through citation performance. The inclusion of articles from both recent years (e.g., 2023) and slightly earlier publications (e.g., 2020) offers a balanced view of both immediate and medium-term scholarly impact. This temporal diversity allows for an assessment that considers the potential influence of newly published research alongside the demonstrated impact of slightly older, well-cited studies.

Overall, this analysis offers a snapshot of articles that stand out due to their citation metrics, novelty, or scholarly relevance. It highlights the dynamic nature of academic contributions, where both emerging and moderately established works play a significant role in shaping the discourse. By considering citation metrics in conjunction with publication year, this section provides a nuanced perspective on how academic influence develops and is recognised over time.

5.2.3 Most Productive Countries

Table 4 presents the ten most productive countries in the field of blockchain technology applied to donation systems. The leading countries are Korea, China, Italy, India, Australia, Japan, the United States, Austria, Brazil, and France. Korea tops the list with five publications, followed by China and Italy with four articles each. Meanwhile, countries such as Australia, Brazil, and France have each contributed one article to the field. Notably, Korea and China emerge as the leading contributors in terms of publication output. This prominence may be attributed to strong national initiatives promoting digital innovation, where governments actively support blockchain research and development. Such patterns suggest that national digital policies play a crucial role in shaping global research trends in blockchain-based donation systems. These findings underscore the influence of policy and institutional support in advancing academic engagement within emerging technological domains.

Table 4. Top 10 Productive Countries

Country	Articles	SCP	MCP	Freq	MCP_Ratio
Korea	5	5	0	0.114	0
China	4	2	2	0.091	0.5
Italy	4	3	1	0.091	0.25
India	3	3	0	0.068	0
Australia	2	2	0	0.045	0
Japan	2	2	0	0.045	0
USA	2	0	2	0.045	1
Austria	1	1	0	0.023	0
Brazil	1	1	0	0.023	0
France	1	1	0	0.023	0

5.2.4 Most Productive Affiliations

This study also identifies the ten most productive institutional affiliations contributing to research on blockchain technology in the context of donations (refer to Table 5). Among these, the Institute of Innovative Research emerges as the most prolific, with a total of seven published articles. Dongguk University follows closely, contributing six publications. Additionally, both Macquarie University and Zhengzhou University have each produced five research articles within the specified nine-year period. These findings highlight the central role of specific institutions in advancing scholarly work in this emerging field. The concentration of publications within a few key affiliations suggests the presence of dedicated research groups or strategic initiatives focused on blockchain applications in donation systems.

Table 5. Top 10 Productive Affiliations

Affiliation	Articles
Institute of Innovative Research, Japan	7
Dongguk University	6
Macquarie University	5
Zhengzhou University	5
Nirma University	4
Universidade Federal De Pernambuco	4
Hanyang University Business School	3
Instituto Politécnico Nacional	3
Khalifa University of Science and Technology	3
Osaka Metropolitan University	3

6. Intellectual Structure, Trends and Future Research Avenues

6.1 World Cloud of Keywords

Figure 2 illustrates a word cloud i.e. a visual representation of textual data in which the size of each word reflects its frequency or perceived importance in the source material. In this context, the word cloud is derived from author keywords across selected documents related to blockchain technology. The dominance of the term *"blockchain"* indicates its centrality in the dataset, suggesting that the core research focus across these articles is indeed on blockchain and its applications. Beyond listing popular terms, the word cloud also highlights the thematic direction of the research. Prominent keywords such as *"smart contract"* and *"cryptography"* reveal key areas of emphasis. The visibility of *"smart contract"* points to a strong interest in self-executing digital agreements where contractual terms are encoded in software. Similarly, *"cryptography"* underlines the importance of secure communication and data integrity—essential features of blockchain systems.

Additional terms like *"distributed ledger"*, *"distributed computer systems"*, and *"decentralised system"* emphasise blockchain's technical origins as a distributed database. These keywords reflect ongoing research interest in blockchain's role in developing decentralised infrastructure, where information is not stored in a central repository but across a distributed network. The presence of keywords such as *"supply chains"*, *"donation systems"*, *"nonprofit organisation"*, and *"transparency"* suggests that scholars are applying blockchain to practical domains. These include improving supply chain management, enhancing transparency in charitable giving, and strengthening the operational efficiency of nonprofit organisations. These terms point to a growing body of research investigating how blockchain can address industry-specific challenges.

Terms such as *"sustainability"*, *"moral obligations"*, and *"privacy"* indicate an emerging focus on the ethical, societal, and regulatory implications of blockchain technology. These keywords suggest that researchers are exploring how blockchain contributes to sustainable development and the ethical considerations surrounding its implementation, particularly with regard to data privacy and responsible innovation. Furthermore, the

inclusion of keywords like *"COVID-19"*, *"social media"*, and *"crowdsourcing"* shows that researchers are engaging with contemporary and global issues. The reference to COVID-19 may relate to blockchain's potential role in public health, such as secure data sharing for contact tracing or vaccine distribution. Meanwhile, *"social media"* and *"crowdsourcing"* point to the growing interest in how blockchain intersects with digital platforms that rely on community engagement and data sharing. Keywords such as *"network security"*, *"algorithms"*, and *"metadata"* underscore the technological dimensions and challenges of blockchain systems. These terms highlight ongoing concerns in securing blockchain networks, developing efficient algorithms, and managing the vast amounts of metadata generated through decentralised systems.

In summary, the word cloud reflects the multidimensional scope of blockchain research. It captures not only the technical foundations of the technology but also its practical applications, ethical considerations, and relevance to current global challenges. Terms like *"smart contract"*, *"transparency"*, and *"cryptography"* demonstrate a research focus on building trust and enhancing security—particularly within the domain of donations. The presence of contemporary keywords such as *"COVID-19"* and *"social media"* further highlights the real-world applicability of blockchain, confirming that the field is moving beyond theoretical exploration towards integrated, multidisciplinary discussions that bridge technology, society, and ethics.
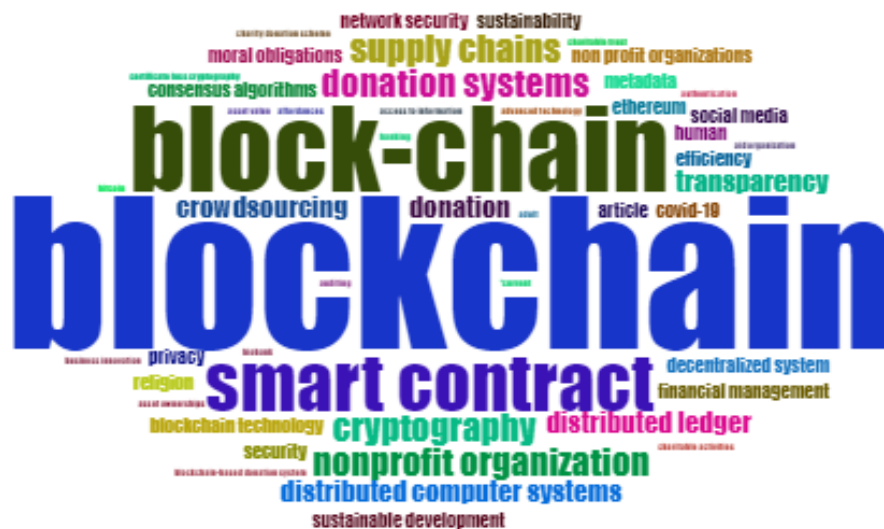

Figure 2. Author world cloud of keywords

6.2 Co-word Analysis

As illustrated in Figure 3, the keyword *"blockchain"* (highlighted in red) appears as the largest and most central node in the co-word network, signifying its primary importance within the dataset. Its central position and dominant size indicate that *"blockchain"* is the most frequently occurring and thematically significant term across the analysed documents. Directly connected to *"blockchain"* are key terms such as *"cryptocurrency"*, *"bitcoin"*, *"distributed ledger"*, and *"encryption"*, which represent core concepts associated with

blockchain technology. These closely linked nodes form clusters that reflect the technological and financial dimensions of the discourse.

A notable cluster includes *"cryptocurrency"*, *"bitcoin"*, and *"fundraising"*, suggesting that a significant portion of research is focused on blockchain's financial applications, particularly in relation to digital currencies and fundraising mechanisms such as Initial Coin Offerings (ICOs) and crowdfunding. The proximity of *"governance"* and *"trust"* to these financial terms reflects an ongoing scholarly conversation around blockchain's governance structures and its inherent potential to serve as a trust-building mechanism in digital environments.

The term *"Ethereum"* (in blue), a specific cryptocurrency platform, is strongly associated with *"blockchain"* and *"smart contracts"*. This reflects Ethereum's central role in enabling decentralised applications and programmable contracts. The interrelationship among these keywords highlights the functional synergy between blockchain platforms and their applications in secure, automated transactions. Although smaller in size, nodes such as *"crowdfunding"*, *"encryption"*, and *"trust"* hold thematic significance. These connections illustrate how blockchain's foundational technologies (e.g., encryption) are applied in real-world contexts like crowdfunding, with the overarching goal of enhancing transparency and accountability. This relationship reinforces the role of blockchain in fostering trust in financial and social systems.

The term *"smart contracts"* is also connected to keywords such as *"charity"* and *"transparency"* (highlighted in green), reflecting the emerging research interest in applying smart contract functionality to charitable organisations. This connection suggests that scholars are examining how blockchain can facilitate transparent, traceable donation systems, thereby addressing long-standing concerns about accountability and donor trust within the nonprofit sector. The co-word network visualisation demonstrates a complex thematic ecosystem with *"blockchain"* at its centre and a range of interconnected research foci branching outwards. These connections reflect the multi-dimensional nature of blockchain research, spanning technology, finance, ethics, governance, and social impact. For example, the proximity of *"trust"* to *"governance"* suggests that blockchain is not only viewed as a technical solution but also as a framework for enhancing institutional accountability.

In summary, the analysis reveals how blockchain serves as a nexus for a broad spectrum of themes, from technical innovation and financial transformation to social trust and charitable transparency. The linkages between *"smart contracts"*, *"charity"*, and *"trust"* show a growing scholarly interest in leveraging blockchain to reform traditional donation systems, indicating that blockchain is increasingly seen as a viable solution to enduring challenges in fundraising and philanthropy.
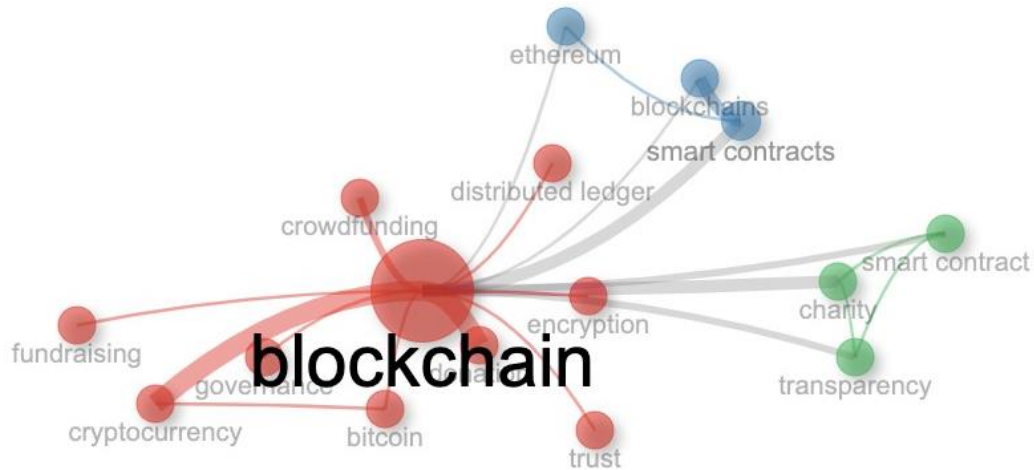
Figure 3. A network of keywords cluster
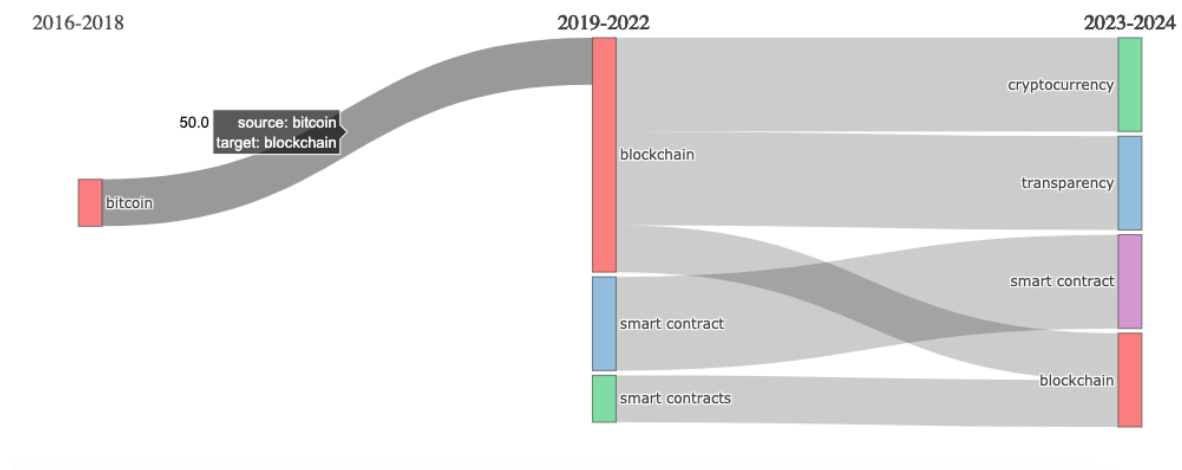
6.3 Evolution of Themes

Figure 4. Evolution of themes

The thematic evolution of research, as illustrated in Figure 4, highlights distinct trends across specific time intervals. Between 2016 and 2018, scholarly attention predominantly centred on *Bitcoin*, marking a phase of intensive investigation into the mechanisms, implications, and economic impact of cryptocurrency. This early period reflects the initial fascination with blockchain's most well-known application. From 2019 to 2022, the research focus expanded to encompass broader concepts such as *blockchain technology* and *smart contracts*. This thematic shift signifies growing academic interest in the underlying infrastructure of decentralised systems, moving beyond individual cryptocurrencies to explore the potential of blockchain as a foundational technology across various domains.

As the research matured into the current decade, there has been a noticeable transition towards the practical integration of these technologies into social systems, particularly in the context of *donation platforms*. Recent trends reflect a move away from purely conceptual or technical exploration, toward applying blockchain to solve real-world

challenges in *charity*, *philanthropy*, and *social accountability*. This progression indicates an evolving scholarly landscape, shifting from understanding the mechanics of blockchain and cryptocurrencies to leveraging these tools for addressing tangible societal needs. The thematic evolution thus underscores the field's transition from exploratory to applied research, reflecting both technological maturity and increasing relevance to global challenges.
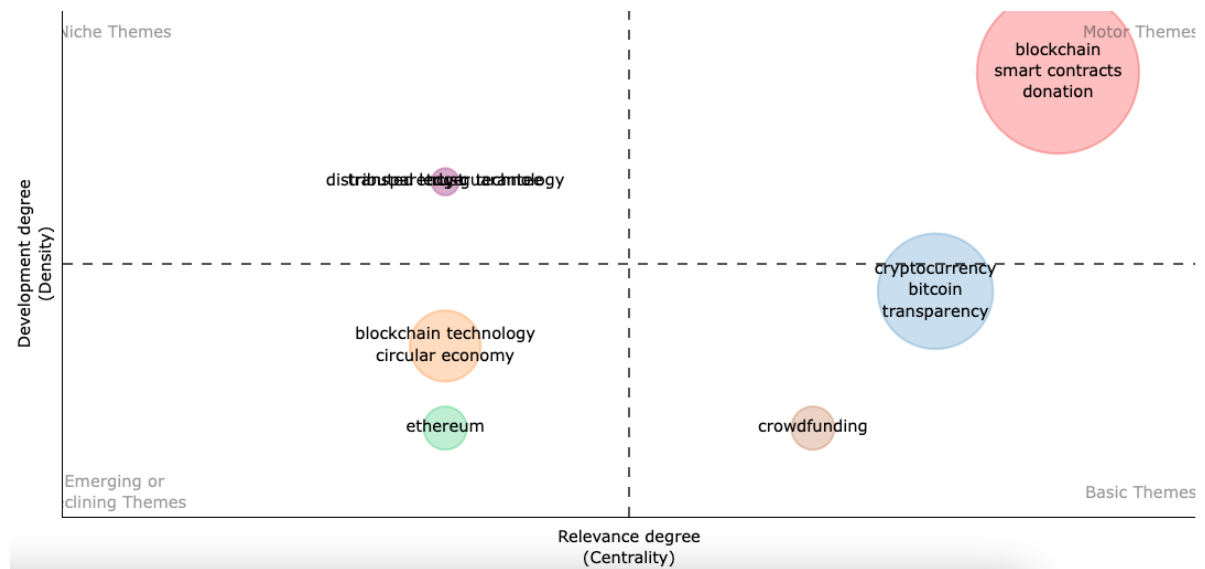
6.4 Strategic Maps

Figure 5. Strategic Maps

6.5 Strategic Mapping and Thematic Clusters

The bibliometric analysis reveals specific areas of scholarly focus that chart the academic trajectory surrounding blockchain technology and its application in donation systems. As illustrated in Figure 5, the *motor themes* comprising blockchain, smart contracts, and donation form the central axis of the strategic map. These elements represent the foundational cluster that drives innovation and inquiry in this domain. Research under this theme primarily investigates how blockchain networks and smart contracts can enhance transparency, efficiency, and accountability in donation processes. Adjacent to the motor themes are the *basic themes*, which encapsulate essential and well-established concepts such as Bitcoin, cryptocurrencies, transparency, and crowdfunding. These themes focus on how blockchain functions as a platform for facilitating donations, particularly within charitable organisations. The literature emphasises blockchain's transformative potential to modernise traditional funding models by creating secure, decentralised, and transparent channels for the transfer of donation funds.

Another emerging theme gaining traction is the intersection of blockchain technology and the circular economy, which has become an increasingly important area of academic inquiry. In this context, blockchain enables the systematic redistribution of donated items or funds, while smart contracts automate functions such as determining recipient eligibility and ensuring appropriate distribution. This line of research explores how blockchain can enhance

sustainability, resource efficiency, and ethical governance in donation ecosystems by promoting transparency, circularity, and accountability. Within the broader discourse on blockchain and charitable contributions, Distributed Ledger Technology (DLT) emerges as a *niche theme* that offers more technical and system-oriented insights. Scholars working in this area focus on the architecture and operational frameworks of DLT, with the goal of improving the traceability, security, and reliability of donation platforms. Research in this cluster often addresses challenges such as donor anonymity, tamper-proof record-keeping, and system interoperability.

The strategic mapping demonstrates that the application of blockchain in donation systems is not only conceptually viable but also gaining momentum as a practical solution. The increasing scholarly emphasis on *smart contracts* and *transparency* signals a shift towards implementation and real-world application. Moreover, the growing interest in themes like *circular economy* and *distributed ledger* suggests the potential for divergent yet complementary research trajectories. These directions may inform the development of future donation platforms that are not only technologically efficient but also ethically sound, environmentally sustainable, and socially equitable.

7. Discussion

This study investigates the bibliometric evidence illustrating the development of blockchain technology within charitable systems over recent years. The findings indicate a clear trajectory of research evolution from foundational concepts to emerging trends through an analysis of clustered themes across the literature. This section interprets the results within an academic framework, highlighting the transition of scholarly focus in the nonprofit sector from conceptual exploration to applied technological solutions. The literature on blockchain applications in donation ecosystems demonstrates considerable innovation and emerging market patterns. Scholars such as Irwin ASM and Milad G have made influential contributions to this field, with early studies laying the groundwork for later developments (Irwin & Milad, 2016).

Similarly, the work of Abid A and Farooq MS (Farooq et al., 2020) illustrates how philanthropic blockchain systems can enhance audit transparency—marking a significant milestone in blockchain research for charitable applications. The research productivity of countries such as South Korea (Tith et al., 2020; Jaekyu et al., 2018), China (Meng et al., 2023; Wei et al., 2021), and Italy (Rangone & Busolli, 2021) underscores a growing international engagement with blockchain technologies in the nonprofit sector. Notably, the Tokyo Institute of Technology (via the Institute of Innovative Research) emerges as a leading institution in this domain, with a high volume of scholarly output and influence.

As presented in the strategic map (Figure 5), the research landscape is categorised into four thematic areas. Among these, the role of *smart contracts* in donation systems remains insufficiently understood. While they are frequently cited as tools for enhancing transparency and automating transactions, researchers have yet to explore their structural and functional integration into donation workflows in depth (Aguilera et al., 2021). Future investigations should focus on the design, operation, and effectiveness of smart contracts,

especially regarding their potential to reduce inefficiencies, eliminate unaccountability, and re-engage disengaged donors.

Another underexplored area is the acceptance of *cryptocurrency donations*. Despite the growing interest in blockchain-based philanthropy, research into the behavioural and psychological factors influencing donor acceptance of cryptocurrencies is still limited (Alexakis et al., 2024). There is a clear need for empirical studies examining donor attitudes, motivations, and perceived barriers, which could inform strategies to improve the adoption of crypto-philanthropy. The emergence of *blockchain and the circular economy* as a theme presents an exciting direction for future research. However, existing literature often lacks specificity regarding how blockchain can operationally enhance circularity within donation systems (Almaghrabi & Alhogail, 2022).

Future studies should focus on identifying concrete use cases, technologies, and mechanisms that foster resource efficiency**,** sustainability, and ethical compliance through blockchain integration in charitable supply chains. The theme of *distributed ledger technology (DLT)*, while more technical in nature, also offers fertile ground for academic inquiry (Qaiser Razi et al., 2023). DLT holds potential for improving platform security**,** traceability**,** and data integrity, but there are gaps in our understanding of its scalability, interoperability, and comparative benefits over traditional blockchain systems. Further research could assess how various DLT models perform in diverse donation contexts and their suitability for long-term adoption.

Table 6. Summary of Future Research Suggestions

Research Gaps	Suggested Research Questions
Integration of Smart Contracts in Donation Processes Investigate how smart contract-enabled donation platforms impact transparency, accountability, and donor engagement.	• How do smart contracts impact donation transparency and accountability? • What challenges and benefits arise from using smart contracts in donation management?
Exploration of Cryptocurrency Adoption Understand donor perceptions and barriers to using cryptocurrency for charitable giving and develop strategies to improve its adoption and usability.	• What factors influence donor willingness to use cryptocurrency for donations? • How can cryptocurrency adoption be encouraged in donation contexts?
Circular Economy Applications of Blockchain in Donation Explore how blockchain can improve resource efficiency, sustainability, and ethical practices in donation systems, including novel approaches.	• How can blockchain promote sustainability and resource efficiency in donations? • What are the benefits and challenges of integrating blockchain into circular economy initiatives for donations?
Exploration of Distributed Ledger Technology Examine the potential benefits of distributed ledger technology (DLT) beyond traditional blockchains, focusing on scalability, interoperability, and security in donation contexts.	• What unique advantages does distributed ledger technology offer for donation platforms? • How can distributed ledger technology address scalability and security issues in donation systems?
Cross-Disciplinary Collaborations and Impact Assessment	• How can collaboration across disciplines enhance our understanding of

Assess the societal impact of blockchain-enabled donation initiatives, integrating insights from diverse fields to understand their implications on philanthropy and social welfare.	blockchain's impact on donations? • What methods can assess the broader societal impact of blockchain-enabled donations?

A notable gap in the literature lies in the lack of interdisciplinary collaboration and the limited focus on the broader societal impacts of blockchain-enabled donations. Future studies could benefit from integrating theoretical and methodological perspectives from economics, sociology, public policy, and environmental science. This would allow for a more comprehensive evaluation of how blockchain influences social welfare**,** philanthropic behaviour**,** and institutional trust**.** Finally, Table 6 provides a summary of future research recommendations, identifying key areas that merit deeper investigation and outlining potential directions for advancing the field.

8. Research Contribution

This study offers valuable contributions to both academic and practical spheres in the growing field of blockchain technology and charitable giving. From an academic perspective, it enriches existing discourse by being among the earliest cohesive studies that systematically explore the integration of blockchain into donation systems. While previous studies have tended to examine blockchain and donation as separate domains, this research bridges that divide through a comprehensive bibliometric analysis covering performance metrics, co-word analysis, thematic evolution, and strategic mapping.

By analysing 44 scholarly publications from 2016 to 2024 using the Biblioshiny tool, the study identifies key trends, intellectual structures, and the academic trajectory that has shaped this evolving field. Notably, it highlights the increasing scholarly attention paid to *smart contracts* and *distributed ledger technology (DLT)*, as well as the growing relevance of concepts such as the *circular economy* and *cryptocurrency* within donation frameworks. In doing so, this study establishes a strong foundation for future research by clearly outlining unresolved questions and research gaps. These include the operational integration of smart contracts, donor perceptions towards cryptocurrency-based contributions, and the ethical implications of blockchain-enabled donation systems. Collectively, these contributions serve as a roadmap for scholars aiming to develop theoretical and empirical advancements in blockchain, algorithmic trust, philanthropy, and nonprofit governance.

Beyond its academic contributions, the study offers several practical implications for charitable organisations and policymakers. Blockchain and smart contracts emerged as dominant themes in both strategic mapping and thematic evolution analyses, underscoring their potential to enhance transparency, reliability, and donor confidence. These findings offer concrete guidance for charitable organisations aiming to adopt blockchain-based solutions to increase accountability and improve trust among donors. Additionally, the increasing prominence of *cryptocurrency* as a research focus reveals potential hesitance among donors towards this emerging form of giving. This underscores the need for donation platforms to develop secure, accessible, and user-friendly systems that address donor concerns.

Moreover, the growing academic interest in blockchain's relevance to circular economy models introduces novel possibilities for more sustainable donation practices. Smart contracts, for example, enable automated and ethically guided resource allocation, ensuring more efficient and transparent use of funds or materials. In the policy sphere, co-word and keyword frequency analyses revealed recurring concerns around *governance*, *privacy*, and *ethical use* of technology. These findings offer critical insights for regulators seeking to formulate robust legal frameworks that enhance trust, ensure compliance, and support ethical conduct in blockchain-enabled donation systems. Regulatory clarity will be key in safeguarding public trust while enabling innovation within the philanthropic sector.

9. Conclusion

This study offers timely and valuable insights into the evolving role of blockchain technology within the donation ecosystem, highlighting emerging trends, research gaps, and future research directions. Through a systematic bibliometric analysis of publications indexed in the SCOPUS database from 2016 to 2024, the study underscores how blockchain technologies particularly smart contracts, cryptocurrencies, and distributed ledger systems are being explored to improve transparency, efficiency, and accountability in charitable giving. The findings point to the increasing maturity of academic interest in this field and demonstrate how blockchain tools are being discussed not merely from a technical standpoint but also in relation to ethical, organisational, and societal concerns. The study also calls for a more interdisciplinary research agenda to fully understand the broader implications of blockchain on charitable practices and social welfare outcomes.

It is important to acknowledge the methodological limitations of the study. Although SCOPUS provides access to a broad and credible collection of peer-reviewed literature, it does not encompass the entirety of relevant publications, especially in a rapidly evolving field such as blockchain. Furthermore, the selection of articles within a specific timeframe may inadvertently exclude the most recent advancements or alternative perspectives. Future research would benefit from incorporating multiple databases and extended temporal scopes to provide a more comprehensive view of the field. Despite these limitations, the study offers foundational knowledge for researchers, practitioners, and policymakers alike. It identifies important gaps and suggests future research pathways that could shape both theoretical development and practical implementation of blockchain in charitable systems. Ultimately, sustained academic inquiry and cross-sector collaboration will be critical to unlocking the full transformative potential of blockchain technology in enhancing trust, efficiency, and equity in donation systems.

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