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Research Trend on Technology Applications in Social Funding Activities: A Bibliometric Analysis

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ABSTRACT

This study presents a bibliometric analysis of the evolving landscape of technology applications in social funding activities. It examined the interconnection of worldwide research activities using data obtained using VOSviewer software, which emphasizes the important role of technology in promoting social financing projects. The study was based on a network of bibliographic couplings with nodes indicating countries contributing to the subject and edges and the degree of research linkages between these countries. The results reflect a vibrant and dynamic research community with the United States, United Kingdom, China, and Canada emerging as important sites of innovation and cooperation. These nations have considerable bibliographic coupling, which suggests many related references and research interests. The network depicts the amount of research output and the complex patterns of international cooperation, with the United States being positioned as a prominent influencer owing to its wide connections and a central node in the network. The trend of technology applications in social financing is defined by various digital platforms, crowdfunding techniques, and financial technologies that redefine how social initiatives are financed and handled. The bibliometric map emphasizes the crucial role of technology in increasing the efficiency, reach, and effect of social financing across sectors and countries. Finally, this study offers a detailed review of the present status and development in technology applications within social financing and insights into the main actors and collaborative networks moving this sector ahead. It lays the groundwork for future research and development initiatives targeted at utilizing technology for social benefit.

Keywords:

Technology; Social funding; Crowdfunding; Social financing

1. Introduction

Technology applications in social financing activities have received prominent attention in recent years since digital financial services and financial technology (FinTech) solutions can potentially improve financial inclusion and economic growth [1]. This resulted in a wide range of studies on the role of digital financial services, such as mobile banking, online payment systems, and

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cryptocurrencies, in improving financial access and socioeconomic development [2-4]. Technology has had a significant impact on certain communities [5]. On the contrary, the multidisciplinary character of this discipline poses difficulty in comprehending its extent, patterns, and principal discoveries [1]. A bibliometric analysis is a rigorous methodological evaluation that may aid in addressing this difficulty by methodically mapping past research and showing trends in publication output, citation activity, authorship, and research topics [6]. This method has been used in several areas, including technology management, fintech, and digital finance, to discover new trends and assess the research environment [7].

Technology applications have been proven to improve efficiency, transparency, and accountability in the context of social funding activities [8]. For instance, the use of blockchain technology in charity contributions has made money distribution more transparent and safe, while artificial intelligence (AI) has been used to evaluate societal needs and improve resource allocation for public welfare programs [9]. The notion of social innovation, which is strongly tied to the use of technology in social financing operations, has also evolved significantly over time. Initially, sociologists utilized the notion to explain how more networked societies fuelled technical innovation or to comprehend the social consequences of inventions [10].

Subsequently, the research on social innovation is divided into three major categories: technical innovation, social interactions, and societal effect [11-13]. This progression reflects the increased integration of technical innovation with social interactions and societal influence and the increasing significance of technology applications in social and economic sectors. This paper thoroughly examines the research trends in technology applications for social fundraising activities by conducting a bibliometric study. The objective is to identify critical domains of interest, burgeoning patterns, and possible deficiencies in the body of literature. The findings will provide valuable insights for policy formation and future research in the realm of social financing while aiding practitioners and scholars in comprehending technology's role in such endeavours.

2. Literature Review

The study of technology applications in social financing activities has seen a substantial increase in attention, especially within the context of digital financial services and financial technology (FinTech) [14-16]. A bibliometric study conducted by [1] deeply examined the importance of digital financial services in fostering economic growth and financial access. The study was published in the Humanities and Social Sciences Communications journal and included scholarly articles published between the early 2000s and the present. It stressed the value of ongoing research considering the dynamic FinTech environment and the criticality of international cooperation among scholars. The study also underscored the multidisciplinary character of the area and the growing influence of digital financial services on financial accessibility and economic progress [1].

Moreover, [17] examined the growing reliance on information trends in financial inclusion through technology, focusing on its transformative impact in emerging markets. This study, together with the research by Alzahrani *et al.,* was published in the Technological Forecasting and Social Change journal and illustrated the increasing focus on the influence of technology on social financing and financial inclusion initiatives. Additionally, bibliometric studies in other pertinent disciplines have examined the growing research trend concerning technological applications in social financing operations. An example of a scholarly investigation that exemplifies the wider concern for comprehending the societal ramifications of research endeavours is the systematic literature review conducted by Viana-Lora and Nel-lo-Andreu (2021) concerning the social impact of research across diverse academic disciplines [18].

Furthermore, the convergence of technology and social financing is also noticed in Islamic finance [19]. Past research on Waqf and socioeconomic development has emphasized the need for social effect assessments in Islamic finance as well as the rising interest in Islamic social finance and social impact [20-22]. This intersection emphasizes the importance of technological applications in improving Islamic finance funding management's social effect and sustainability. The increasing use of digital platforms, social networks, and alternative financing methods to achieve social impact and financial inclusion has led to multidisciplinary literature on FinTech, crowdfunding, and Islamic finance [23]. These studies highlight the rising scholarly attention to the role of technology in social funding and the necessity to evaluate its social impacts adequately.

3. Research Question

i. What are the research trends of technology applications in social funding activities study according to the year of publication?
ii. Who writes the most cited articles on technology applications in social funding activities?
iii. What are the most documents by subject area of technology applications in social funding activities?
iv. What are the Top 10 number citations by research related to technology applications in social funding activities?
v. What are the Co-occurrence keywords related to technology applications in social funding activities?
vi. What are the bibliographic coupling countries' collaboration in technology applications in social funding activities?

4. Methodology

Bibliometric refers to the collection, management, and analysis of bibliographic data derived from scientific publications [24-26]. It includes advanced approaches such as document co-citation analysis and general descriptive data such as publishing journals, publication year, and author categorization [27]. An effective literature review requires an iterative process that includes discovering relevant keywords, a literature search, and rigorous analysis to create a full bibliography and provide reliable findings [16]. Therefore, this study concentrated on high-quality papers that provided useful insights into the theoretical views guiding the progress of the research topic. The data collection process was conducted by relying on the SCOPUS database to ensure data trustworthiness [28]. To ensure the inclusion of high-quality publications, only papers published in rigorously peer-reviewed academic journals were examined, while other materials like books and lecture notes were excluded [20]. Conversely, empirical papers published in Elsevier's Scopus from 2018 to December 2023 were gathered for further analysis as the database is widely recognized for its comprehensive coverage.

4.1 Data Search Strategy

A screening procedure was conducted to select the search keywords for article retrieval. The study began with an online search of the Scopus database. Document retrieval entails the process of article search using the title, abstract, and keywords. It was achieved in this study by utilizing the following search string: (TITLE-ABS-KEY ("technology" OR "digital") AND TITLE-ABS-KEY ("Donations" OR "Philanthropy" OR "Waq*" OR "crowd fund*")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (

PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2022) OR LIMIT-TO (PUBYEAR , 2023)). The result produced a total of 4328 publications. After the refining process, approximately 1032 articles were generated. These were further refined to include only research articles in English, excluding article reviews, conference papers, book chapters, and books. Table 1 summarizes the search string while Table 2 depicts the inclusion and exclusion criteria for selecting articles.

Table 1
The search string

Scopus	TITLE-ABS-KEY ("technology" OR "digital") AND TITLE-ABS-KEY ("Donations" OR "Philanthropy" OR "Waq*" OR "crowd fund*")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2022) OR LIMIT-TO (PUBYEAR , 2023))

Table 2
The selection criterion is searching

Criterion	Inclusion	Exclusion
Language	English	Non-English
Time line	2018 – 2023	< 2017
Literature type	Journal (Article)	Conference papers, book, book chapters and article review
Publication Stage	Final	In Press

4.2 Data Analysis

Datasets comprising the articles' year of publication, titles, authors, journals, citations, and keywords in PlainText format were obtained from the Scopus database and analysed using VOSviewer version 1.6.19. The software enabled the execution of map analysis and creation via the VOS clustering and mapping methodologies. VOSviewer is a different method of Multidimensional Scaling (MDS) [29] and it is similar to the MDS strategy in terms of its goal, which is to position things in low-dimensional areas in such a way that the relatedness and similarity of any two items are correctly represented by the distance between them [30]. Unlike MDS, which is primarily concerned with the calculation of similarity measures like Jaccard indexes and cosine, VOS employs a more appropriate approach for normalizing co-occurrence frequencies [31], such as the association strength (ASij) and it is calculated as:

i. ASij ¼ Cij
ii. Wiwj

which is "proportional to the ratio between the actual number of co-occurrences of I and j and the predicted number under the assumption that co-occurrences are statistically independent" [29]. Hence, using this index, VOSviewer maps items by lowering the weighted sum of the squared distances between all item pairs. Additionally, LinLog/modularity normalization was applied in this study following the recommendation by [30]. Mathematical correlations were then revealed by visualizing the dataset using VOSviewer followed by keyword co-occurrence, citation, and co-citation studies.

The VOSviewer subsequently placed items in the shape of a map after lowering the weighted total of the squared distances between all item pairings. The LinLog/modularity normalization was implemented following the suggestion by [32]. Conversely, the software was used to discover

patterns based on mathematical correlations by applying visualization methods to the dataset followed by studies such as keyword co-occurrence, citation analysis, and co-citation analysis.

5. Result and Finding

5.1 Document Publication by Years

Figure 1 depicts a line graph of the number of documents related to technology applications in social funding activities as indexed by Scopus between 2018 to 2023. A significant increase in the number of publications can be seen throughout this period, indicating an increasing interest within the area of research.

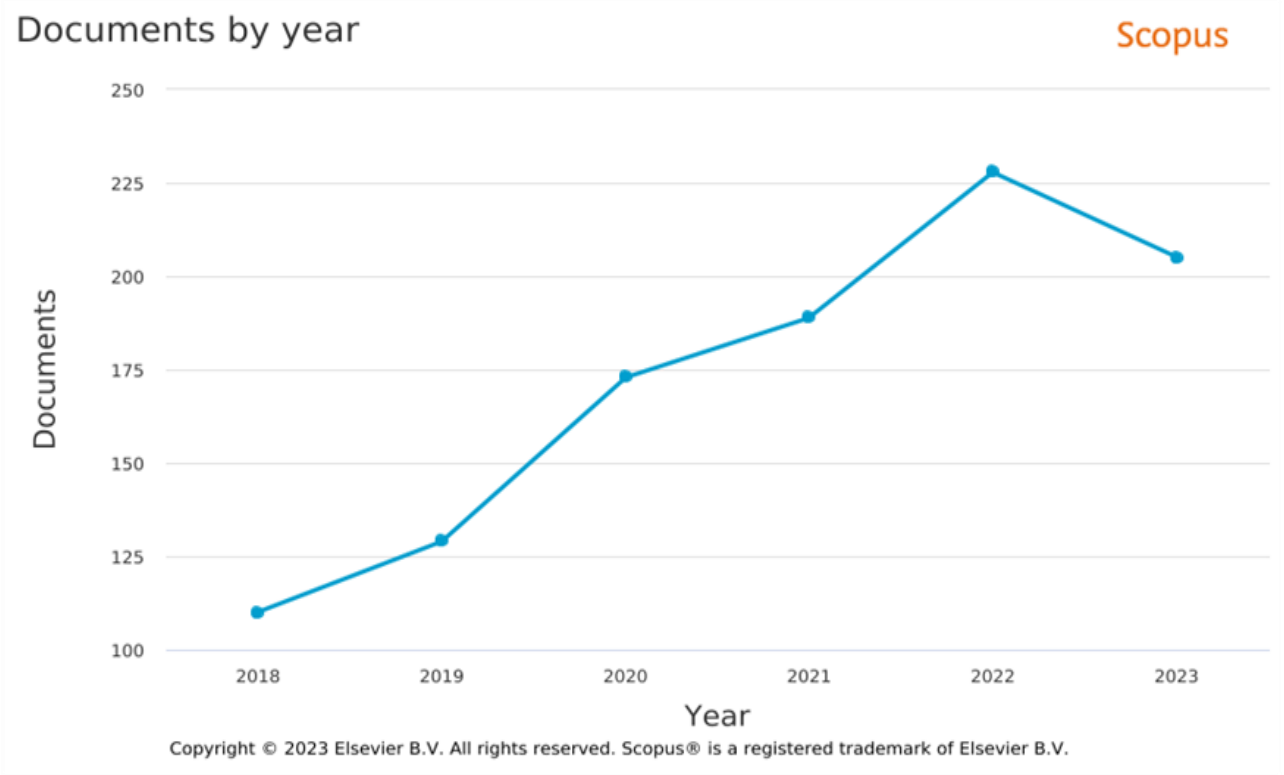

Fig. 1. Plotting document publication by years

Prior to 2020, the number of publications was increasing steadily with an average of 10 to 15 articles published per year. However, a significant rise was recorded in 2020 during which the number of publications increased to more than 34 articles. Such trend persisted throughout 2021 and 2022 with 42 and 52 published articles, respectively. The growth in research efforts could be ascribed to various causes, including the rising popularity of crowdfunding platforms and the increase in awareness regarding the potential of technology in enhancing the efficiency and transparency of social financing operations.

It is also important to note that the increasing trend is likely to continue in recent years, with 48 articles were published as of October 2023 as compared to the same timeline in 2022. This shows that the topic of technological applications in social financing is still in its infancy with enormous potential for future expansion.

The statistics captured the increasing interest in using technology for social fundraising initiatives. Such tremendous growth in the number of publications throughout recent years implies that this area has prominent potential to change the world.

5.2 Author Profile

Figure 2 depicts the distribution of articles according to authors and the corresponding percentages in the dataset. The highest contribution was recorded by Zegers-Hochschild, F. with 13 articles, which accounted for 1.3% of the total publication. It is followed closely by Musri, C. with 10 articles (1.0%) and Crosby, J. A. with 9 articles (0.9%).

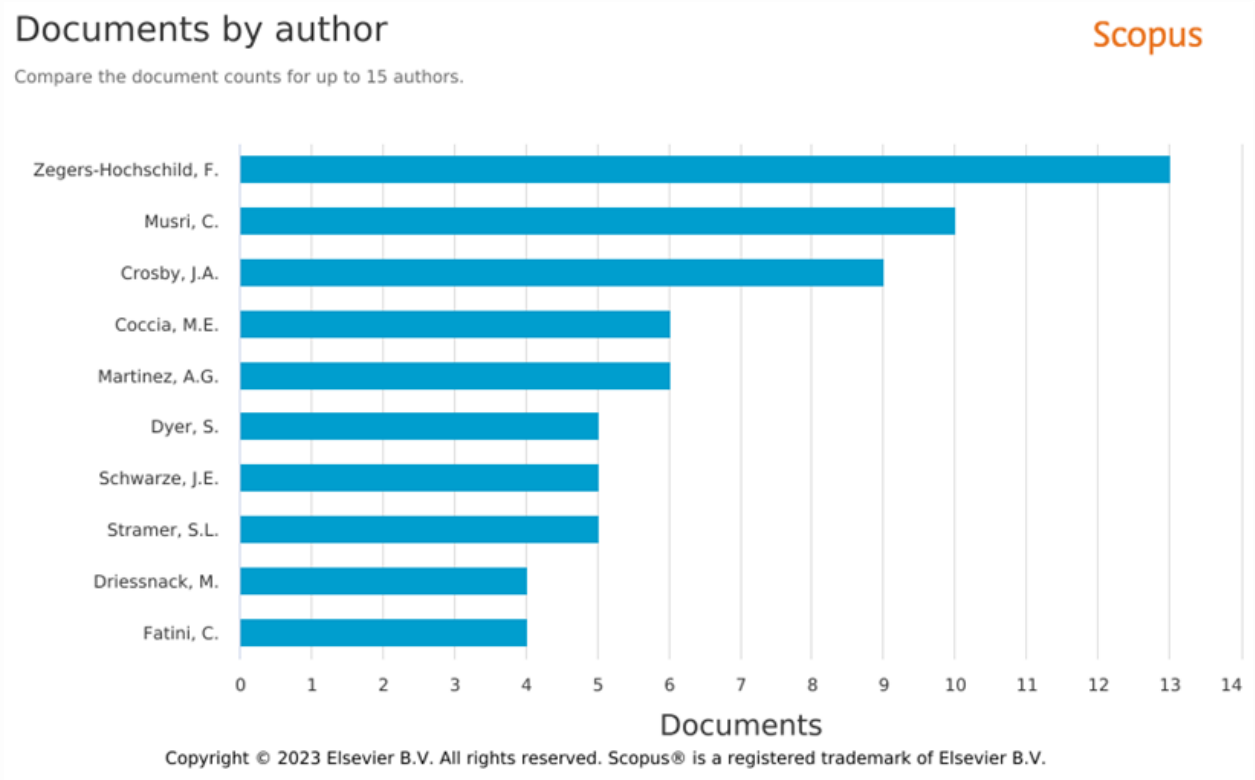

Fig. 2. Author Profile

Meanwhile, Coccia, M. E. and Martinez, A. G. contributed 6 articles each, accounting for 0.6% of the total publication. Additionally, Dyer, S., Schwarze, J. E., and Stramer, S. L. authored 5 articles each, which represented 0.5% of the dataset. Lastly, Driessnack, M. and Fatini, C. contributed 4 articles each, constituting for 0.4% of the entire publication. This breakdown demonstrates a hierarchical relationship between the number of papers produced by each author and their percentage of contribution to the entire collection. It demonstrates the various degrees of author participation, highlighting Zegers-Hochschild, F. as the most prominent contributor. In summary, the dataset showed a trend in document contributions from various authors that indicates their prominence in the area.

5.3 Type of Document by Subject of Research

Figure 3 depicts the distribution of documents by research area. Each colour code represents a distinct area and the size of each segment indicates the fraction of papers relevant to that subject.

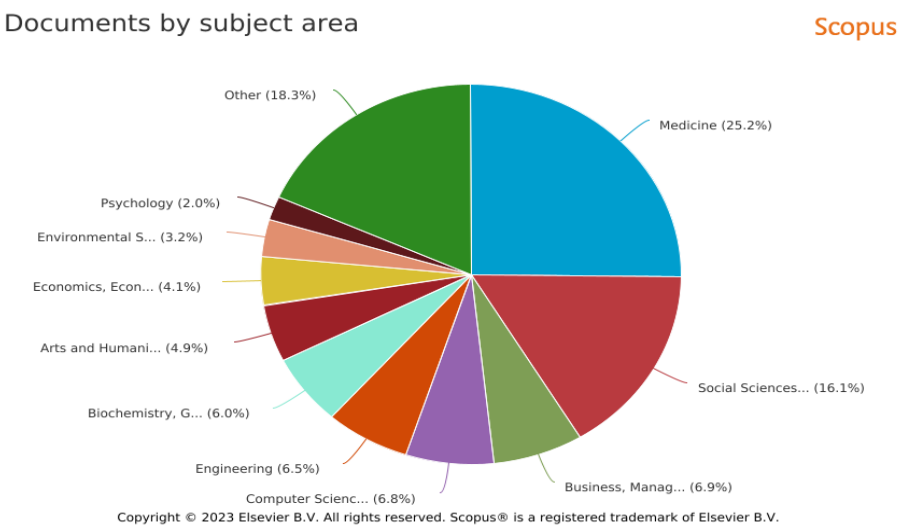

Fig. 3. Documents by subject area

A summary of the key findings is as follows:

i. Medicine emerged as the principal field of research that accounted for 25.2% of the entire publications. It demonstrates the research community's strong interest in health and medical sciences. This significant focus is unsurprising considering the critical relevance of improvements in healthcare and medical technology, which represent a constant effort to improve the well-being of humans. Furthermore, Social Sciences appeared as a substantial contributor (16.1%). It comprised various disciplines such as sociology, political science, education, and multidisciplinary studies, all of which provide varied views to social knowledge and progress.

ii. Engineering and Computer Science were also extensively covered, accounting for 6.5% and 6.8% of the total publication. These disciplines play key roles in supporting technological progression and innovation, hence underlining their crucial value in driving significant progress. Furthermore, Business, Management, and Accounting accounted for 6.9% of all papers, suggesting a great interest and involvement in commercial, financial, and organizational issues contributing to good business operations.

iii. Biochemistry, Genetics, and Molecular Biology contributed 6.0% of all articles, thus indicating the critical significance of these areas in uncovering the fundamental basis of life and investigating possible applications in healthcare and business. On the other hand, Arts and Humanities, Economics, Econometrics, Finance, and Environmental Science accounted for 4.9%, 4.1%, and 3.2% of the total publications, respectively. Despite being less common than Medicine or Social Sciences, these fields are important in advancing complete knowledge and holistic understanding across several domains.

iv. Psychology, albeit representing a minor proportion of 2.0%, continues to reflect a sustained interest in investigating human behaviour and mental processes. The "other" category encompassed 18.3% of the documents distributed across many disciplines, thus highlighting the wide array of research areas that contribute significantly beyond the specified subjects.

5.4 Top 10 Authors Based on Citation by Research

Table 3 illustrates the top 10 writers and their research articles, indicating the vast interest and focus of modern academic publications in this field of study. The article by Ju *et al.,* titled "Citizen-centred Big Data Analysis-driven Governance Intelligence Framework for Smart Cities" and published in Telecommunications Policy gained the top rank with 68 citations. It highlights the growing relevance of data-driven governance techniques in the context of smart cities. This is consistent with current technical advances and urban development projects and reflects a determined drive toward more efficient government systems.

Table 3
Top 10 authors based on citation by research

Authors	Title	Year	Source title	Cited by
Ju *et al.*,	Citizen-centred big data analysis-driven governance intelligence framework for smart cities	2018	Telecommunications Policy	68
Agarwal & Chua	FinTech and household finance: a review of the empirical literature	2020	China Finance Review International	55
Wonglimpiyarat	Challenges and dynamics of FinTech crowd funding: An innovation system approach	2018	Journal of High Technology Management Research	44
McDougall *et al.*,	An empirical explanation of the natural-resource-based view of the firm	2019	Production Planning and Control	44
Mohd Thas Thaker *et al.*,	Modelling crowd funders' behavioral intention to adopt the crowdfunding-waqf model (CWM) in Malaysia: The theory of the technology acceptance model	2018	International Journal of Islamic and Middle Eastern Finance and Management	44
Hudaefi	How does Islamic fintech promote the SDGs? Qualitative evidence from Indonesia	2020	Qualitative Research in Financial Markets	40
Usman *et al.*,	Integrating trust, religiosity, and image into technology acceptance model: the case of the Islamic philanthropy in Indonesia	2022	Journal of Islamic Marketing	39
Robiady *et al.*,	Customer engagement in online social crowdfunding: The influence of storytelling technique on donation performance	2021	International Journal of Research in Marketing	38
Yoo & Drumwright	Nonprofit fundraising with virtual reality	2018	Nonprofit Management and Leadership	36
Bin-Nashwan *et al.*,	Social solidarity amid the COVID-19 outbreak fundraising campaigns and donors' attitudes	2022	International Journal of Sociology and Social Policy	29

Furthermore, the study by Agarwal and Chua on "FinTech and Household Finance: A Review of Empirical Literature" published in China Finance Review International garnered 55 citations, demonstrating the growing interest in FinTech and its implications for managing household finances. Similarly, the empirical research by Wonglimpiyarat titled "Challenges and Dynamics of FinTech Crowdfunding" which was published in the Journal of High Technology Management Research and

McDougall *et al.,* "Natural-Resource-Based View of the Firm" published in Production Planning and Control received 44 citations each, thus highlighting the importance of FinTech in the dynamics of crowdfunding and firms' perceptions on natural resource-based benefits, respectively.

The data also demonstrates the growing interest in Islamic finance and technology. For instance, the work by Mohd Thas Thaker *et al.,* regarding "Modelling Crowd Funders' Behavioural Intention to Adopt the Crowdfunding-Waqf Model in Malaysia" was published in the International Journal of Islamic and Middle Eastern Finance and Management and received 44 citations. It emphasizes the significance of technological acceptance models to understand crowdfunding in the Islamic finance industry. Similarly, Hudaefi's study on "How Islamic Fintech Promotes the SDGs" published in Qualitative Research in Financial Markets and Usman *et al.,* research titled "Integrating trust, religiosity, and image into technology acceptance model: the case of the Islamic philanthropy in Indonesia" demonstrate the rising interest and ramifications of Islamic FinTech.

Collectively, these highly cited research papers show the wide array of current scholarly interests across various topics, such as data-driven governance, financial technology, crowdfunding dynamics, firm perspectives, Islamic finance, customer engagement, fundraising innovations, and social solidarity amidst crises. The different number of citations for these papers illustrate their importance within their respective fields and indicate the broad and in-depth research interest.

5.5 Co-Occurrence Key Words

The co-word analysis revealed a total of 51 keywords with a minimum of 40 occurrences. The most frequently occurring keyword was 'human' (468 occurrences), followed by articles (413 occurrences) and 'humans' (366 occurrences). Table 4 shows the results of the top 10 keywords co-occurrence analysis.

Table 4
Top 10 authors based on citation by research

	Keyword	Occurrence	Total link strength
1	Human	468	4108
2	Article	413	3861
3	Humans	366	3479
4	Female	299	3359
5	Adult	263	2941
6	Male	219	2272
7	Controlled study	173	1908
8	Oocyte donation	120	1616
9	Infertility Therapy	124	1601
10	Pregnancy	104	1526

i. Cluster 1 (Red): This cluster comprises 28 keywords titled "Technology's Role in Medical Crowdfunding". Medical crowdfunding has been gaining popularity as a technique for generating cash for medical bills. A few research has investigated the different facets of technology's involvement in medical crowdfunding. For example, a comprehensive assessment of the research on medical crowdfunding underlined the importance of textual elements in the success of crowdfunding projects [33]. Another research reported the impact of attention and dependability on the success of online medical crowdfunding campaigns, with the goal amount playing a moderating role [34,35]. Additionally, the use of social media for medical crowdfunding has highlighted ethical problems, leading to an investigation into the influence of communication style on fundraising and emotional

attachment [36]. These studies show that technology has a substantial impact on the success and ethical consequences of medical crowdfunding projects.

ii. Cluster 2 (Green): This cluster consists of 20 keywords titled "Technology-enabled funding for reproductive health". Currently, there is a scarcity of information on technology-enabled reproductive health financing that specifically focuses on SRH interventions. Despite the abundance of information on SRH technology, including mHealth (mobile) solutions and digital health methods, technology-enabled reproductive health financing has not been thoroughly discussed in the literature. The literature also emphasizes on using technology to enhance SRH outcomes, promote sexual health education, and deliver services, particularly in low- and middle-income countries [37,38].

iii. Cluster 3 (Blue): This cluster is formed by 2 keywords titled "Technological advancements in paediatric cell treatments". Paediatric cell therapy technological breakthroughs have opened up new therapeutic alternatives for a broad spectrum of hereditary and acquired disorders, hence challenging the established treatment approaches [39]. Social funding has been critical in enabling these developments. Furthermore, the use of digital health technology in paediatric trials has created new opportunities for gathering physiological data and evaluating the efficacy of novel therapies [40].

Figure 4 outlines each cluster and its label based on the co-occurrence analysis. The clusters are groups of objects relating to a single theme as follows:

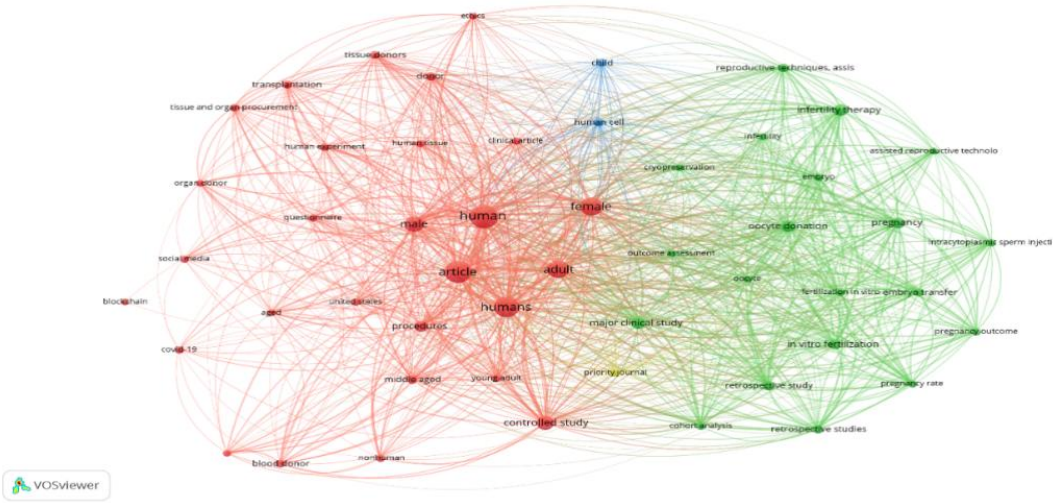

Fig. 4. Co- occurrence analysis of emerging of technology and social funding activities

Table 5 provides a summary of the co-occurrence analysis of emerging technology and social funding activities, which include labels, the number of keywords, and representative keywords.

Table 5

Summary of Co-occurrence clusters on emerging research of technology application in social funding

Cluster No and colour	Cluster	Number of keywords	Representative keywords
1 (red)	Technology's Role in Medical Crowdfunding	28	Adult, aged, article, blockchain, blood donors, clinical article, controlled study, covid-19, donor, ethics, female, human, human experiment, human tissue, humans, male, middled aged, non-organ donor, procedures, questionnaire, social media, tissue and organ procurement, tissue donors, transplantation, united states, young adult
2 (green)	Technology enabled funding for reproductive health.	20	Assisted reproductive technology, cohort analysis, cryopreservation, embryo, embryo transfer, fertilization in vitro, in vitro fertilization, infertility, infertility therapy, Intracytoplasmic sperm, Major clinical study, Oocyte, Oocyte donation, Outcome assessment, Pregnancy, Pregnancy outcome, Pregnancy rate, Reproductive technique, Retrospective studies, retrospective study
3 (blue)	Technological advancements in paediatric cell treatments	2	Child, human cell

5.6 Bibliographic Coupling

From 1024 documents included in the bibliographic coupling for countries analysis, 151 documents met the 52 citations threshold. The analysis produced seven significant clusters. Based on total link strength, the top 3 countries in bibliographic coupling are the United States, United Kingdom, and France with total link strength of 12,491, 8825, and 4693, respectively. Table 6 presents the top 10 countries in the bibliographic coupling analysis**.**

Table 6
Bibliographic Coupling by Countries

	Country	Documents	Citations	Total link strength
1	United States	284	2592	12491
2	United Kingdom	116	1667	8825
3	France	46	619	4693
4	Germany	55	689	4678
5	Italy	49	557	4495
6	Spain	53	445	4344
7	Canada	55	587	4297
8	Australia	50	562	4293
9	Netherlands	35	469	4048
10	Switzerland	27	388	3776

The bibliographic coupling network map revealed seven significant clusters as shown in Figure 5. The nations involved in the research of technology application in social funding are discussed below.

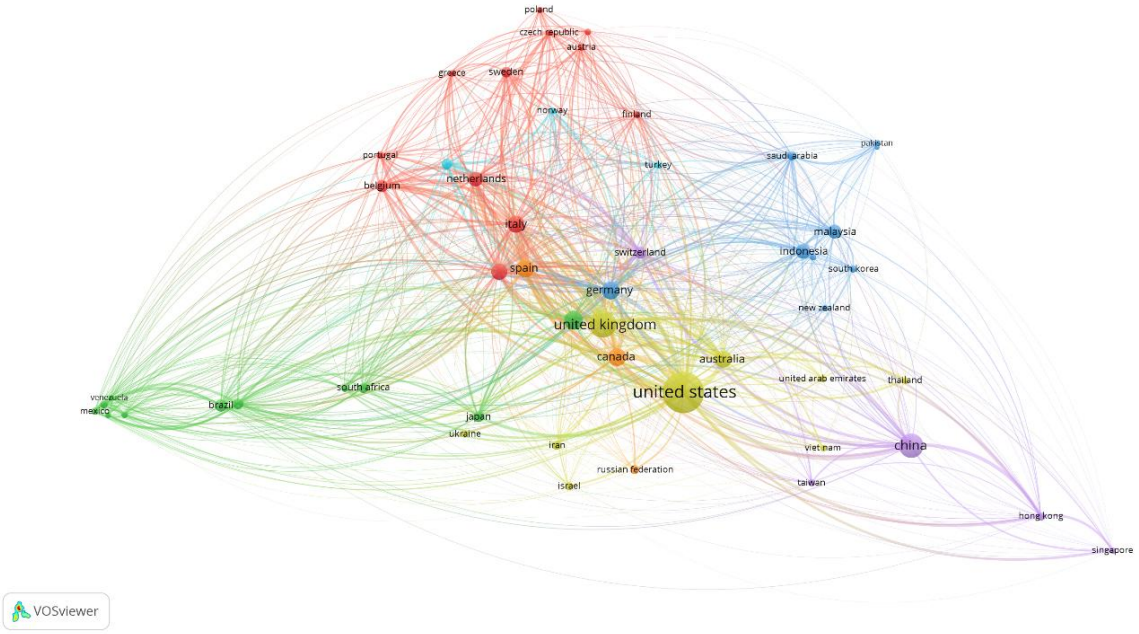

Fig. 5. Bibliographic coupling for countries involves in research of technology application in social funding

The United States (highlighted in yellow) seems to be a prominent hub in this network, hence suggesting a significant amount of research and strong ties to other nations. This significance implies that the United States is crucial in the development and implementation of technology in social financing, having a considerable influence on the worldwide research community. The dense network of links connecting the United States node to the rest of the world suggests substantial cooperation and impact.

China (highlighted in purple) is another significant node with prominent contributions to the discipline. Strong ties between China and other Asian nations, such as South Korea, Singapore, and Hong Kong, show regional cooperation. However, China has significant linkages to Western nations, subsequently demonstrating its worldwide reach across this research field.

The United Kingdom and Canada (highlighted in red) and Australia (highlighted in blue) are important nodes with many connections. Together with the United States, these nations create a cluster that implies a strong English-speaking research community with common interests and joint efforts in the use of technology for social funding.

Smaller nodes, such as those representing various nations in South America, Africa, and portions of Asia, are also visible in the image. Even though these nodes are smaller, they are nonetheless linked to the bigger network, thus reflecting their involvement in the global conversation. Their links to bigger nodes indicate possible pathways for expanded cooperation and information sharing, which might improve their effect in the area. In summary, the results emphasize the pivotal role of nations such as the United States, China, the United Kingdom, and Canada, along with the relevance of cross-continental collaboration networks. The image exemplifies the interrelated nature of current research and the worldwide attempt to use technology for social benefit.

Table 7 shows the bibliographic coupling summary which comprises the cluster number and colour, cluster labels, number of countries, and representative countries.

Table 7
Summary of bibliographic coupling by countries

Cluster Number and Colour	Number of Countries	Representative Countries
1 (Red)	12	Austria, Belgium, Czech Republic, Finland, France, Greece, Ireland, Italy, Netherlands, Poland, Portugal, Sweden
2 (Green)	11	Argentina, Brazil, Chile, Colombia, Egypt, India, Japan, Mexico, South Africa, Uruguay, Venezuela
3 (Blue)	9	Germany, Indonesia, Malaysia, New Zealand, Nigeria, Pakistan, Romania, Saudi Arabia, South Korea
4 (Yellow)	9	Australia, Iran, Israel, Thailand, Ukraine, United Arab Emigrated, United Kingdom, United States, Vietnam
5 (Purple)	5	China, Hong Kong, Singapore, Switzerland, Taiwan
6 (Light blue)	3	Denmark, Norway, Turkey
7 (Orange)	3	Canada, Russian Federation, Spain

6. Discussion and Conclusion

The growth of technology in social financing from 2018 to 2023 demonstrates a significant increase in academic interest. Initially, a gradual growth in publications was revealed in 2020, with an average of 10 to 15 publications per year. It later doubled to 34 publications and continued increasing to 42 publications in 2021 and 52 publications in 2022. Such an increasing trend, as evidenced by 48 publications in 2023, revealed a budding sector that is still in its infancy with significant potential for development in the future.

This study depicts the growing focus on technology's involvement in social fundraising activities. The significant increase in publications reflects the field's potential effect on shifting social dynamics. Figure 2 depicts a hierarchical connection among contributors, with Zegers-Hochschild, F. as the most prominent author, followed by increasing degrees of author engagement as shown by the percentages assigned to each author. This variance in contributions highlights different degrees of interest within the research dataset.

The distribution of documents by research area (Figure 3) illustrates Medicine (25.2%) as the dominant area of research in technological advancement, followed by Social Sciences, Engineering, Computer Science, Business, and Biochemistry. Moreover, the highly cited research papers detailed in Table 3 underscore the diverse scholarly interests encompassing topics such as data-driven governance, financial technology, Islamic finance, and social solidarity, subsequently accentuating their significance within respective fields.

The co-occurrence analysis identified 3 independent clusters, which highlight the tremendous effect of technology in these specialized domains: "Technology's Role in Medical Crowdfunding," "Technology-Enabled Funding for Reproductive Health," and "Technological Advancements in Paediatric Cell Treatments." The bibliographic coupling analysis, as shown in Figure 5, depicts a global network of research involvement. Furthermore, the United States, China, the United Kingdom, Canada, and Australia appeared as crucial nodes that demonstrate significant collaborative links within an English-speaking research community. The smaller nodes also suggest global engagement with opportunities for further global collaboration and information exchange.

The findings of this study also revealed an increasing trend in research pertaining to the influence of technology on social financing activities, as seen by a significant increase in publications from 2018 to 2023. The dynamics of authors' contribution reflect varying degrees of participation while the broad distribution of papers across academic disciplines emphasizes the multidimensional character of technology's role in social financing. Moreover, the highly cited research fields, specialized clusters revealed using co-word analysis, and powerful worldwide research partnerships highlight the field's

potential for social impact. The data depicts the key role of technology in transforming social funding, hence providing chances for multidisciplinary cooperation and creative solutions to a wide range of societal concerns.

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References

[1] Afjal, Mohd. "Bridging the financial divide: a bibliometric analysis on the role of digital financial services within FinTech in enhancing financial inclusion and economic development." *Humanities and Social Sciences Communications* 10, no. 1 (2023): 1-27. https://doi.org/10.1057/s41599-023-02086-y

[2] Rasheed, Rabia, Sulaman Hafeez Siddiqui, Iqbal Mahmood, and Sajjad Nawaz Khan. "Financial inclusion for SMEs: Role of digital micro-financial services." *Review of Economics and Development Studies* 5, no. 3 (2019): 571-580. https://doi.org/10.26710/reads.v5i3.686

[3] Ohnesorge, Jan. *A primer on blockchain technology and its potential for financial inclusion*. No. 2/2018. Discussion Paper, 2018.

[4] Sembiring, Murpin Josua, Wahyudi Wibowo, and Grace Citra Dewi. "Adoption of innovative mobile payment technologies in Indonesia: The role of attitude." (2023).

[5] Masrom, Maslin, Mohd Nazry Ali, Wahyunah Ghani, and Amirul Haiman Abdul Rahman. "The ICT implementation in the TVET teaching and learning environment during the COVID-19 pandemic." *International Journal of Advanced Research in Future Ready Learning and Education* 28, no. 1 (2022): 43-49.

[6] Brika, Said Khalfa Mokhtar. "A bibliometric analysis of fintech trends and digital finance." *Frontiers in Environmental Science* 9 (2022): 796495. https://doi.org/10.3389/fenvs.2021.796495

[7] Dissanayake, Hiranya, Catalin Popescu, and Anuradha Iddagoda. "A Bibliometric Analysis of Financial Technology: Unveiling the Research Landscape." *FinTech* 2, no. 3 (2023): 527-542. https://doi.org/10.3390/fintech2030030

[8] Martínez-Peláez, Rafael, Alberto Ochoa-Brust, Solange Rivera, Vanessa G. Félix, Rodolfo Ostos, Héctor Brito, Ramón A. Félix, and Luis J. Mena. "Role of digital transformation for achieving sustainability: mediated role of stakeholders, key capabilities, and technology." *Sustainability* 15, no. 14 (2023): 11221. https://doi.org/10.3390/su151411221

[9] Patil, Purva Deepak, Dikshita Jaiprakash Mhatre, Nidhi Hemant Gharat, and Jisha Tinsu. "Transparent charity system using smart contracts on ethereum using blockchain." *International Journal for Research in Applied Science & Engineering Technology (IJRASET)* 10 (2022). https://doi.org/10.22214/ijraset.2022.41339

[10] Ayob, Noorseha, Simon Teasdale, and Kylie Fagan. "How social innovation 'came to be': Tracing the evolution of a contested concept." *Journal of Social Policy* 45, no. 4 (2016): 635-653. https://doi.org/10.1017/S004727941600009X

[11] de Melo, Mary Fernanda de Sousa, Rodrigo Trotta Yaryd, Roberta Castro Souza, and Willerson Lucas Campos-Silva. "How social impact and innovation have been related in the academic literature?." *Future Studies Research Journal: Trends and Strategies* 12, no. 1 (2020): 130-151. https://doi.org/10.24023/FutureJournal/2175-5825/2020.v12i1.406

[12] Mildenberger, Georg, Gudrun Schimpf, and Jürgen Streicher. "Social Innovation Assessment? Reflections on the impacts of social innovation on society-Outcomes of a systematic literature review:¿ Evaluación de la innovación social? Reflexiones sobre los impactos de la innovación social en la sociedad-Resultados de una revisión sistemática de la literatura." *European Public & Social Innovation Review* 5, no. 2 (2020): 1-13. https://doi.org/10.31637/epsir.20-2.1

[13] Leite, Emilene. "Innovation networks for social impact: An empirical study on multi-actor collaboration in projects for smart cities." *Journal of Business Research* 139 (2022): 325-337. https://doi.org/10.1016/j.jbusres.2021.09.072

[14] Cuesta, Carmen, Santiago Fernández de Lis, Irene Roibas, Ana Rubio, Macarena Ruesta, David Tuesta, and Pablo Urbiola. "Crowdfunding in 360º: alternative financing for the digital era." *Digital Economy Watch* (2015).

[15] Mpofu, Favourate Y. "Fintech, the fourth industrial revolution technologies, digital financial services and the advancement of the SDGs in developing countries." *International Journal of Social Science Research and Review* 6, no. 1 (2023): 533-553.

[16] Fauzi, Muhamad, and Ahmad Darussalam. "Digitalization Of Baitul Maal Wa Tamwil: How Does Survival In Covid-19 Pandemic?." *J-EBIS (Jurnal Ekonomi Dan Bisnis Islam)* (2022): 69-86. https://doi.org/10.32505/j-ebis.v7i1.3644

[17] Falaiye, Titilola, Oluwafunmi Adijat Elufioye, Kehinde Feranmi Awonuga, Chidera Victoria Ibeh, Funmilola Olatundun Olatoye, and Noluthando Zamanjomane Mhlongo. "Financial inclusion through technology: a review of

trends in emerging markets." *International Journal of Management & Entrepreneurship Research* 6, no. 2 (2024): 368-379. https://doi.org/10.51594/ijmer.v6i2.776

[18] Viana-Lora, Alba, and Marta Gemma Nel-lo-Andreu. "Approaching the social impact of research through a literature review." *International Journal of Qualitative Methods* 20 (2021): 16094069211052189. https://doi.org/10.1177/16094069211052189

[19] Shaikh, Salman Ahmed. "Using Fintech in scaling up Islamic microfinance." *Journal of Islamic Accounting and Business Research* 12, no. 2 (2021): 186-203. https://doi.org/10.1108/JIABR-10-2019-0198

[20] Listiana, Lisa, Syed Musa Alhabshi, and Agastya Widhi Harjunadhi. "Waqf for socio-economic development: A perspective of Ibn Khaldun." *İbn Haldun Çalışmaları Dergisi* (2020). https://doi.org/10.36657/ihcd.2020.67

[21] Iskandar, Azwar, Bayu Taufiq Possumah, Khaerul Aqbar, and Akhmad Hanafi Dain Yunta. "Islamic philanthropy and poverty reduction in Indonesia: The role of integrated Islamic social and commercial finance institutions." *AL-IHKAM: Jurnal Hukum & Pranata Sosial* 16, no. 2 (2021): 274-301. https://doi.org/10.19105/al-lhkam.v16i2.5026

[22] Ismail, Nurizal, and Siti Aisyah. "Islamic Social Finance: A Bibliometric Analysis." *Global Review of Islamic Economics and Business* 9, no. 2 (2021): 019-028. https://doi.org/10.14421/grieb.2021.092-02

[23] Binsaeed, Rima H., Zahid Yousaf, Adriana Grigorescu, Razvan Ion Chitescu, Alina Samoila, and Abdelmohsen A. Nassani. "The Power of Electronic Media: Nexus of Digital Crowdfunding Platforms, Innovation Strategy, Technology Orientation and Crowdfunding Performance." *Electronics* 12, no. 11 (2023): 2414. https://doi.org/10.3390/electronics12112414

[24] Verbeek, Arnold, Koenraad Debackere, Marc Luwel, and Edwin Zimmermann. "Measuring progress and evolution in science and technology–I: The multiple uses of bibliometric indicators." *International Journal of management reviews* 4, no. 2 (2002): 179-211. https://doi.org/10.1111/1468-2370.00083

[25] Assyakur, Dienda Sesioria, and Elsye Maria Rosa. "Spiritual Leadership in Healthcare: A Bibliometric Analysis." *Jurnal Aisyah: Jurnal Ilmu Kesehatan* 7, no. 2 (2022): 355-362. https://doi.org/10.30604/jika.v7i2.914

[26] Alves, Josivan Leite, Igor Bernardino Borges, and Jeniffer de Nadae. "Sustainability in complex projects of civil construction: bibliometric and bibliographic review." *Gestão & Produção* 28 (2021): e5389. https://doi.org/10.1590/1806-9649-2020v28e5389

[27] Wu, Yen-Chun Jim, and Tienhua Wu. "A decade of entrepreneurship education in the Asia Pacific for future directions in theory and practice." *Management Decision* 55, no. 7 (2017): 1333-1350. https://doi.org/10.1108/MD-05-2017-0518

[28] Mota, Jorge, Rui Costa, António Moreira, Silvana Serrão, and Carlos Costa. "Competitiveness framework to support regional-level decision-making in the wine industry: A systematic literature review." *Wine Economics and Policy* 10, no. 2 (2021): 29-40. https://doi.org/10.36253/wep-10131

[29] Van Eck, Nees, and Ludo Waltman. "Software survey: VOSviewer, a computer program for bibliometric mapping." *scientometrics* 84, no. 2 (2010): 523-538. https://doi.org/10.1007/s11192-009-0146-3

[30] Appio, Francesco Paolo, Fabrizio Cesaroni, and Alberto Di Minin. "Visualizing the structure and bridges of the intellectual property management and strategy literature: a document co-citation analysis." *Scientometrics* 101 (2014): 623-661. https://doi.org/10.1007/s11192-014-1329-0

[31] Van Eck, Nees Jan, and Ludo Waltman. "Bibliometric mapping of the computational intelligence field." *International Journal of Uncertainty, Fuzziness and Knowledge-Based Systems* 15, no. 05 (2007): 625-645. https://doi.org/10.1142/S0218488507004911

[32] Appio, Francesco Paolo, Antonella Martini, Silvia Massa, and Stefania Testa. "Unveiling the intellectual origins of social media-based innovation: insights from a bibliometric approach." *Scientometrics* 108 (2016): 355-388. https://doi.org/10.1007/s11192-016-1955-9

[33] Zhang, Fuguo, Bingyu Xue, Yiran Li, Hui Li, and Qihua Liu. "Effect of textual features on the success of medical crowdfunding: model development and econometric analysis from the tencent charity platform." *Journal of medical Internet research* 23, no. 6 (2021): e22395. https://doi.org/10.2196/22395

[34] Liu, Shan, Tingwei Cheng, and Hao Wang. "Effects of attention and reliability on the performance of online medical crowdfunding projects: The moderating role of target amount." *Journal of Management Science and Engineering* 5, no. 3 (2020): 162-171. https://doi.org/10.1016/j.jmse.2020.08.004

[35] Fan-Osuala, Onochie. "Communication Style in Medical Crowdfunding: Effect of Emotional Framing and Updates Frequency on Funding and Emotional Support." (2019).

[36] Kubheka, Brenda Zanele. "Bioethics and the use of social media for medical crowdfunding." *BMC Medical Ethics* 21, no. 1 (2020): 96. https://doi.org/10.1186/s12910-020-00521-2

[37] Bacchus, Loraine J., Kate Reiss, Kathryn Church, Manuela Colombini, Erin Pearson, Ruchira Naved, Chris Smith, Kathryn Andersen, and Caroline Free. "Using digital technology for sexual and reproductive health: are programs adequately considering risk?." *Global Health: Science and Practice* 7, no. 4 (2019): 507-514. https://doi.org/10.9745/GHSP-D-19-00239

[38] Desrosiers, Alethea, Theresa Betancourt, Yasmine Kergoat, Chiara Servilli, Lale Say, and Loulou Kobeissi. "A systematic review of sexual and reproductive health interventions for young people in humanitarian and lower-and-middle-income country settings." *BMC public health* 20 (2020): 1-21. https://doi.org/10.1186/s12889-020-08818-y

[39] Buckland, Karen F., and H. Bobby Gaspar. "Gene and cell therapy for children—New medicines, new challenges?." *Advanced drug delivery reviews* 73 (2014): 162-169. https://doi.org/10.1016/j.addr.2014.02.010

[40] Malhotra, Atul, Bernard Thebaud, Madison CB Paton, Bobbi Fleiss, Paris Papagianis, Elizabeth Baker, Laura Bennet *et al.,* "Advances in neonatal cell therapies: proceedings of the First Neonatal Cell Therapies Symposium (2022)." *Pediatric Research* 94, no. 5 (2023): 1631-1638. https://doi.org/10.1038/s41390-023-02707-x