Article

Potential of the Crypto Economy in Financial Management and Fundraising for Tourism

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Abstract: This study aims to examine the potential of blockchain technology in the financing and financial management of entrepreneurial tourism projects. It highlights two objectives: how the technology can be used as an alternative financing tool and how it can improve efficiency and transparency in the financial management of tourism companies. This study shows that initial coin offerings are an effective way to finance innovative tourism projects and that blockchain technology can improve the competitiveness and efficiency of tourism companies. Due to the lack of empirical data on the actual implementation and impact of blockchain technology in the tourism industry, it is suggested that further research is needed to examine the practical application of blockchain technology in the tourism industry, its potential impact on tourism businesses and its implications for the regulatory framework. The proposed methodology includes a systematic literature review on the application of blockchain technology for the financing of tourism projects and the financial improvement of tourism business models. The results indicate that blockchain technology has the potential to transform the financing and financial management of the tourism industry and improve its efficiency and transparency. Furthermore, combining blockchain with other technologies can provide additional benefits in supply chain management and event automation.

Keywords: blockchain; Bitcoin; financing; cryptocurrency; cost efficiency; bibliometric analysis

1. Introduction

Blockchain technology is defined as an accounting register that has the characteristic of being distributed in a decentralised way using a consensus protocol and a data structure with an architecture resistant to modifications [1]. Since its appearance in 2008 [2], this technology, based on the generation of encrypted blocks of information, has the particularity of being able to store and transmit stored data records containing information about the sender of the transaction, the receiver, the date and time of the transaction, the type of asset transferred and the amount of the same [3]. This type of technology can transfer a type of cryptocurrency to make payments between different countries without having to go through an intermediary, execute a contract between third parties without the need for an intermediary or execute a smart contract [3,4] associated with the automatic resolution of a tourist service reservation contract.

1.1. Blockchain Technology Overview

The growth in the market capitalisation value of cryptocurrencies, which stood at $1.67 T in January 2022 [5], indicates the level of investment expectations this blockchain technology is generating globally. It is estimated that by 2030, this technology's investments could contribute to a global economic growth of US$1.76 trillion [6]. Furthermore, this

technology has already demonstrated its usefulness in reducing financial costs in different industries [7] or securing and providing transparency to transactions [3]. This paper aims to deepen the analysis of the contribution to the financing of tourism projects and their management by incorporating different benefits and utilities in the value chain [8] of tourism companies and business models.

1.2. Crypto Economy and Practical Application of Blockchain Technology

Since the publication in 2008 of the document where Bitcoin [2] was discussed, the development of blockchain technology has evolved to the development of the so-called "crypto economy" [9], which is identified with the transaction system that uses cryptographic hashes as computational proof mechanisms within a network, to transfer and confirm the transmission of assets such as electronic money or smart contracts. In a crypto economy, cryptocurrency tokens serve as a medium of exchange, store of value and unit of account, allowing transactions to occur directly between parties without intermediaries such as banks [10]. Furthermore, the decentralised nature of blockchain technology also allows for the creation of decentralised autonomous organisations (DAOs) that can operate autonomously based on a set of rules encoded in smart contracts [11]. However, cryptoeconomics is a relatively new and evolving field, and there are still many challenges and uncertainties, including issues related to regulation, security and volatility [1].

Blockchain technology seeks to replace the trust placed in a third party, traditionally a financial institution, with a series of tools that make these organisations dispensable. It replaces the trust of human actions with algorithms based on decentralised blockchain technology and assigns trust characteristics to the economic system it supports [1]. This technology is valuable in generating business and social value in the business world [12], bringing security, transparency and privacy management to economic transactions and other parts of the business value chain [13].

From a practical point of view, the applications developed are related to so-called smart contracts [14], which can automatically execute a set of instructions previously programmed through a computerised protocol [15]. Thus, smart contracts are used to automate the management of investments and the distribution of profits among investors, to ensure that the conditions established in the insurance contract are met, to automate the process of granting and monitoring credit or to automate the process of making payments and financial transfers, which helps to reduce costs and speed up the process of the contract or investment.

Its application in the tourism sector still needs to be more widespread. The leading publications focus on the potential of blockchain technology to improve the efficiency and sustainability of the operations of different tourism services and as a tool to enhance the quality of the service provided to the tourist customer [16]. In this way, smart contracts automate the booking process of accommodation and tourism services and manage payments automatically. They are also used to automate the process of purchasing and using travel insurance, ensuring that the conditions set out in the contract are met and facilitating the claims process in case of cancellation or other eventualities. Real applications already exist that are used to automate accumulating and redeeming points in tourism loyalty and reward programmes, thereby reducing management costs for tourism service providers [17].

1.3. Uses of Bibliometrics in Other Research Fields

Bibliometric analysis is a technique used to assess the impact of scientific and technological research, which includes different tools and software for its implementation [18]. Technological development has led to specialised software that incorporates pre-designed workflows and is available to the scientific community and the general public [19]. This work proposes using tools that comply with the necessary bibliometric workflow and are developed under the open-source modality, which means that it is not required to acquire any commercial licence for their use.

Bibliometrics is a technique that has been widely used in all academic fields to assess the impact of scientific and technological research. This technique makes it possible to determine, among other parameters, the most cited research papers, the most cited authors or the contributions by country [20]. The use of bibliometrics provides a complete picture of the performance of a given research topic, which helps explore the evolution of a particular academic research field. In this work, an application called Bibliometix has been used to make thematic maps and explore the evolution of a specific area of research. The VOSviewer software [21] has also been used to carry out an analysis of bibliometric maps by text mining, which allows related terms with the capacity to form a specific cluster or theme to be created. This technique allows clusters of countries, institutions, keywords or the overall performance of a citation structure to be obtained and helps researchers to explore a particular field of research in-depth, identifying research narratives with a certain proximity based on the keywords, authors or publications analysed [22].

1.4. Blockchain Technology and Financing Opportunities

Due to the scarcity of academic literature in the field of study, the document helps to build a theoretical framework that will contribute to broadening the range of research in the area. It also aids in developing a conceptual framework based on the literature review and identifying key concepts, providing a solid basis for future research. It could also be used as future support for the elaboration of case studies on specific financing models based on the challenges and limitations of blockchain technology for financing tourism projects, improving financial transparency and efficiency of the tourism supply chain.

This paper aims to conduct a systematic review of the academic literature associated with blockchain technology applied to the financing of the tourism sector from a dual perspective. First, the opportunities for financing business projects related to the tourism sector. Second, the opportunities to provide new management tools for tourism companies along the value chain from a financial perspective. Although blockchain technology is generating a large amount of academic literature in recent years [23], work on its contribution to the financial sphere, more specifically, its contribution to the financing and management of tourism projects, has yet to begin to be investigated. Still, research interest is expected to awaken in the coming years.

The contributions of this document are intended to be channelled through two research questions. RQ1: To what extent can blockchain technology help finance tourism projects and business models? RQ2: Can blockchain technology contribute to the improvement in the financial management of tourism companies?

Answering these research questions pretends to reveal possible applications of blockchain technology in the financing and management of tourism projects, which historically have been financed with various innovative financial tools and structures to varying degrees [24]. Especially in recent years, platforms incorporating crowdfunding and other innovative forms of financing have emerged [24,25]. This paper is structured as follows. First, a systematic review of the existing literature on blockchain technology and its contribution to the financing and management of tourism projects is conducted. An analysis is also carried out with two types of bibliometric techniques used. Finally, the results are presented, followed by a discussion and conclusions.

Once you highlight the current and future possibilities of blockchain technology in the financing of the tourism sector, a systematic review methodology is applied to a topic such as blockchain technology, which alone has generated more than 24,000 scientific publications [26] but focused on a sector such as the tourism sector, which, in terms of gross domestic product and employment generation, has a significant impact worldwide [27]. Considering also that the tourism sector is traditionally made up of participants who are very permeable to incorporating new information and communication technologies [28].

2. Materials and Methods

The scientific database Web of Science (WoS) has been selected as the primary source of resources, as it is composed of the most extensive collection of the world's most prestigious research journals, where researchers from more than 140 countries have published their contributions in the last 15 years [29]. Documents written in English, mainly articles, have been analysed, as it is considered the most legitimate academic source [30], published until the end of December 2022. Using a Boolean approach, the keywords chosen were "blockchain tourism financial" and "blockchain tourism finance", using the fields title, abstract and key words. Due to the limited academic literature on the analysed topic, the following categories of documents have been used: article, article early access, proceedings paper and review. Relevant is the case of the proceedings paper that can provide relevant information given the limited existing academic literature in the field of study [31].

Applying the Prisma Statement data methodology [32], data were collected from the WoS source up to 26 December 2022. The set of publications collected as of 26 December 2022 reflected 18 documents. After a detailed analysis, one duplicate document was detected, and no further documents needed to be excluded from the analysis. A total of 17 documents were part of the analysis. Figure 1 summarises the workflow used in this study, a process found in different studies using scientific mapping [18].
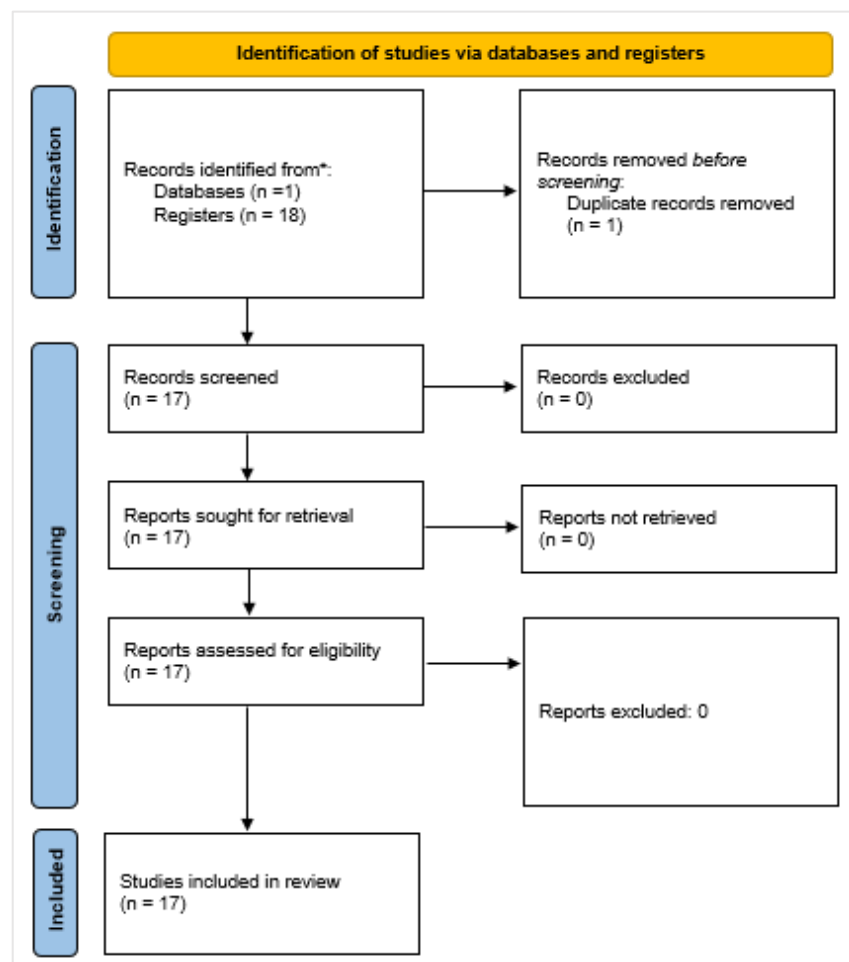

Figure 1. Workflow followed for the systematic review.

The first part of the analysis was carried out using the Biblioshiny software [18], which is helpful for descriptive bibliometric analysis, also based on the coding of variables used in previous work [33]. For the second part of the analysis, the VOSviewer tool [34] was used to analyse and visualise networks based on co-authorship, co-citation criteria and keywords,

among other types of analysis. Finally, in the third part of the analysis, a descriptive study and analysis of the 17 documents included were conducted, motivating the conclusions.

3. Results

3.1. Descriptive Analysis

The main results of the descriptive statistics analysis about blockchain technology and sustainability in the tourism sector are presented below. Table 1 is the sample data from 2019 to December 2022, consisting of 17 papers published in 16 resources and 55 authors participating in these articles. The number of co-authors per article was 3.24. Analysing the authorship pattern, the average value of papers per author was 0.31.

Table 1. Data characteristics.

Description	Results
Timespan	2019:2022
Sources (Journals, Books, etc.)	16
Documents	17
Annual Growth Rate %	51.83
Article	12
Article; early access	2
Article; proceedings paper	2
Review	1
Document Average Age	0.933
Average citations per doc	4.118
References	1107
Keywords Plus (ID)	51
Author's Keywords (DE)	61
Authors	55
Authors of single-authored docs	4
Single-authored docs	4
Co-Authors per Doc	3.24
International co-authorships %	17.65

As shown in Figure 2, the interest in research on this topic has only recently begun, with an annual growth rate of 51.83%. In 2019, the first article was published in which the possibilities of establishing payment systems using blockchain technology in the tourism sector were analysed [35,36]. The annual citations of the published articles are shown in Table 2, showing the average number of total citations per article and the average number of total citations per article per year. The year 2022 stands out as the most prolific in terms of the average number of citations per paper and year, which partly confirms the recent interest in the subject analysed.
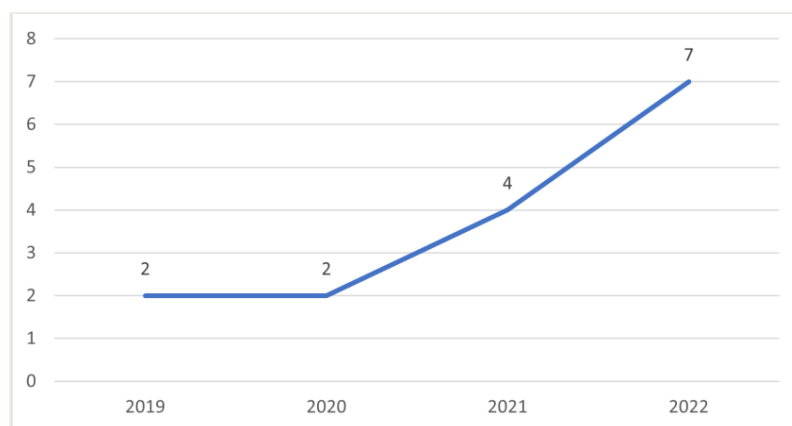

Figure 2. Annual scientific production.

Table 2. Annual citations.

Year	N [1]	MeanTCperArt [2]	MeanTCperYear [3]	Citable Years
2019	2	7.00	2.33	3
2020	2	18.5	9.25	2
2021	4	2.75	2.75	1
2022	7	1.14	-	0

[1] N, number of documents. [2] MeanTCperArt, mean total citations per document. [3] MeanTCperYear, total citations per year.

Figure 3 shows the total number of citations of the authors. The ten most influential authors are added according to their number of citations. Authors Cammarano A, Caputo M, Michelino F and Varriale V are the most relevant authors by the number of citations, a total of 20 citations for each. As seen in Figure 4, no single author stands out above the others regarding the number of publications, with a total of ten authors with one publication.
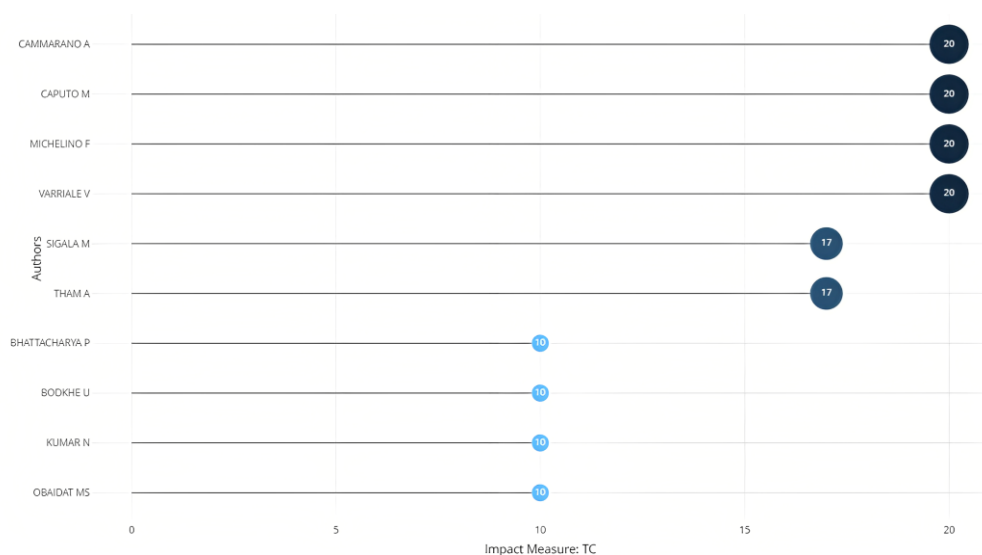

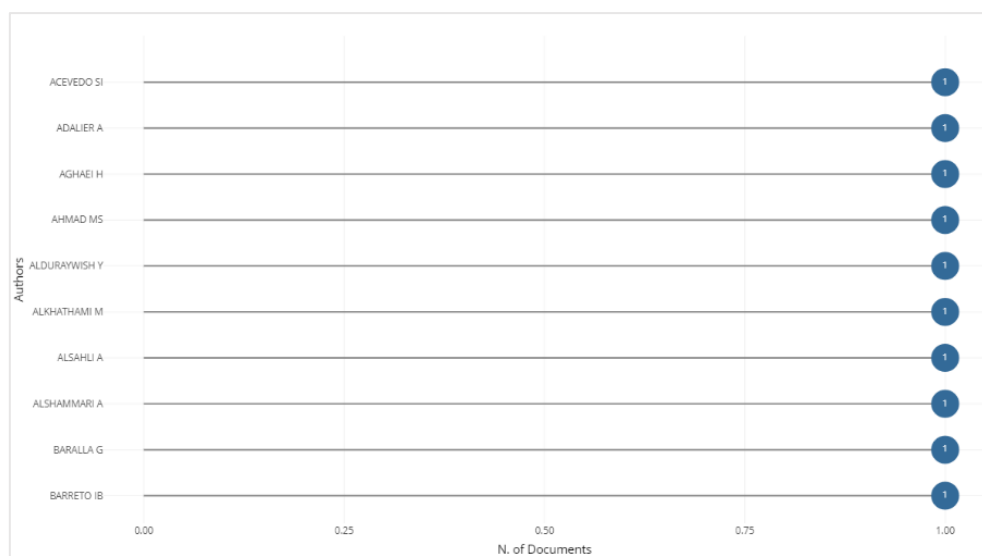**Figure 3.** Total citations per author.

Figure 4. Authors' number of publications.

Table 3 reflects the most cited papers during the period analysed. The most cited paper analyses the possibilities of introducing blockchain technology in sustainable supply chains, incorporating solutions from a financial point of view [37]. Table 4 shows the relevant journals with the most published articles. The leading journal is related to the hospitality and tourism technology sector.

Table 3. Most cited documents.

Paper Title	DOI	Total Citations	TC per Year [1]	Normalised TC [2]
The Unknown Potential of Blockchain for Sustainable Supply Chains	10.3390/su12229400	20	6.67	1.08
Road block(chain): bit(coin)s for tourism sustainable development goals?	10.1108/JHTT-05-2019-0069	17	5.67	0.92
BloHosT: Blockchain Enabled Smart Tourism and Hospitality Management	10.1109/CITS.2019.8862001	10	2.50	1.43
Designing A Tourism Business Model on Block Chain Platform	10.1016/j.tmp.2021.100845	8	4.00	2.91
Blockchain Technology in The Tourism Industry: New Perspectives in Switzerland	10.3917/jie.pr1.0111	4	4.00	3.50
Criptomonedas Y Blockchain En El Turismo Como Estrategia Para Reducir La Pobreza	10.17163/ret.n18.2019.07	4	1.00	0.57
Blockchain-Based Entrepreneurial Finance: Success Determinants of Tourism Initial Coin Offerings	10.1080/13683500.2021.1980505	2	2.00	1.75
The Relation Between Tokens and Blockchain Networks: The Case of Medical Tourism in The Republic of Moldova	10.31585/jbba-4-1-(2)2021	2	1.00	0.73
Blockchain For Government Organizations: Past, Present and Future	10.1108/JGOSS-08-2021-0063	2	2.00	1.75
Moving Beyond the Crypto-Currency Success of Blockchain: A Systematic Survey	10.12694/scpe.v22i3.1853	1	0.50	0.36

[1] TC per Year, total citations per year. [2] Normalised TC, actual count for citing items by expected citation rate for documents.

Table 4. Sources with at least one cited article.

	Source	Articles
1	Journal of Hospitality and Tourism Technology	2
2	2021 IEEE IOT Vertical and Topical Summit for Tourism	1
3	Current Issues in Tourism	1
4	Electronic Commerce Research	1
5	International Journal of Computer Science and Network Security	1
6	Journal of Environmental and Public Health	1
7	Journal of Global Operations and Strategic Sourcing	1
8	Journal of Innovation Economics & Management	1
9	Journal of The British Blockchain Association	1
10	Proceeding of the 2019 International Conference on Computer, Information and Telecommunication Systems (IEEE CITS 2019)	1

Table 5 shows the eight most repeated nationalities among the authors of the articles analysed, considering that the same document may belong to authors of different nationalities. Again, Italy has the highest number of total citations, and Australia has the highest average number of citations per article, having the highest average number of citations of all the countries included in the analysis.

Table 5. Nationalities of the authors analysed.

	Country	Articles	Total Citations	Average Article Citations
1	Italy	2	20	10.00
2	Australia	1	17	17.00
3	India	3	13	4.33
4	Iran	2	8	4.00
5	Peru	1	4	4.00
6	Switzerland	1	4	4.00
7	France	1	2	2.00
8	Turkey	1	2	2.00

According to Figure 5, the analysed topic is used in many research areas, as can be deduced from the keyword analysis. Six of the analysed documents include the keyword "Bitcoin", which is the origin of blockchain technology [2]. Relevant is the use of the keywords "management" and "challenges", which appear four times in the analysed documents, indicating an emerging trend within the analysed topic.

3.2. Network Analysis and Visualisation

Visualisation of similarities (VOS) analysis is a technique that aims to provide a low-dimensional visualisation in which the depicted objects are placed in such a way that the distance between any pair of objects reflects their similarity as accurately as possible [38]. This is achieved by analysing the relationships between selected elements through the nodes' size, colour and thickness of their lines. Finally, network analysis of co-authorship, co-citation, keyword co-occurrence and bibliographic coupling is a technique used to reveal the most prominent relationships between authors, documents, co-cited references and sources. Different analyses of this type have been carried out in this work, making it possible to detect the main clusters of work.

Figure 5. Keywords analysed.

Figure 6 shows the visualisation map of countries' co-authorship in the publication of the literature related to the subject of the analysis. The node's size marks the number of articles published by each country. The larger the size, the greater the number of papers published by the country. It can be seen that different colours represent five clusters. According to the size of the nodes shown in Figure 6, it can be seen that there is no relationship between the analysed nodes. China (red cluster) represents the largest node size. However, it is not among the most cited countries. Table 6 shows the co-occurrence of the different keywords in the analysed documents to assess the strength of the links between the analysed documents. The words "Bitcoin" and "blockchain" are the keywords with the highest total link strength, with 21 and 20 links, respectively. In addition, the appearance of terms such as "challenges", "innovation" and "management" is significant, marking a key trend in the research areas.
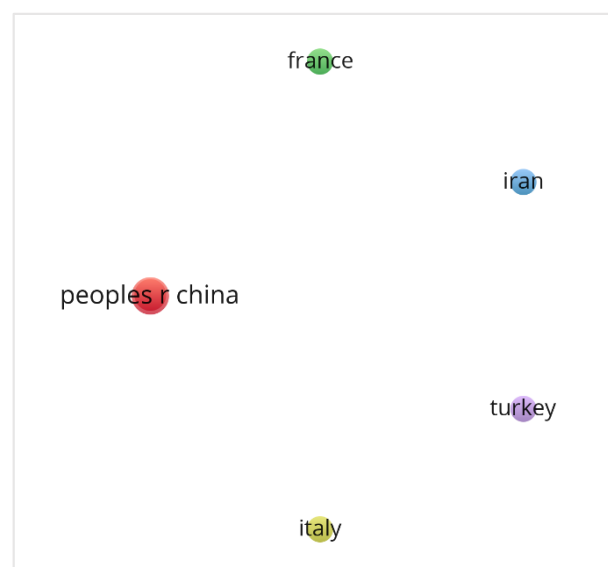

Figure 6. Network analysis of countries' co-authorship.

Table 6. Keywords' co-occurrence.

Keyword	Occurrences	Total Link Strength
Bitcoin	6	21
Blockchain	11	20
Blockchain technology	3	9
Challenges	4	16
Innovation	4	15
Management	4	16
Technology	5	18
Tourism	6	15

The authors' co-citation was analysed considering a minimum number of citations per author of five. A total of 11 authors have been filtered according to this selection, forming 3 clusters, as depicted in Figure 7. The largest cluster consists of five authors and the second one of four. As can be seen in Figure 7, the largest cluster (red colour) contains authors who have made essential publications in the blockchain field. The most prominent authors in this cluster, Kshetri N, Nakamoto S, Swan M, Treiblmaier H and Yli-Huummo J, have published different articles based on blockchain technology and its scalability to different industries, the applications of blockchain technology to the field of marketing and the application of the discussed technology in the supply chains of other industries. Four authors form the second cluster (green colour), the most prominent authors being Kwok A, Nam K, Onder I and Sigala M. These authors have made contributions in areas related to the security of blockchain technology and the future of blockchain technology in accommodation tourism or the application of blockchain technology to smart tourism.
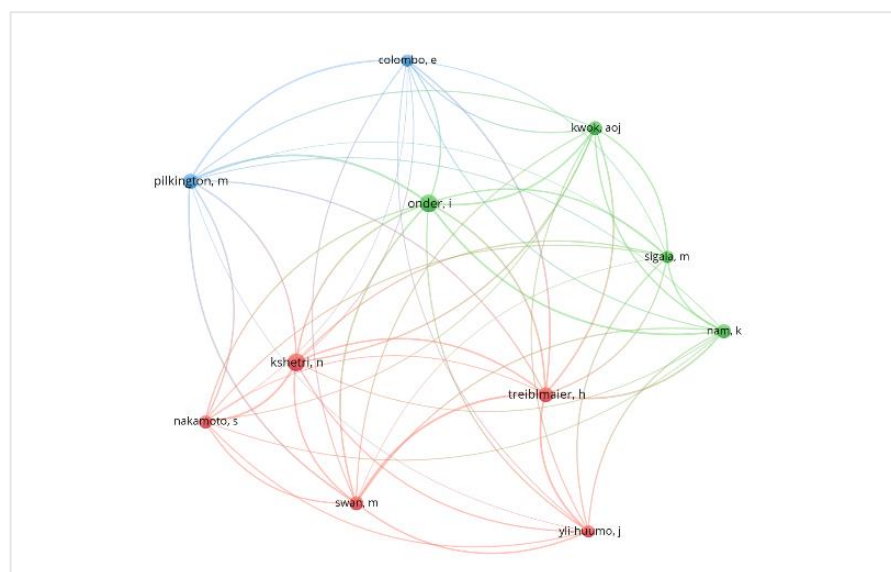

Figure 7. Co-citation analysis of authors.

Table 7 shows the list of the 11 authors most frequently co-cited by other authors. The link strength is a measure that shows the frequency with which a paper by two authors is cited jointly. In this case, the authors Önder I and Treiblmaier H are those with the highest co-citation strength, identified as key or emerging figures in the research trend analysed.

Table 7. Author co-citation.

Author	Citations	Total Link Strength
Colombo, E	5	34
Kshetri, N	11	47
Kwok, Aoj	7	43
Nakamoto, S	6	34
Nam, K	7	42
Onder, I	11	61
Pilkington, M	8	42
Sigala, M	5	34
Swan, M	7	46
Treiblmaier, H	8	59
Yli-Huumo, J	5	38

3.3. Research Questions Validation

From the point of view of financing entrepreneurial tourism projects, initial coin offerings (ICO) issuance has become an effective way to raise funds for new tourism projects [39]. However, there are also certain risks to consider. Some of these risks include the lack of regulation, the possibility of fraud [40] and the volatility of cryptocurrencies. In general, ICO issuances [41] are not usually protected by government laws or traditional financial regulation, although some public bodies have already warned of the need for regulation [42]. On the other hand, introducing blockchain technologies into the value chains of tourism businesses makes it possible to generate new business-to-business (B2B) digital asset exchange markets. This feature opens the door to financing new tourism business models [43]. In addition, there are pioneering projects based on the development of cryptocurrencies associated with tourism products [44], introducing the concept of "tokenised tourism" [45], which already allow for the financing of projects through modalities such as crowdfunding.

4. Discussion

Smart contracts simplify the financial transaction process and bring transparency to regulation [46,47], improving data security and reducing the risks associated with traditional financial transactions [48]. Implementing this technology eliminates many of the existing financial costs [49], such as those related to international transactions, and gives tourism businesses the ability to remain competitive [32,39] and be more efficient [50]. Blockchain technology enables the deployment of digital payment networks in business-to-consumer (B2C) transactions [51] that have a clear impact on improving the personalisation of tourist-oriented services [52]. These utilities have already started to be deployed by large tourism organisations, such as tour operators [53], airlines [54] or the logistics sector [55]. However, many other applications and developments will be deployed in the future [56], summarised in Figure 8.

Blockchain technology is essential in enabling greater transparency in supply chain and resource management; for example, by recording the provenance and traceability of food and beverage products [57]. It also ensures compliance with ethical and environmental business standards that contribute to creating new, more sustainable business models [58] related to the circular economy. Furthermore, combining blockchain technology with other technologies is a field to be fully explored. For example, blockchain technology, combined with wireless sensor network (WSN) technology, can be of great use in tourism, especially regarding the reliability and automation of discrete events [59]. Discrete event-based simulation is a modelling and simulation technique that allows for studying the behaviour of a system over time. In this type of simulation, time is divided into discrete moments, and the events occurring in the system at each moment are processed sequentially. An example of this combination could be developing a method for real-time monitoring and controlling weather conditions in a tourist region by combining Internet of Things technology [60]. Artificial intelligence can also contribute, together with blockchain technology, to fostering

sustainable tourism, by using such technology to implement measures that help reduce the adverse effect of tourism activity on natural and cultural resources [61]. Finally, there are also proposals to combine augmented reality and virtual reality with blockchain technology to help improve the perception of products and services in various sectors [62]. In the case of the tourism sector, the combination of technologies can help create immersive experiences.
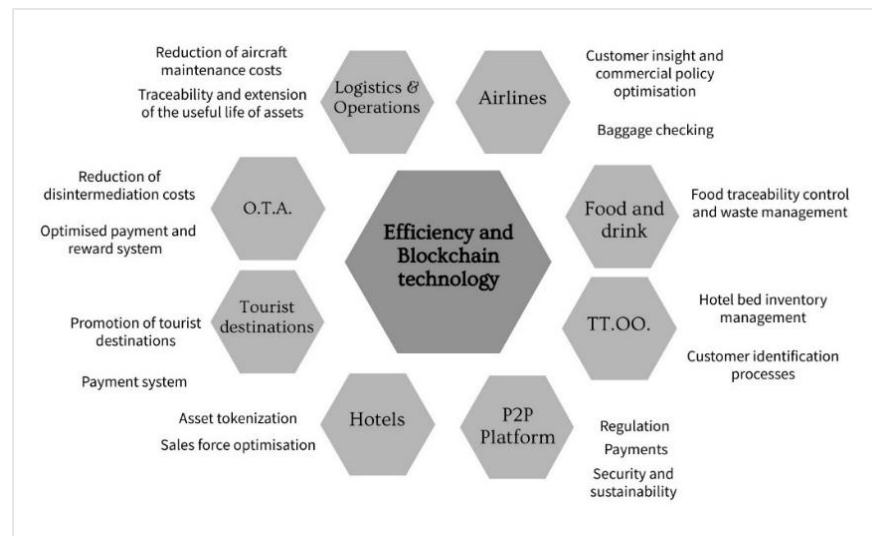

Figure 8. The potential financial impact of blockchain technology by tourism segments.

Responding to the first research question, RQ1: To what extent can blockchain technology help finance tourism projects and business models?, the results reveal successful cases of project financing in the tourism industry through so-called ICOs, considered alternative financing tools based on the crowdfunding technique. These tools consist of issuing and selling cryptocurrencies used as a form of project financing, providing a fast and efficient source of funding for innovative projects in the tourism sector.

Regarding RQ2: Can blockchain technology contribute to the improvement of the financial management of tourism companies?, experiments are already being carried out that combine blockchain technology and other technologies, such as big data, to obtain statistical information systems in the tourism and cultural industry that make it possible to obtain relevant information on the contribution of these activities to the added value of a given economy, serving as a basis for decision-making by companies and public authorities. Technology also makes it possible to simplify financial transactions, providing greater transparency and reducing financial costs, allowing for improvements in terms of efficiency and competitiveness of the companies involved.

5. Conclusions

This paper demonstrates the potential of blockchain technology in financing entrepreneurial tourism projects and improving the financial management of the tourism industry. The theoretical framework constructed in this paper provides a basis for understanding how blockchain technology can improve efficiency and transparency in the financing of tourism projects and the financial management of tourism enterprises.

The theoretical implications of this study focus on the application and potential of blockchain technology in the financing and financial management of tourism enterprises. In addition, the possible effects of the adoption of this technology on the competitiveness and profitability of tourism companies are discussed. Finally, on a practical level, this paper provides valuable information for decision-makers in the tourism industry, regulators and investors, showing how blockchain technology can be used as an alternative and efficient financing tool in the tourism industry and how it can improve the financial management of tourism companies.

This study's limitations are based on the need for empirical data on the implementation and impact of blockchain technology in the tourism industry. Therefore, more research is needed to investigate the practical application of blockchain technology in the tourism industry, its potential impact on tourism businesses and its implications for the regulatory framework, focusing on the development of frameworks and guidelines for safe and effective use in tourism businesses.

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