

BLOCKCHAIN INTERVENTION IN THE TOURISM INDUSTRY: A SYSTEMATIC REVIEW

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ABSTRACT

A network-based system designed for making trustworthy, intelligent, and open distributed ledgers, blockchain technology is the technical term for this system. Smart contracts, decentralized applications, and crypto currencies are the new tools helping to elevate its profile across sectors, including the travel and tourism business. The widespread adoption of blockchain technology is indicative of its status as a major digitalization trend. Bank of America, Microsoft, Deutsche Bank, and UniCredit are leading examples of the financial behemoths and multinational organizations that have seen the promise of blockchain technology and digital currencies. Despite the topic's growing importance, research into blockchain's applications in the tourism industry is still in its infancy. The present research is based on systematic literature review that allows researchers to view the application of blockchain "lay of the land" in the tourism industry. The results could serve as a springboard for further observational research.

Keywords: Blockchain, Tourism, Technology, Digitalization, Travel.

INTRODUCTION

People's lives and the global economy rely heavily on the tourism business. The direct, indirect, and induced contributions of the travel and tourism sector totaled \$8.9 trillion US dollars in 2019 (10.3% of global GDP). About half the gross domestic product (GDP) for places like Macau, Maldives, and Seychelles is generated by the tourism sector, and it employ 330 million people; approximately 10% of the world's workforce as per World Travel and Tourism Council (WTTC, 2022). This statistic supports the claim that the tourism business is highly valuable. Despite its obvious value, the development of the traditional tourism sector has been hampered by several factors (Li et al, 2017). Firstly, the tourist itineraries are always passively driven, resulting in insufficient discovery of the sites. Some major amusement sites feature numerous shows and attractions making it tough to get visitors excited about all the activities. Secondly, there is no reason for guests to return over and over to the same sites. Finally, it's hard to get the word out about brand new activities (Rana et al, 2022). The tourism business faced particularly difficult conditions during the COVID19 pandemic and post COVID scenario. It indicated a need for changes in the ways conventional travel is conducted (Ozgit et al, 2022).

Smart tourism is being created by businesses and educational institutions using big data analytics and Internet of Things (Guo et al, 2018). It helps in developing connections between visitors and attractions through the IoT devices that are widely available and are installed at the attractions (Strebinger & Treiblmaier, 2022). Tripathy and team stated that localization devices can alert visitors to must-see landmarks in the area. Also, when it comes to collecting data about tourists, the IoT is indispensable (Tripathi et al., 2018). Improving tourist's

experiences while sight-seeing is possible with the help of IoT and big data analytics, but this will not be enough to get them to become regulars or attempt something new (Erol et al, 2022). It calls for the need of Smart tourism that can be facilitated by big data analytics through IoT data etc. It is typically used for recommending travel routes, analyzing visitor behaviour, and spreading information via social media (Miah et al., 2017).

According to Zsarnoczky (2018), the growing influence of digitization in the tourism industry is being driven by the evolving wants and needs of tourists and travelers. The study also claims that the principles of the sharing economy, which underpin blockchain technology, are already evident in the travel industry. As the sharing economy grows, the travel industry will shift its emphasis to the customer experiences, and digitalization will have a major effect on the sector. In addition to blockchain, other digital technologies like AI and VR will be used by the industry (Verma & Sheel, 2022).

The financial sector, the educational sector, the healthcare sector, is just a few of the areas where blockchain technology is finding widespread interest (Puri et al, 2023). Blockchain is an information format for the storage of data in a sequential order that is immutable and auditable. The utilization of "smart contracts" in blockchain technology enables the execution of predetermined code in accordance with the terms of transactions (Kumar, Liu & Shan, 2020). When viewed through the prism of "smart tourism," blockchain technology (BCT) can serve as a connect between the tourists and destinations in a dependable manner. In addition, the usage of smart contracts allows for the provision of rewards as a sort of incentive to site visitors. To summarise, blockchain is an effective supplemental response to IoT, big data, and other similar technologies for the purpose of delivering incentives to site visitors (Demirel et al, 2022).

Despite numerous white papers being published about blockchain-based applications in the tourism and travel industry (Rezaei et al, 2022; Porter et al, 2020; Puri et al, 2021; Nguyen, 2021), only a few studies have attempted to investigate the foundations of blockchain as criteria for evaluating these applications in the tourism domain. This research attempts to provide a basic understanding of universal blockchain fundamentals that are applicable to the travel sector. It intends to study academic documents generated on platforms in the tourist industry to gain a better understanding of the unique characteristics of these platforms.

Overview of Blockchain in Tourism Industry

Digital technology has presented the tourism industry with a significant opportunity for evolution due to the increasing number of tourists as well as the evolving requirements of travel companies (Rejeb & Rejeb, 2019). To recover from the epidemic and preserve healthy competition in its ecosystem, the tourism sector constantly innovates. As per a study by (Kumar, Liu & Shan, 2020), tourism activities can now be collected and recorded in long-lasting and trustworthy blocks. Blockchain technology will increase tourist efficiency by strengthening stakeholder trust (Lin et al, 2020). Blockchain can cut currency conversion costs by 90% and simplify frequent traveller loyalty programmes. Tourism is predicted to broadly adopt this innovation because of rising traveller numbers and changing organisational needs (Nam et al, 2021).

It is anticipated that by the year 2025, the adoption rate of emerging technologies like blockchain in the hospitality and tourism industries will have skyrocketed (Garaus & Treiblmaier, 2021).

By comparing and contrasting BCT with the smart city/tourism framework, Nam et al. (2021) created predictions regarding the future course of technology and the impact it will have on the tourism industry. This provided them with insight into these themes.

Furthermore, they have identified many of the common characteristics of BCT, such as low costs as the primary benefit of using blockchain, the incorporation of coins or tokens into their business model for more efficient currency exchange, loyalty and/or reward for reviews, and the development of travel platforms by companies to create their own eco-system.

Many areas of business will be influenced by the new development and its implementation. Blockchain technology offers numerous potential advantages, but there are still many problems that require fixing before it can be used to improve the travel business (Van et al, 2020). The demands and desires of tourists cause significant upheaval in the tourism sector, making it a dynamically changing market. As a result, it is critical to research the many aspects of blockchain technology's practical implementation in the tourism business (Aghaei et al, 2021).

RESEARCH METHODOLOGY

To deliver a thorough analysis, a methodical, rigorous, and repeatable procedure for retrieving, selecting, and analysing relevant literature was opted for. This paper follows the standard methodology of a literature review by first establishing a framework, then conducting the review, and finally reporting and analysing the results. Study's framework involves information collection, preparation, information selection, and identification of prospective research areas.

A) Information gathering- Some terms have been contextualised to improve the precision of semi-automatic keyword searches. The following terms have been agreed upon: ("blockchain") AND ("tourism") AND ("reliable systems" + "travel" + "accommodation" + "services" + "hotel industry" + "loyalty/rewards programmes" + "travel" + "airline industry" + "restaurant" + "transparency" + "event" + "e-governance" + "feedback" + "reviews" + "sharing economy"). The publications for this review were found using IEEE-xplore, Science-direct, SCOPUS, Research Gate, and Google Scholar.

B) Preparation- At this stage, filter was used to locate important material on BCT in the tourism domain. The major goal was to consider the features that could be used for further investigation. Relevant data on the use of BCT in the tourism industry was considered, while irrelevant data was excluded.

C) Selection of pertinent information-. This study considered parameters such as abstract, keywords, application, and authors. Based on the keywords, 45 papers were included in the initial tally, but after a more coarse-grained analysis, 20 papers relevant to the research were included.

D) Identification of promising study fields - Relevant information was organised in tabular form for easier comprehension. Diverse applications of BCT in tourism have been identified in certain tourism domains.

Experimental Findings

In most of the papers authors agree on the importance of increasing reliability and easing security worries in the tourism sector (Onder & Treiblmaier, 2018). Other motivations cited (Dogru et al, 2018; Han et al, 2022) involve the aim to standardise collaboration between many players and to ensure that it takes place. According to a study by (Dogru et al, 2018), both latter goals - automation and process simplification - are linked to the former. Authors (Dogru et al, 2018; Dudin et al, 2017) emphasise the importance of employing BCT to give better service to clients. According to studies, the implementation of blockchain technology will assist the hospitality and transportation industries. The authors Utz et al. (2023) concentrates on used situations that are unique to the aviation industry and are characterised by complex systems with a varied range of players. To allow its employees

more freedom, the Hainan Airlines company deployed a blockchain-enabled E-commerce platform, and the benefits of BCT for strengthening airline customer loyalty programmes were also highlighted. In both circumstances, several autonomous entities must be coordinated centrally. To overcome the inconsistency of options supplied by the different subsidiaries in terms of the E-commerce platform, standardisation is essential. Standardisation is important to address the lack of cooperation between different suppliers in the domain of customer loyalty programmes (Utz et al., 2023). Standardisation is required to overcome this lack of cooperation, since there is no middleman involved, the system must gain the trust of its distributed network of nodes to function properly. This is essential for the smooth integration of the network's many participants. Privacy and security must be considered when establishing credibility.

Domain / Sector	Diverse Applications	Author	Year
	flight planning and the luggage chain	Ahmad et al.	2021
	Loyalty rewards; frequent flyer miles	Utz et al.	2023
	Digital ID and identity management (airport, hotel, restaurant)	Robinson J	2017
	Guest and meal tracking in a hotel	Dogru et al, 2018	2018
Restaurant / Hotel / Airline Industry		Puri et. al.	2023
	Ability to share, rent, or sell a useful resource	Hawlitshcek, Notheisen, & Teubner	2018
	App for Collaboration	Makhdoom et al.	2020
	Housing sharing apps available online	Nasarre-Aznar	2018
	Web service for ordering taxis	Mahmoud, Aly & Abdelkader	2022
Sharing Economy	Confidentiality in sharing a house/room	Islam et al.	2018

Financial Transactions	Crypto currency	Seigneur J-M	2018
	Left-over currency exchange framework	Bhattacharya	2017
Medical / Health Tourism	Electronic Health Record Administration System	Han, Zhang, Vermund	2022
Loyalty rewards for travellers	Loyalty programs in connection with blockchain based tokens	Agrawal	2019
Other categories	Reviewing Products Online	Salah, Alfalasi, & Alfalasi	2019
	Market for Tourism in the Region	Dudin MN et al.	2017
	The role of tourism in reducing poverty	Pilkington, Crudu, Grant	2017
	Mobility - Service ecosystem	Karinsalo & Halunen	2018
	car insurance – “Pay-as-you go”	Auer et al.	2022
	Online travel platform (travel trade)	Onder I, Treiblmaier H	2018

Source: Author's work.

Table 1 summarizes how the research was able to be applied to various domain/sector in tourism industry. Some studies appear multiple times in Table 1 because they focus on a narrower set of applications, while others make a more general contribution to our understanding of the ways in which BCT are used. At last, the papers are sorted into types according to the level of development of their contributions. According to the findings, most of the papers are still in the conceptualization phase. However, it has been speculated that the travel and lodging industries have particularly high potential for applying blockchain technology (Robinson, 2017). Also, Standardization of customer loyalty programmes is necessary to address the lack of collaboration between service providers. The ability to trust one another is also essential for the smooth integration of various parties into the network. Since there is no middleman involved, the system must create confidence by relying on the multitude of nodes that make up the blockchain network. Privacy and security rules need to be followed when it comes to trust services (Utz et al, 2023).

Blockchain technology can transform the hotel sector by improving transparency, security, and efficiency across the board. A blockchain is, at its heart, a decentralised and distributed ledger that records and verifies transactions across several computers or nodes (Luo & Zhou, 2021). By eliminating intermediaries such as banks or payment processors, it enables safe and transparent transactions. It enables hotel visitors to pay directly to hotels

using cryptocurrencies or digital tokens, lowering transaction fees and the risk of fraud (Raluca, 2022). Smart contracts, which are self-executing agreements kept on the blockchain, can automate payment procedures and release funds if certain conditions are met. Guests can maintain control over their personal information and choose which details to share with hotels, streamlining the check-in process (Dadkhah et al, 2022). By integrating blockchain technology, hotels can automate and streamline various processes such as reservations, inventory management, and room bookings. Smart contracts can be used to enforce terms and conditions, decreasing the need for middlemen, and reducing the possibility of double bookings (McKercher, 2018). The legitimacy of guest reviews can be verified, and the integrity of the comments can be ensured by recording them on a blockchain. This enables potential guests to make more educated judgements about lodging (Irannezhad & Mahadevan, 2020).

It has been proposed (Dogru et al, 2018) that improvements in areas such as security, dependability, transparency, immutability, and privacy can have a significant impact on how consumers are provided with travel options. Encrypting and signing blockchain transactions can provide data authenticity and user anonymity (Calvaresi et al 2019). A blockchain enabled sharing economy platform that protects users' anonymity, has been proposed, while still allowing users to do things like make agreements, transfer funds, and (potentially) cancel transactions (Hawlitschek, Notheisen, & Teubner, 2018). Users can also rent out or share their personal property using blockchain technology. A user's Ethereum public key is used as their unique identifier. Because of this, the programme can be used by everyone who possesses the appropriate private key; there is no need to sign up or provide any more information, creating a win-win situation for stakeholders involved (L'Hermitte & Nair, 2021).

CONCLUSION

Through academic literature, the study analyses alternative architectures and technologies in the tourism industry, with a focus on BCT. Such evaluations aid in understanding and developing blockchain applications for the tourism industry. One of the key factors contributing to the expansion of the tourism business is the rapid emergence and evolution of information and communication technologies. This article provides an introduction to blockchain technology and its potential applications in the tourism industry. The literature review shows how keywords are categorised into clusters such as tourist, blockchain, technology, and industry. This synthesis aided in finding the most prevalent domain/sector of BCT applicability in the tourism industry as evidenced in academic literature. Restaurant/ Hotel/ Airline industry - The flight planning process, luggage chain and luggage tracking, frequency of flyers/mile are considered as some of the diverse applications of BCT in tourism space. Loyalty rewards for frequent flyers and hotel guests, digital identity to travelers and guests secure identity management, tracking of meals and transaction and transfer of money have also been the application of BCT.

1. Sharing Economy- Application of BCT is seen in sharing, renting, or selling of tourism resources. Development of various apps related to collaboration, development of web services, house sharing apps, apps for collaborations in secure digital environment are also seen effective in the tourism domain.
2. Financial Transactions- Currency exchange framework, secure and transparent transactions in the form of cryptocurrency is reported as one of the prominent BCT applications in tourism.
3. Medical/ Health Tourism- Electronic health records and administration systems have also witnessed the application of BCT in the medical tourism domain.

4. Loyalty rewards – Frequent flyers, frequent guests as well as loyal travelers have reported loyalty programs based on blockchain tokens.
5. Other fragmented domains- Online tourism product reviews, market for tourism, online travel platform etc. have also witnessed diverse application of BCT in the tourism domain.

Adoption, industry, and innovation are commonly used alongside the words smart and services. Furthermore, blockchain is related with various words, including apps and development. As previously stated, there is a slow development trend indicating academics' use of current technology for blockchain in the smart tourism domain. The theme of innovative tourism also includes blockchain in tourism. When we review publications and expected phrases in the title and abstract, authors research new technological uses, and terms like tourism and blockchain appear in titles more frequently than blockchain and technology. The authors conclude that future research will be interested in many aspects of blockchain technology utilisation. Researchers interested in blockchain applications in tourism may study and base their research on the possibilities of these keywords. The best blockchain tourism framework, technology, and tools are currently being created. Blockchain applications in the tourism sector have enormous promise, but further research is required to expedite development.

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