Penerbit UTHM

JTMB

http://penerbit.uthm.edu.my/ojs/index.php/jtmb
ISSN : 2289-7224 e-ISSN : 2600-7967

Journal of Technology Management and Business

Blockchain Technology and Its Untapped Potentials in the Hospitality Industry

Rashed Al Karim[1*], Mahima Ishrat[1], Mohammad Ashequr Rahman[1]

[1]School of Business Administration
East Delta University, BANGLADESH

*Corresponding Author

DOI: https://doi.org/10.30880/jtmb.2022.09.01.001
Received 06 March 2022; Accepted 08 March 2022; Available online 29 June 2022

Abstract: Blockchain technology has recently emerged as a contentious issue in academics and industry. Financial institutions have responded immediately to the adoption of blockchain technology. The remarkable features of this technology, such as high security, dependability, and efficiency, have made it extremely popular in the financial sector. However, the hospitality and tourism industries are blissfully unaware of this new blockchain technology and its exceptional services. Furthermore, the notion of blockchain is still foggy and poorly understood, and information on the level of knowledge and application of blockchain in the hospitality industry is very few. This research thus aims to highlight the blockchain's standard features, advantages, and applications in the hospitality industry. This study has been carried out based on secondary data sources. Specifically, journal articles, book chapters, organisational publications, website materials, and other sources have been used for data and information generation. To better operational efficiency and revenue generation and improve privacy and security, the study examines the consequences and several advantages of blockchain technology using secondary sources. The study contributes to a comprehensive understanding of blockchain technology and the benefits and diverse uses of blockchain technology in the hospitality industry.

Keywords: Blockchain, distributed ledger, smart contracts, bitcoin, cryptocurrency

1. Introduction

Since the outset of the digital era, the world has perceived the innovation of numerous cutting-edge technologies in several areas, including industries that intend to make individuals' day to day lives more spontaneous and efficient. Among all these developments, especially the technological one, money transaction in a modern manner plays a significant role. With the blessings of numerous software applications and internet accessibility, the method of making payments has become simpler along with reliable than it was previously used to be (Sergeenkov, 2018). Likewise, blockchain technology is a revolution for the digital world that debuted a decade earlier with the potentiality of transforming the world economy (Tchakerian, 2019). Blockchain is regarded as the secured digital registers executed in a decentralised manner without involving a focal vault or authority such as a state, bank or business (Tchakerian, 2019). It is an inflexible database that incorporates a recurring chain of blocks carrying single data transactions that are transmitted through a decentralised mechanism across the participants of that specific network (Rekha & Resmi, 2021). It is worth mentioning that the leading concept of blockchain technology is boundlessly self-evident: a liberal doctrine that embraces the concept of cyberspace, which means this certain technology requires no limitations, financial institutions or the intermediary association of third parties (Dogru et al. 2018; Tchakerian, 2019;
Blanc, 2016). The most engrossing characteristic of blockchain technology is that it provides a shared or distributed ledger, which signifies that every other transaction and asset ownership that appears in the blockchain is evident to all the blockchain individuals (Dogru et al., 2018).

*Corresponding author: alkarim.rashed@gmail.com

In today's world, technology is the leading driver that is moving the industries and the hospitality and tourism industry forward (Valeri & Baggio, 2020; Khanna et al. 2020). For the business world, the development of the hospitality and tourism industry is significant as presently; this particular industry is considered the most prosperous industry in the global economy. Hospitality and tourism comprise a wide variety of service industry areas, including restaurants, hotels, cruise lines, transportation, theme park, event management and other tourism-related businesses (Antoniadis et al., 2021; Khanna et al. 2020). This multibillion-dollar industry predominantly leans on disposable income and the availability of recreational time. The hospitality and tourism industry might transform considerably in the future years because of the massive usage of digitalisation and that will lead to a significant shift in consumers' choice of the industry's products and services (Valeri & Baggio, 2020). Even though this industry is already in the midst of a change as the internet has made it manageable for the customers to search, book and purchase travel items online and providing customers with the opportunity to shift their demand from traditional methods (Antoniadis et al., 2021; Kavoura & Stavrianeas, 2015). Furthermore, the emergence of blockchain technology and its remarkable services has prompted a slew of innovative concepts for administering business activities within numerous industries (Erceg et al., 2020).

Earlier blockchain technology was utilised for Bitcoin or other cryptocurrency transactions, but presently, the implications and beneficial services have become apparent, extending much further than cryptocurrency applications (Dogru et al., 2018). Accordingly, the effective utilisation of blockchain technology drew the interest of businesses, media along with hospitality and tourism industries (Antoniadis et al., 2021). The data report of CBS Insights (2018) suggests that in the upcoming years, including hospitality and tourism, another 49 industries are about to transform their business framework and operation by launching blockchain-based services.

2. History of Blockchain

It is an undeniable fact that blockchain technology is one of the most significant breakthroughs of the 21st century but the theoretical foundation of this distributed ledger technology was first introduced in the late 1980s and early 1990s (Iredale, 2020; Yaga et al., 2018). An article titled "New directions in cryptography" was presented in 1976, where the concept of cryptography was composed for the first time (Diffie & Hellman, 1976). After that, in 1991, two researchers, Stuart Haber & W. Scott Stornetta, conceptualised the advancement of cryptography with their paper titled "How to Time-Stamp a Digital Document". This initial project of the researchers aimed to construct a chain of cryptographically protected blocks and have the potential of forbidding anyone from tempering the date and time of documents (Valeri & Baggio, 2020).

Later on, to make blockchain structure more effective, Merkle Trees were included by enabling multiple records to be grouped in a single block. The major reason behind adding Merkle Trees was to develop a protected chain of blocks that no one can manipulate, and it is important for maintainability in the long run (Merkle, 1987; Vujičić et al., 2018). It preserved a chain of datasets where every other block is attached to the one before it. In 1997, another extraordinary theory was developed by Adam Back titled 'Hashtag' that attempted to provide a solution to manage spam emails (Sarmah, 2018). In 2004, Hal Finney, a cryptography researcher along with a software engineer, presented the RPoW (Reusable proof of work) system as a concept for cashless payment (Vujičić et al., 2018). This system is used to record the ownership of receipts on a reliable server so that the issue of double-spending can be solved. This system was built to enable participants all over the globe to examine its reliability and accuracy instantaneously.

The advent of this system was a pivotal event in the history of cryptocurrencies. In 2008, Satoshi Nakamoto, a Japanese individual who might not be real wrote a paper called 'Bitcoin: A peer to peer electronic cash system' based on Bitcoin (Pérez-Sánchez et al., 2021, Willie, 2019). Nakamoto is widely regarded as the developer of this revolutionary blockchain technology who improved the design by adding blocks with the original chain and eliminating the need for third parties' involvement (Pérez-Sánchez et al., 2021). The new improvements in the technology became capable of containing secured data and reducing the risk of counterfeiting data history (Valeri & Baggio, 2020). This system could be tackled autonomously, and the involvement of central authority is mandatorily not required (Sarmah, 2018). As a result of these developments blockchain technology has become the foundation of cryptocurrencies. A wide range of cryptocurrencies are utilised worldwide, for instance, Litecoin, Stellar, Cardano, Ripple etc but among all Bitcoin has grabbed a significant share in the market and is recognised as the most widespread and expensive cryptocurrency, worth 4931 USD per bitcoin (Macauley, 2021). With the evolution over time, the utilisation of blockchain has progressed in a promising and consistent way and went beyond cryptocurrency transaction services (Dogru et al. 2018; Antoniadis et al. 2021). According to Zheng et al. (2017) and Bodkhe et al. (2020), the four main activities are mandated to put in a new block to the blockchain:

- ***Stage 1***: First, a transaction will be proposed. The blockchain will dictate the sort of transaction requested.
- ***Stage 2***: Step two is to publish the transaction on the blockchain system, where it will be viewed by all participants.
- ***Stage 3***: In the third stage, the system participants must grant the proposed transaction.
- ***Stage 4***: In the final step, a new block will be listed on the blockchain irrevocably once the majority of participants confirm the transaction.

3. Blockchain Generations

Based on the implementations of blockchain, the three stages of this technology were first articulated as tires of blockchain in the book of Melanie Swan named "Blockchain, Blueprint for a New Economy". According to Swan (2015), this section exhibits several versions of this technology that has been upgraded over time. It was stated before that the prime reason behind developing blockchain was to transact cryptocurrency. However, the development of this technology changed the game and with the evolution of this technology, it has become capable of providing a wide range of services. The tires of blockchain are nothing but versioning which means a logical separation of several blockchain classifications based on how it currently works provides services, develops and is supposed to be developed.

Blockchain 1.0: After the invention of Blockchain, this tier was created and it was predominantly employed for the transactions of cryptocurrencies. The journey of this generation started in 2009 and lasted till early 2010. With Bitcoin, this version includes all the other cryptocurrencies. Besides, payments and applications fall into the utilisation of this version (Erceg et al., 2020; Swan, 2015, Bodkhe et al., 2020).

Blockchain 2.0: For operating smart contracts and financial services, this certain blockchain version has been utilised considerably. The applications of this tier are not limited to finance, currency or market. Recently invented cryptocurrencies such as Ethereum, Hyperledgers and so on are included in the 2.0 version of blockchain. In 2010, blockchain took the interest of individuals and the idea of implementing blockchain for other purposes rather than Bitcoin transactions. At that point, this blockchain generation was commenced and applied in different areas (Erceg et al., 2020; Swan, 2015, Bodkhe et al., 2020).

Blockchain 3.0: This 3rd generation of blockchain is significantly used to foster blockchain implementations in health, media, tourism, government, financial services and multiple other sectors. Just as Blockchain 2.0, Hyperledger, Ethereum and other emerging blockchains that can execute smart contracts are included within this layer. Around the year 2012, numerous applications of blockchain technology in different sectors were researched, bringing about this tier of the blockchain (Erceg et al., 2020; Swan, 2015; Bodkhe et al., 2020).

Blockchain 4.0: This generation was primarily concerned with real-time services such as public ledgers and distributed databases. Industry 4.0-based applications are seamlessly integrated at this level. It makes use of smart contracts, which do away with the need for paper contracts and control the network by consensus (Bodkhe et al., 2020; Holland et al., 2018).

4. Classifications of Blockchain

Despite containing a distributed database of the ledger, it is fundamental to understand that the nature of blockchain governance can be different. Blockchain is evolving rapidly, and depending on its significant traits, this technology can be categorised into different sections (Dogru et. al, 2018).

Public Blockchain: Among the many other forms of blockchain technology, public blockchain is one of them. According to Yaga et al. (2018), a public blockchain is a distributed ledger that is permission free where any participant can access the system and complete transactions along with keeping a copy of transaction records within this non-restrictive edition of the blockchain (Crosby et al., 2016; Valeri & Baggio, 2020). Inside a public blockchain network, each network participant can peruse and keep in touch with all the records. As this system is accessible to all the users, so there is a high possibility that fraudulent individuals may attempt to trick the network by generating blocks in an unauthorised way (Iredale, 2021).

Private Blockchain: Private Blockchain is a permissioned blockchain network where the blocks that are published by users cannot be approved automatically. In this network, users require the approval of a third party to submit a block (Gupta, 2017). This blockchain network remains authorised by some specific individuals of the organisation who control the network (Iredale, 2021; Bhasin, 2019). As a result, the accessibility of this blockchain network can be restricted feasibly. To create and manage this blockchain system, open or closed sourced software can be employed (Bhasin, 2019).

Semi-private Blockchain: Semi-private blockchain is a different sort of blockchain where a specific portion of this network is governed by an organisation's authority and the remained portion is accessible to the public that can be used by every participant (Sarmah, 2018).

5. Features of Blockchain

With the advent of blockchain, the popularity of this technology is growing extensively (Antoniadis et al., 2021). Even though blockchain is a controversial technology, and there are vast amounts of conflicting opinions about this system, it is an undeniable fact that this technology is playing a significant role in revolutionising the world economy (Iradale, 2020). Though blockchain used to be a backup infrastructure for Bitcoin or cryptocurrency the four main features of blockchain technology are making the system more appealing and acceptable for a wide range of industries across the world (Antoniadis et al., 2021). These four features are mentioned below:

5.1 Shared-ledger

To provide an accurate and authentic transcriptional history to the users, the system utilises a time-stamped ledger (Yaga et al., 2018). In the blockchain, unlike other typical databases, the information, transaction and other records are not allowed to be overwritten. Even a blockchain system offers a single basis of certainty by tracking and keeping all the records of trades or ownership status visible to all participants simultaneously (Dogru et al., 2018).

5.2 Disintermediation

One of the most distinguishing characteristics of blockchain is the lack of third parties to whom the transactions' authenticity is entrusted (Dicuonzo et al., 2021). The potential of blockchain to consumers is numerous, mostly because peer-to-peer networks do not need agents or intermediaries; transactions may take place intelligently between sole participants (Hughes et al., 2019). In a blockchain system, the participants in the chain are the ones who verify and authenticate the transactions according to the algorithms defined by the blockchain's administration (Dicuonzo et al. 2021). Unlike traditional methods that need the involvement of third parties or extra technology to secure the integrity of a sequence of payments, the blockchain is built-in by default. (Dicuonzo et al. 2021; Hughes et al. 2019).

5.3 Immutability

The immutability of transactions confirmed by the blockchain allows applications and processes authorised by the registry to function with a high level of confidence (Dicuonzo et al., 2021). In the shared ledger, no modifications or tampering should be made to any of the network's data, and the integrity of the saved data is ensured accordingly (Bodkhe et al., 2020). Immutability ensures authenticity and trust, enhancing security and lowering the risk of fraudulent transactions (Dicuonzo et al. 2021).

5.4 Security

Transactions are validated by consent in the blockchain platform that is performed by the participants of the network (Pilkington, 2016). As blockchain systems are maintained by multiple servers, to hack or manipulate the system, it is required to hack all the computers at a time. As a result, it becomes tough for a participant to hack the blockchain or counterfeit any information about the system (Crosby et al. 2016, Dogru et al. 2018). According to Iredale (2020), on the blockchain platform, every single piece of data is cryptographically encrypted. In simplistic terms, the data on the system covers the actual properties of the data and when any input data is transferred through a numerical algorithm that yields a different version of value, however, the chain of the blocks stays unchanged (Barkel et al. 2021; Dogru et al., 2018; Iredale, 2020).

5.5 Efficiency

On a blockchain-based platform, users do not require mediators to develop trust as transactions are managed and authenticated within the blockchain system (Dogru et al., 2018; Gupta, 2017). According to Economist (2015), to do transactions within a blockchain platform, the necessity of middlemen such as the government or banks is zero. So, the deletion of intermediaries from the platform simplifies the whole procedure and minimises transaction costs and time enormously (Irannezhad & Mahadevan, 2021).

5.6 Smart Contract

A smart contract is an agreement or set of rules that govern a business transaction, stored on the Blockchain and is automatically executed as part of the transaction (Gupta, 2017). In other words, smart contracts are self-enforcing contracts that define the rules for Blockchain transactions (Barkel et al., 2021). Smart contracts are just blockchain-based programmes that run when specific criteria have been met. They are often used to automate the implementation of a contract so that all parties are instantly confident of the outcome. If certain prerequisites are fulfilled, they can help simplify a workflow (Ante, 2021; Dogru et al. 2018). A smart contract in its simplest form is an automated hotel room management system. While a consumer departs a room, the smart contract is notified automatically (Ante, 2021).

6. Common Applications of Blockchain

Land record and asset management, educational services, citizen registration systems, patient management, taxation systems, security and privacy enhancement of mobile devices and related services are all areas where blockchain technology has the potential to assist (Sial, 2019; Zheng et al., 2018). To name just a few of the promising applications for Blockchain technology:

- ✓ Blockchain technology can be used by municipalities and government entities for identity management, such as birth, marriage, and death certificates, passports, and voting.
- ✓ When it comes to fundraising, blockchain might be utilised to promote transparency, security, and integrity.

- ✓ Educational institutions may utilise it to keep academic data for students and universities on distributed ledgers, and there are examples of tokens being used to foster learning.
- ✓ Blockchain technology may provide insight into the intellectual property in the arts, for example, by developing a complete and accurate decentralised database of music rights, which will provide transparent information on royalties and copyright registration.
- ✓ Regarding food, blockchain technology may be used to track the supply chain and offer information on the item's composition, source, and expiry date.
- ✓ Moreover, in healthcare, Blockchain technology may be used to store and protect sensitive information included in personal health records (Rawat et al., 2019; Whitaker, 2019; Barkel et al., 2021).

7. Benefits of Integrating Blockchain Technology in the Hospitality Industry

Many researchers worldwide are investigating methods and ideas for integrating blockchain technology into the tourism and hospitality industry to improve customer experiences. The following are some of the benefits of incorporating blockchain technology into the hospitality industry:

7.1 Traveller Digital Identity

Nowadays, visitors are required to provide and verify their identification at many checkpoints during their guest journey, such as at airports, hotels, and restaurants in order to pass security and check in to their flights, and hotel rooms or consume alcoholic beverages. This threatens customers with identity theft, not just from the individual verifying IDs but also from others who may gain personal data (Dogru et al. 2018). Using a Blockchain token that provides digital evidence of customers' passport, they may effortlessly pass through checkpoints using their smartphone, which decreases complications and costs and increases trustworthiness (Barkel et al., 2021). Blockchain allows paperless identification for visitors. In addition to reducing the risk of physical IDs or personal details being lost or stolen, digital IDs that are maintained on a blockchain might also reduce the possibility of forgeries occurring (Gupta, 2017). As a result, visitors will have a more pleasant experience, and the local authorities will be better informed about the location of a certain traveller (Khanna et al. 2020).

7.2 Tracking Guests

Travelling to the airport, checking in for the flight, and arriving at the hotel may all be updated instantly by implementing blockchain technology in the hospitality industry (Barkel et al., 2021). This tracking can improve efficiency by lowering check-in wait times and improving guest satisfaction. While tracking visitors' movements may be deemed a privacy violation, guests will be able to control how much information is shared with hotels or other network users (Dogru et al. 2018). Therefore, blockchain technology can provide seamless integration of guest services with maintaining the visitors' privacy (Dogru et al. 2018; Barkel et al. 2021).

7.3 Tracking Baggage

The loss of luggage is one of the most aggravating experiences for travellers. One of IATA's top priorities is to eliminate luggage mistreatment. According to IATA's resolution, airlines must use smart technologies such as IoT, cloud, and Blockchain to reduce baggage mishandling. By supplying a unique code, scanning it regularly, and logging into the Blockchain, it becomes possible to determine the location of an item in real-time (Barkel et al., 2021; Khanna et al., 2020).

7.4 Secure & Transparent Transactions

As a part of the travel and tourism business, the hotel industry contributed $8.81 trillion to the world's economy in 2018 (Lock, 2019). This sector relies heavily on financial transactions, which necessitates a large volume of monetary operations (Barkel et al. 2021). With the widespread implementation of blockchain, it has become significantly easier to integrate databases with payment providers and online travel agencies. The level of security is expected to increase several times. Consequently, customers will find it easier and more secure to make online payments. The hotel sector benefits significantly from blockchain technology due to the massive volume of payments it needs to process online and offline (Jobs, 2022). Moreover, the use of blockchain technology to make payments eliminates the need for intermediate financial organisations such as banks, as well as the transaction fees they impose. Every transaction is visible and encrypted, making it resistant to fraud (Jain, 2021).

7.5 Genuine User Ratings and Reviews

Ratings and reviews have a significant influence on travellers' booking process. Consumers trust website reviews as much as personal recommendations from friends (Barkel et al. 2021). Additionally, user ratings and reviews are the most accurate approach to assessing the quality of hospitality service. However, in a period of falsified reviews, it can

be challenging for customers to tell the difference between a dodgy hospitality service provider and the others. The adoption of Blockchain will ensure that user ratings are genuine and validated (Khanna et al., 2020). The usage of blockchain allows for creating a tamper-proof public ledger accessible to all users on the network. As a result, all users will only see real reviews from actual customers (Khanna et al., 2020; Barkel et al. 2021).

7.6 Smart Contracts

In the hotel business, smart contracts may be used to expedite all minor and major payments. Smart contracts on blockchain systems, for example, might help hotels and travel companies simplify their business interactions with their valuable customers (Gupta, 2017; Dogru et al. 2018). A smart contract between hotels and travel agents would contain contractual conditions specified by the transacting parties, the same as a formal contract (Crosby et al. 2016; Gupta, 2017), when smart contracts are integrated into Blockchain systems as a computer protocol aimed at digitally facilitating, verifying, or enforcing the negotiation or performance of a contract and allowing trustworthy transactions without the involvement of third parties (Yue, 2018; Barkel et al., 2021). This would make payments easier but would also improve room sales by allowing hotels and travel companies to work together more effectively (Dogru et al. 2018). Smart contract applications may also be extended to visitors, eliminating the check-in procedure. The most significant development in this smart contract is that both IDs and payment details are encrypted using secure codes and thus are not vulnerable to fraud (Gupta, 2017; Dogru et al., 2018)

7.7 Loyalty Programs

Many organisations in the hospitality and travel industries employ loyalty programmes which are critical to their business success (Barkel et al. 2021). Hotels and airlines may use a blockchain platform to create loyalty programmes and reward their customers with loyalty tokens (Kowalewski et al., 2017). Unlike other loyalty points, blockchain technology allows customers to easily purchase, sell, or exchange their loyalty tokens with others. Allowing customers to swap loyalty points in an open exchange can improve loyalty programme competition and service quality (Dogru et al. 2018). Loyalty points may be kept on the Blockchain, making them instantly accessible and exchangeable to the user. Customers will be able to use their hotel loyalty tokens in restaurants, airlines, coffee shops, and other companies using the blockchain network. Loyyall, a startup technology business, is working with IBM to establish a blockchain platform where customers can redeem, buy, trade, or swap loyalty points (Hill, 2017). Organisations, alternatively, may minimise advertising expenditures by creating real-time, personalised offers based on the data and consumer profiles developed through blockchain, as well as avoid programme fraud (Barkel et al., 2021).

7.8 Gamification and Guest Experiences

Many sites must cope with tourists that only visit the main attractions. This leads to over tourism-related issues and underutilised potential for the rest of the location, both financially and in terms of the tourist experience. Gamification may be utilised to encourage visitors to explore and experience other destinations. A blockchain-based technology firm, KeyoCoin, has established its platform to gamify the entire travel experience, offering hospitality, tour and benefit operators, and other suppliers in the travel ecosystem. Customers earn cryptocurrency as a reward for making purchases or bookings, as well as for doing fun tasks related to the location (Barkel et al., 2021). Besides, Loyyal, a New York-based Blockchain business in collaboration with Dubai, has created Dubai Points (Garcia, 2016), which would reward travellers for visiting other destinations. In addition, the Norwegian government is collaborating with Loyyal to incentivise tourists to contribute to a holistic guest experience (Barkel et al., 2021).

7.9 Sharing Economy

The sharing economy is a new business model that allows anyone, mainly private individuals, to share their property or give services via internet platforms. Hamari et al. (2015) define the sharing economy as "*the peer-to-peer-based activity of obtaining, giving, or sharing the access to goods and services, coordinated through community-based online services*". Leading firms like Uber and Airbnb provide a centralised agreement solution through blockchain that connects suppliers and customers. The blockchain-based sharing economy allows individuals and groups to make money from underused assets (Menne, 2018). By 2025, worldwide earnings from the five key sharing economy sectors of travel, car sharing, finance, staffing, and music and video streaming may rise from $15 billion in 2015. Sharing platforms are used for a variety of reasons. In a survey conducted by PwC, users' primary motives were cost, ease of use, sustainability, and social responsibility (PwC, 2015; Menne, 2018). Blockchain has the potential to limit or eliminate the influence of present sharing economy platforms that function as intermediaries. Beetoken, for example, is a decentralised network that connects homeowners and tourists directly and manages the entire process of renting a room, from payment to reviews, with very minimal transaction fees. Once again, Travala, another example, utilises a Dapp to link travellers to a wide choice of lodgings, including hotels, apartments, and villas, ranging from hostels to luxury 5-star resorts (Barkel et al., 2021).

8. Applications of Blockchain-Based Services in the Hospitality Industry

Although blockchain's conceivable implementations in the hospitality sector are countless, a few have already surfaced and had a groundbreaking impact. Besides the blockchain's theoretical future potential, it is worth noting that presently this technology is being used in tourism & hospitality sectors across several nations (Valeri & Baggio, 2020). "LockChain," for instance, claimed to have been the first Blockchain distribution network focused just on the hospitality industry. In April 2018, LockChain was renamed "LockTrip" and commenced using its own cryptocurrency named the LOC token (LockTrip, 2018). According to Önder and Gunter (2020), the new blockchain-based hospitality networks that support Bitcoin and other cryptos as payment options are ideal for hospitality and tourism sector applicability. Winding Tree can be a quintessential example of a blockchain application which is a demand and supply-side marketplace for monitoring product availability that is publicly accessible. Air New Zealand & Lufthansa, the most prominent airlines, have already teamed up with this network for enabling services to their customers like blockchain reservation and baggage frameworks, an absence of third party support in booking strategies and better detectability along with transparency in managing baggage systems (Önder & Gunter, 2018; Sundararajan, 2017).

In Spain, the Alastra project is setting up a computerised ID that aims to make visitors' activities simpler by placing all of a person's data in a single place (Fragnière et al., 2022). On the other hand, the travel industry 2.0, a Blockchain-empowered marketplace that joins potential customers straightforwardly to hotel and tour operators, was founded in 2018. Dubai's Department of Tourism and Commerce Marketing has established this significant marketplace to assist the city's tourism objectives (Fragnière et al., 2022). True Tickets intends to provide a secure ticket to its customers by adopting blockchain technology, bringing better security and transparency to the previously untouchable ticketing industry (Fragnière et al., 2022). Marr (2018) stated that through the establishment of 'Bed-Swap', an in-house blockchain program, TUI the biggest and most renowned travel firm, was one of the first to engage in blockchain technology officially (Valeri & Baggio, 2020; Antoniadis et al., 2021; Irannezhad & Mahadevan, 2021). This firm may operate the blockchain innovation to track the supply and demand of the inventory across places of the sale in real-time.

Along with all these organisations, many businesses around the world have shown their interest in blockchain implementation within their business operations. For example, Trippki is employing blockchain in their business for introducing loyalty reward programs and establishing a direct hotel and customer relationship by eliminating the need for a third party. Moreover, the incredible implication of blockchain technology has also been seen in a global Swiss-based air transport IT company named ShoCard & Sita that has adopted blockchain technology for preserving travellers' identity information (www.revfine.com). The key purpose of these businesses behind adopting blockchain and implementing blockchain-based services is to use a secure decentralised system with better transparency that enables services to be performed without requiring the third party or any commission fees (Valeri & Baggio, 2020). Blockchain-based services have the potential to be the core, underlying technology of the future tourism and hospitality sector by dropping transaction costs and increasing operational effectiveness (Rekha & Resmi, 202).

9. Conclusion

We begin this paper by informing readers about blockchain technology and its significance, as well as its history and classification. Then, we have focused on a few key attributes of blockchain technology, such as shared ledger, decentralisation, immutability, security, efficiency, and smart contracts. Following that, some common blockchain applications in diverse domains are described. Finally, the significant benefits of this technology for the hotel business are discussed.

Based on the review of prior blockchain-based research, it can be pretended that blockchain technology is predicted to disrupt numerous industries, including travel and hospitality, as it continues to gain momentum in the business world. The blockchain is utilised in various financial services such as digital assets, money transfers, and online payments since it allows payments to be done without the involvement of a bank or an intermediary (Hughes et al., 2019; Barkel et al., 2021). Even though blockchain technology has only been available for roughly ten years, it has already brought about improvements in the hospitality industry that benefit both the industry and its customers. Blockchain technology contributes significantly to the hotel and tourist industry's innovation efforts to exploit opportunities and address risks, such as streamlining online distribution and services using loyalty programmes and enticing and retaining customers. Moreover, it is assisting in the technological advances in the fields of payment processing, supply chain management, and fraud protection (Barkel et al., 2021; Dogru et al. 2018; Khanna et al., 2020). Eventually, the advantages of blockchain technology are expected to draw the interest and investment dollars of businesses across the spectrum when the economy is robust, and the tourism and hospitality sector is optimistic about its future.

Acknowledgement

The authors are indebted to the anonymous reviewers for their helpful remarks and recommendations, which assisted in enhancing the quality of this paper. We would also like to acknowledge the hard work of the editorial and technical team of JTMB, specifically for their thoughts in the manuscript.

References

Ante, L. (2021). Smart contracts on the blockchain–A bibliometric analysis and review. Telematics and Informatics, 57, 101519

Antoniadis, I., Spinthiropoulos, K., & Kontsas, S. (2021). Blockchain Applications in Tourism and Tourism Marketing: A Short Review. springerprofessional.de. Retrieved 19 October 2021, from https://www.springerprofessional.de/en/blockchain-applications-in-tourism-and-tourism-marketing-a-short/17783016

Barkel, C., Kurgun, H., & Groen, B. (2021). Blockchain in the Hospitality and Tourism Industry. University of South Florida M3 Center Publishing, *17*(9781732127593), 4

Bhasin, H. (2019). 3 Main Types of Blockchain-Classification of Blockchain. Available at https://www.marketing91.com/types-of-blockchain/

Bodkhe, U., Tanwar, S., Parekh, K., Khanpara, P., Tyagi, S., Kumar, N., & Alazab, M. (2020). Blockchain for industry 4.0: A comprehensive review. IEEE Access, 8, 79764-79800

Crosby, M., Pattanayak, P., Verma, S., & Kalyanaraman, V. (2016). Blockchain technology: Beyond bitcoin. Applied Innovation, 2(6-10), 71

Dicuonzo, G., Donofrio, F., Fusco, A., & Dell'Atti, V. (2021). Blockchain Technology: Opportunities and Challenges for Small and Large Banks During COVID-19. International Journal of Innovation and Technology Management (IJITM), *18*(04), 1-25

Diffie, W., & Hellman, M. (1976). New directions in cryptography. IEEE Transactions on Information Theory, 22(6), 644-654

Erceg, A., Damoska Sekuloska, J., & Kelić, I. (2020, March). Blockchain in the tourism industry—A Review of the situation in Croatia and Macedonia. In Informatics (Vol. 7, No. 1, p. 5). Multidisciplinary Digital Publishing Institute

Fragnière, E., Sahut, J. M., Hikkerova, L., Schegg, R., Schumacher, M., Grèzes, S., & Ramseyer, R. (2022). Blockchain technology in the tourism industry: new perspectives in Switzerland. Journal of Innovation Economics Management, 37(1), 65-90

Garcia, M. (2016). Dubai and Norway to drive visitors beyond star attractions with a blockchain-based loyalty program. Retrieved from https://www.phocuswire.com/Dubai-and-Norway-to-drive-visitors-beyondstar-attractions-with-a-Blockchain-based-loyalty-program

Gupta, M. (2018). Blockchain for dummies, 2nd IBM limited edition, John Wiley & Sons, Inc

Hamari, J., Sjöklint, M., & Ukkonen, A. (2015). The Sharing Economy: Why People Participate in Collaborative Consumption. In Journal of the association for information science and technology, Vol. 67, Issue 9. 2047- 2059. DOI= https://doi.org/10.1002/asi.23552

Hill, D. K. (2017, July 27). Blockchain Will Transform Customer Loyalty Programs. Retrieved from https://hbr.org/2017/03/blockchain-will-transform-customer-loyalty-programs

Holland, M., Stjepandić, J., & Nigischer, C. (2018). Intellectual property protection of 3D print supply chain with blockchain technology. In *2018* IEEE International conference on engineering, technology and innovation *(*ICE/ITMC*)* (pp. 1-8). IEEE

Hughes, A., Park, A., Kietzmann, J., & Archer-Brown, C. (2019). Beyond Bitcoin: What blockchain and distributed ledger technologies mean for firms. Business Horizons, 62(3), 273-281

Irannezhad, E., & Mahadevan, R. (2021). Is blockchain tourism's new hope?. Journal of Hospitality and Tourism Technology, 12(1), 85-96

Iredale, G. (2020). History of Blockchain Technology: A Detailed Guide. 101 Blockchains. Retrieved from https://101blockchains.com/history-of-blockchain-timeline/

Iredale, G. (2021). What Are The Different Types of Blockchain Technology?. 101 Blockchains. Retrieved from https://101blockchains.com/types-of-blockchain/

Jain, P. (2021). Benefits of blockchain technology in the hotel industry. Retrieved from https://www.traveldailymedia.com/benefits-of-blockchain-technology-in-the-hotel-industry/

Jobs, S. (February 9, 2022). Blockchain For Hospitality Industry – Benefits and Uses. Retrieved from https://www.soegjobs.com/blockchain-hospitality-industry/

Kavoura, A., & Stavrianeas, A. (2015). The importance of social media on holiday visitors' choices-the case of Athens, Greece. EuroMed Journal of Business, 10(3), 360

Khanna, A., Sah, A., Choudhury, T., & Maheshwari, P. (2020, November). Blockchain Technology for Hospitality Industry. In European, Mediterranean, and Middle Eastern Conference on Information Systems (pp. 99-112). Springer, Cham

Kowalewski, D., McLaughlin, J., & Hill, A. (2017). Blockchain will transform loyalty programs. Harvard Business Review. Retrieved from https://hbr.org/2017/03/blockchain-will-transform-customer-loyaltyprograms

Lock, S. (2019). Market size of the global hotel industry from 2014 to 2018. Retrieved from https://www.statista.com/statistics/247264/total-revenue-of-the-global-hotel-industry/

LockTrip. (2018, April 24). LockChain Rebranding to LockTrip — Completed!. Available at LockChain Rebranding to LockTrip — Completed! | by LockTrip.com (LOC Token) Official Blog | LockTrip | Medium

Macauley, E. (2021). What Are the Most Popular Cryptocurrencies? The Hartford

Menne, A. (2018). *Blockchain in the Sharing Economy: Will Blockchain Disrupt Today's Winning Business Models?* Paper presented at 29th Twente Student Conference on IT, Enschede, The Netherlands

Önder, I., & Gunter, U. (2020). Blockchain: Is it the future for the tourism and hospitality industry?. Tourism Economics, 1354816620961707

Pérez-Sánchez, M. D. L. Á., Tian, Z., Barrientos-Báez, A., Gómez-Galán, J., & Li, H. (2021). Blockchain Technology for Winning Consumer Loyalty: Social Norm Analysis Using Structural Equation Modeling. Mathematics, *9*(5), 532

Pilkington, M. (2016). Blockchain technology: principles and applications. In Research Handbook on Digital Transformations. Cheltenham, UK: Edward Elgar Publishing. doi: https://doi.org/10.4337/9781784717766.00019

Puthal, D., Malik, N., Mohanty, S. P., Kougianos, E., & Das, G. (2018). Everything you wanted to know about the blockchain: Its promise, components, processes, and problems. IEEE Consumer Electronics Magazine, 7(4), 6-14

PwC (2015). The Sharing Economy. In PwC Consumer Intelligence Series. Retrieved from https://www.pwc.fr/fr/assets/files/pdf/2015/05/pwc_etude_sharing_econom y.pdf

Rawat, D. B., Chaudhary, V., & Doku, R. (2019). Blockchain: Emerging applications and use cases. arXiv preprint arXiv:1904.12247

Rekha, A. G., & Resmi, A. G. (2021). An Empirical Study of Blockchain Technology, Innovation, Service Quality and Firm Performance in the Banking Industry. In Eurasian Economic Perspectives (pp. 75-89). Springer, Cham

Sarmah, S. S. (2018). Understanding blockchain technology. Computer Science and Engineering, *8*(2), 23-29

Sergeenkov, A. (2018). How Blockchain is Changing Money Transfers | Hacker Noon. Hackernoon.com. Retrieved from https://hackernoon.com/how-blockchain-is-changing-money-transferse9cb85e94932

Sial, M. F. K. (2019). Blockchain Technology–Prospects, Challenges and Opportunities. IEEE Blockchain, Technical Briefs

Sundararajan, S. (2017) Air New Zealand, winding tree team up for blockchain exploration. Available at: https://www.coindesk.com/markets/2017/11/23/air-new-zealand-winding-tree-team-up-for-blockchain-exploration/

Swan, M. (2015). Blockchain Blueprint for a New Economy, eds. McGovern, O'Reilly. Sebastopol, Sebastopol, CA.
Tchakerian, A. (2019). The Blockchain Revolution, 04-06. https://doi.org/10.13140/RG.2.2.34640.6656

Valeri, M., & Baggio, R. (2021). A critical reflection on the adoption of blockchain in tourism. Information Technology & Tourism, 23(2), 121-132

Vujičić, D., Jagodić, D., & Ranđić, S. (2018, March). Blockchain technology, bitcoin, and Ethereum: A brief overview. In 2018 17th international symposium infoteh-jahorina (infoteh*)* (pp. 1-6). IEEE

Whitaker, A. (2019). Art and Blockchain. A primer, history and taxonomy of Blockchain use cases in the arts. Artivate, 8(2), 21-46

White, G. R. T. (2017). Future applications of blockchain in business and management: A Delphi study. Strategic Change, 26, 439–451

Willie, P. (2019). Can all sectors of the hospitality and tourism industry be influenced by the innovation of Blockchain technology?. Worldwide Hospitality and Tourism Themes, 11(2), 112-120.
www.revfine.com/blockchain-technology-hospitality-industry/

Yaga, D., Mell, P., Roby, N., & Scarfone, K. (2018). Nistir 8202 blockchain technology overview. National Institute of Standards and Technology, US Department of Commerce, Washington, USA

Zheng, Z., Xie, S., Dai, H. N., Chen, X., & Wang, H. (2018). Blockchain challenges and opportunities: A survey. International Journal of Web and Grid Services, 14(4), 352-375

Zheng, Z., Xie, S., Dai, H., Chen, X., & Wang, H. (2017, June). An overview of blockchain technology: Architecture, consensus, and future trends. In 2017 IEEE international congress on big data (BigData congress) (pp. 557-564). IEEE