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IMPACT OF BLOCKCHAIN TECHNOLOGY ON THE GOVERNANCE OF THE TOURISM AND HOSPITALITY INDUSTRY

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Purpose: To explore the impact of Blockchain technology on the tourism industry, particularly in terms of sustainability and business model efficiency.
Design/methodology/approach: Conduct a thorough review of existing literature and case studies to analyse the potential benefits and challenges associated with implementing Blockchain technology in the tourism sector from both environmental sustainability and business perspectives. The research will also involve examining real-world examples where blockchain has been successfully applied within the travel industry.
Findings: The findings highlight that Blockchain technology can bring a higher level of transparency to supply chains in tourism, tracking emissions, improving social welfare reputation, and reducing fraud related to data security.
Originality/value: This paper provides insights into how Blockchain can revolutionise travel processes by enhancing transparency, security, and cost-effectiveness while addressing sustainability concerns. It presents a comprehensive analysis of its potential implications for stakeholders within the tourism industry.
Keywords: blockchain technology, tourism, hospitality, sustainability, supply chains.
Category of the paper: General review.

1. Introduction

Blockchain technology has been increasingly embraced across industries due to its capacity to enhance security, transparency, and efficiency in transactions. In the tourism and hospitality sector, its potential impact extends to various facets of governance, encompassing rating systems, customer-to-customer markets, and payment solutions. As we delve deeper into the

implications of blockchain on governance within this industry, it becomes evident that its adoption has the power to drive substantial transformation in management and oversight. Through this inquiry, we aim to bring clarity to the potential disruptions and advantages that the integration of blockchain technology may bring to the governance of the tourism and hospitality sector.

Blockchain technology, in the simplest terms, is a digital system for executing and recording transactions. It is constructed from both intelligent algorithms and collected data and secured by cryptography. This revolutionary technology has the potential to transform interactions across various industries, including financial markets and healthcare. Despite the excitement, some may see blockchain not as a "disruptive technology", as a "foundational technology" that has the potential to establish new frameworks for economic and social systems (Justinia, 2019).

This technology is characterised by its decentralisation, immutability, and transparency, which are unique features that make it a promising tool for various sectors, including science and academia (Leible et al., 2019). Decentralisation refers to the distribution of authority, power, and computational resources across a network of peers, rather than a central authority (Guo, Yu, 2022). This feature allows for the creation of Blockchain as a distributed ledger where transactions are recorded and verified by numerous nodes in the network, enhancing the security and reliability of the system (Dong et al., 2023). Immutability, another essential feature of blockchain, guarantees that once data is registered on the blockchain, it cannot be modified or erased (Guo, Yu, 2022). This feature is particularly useful in maintaining the integrity of data and preventing fraudulent activities. For instance, in academia, it can be used to verify the authenticity of academic credentials and research data, ensuring that they have not been tampered with (Chen et al., 2018).

Transparency, the third characteristic, allows all participants in the network to view and verify transactions (Guo, Yu, 2022). This feature can enhance trust among participants and improve the efficiency of processes. For instance, in the context of scientific research, it can facilitate peer review and data sharing, making the research process more transparent and collaborative (Rossum, 2018). Karski in his research paper about selected applications of the Blockchain network notices great potential of using blockchain based application in the realm of political elections. He presents great opportunities of electronic voting through Blockchain usage like enhancing transparency, reliability of the voting process or greater trust among citizens (Karski, 2021)

Despite these promising features, it is important to note that blockchain technology is still maturing and research on its potential is ongoing (Wang et al., 2021). Current studies concentrate on different technical aspects including security, efficiency, data authenticity, confidentiality, and expansiveness. According to Zaczyk article despite Blockchain technology based on the Distributed Ledger is being frequently associated with cryptocurrency markets it appears rather multidisciplinary (Zaczyk, 2021). Moreover, there are also studies exploring the legal and regulatory aspects of blockchain technology (Gad et al., 2022). As the technology

develops, it is anticipated to have a wider range of uses in different sectors, such as academia. However, it is crucial to conduct extensive feasibility studies before implementing blockchain systems, given that the technology is not yet at an optimum maturity level (Wang et al., 2021).

The academic field has shown growing interest in blockchain research, with a significant increase in the number of research publications (Wang et al., 2021). This technology has been studied from various perspectives, including its underlying technology such as distributed storage, peer-to-peer networking, cryptography, smart contracts, and consensus algorithms (Xu et al., 2019). Legal researchers have also shown interest in the regulations and laws governing blockchain-related technology.

2. Theoretical background

The theoretical study was based on bibliometric analysis based on the resources of the Web of Science Core Collection (WoS) knowledge base. The goals of the bibliometric analysis were focused on the following research aspects: what is the publication trend regarding blockchain technology in relation to tourism, in what areas of the tourism industry can models with blockchain technology be implemented, what is the potential of blockchain technology for the tourism industry.

Table 1 presents a list of selected bibliometric indicators for terms searched in the WoS database. Search results apply to the "topic" search area in all WoS categories.

Table 1.
Summary of selected bibliometric indicators for the set of keywords explored

Entry	Years of publication	Number of publications	h-index	Number of citations per publication	Total number of citations
blockchain and tourism	2017-2023	142	27	16,68	2369/1741*
blockchain and tourism and potential	2018-2023	40	15	25,75	1030/921*
blockchain and tourism and trend	2020-2023	16	7	11,94	191/183*
blockchain and travel	2017-2023	208	26	12,59	2619/2515*
blockchain and hospitality	2018-2023	45	14	20,71	932/811*
blockchain and hotel	2018-2023	34	7	8,44	287/269*

* without self-citations.

Source: compiled on the basis on Web of Science databases, 1.12.2023.

Table 2 compares search terms with the disciplinary categories of the Web of Science database in which they most often appear.

Table 2.
Summary of the main Web of Science categories for the set of keywords explored

Web of Science Categories	blockchain and tourism	blockchain and tourism and potential	blockchain and tourism and trend	blockchain and travel	blockchain and hospitality	blockchain and hotel
Hospitality Leisure Sport Tourism	34.51%	47,50%	25,00%	8,17%	48,89%	23,53%
Management	14.08%	12,50%	25,00%	3,36%	20,00%	11,76%
Computer Science Information Systems	11.27%	2,50%	12,50%	34,13%	13,33%	41,18%
Computer Science Theory Methods	11.27%	2,50%	6,25%	24,52%	8,89%	11,76%
Computer Science Interdisciplinary Applications	10.56%	7,50%	6,25%	11,06%	6,67%	17,65%
Green Sustainable Science Technology	10.56%	17,50%	12,50%	2,88%	8,89%	8,82%
Business	9.86%	10.00%	31,25%	1,92%	13,33%	8,82%
Environmental Studies	9.86%	17,50%		2,40%	8,89%	
Environmental Sciences	9.15%	20,00%		1,92%	6,67%	5,88%
Economics	7.75%	15,00%		2,88%	6,67%	
Computer Science Artificial Intelligence	6.34%			7,69%	2,22%	8,82%
Computer Science Software Engineering	2,82%	2,50%	6,25%	12,98%	2,22%	2,94%
Engineering Electrical Electronic	4,93%			29,33%	11,11%	14,71%
Telecommunications	5,63%		6,25%	25,00%	11,11%	14,71%
Transportation Science Technology				7,21%		
Law						2,94%

Source: compiled on the basis on Web of Science databases. 1.10.202).

As a result of the bibliometric analysis, the following general conclusions were formulated.

Number of publications

The issue of blockchain technology in the areas of tourism has been discussed since 2017, with an increasing annual increase in the number of publications. The largest number of publications were identified for the queries "blockchain and travel" (208) and "blockchain and tourism" (142), with 35 publications combining both terms ("blockchain and travel and tourism"). Forty-five publications combine “blockchain” and “hospitality”, of which 34 are already included in combination with “tourism”. Thirty-four publications concern the combination of "blockchain" and "hotel", of which 16 are already included in the combination with "tourism", and 12 are included in the query "blockchain and hospitality", due to the fact that "hospitality" is an area containing in the hotel industry as well.

Topicality of the subject matter

All search terms achieved the highest citation rate in 2023. The exception is "blockchain and travel" with a 7% decline compared to 2022, with 2023 not yet closed. These results, combined with the constantly growing trend since the beginning of the publication period in the studied areas, prove the novelty and topicality of the topics and the intensely growing interest (Figure 1).

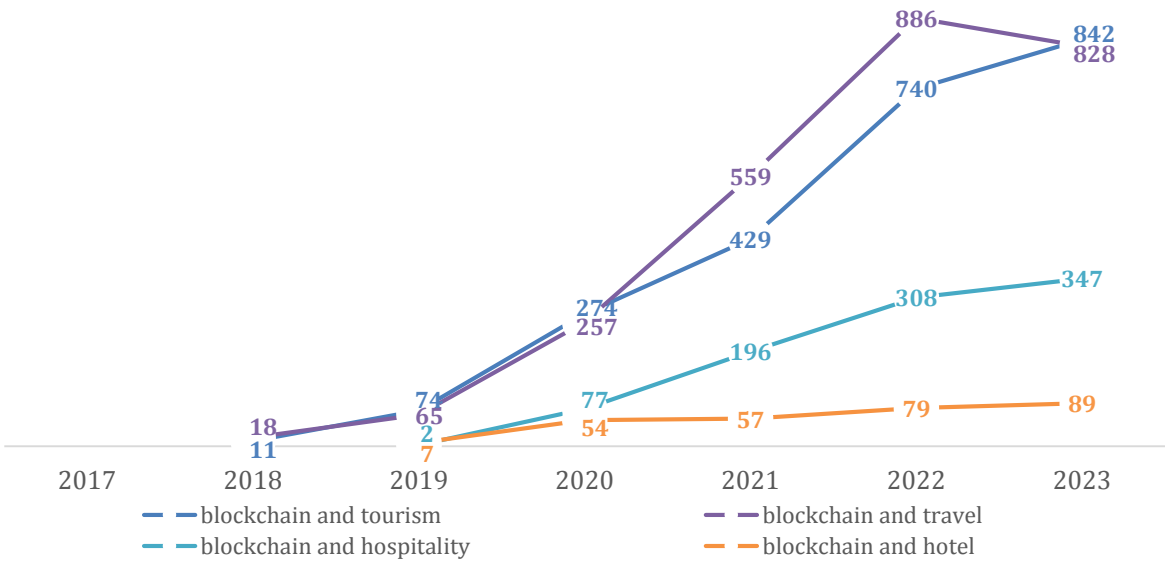

Figure 1. Citation trend of publications for the set of keywords explored.

Source: compiled on the basis on Web of Science databases, 1.10.2023.

Disciplinary categories

The issues connecting the issues of blockchain technology with the areas of tourism are interdisciplinary in nature, combining subject-related issues in the "Hospitality Leisure Sport Tourism" category, management aspects expressed in the "Management" and "Business" categories, technological elements both from the engineering side ("Engineering Electrical Electronic"), as well as various aspects of the "Computer Science" category, as well as issues in the areas of environmental sciences ("Environmental Sciences") and sustainable development ("Green Sustainable Science Technology").

The areas connected in the configurations: blockchain and tourism, blockchain and tourism and trend, blockchain and hospitality focus their interests mainly in the categories "Hospitality Leisure Sport Tourism" and "Management", with blockchain and tourism and trend focusing primarily on the category "Business" (31.25%), as a generator of motivational factors for new trends in tourism. The blockchain and hotel area focuses mainly on IT and technological aspects related to hotel operations in blockchain technologies (41.18% in the "Computer Science Information Systems" category) and this is the only area among the respondents that includes the "Low" category. The blockchain and travel area is even more focused on IT and

technological aspects: 34.13% in the "Computer Science Information Systems" category and 29.33% in the "Engineering Electrical Electronic" category.

3. Application of Blockchain Technology in the Tourism and Hospitality Industry

Blockchain technology has the potential to revolutionise the tourism and hospitality industry by addressing key governance aspects. The adoption of blockchain in this sector can significantly impact areas such as rating systems, customer-to-customer markets, and payment solutions. By leveraging the decentralised, immutable, and transparent nature of blockchain, the tourism and hospitality industry can enhance security, streamline processes, and improve overall governance.

One of the most notable areas where blockchain can make a substantial difference is in rating systems. Traditional rating systems in the industry often face challenges related to authenticity and manipulation. By implementing blockchain-based rating systems, trust and transparency can be significantly improved. The decentralised nature of blockchain guarantees that evaluations and feedback are not under the control of a single entity, thereby minimising the potential for biassed or misleading information.

Furthermore, the customer-to-customer markets in the tourism and hospitality industry can benefit from blockchain technology. With peer-to-peer transactions facilitated by smart contracts on the blockchain, the industry can provide a secure and transparent platform for individuals to engage in transactions directly, thereby reducing the need for intermediaries. Additionally, blockchain's potential for secure and efficient payment solutions can transform financial transactions within the industry. The integration of blockchain can enable secure, instant, and cost-effective payment methods, benefiting both businesses and customers.

As we explore the application of blockchain technology in the tourism and hospitality industry, it becomes evident that the potential for transformative change is substantial. The adoption of blockchain technology in this sector can lead to improved trust, transparency, and efficiency, reshaping the governance landscape.

3.1. Data security and stability

As Dogru and others (2018) in their article about blockchain technology and its implications for the hospitality industry state, that the Blockchain technology may significantly influence data security and stability in the tourism and hospitality industry, especially in terms of privacy, fraud prevention, protection of tourist data, and security of reservations and bookings.

One of the main aspects of blockchain implementation in Tourism is to ensure privacy and prevent fraud. Dogru (2018) also claims that, due to cryptography and decentralised architecture usage, this technology allows to create immutable and transparent transaction records, which in turn makes it difficult to manipulate data and forge reservations. In only 2020 alone, there was a 282% increase in fraudulent bookings and account takeovers in the tourism and hospitality sector. Guo and You (2022) in their paper noted, that in terms of reservation and booking security, blockchain technology with its strong encryption can provide a secure and decentralised platform where customer information and transactions can be safely stored and verified, reducing the risk of data breaches and unauthorised access. It also removes the need to have all data held, processed or stored by a single authority like a hotel. Nowadays tourists have to prove their ID at different touchpoints of their journey for instance at the airport or check-in at the hotel. Due to token on Blockchain usage that represent a digital proof of identification, tourists can use their mobile devices to pass through all checkpoints while travelling quickly and easily. This reduces complexity, costs, and increases reliability. A counterfeit passport or airline ticket will not be verified by Blockchain. For the record, the passport or identity details will not be stored on Blockchain but are off chain. It is only by means of the token the tourist identity will be verified (Çobanoğlu et al., 2021).

What is more, blockchain technology usage can contribute to greater transparency and process efficiency. As Önder and Treiblmaier (2018) present the application possibilities in their article, where hotels can offer real-time pricing information, showing guests that they are getting the best deal without hidden fees. The best example of Blockchain technology usage in tourism can be TUI Group, one of the greatest tourist companies, which has started adopting Blockchain technology in its booking, reservation, and payment systems. What is more, they are also researching further possible blockchain use cases such as tracking and service customization, disintermediation of operations, and innovative loyalty programs.

Introduction of blockchain technology in the tourism and hospitality industry can bring numerous benefits such as enhanced privacy, fraud prevention, protection of tourist data, and secure reservation. As more and more companies in the industry start adopting this technology, it is expected to improve the quality of services and tourist experiences.

3.2. Improvement of service quality and customer satisfaction

The blockchain technology implementation in the tourism and hospitality industry can lead to enhanced service quality and greater customer satisfaction (Dogru et al., 2018).Thanks to enabled transparency and trust in transactions, which allows for accurate and real-time information sharing. One of the key factors is the possibility to track and monitor the entire journey of a tourist, from departure to arrival, ensuring smooth and efficient travel experiences. What's more, it gives the opportunity to gather and analyse customers' data in a much more efficient than traditional way. By means of that, the hoteliers can better understand preferences and needs of its guests, what allows to better personalization of the services, prepare better

package services and also more effective targeting services. What is more, gathered tourist information can help determine the duration of each stage of the traveller's journey. This data can be used to predict future time needed for activities like hotel check-in and provide more detailed information for future tourists. Additionally, hotels can use blockchain technology to track guest preferences, such as room temperature, preferred amenities, and dietary restrictions, enabling them to personalise the guest experience and offer special packages or discounts for those services. This not only enhances customer satisfaction but also creates loyalty among hotel guests.

Kumar and others (2022) in their research paper about Opportunities and Challenges of Blockchain Technology for Tourism Industry in Future Smart Society pay attention that, increased convenience among tourists can be also achieved by contactless travel and the possibility of blockchain technology to store health records, vaccination certificates and travel history securely. This is especially relevant in the context of pandemic time like COVID-19 where there is a need for quick and reliable verification of health information.

3.3. Application in loyalty a program

Loyalty programs are essential tools used widely in the tourism and hospitality industry to reward and retain customers. Nowadays the problem with existing loyalty programs is that affiliated organisations struggle to obtain the desired data. Abu-Rumman (2020) in his case study of tui group on the concept of global governance in tourism franchises noted, that blockchain technology has the potential to transform loyalty programs in the tourism and hospitality sector by offering a secure and transparent system for tracking and utilising rewards. What is more, Prados-Castillo and others (2023) in their article confirm, that guest can earn and redeem rewards seamlessly across different hotels and airlines. Cobanoglu and others (2021) also claim, that earned loyalty points can be stored in Blockchain and therefore are immediately visible and can be exchangeable for the user. In contrast, organisations minimise advertising costs by making real-time personalised offers based on the customer's transaction history. They can also prevent program fraud and gain valuable insights by sharing data with chain partners e.g., airline, car rental companies etc. What is more, Cobanoglu (2021) also mention, that they allow tourism companies to have real-time access where each loyalty point is, how it was earned, and how it has been redeemed. This allows companies to have a comprehensive understanding of their loyalty program's performance, including the number of points earned and redeemed with partners.

As Erceg and others (2020) in their review of the situation in Croatia and Macedonia focused on blockchain in the tourism industry state, that there are already companies that have already based loyalty programs on blockchain technology, such as Loyyal and Liven. But in the tourism and hospitality industry only Trippki and Atlas companies. Trippki is a hotel and reward platform that uses blockchain to book travel and earn loyalty rewards for customers, who book through their platform. What is more, Cobanoglu and others (2021) in their article

also point out those companies confirming, that users who made a reservation using cryptocurrency receive 5% of their booking value in TRIP tokens that they can redeem at the future hotel stay. Additionally, they mention second company, Atlas, that rewards travellers for their reviews. Once the traveller review leads to hotel or restaurant booking, he will receive an ATL-coin. Through that Atlas distributes the transaction commission to the creators of the content in the application.

Mendez and others (2013) in their article on the influence of e-word-of-mouth on travel decision-making researched consumer profiles, where they note that beyond loyalty programs, real rating and reviews play a significant role in influencing consumer decisions. Research shows that 84% of consumers trust online reviews on Google and Tripadvisor as much as personal recommendations from friends or family. Taking into account the importance of accurate and trustworthy reviews in the tourism and hospitality industry, we cannot omit the fact that some of them are biassed or even fake. A survey among 250,000 reviews posted on Tripadvisor only about top ten hotels in top ten popular vacation destinations revealed that one in seven reviews were fake (Guardian, 2019). Visto and others (2021) in their article present application Blockchain technology possibility, where it can help address the issue of fake and biassed reviews in the tourism and hospitality industry by providing a transparent and immutable record of customer reviews, through a decentralised verification system that ensures that reviews only come from verified customers. Through smart contracts usage, blockchain technology can authenticate the identity of reviewers and validate their transactions, ensuring that only genuine reviews are recorded on the platform. Such a blockchain application is Keyopass from Keyocoin, which aims to create a decentralised review platform in the tourism and hospitality industry.

Nowadays, in a world of high competition it is essential in the tourism industry to have regular customers. Blockchain technology has the potential to greatly improve customer loyalty and retention in the tourism industry. By implementing blockchain-based loyalty programs, real reviews and ratings, companies can ensure that customers are rewarded for their loyalty and encouraged to continue using their services.

3.4. Use in luggage tracking

The Blockchain technology can enhance luggage management and therefore improve service quality. The main issue that e.g., airline companies are struggling with is lost or mishandled luggage. Current traditional baggage tracking systems often lack transparency and efficiency. Blockchain technology can be highly beneficial for monitoring luggage movements, particularly with international travel. In numerous instances, a traveller's baggage exchanges ownership multiple times during their trip. As Barten (2023) states using a secure and decentralised ledger makes sharing tracking data between companies a lot easier. In this situation each luggage-related data can be recorded on the blockchain, where each piece of luggage receives a unique digital token. Fragniere and others (2022) in their article also

confirm this and indicate that with the help of smart contracts, the whole process can be automated e.g., check-in, transfer, and delivery of baggage. Thanks to that, travellers can track their luggage in real time and all changes are recorded immutably on the blockchain. In case luggage would be lost or delayed, the system triggers alerts and compensation can be automatically processed. Balasubramanian and others (2022) in their article about enabling framework for Blockchain in Tourism share the point of view, that there are lots of benefits to using blockchain technology in luggage tracking. Firstly, it enhances transparency and accountability in the luggage tracking process, which reduces anxiety among travellers as they gain visibility into their luggage's whereabouts. Secondly, blockchain technology ensures the integrity of data, preventing tampering or unauthorised access. Thirdly, it impacts efficiency through automated processes streamline baggage handling, reducing delays and errors. What is more Antonopoulou, and others (2023) add, that implemented blockchain technology reduces costs. Due to that, airlines and airports can save costs associated with manual tracking and compensations. Puorto (2023) presents one of the application possibilities of a blockchain-based travel platform, which is Winding tree, that aims to decentralise travel distribution, including luggage tracking.

The usage of blockchain technology in luggage tracking can revolutionise the way airlines and travel companies handle and manage baggage thus can be very beneficial for all stakeholders involved.

3.5. Application in reservation systems

The implementation of Blockchain technology offers opportunities to reduce or eliminate current leading booking platforms e.g., booking.com, Airbnb, uber etc., that basically are intermediaries. With blockchain technology, a decentralised reservation system can be created, allowing customers to directly connect with service providers without requiring intermediaries. This not only reduces transaction costs but also increases transparency and security in the reservation process. Additionally, as Antonopoulou and others (2023) mentioned, it can enhance reservation management and improve service quality by ensuring the secure and reliable transfer of data between the tourist business and its customer. As previously mentioned in this paper, blockchain technology can also provide a secure platform for the storage and sharing of customer data, which can help to reduce the risk of data breaches and improve customer privacy. What is more, as Valeri and Baggio (2020) in their article on critical reflection on the adoption of blockchain in tourism state, that in order to automate the reservation process and reduce the need for intermediaries, the blockchain can enable smart contracts technology.

The example blockchain-based system is the online travel portal Webjet, which is developing a blockchain solution to allow stock of empty hotel rooms to be efficiently tracked and traded, with payment fairly routed to the network of middle-men sites involved in filling last-minute vacancies (Marr, 2018).

3.6. Use in smart contracts

One of the definitions of a smart contract can be found in Cobanoglu in other (2021) article, where the authors state that it is " an agreement or set of rules that govern a business transaction; it's stored on the Blockchain and is executed automatically as part of a transaction". By implementing blockchains in conjunction with smart contracts, secure and protected distributed ledgers are created. They also claim, that blockchain technology allows for transparent governance, access control, and automated transactional business logic to build trust between parties involved. In the tourism and hospitality industry, smart contracts can revolutionise the way agreements and payments are made. For instance, hotels and travel agencies may use smart contracts to streamline their business relations. Dogru and Mody (2018) in their paper on Blockchain technology and its implications for the hospitality industry claim, that similarly to legal contracts, a smart contract between a hotel and a travel agency could contain terms and conditions for bookings, pricing details, cancellation policies, and payment arrangements that are determined by the parties of the agreement. Once a transaction is recorded on the blockchain, smart contracts can automatically process payments based on the predetermined terms, eliminating the need for manual processing and reducing payment.

Dogru and Mody (2018) also present the application possibility, that Smart contracts could also be expanded to include guests, eliminating the need for a traditional check-in process. With blockchain technology, digital IDs are stored alongside the authorised account, allowing for automatic guest check-ins upon arrival.

Another instance of smart contract usage in the tourism industry was presented by He and Chen (2023) in their article about Blockchain based framework for smart Tourism, where they mentioned TravelChain—a project seeking to leverage blockchain technology for sector transformation. By incorporating decentralised solutions, smart contracts, and innovative tokenomics, TravelChain aims to enhance transparency, security and efficiency across various aspects of the travel ecosystem.

Lastly, this proposed approach establishes a reservation system with unique smart contracts between customers and hotels. These contracts can encompass all kinds of services that the hotel may offer its guests.

Beneath we can find a graphic (Figure 2) presenting how smart contract works in connection between three entities tourists, hotelier and intermediate suppliers.

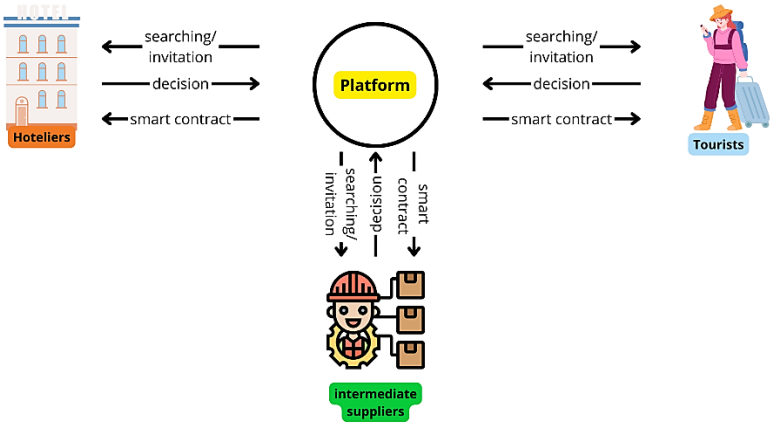

Figure 2. Smart contract between tourist, hotelier and intermediate supplier.
Source: own study.

4. Impact of Blockchain Technology on Governance in the Tourism and Hospitality Industry

The impact of blockchain technology on governance in the tourism and hospitality industry can be observed in several areas, including efficiency and sustainable development, transparency and trust, and innovation and differentiation.

Innovation and differentiation can be fostered through the use of blockchain technology in the industry. Cobanoglu and other researchers in their article state that smart contracts, which are self-executing agreements with terms directly coded into software, can automate a variety of processes including booking and payment. As Balasubramanian and others (2022) confirm in their article on the framework for enabling blockchain in tourism, this automation can lead to more personalized and efficient services for customers, differentiating companies from the competition.

Blockchain technology can enhance efficiency and contribute to sustainable development in the industry by streamlining processes, reducing transaction costs, and promoting environmentally friendly practices (Erol et al.,2022). For instance, blockchain-based platforms facilitate direct transactions between service providers and customers, eliminate intermediaries, and reduce costs. Furthermore, blockchain supports sustainable tourism initiatives by enabling transparent tracking of supply chains and promoting responsible consumption (Tyan et al., 2021). Transparency and trust are also significantly impacted by blockchain technology. Dogru and others (2018) in his article state that by providing an immutable and transparent record of transactions, blockchain can help build trust between stakeholders in the tourism and hospitality industry. What's more, Önder (2020) noted this increased trust can lead to improved customer satisfaction and loyalty, as well as better cooperation between industry partners.

The governance of the tourism and hospitality industry is particularly impacted by blockchain technology. The use of smart contracts, automated processes, and transparent tracking of supply chains not only promotes sustainable development but also fosters innovation and differentiation. Additionally, the transparency and trust facilitated by blockchain technology build stronger relationships between industry partners, leading to improved customer satisfaction and loyalty.

With the growing trend of academic research in the fields of sustainable management and supply chain efficiency, it is clear that blockchain technology has the potential to transform the tourism sector. As businesses continue to invest in this technology to capitalize on the use of distributed ledgers in closed and open networks, it is pivotal to rigorously investigate its impact on the industry. Blockchain technology offers a secure and transparent platform that has the potential to revolutionize the way tourism and hospitality services are delivered, setting businesses apart from their competitors and offering a more personalized and efficient experience for customers.

5. Challenges and Obstacles in Implementing Blockchain Technology in the Tourism and Hospitality Industry

As mentioned earlier, Blockchain technology has the potential to revolutionise the tourism and hospitality industry in various ways, including governance. In their systematic literature review article about the impact of blockchain technology adoption on tourism industry Rana and others (2022) state that through incorporating blockchain technology, the tourism industry can enhance governance and improve service quality by ensuring the secure and reliable transfer of data between the tourism business and its customers. Additionally, Neuhofer and other (2014) claim, that blockchain technology can also provide a secure platform for the storage and sharing of customer data, which can help to reduce the risk of data breaches and improve customer privacy. In addition, blockchain technology can enable the creation of smart contracts, which can automate the governance process and reduce the need for intermediaries.

There are, however, numerous challenges and barriers that must be tackled before the implementation of blockchain technology in the tourism and hospitality industry. Rana and others (2022) in their article point out that one of the main challenges is the technical, infrastructural, and investment requirements associated with blockchain technology. This point of view in their article also share Halkiopoulos and others (2023) claiming that, the integration of blockchain technology demands substantial investment in hardware, software, and personnel, posing a considerable obstacle for small and medium-sized enterprises. Dudziak (2023) in her article states that, the hospitality sector often relies on legacy systems that may not readily communicate with modern blockchain solutions, making the integration process complex.

Additionally, the lack of interoperability and standardisation can hinder the effective implementation of blockchain technology. What is more, she postulates that the adoption of blockchain technology requires substantial investment, not just in financial resources but also in time and effort for training and education.

As Halkiopoulos and other (2022) in their article about integration of blockchain technology in tourism industry clam that it's essential to acknowledge that regulatory and legal uncertainty poses a challenge, potentially creating barriers to the adoption of blockchain technology in the tourism industry. The lack of clear regulations and standards for blockchain technology can create uncertainty and confusion among businesses and consumers, which can hinder its adoption. Laws written decades ago were not drafted with distributed data exchange or self-executing contracts in mind, leading to uncertainty about the new technology's compliance requirements within organisations. The lack of regulatory certainty and evolving legal and regulatory position is challenging for market participants, and it is necessary that they continually monitor the legal and regulatory landscape. Moreover, numerous legal uncertainties exist when smart contracts are used, what Treiblmaier (2022) in his paper admits. Additionally, the resistance to change can also be a significant barrier. Many businesses in the tourism industry can be reluctant to change due to the perceived complexity and cost of implementing blockchain. For this technology to be effective, it requires broad participation from all stakeholders, which can be difficult to obtain.

Despite these challenges, blockchain technology has the potential to bring significant benefits to the tourism and hospitality industry. Blockchain technology can improve efficiency and sustainable development, transparency and trust, and innovation and differentiation. By addressing the challenges and obstacles associated with blockchain technology, the tourism industry can unlock the full potential of this technology and enhance service quality for its customers.

6. Future of Blockchain Technology in the Tourism and Hospitality Industry

The impact of blockchain technology on future trends and strategies in the tourism and hospitality industry is significant. Blockchain technology has the potential to lower expenses, enhance effectiveness, and elevate service standards, ultimately resulting in a boost in competitiveness and profitability.

Blockchain technology can also lead to potential new applications and business models in the tourism and hospitality industry. As Halkiopoulos and others (2023) in their paper about integration of blockchain technology in tourism industry state, that blockchain technology has the potential to be utilised in establishing a decentralised platform for booking and payment

systems., which can reduce the need for intermediaries and increase transparency and trust between businesses and customers. Moreover, it can also be used to create a secure and reliable platform for the sharing of customer reviews and feedback, which can help businesses to improve their services, enhance customer satisfaction and increases credibility.

One of the key areas where blockchain technology can be applied is in reservation management. By using blockchain, the reservation process can become more transparent and secure, eliminating unnecessary intermediaries and reducing the risk of fraud.

In addition, blockchain technology can optimise supply chain management in the hotel industry by increasing traceability and transparency, thereby improving service quality and enabling more efficient resource management.

Another potential application of blockchain technology is traveller identity management. Decentralised identity management offers an added layer of security for travellers, giving them complete control over their personal data and sharing it only as needed, thus improving data protection and preventing identity theft.

Blockchain technology may also impact future strategies in the tourism and hospitality industry by enabling the development of new business models. For example, blockchain technology can enable smart contracts that automate processes in the hotel industry from room allocations to settlements, which not only improves operational efficiency but also provides customers with faster and more personalised experiences.

Finally, blockchain technology has potential to influence future trends in the tourism and hospitality industry such as sustainable travel practices. Tracking operations within a supply chain enables travellers to make more informed decisions regarding sustainable practices. From food origin to environmental policy, blockchain facilitates transparency in sustainability practices.

All these potential applications and impacts on the tourist and hospitality industry are highly dependent on further development and adaptation of technology, and resolving existing challenges, such as technical infrastructure and investment requirements, and regulatory and legality uncertainty bias.

7. Conclusion

In conclusion, blockchain technology holds great promise for the tourism and hospitality industry, offering myriad solutions that can revolutionize traditional practices and optimize various aspects of operations. Throughout the course of this paper, it has been established that blockchain technology can elevate service standards, enhance transparency and trust, and foster innovation and differentiation within the industry.

Despite the significant challenges and barriers that currently exist, there is vast potential for blockchain technology to contribute to the future success and sustainability of the tourism and hospitality sector. By understanding and addressing the challenges associated with the integration of blockchain technology, the industry can pave the way for improved efficiency, enhanced customer experiences, and the development of new business models that will shape the future of travel and hospitality.

The future of blockchain technology in the tourism and hospitality industry is poised to bring about transformative change, offering solutions such as decentralized platforms for booking and payment systems, transparent reservation management, optimized supply chain operations, and enhanced traveller identity management. Furthermore, the technology is expected to drive the development of advanced business models and support sustainable travel practices, contributing to an overall improvement in service quality and customer satisfaction.

In light of these opportunities, it is imperative for stakeholders in the tourism and hospitality industry to invest in further research, development, and regulation of blockchain technology to mitigate the challenges and realize the full potential of this innovative solution. Through collaboration and strategic implementation, the industry can harness the benefits of blockchain technology to transform its operations, enhance customer experiences, and ensure sustainable growth and success in the years to come.

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