



# Blockchain technology framework: Current and future perspectives for the tourism industry

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## ABSTRACT

Blockchain's ability to increase the level of disintermediation in tourism represents this technology's most effective influence on the industry. The advent of online travel agencies has changed tourism's market structure by transferring power from suppliers to consumers. This paper aims to develop a blockchain-based framework for the tourism industry by employing a qualitative method that uses the semi-structured interview to determine how domain experts conceive the future of intermediaries were the tourism industry to adopt blockchain technology. The results show that when taking into account blockchain's influence on businesses, blockchain is considered an appropriate technology for eliminating mediators from the tourism industry's supply chain and also for banning new mediators from gaining access to this industry, thereby removing intermediaries from the tourism market.

## 1. Introduction

Angus Hervey tells us that "lockchain is a new model that makes the exiting model obsolete" (Hervey, 2017). Blockchain is largely associated with cryptocurrencies, especially Bitcoin. Blockchain is a decentralized database system with high capabilities and a strong security system that is based on a series of data protections (Khalifa, 2018). It can be defined as a huge public ledger that is distributed and records transactions over a network (Gatteschi, Lamberti, Demartini, Pranteda, & Santamaria, 2018). By using digital ID, blockchain technology means travelers will no longer need to present their physical IDs; in turn, this will facilitate travel and reduce queuing time. The potential use of blockchain technology (BCT) will help concerned companies create secure digital records and also enable secure data storage. The adoption of cryptocurrencies as a payment method can save millions of travelers the extra costs associated with using intermediary platforms; this means travelers will be able to book hotels and airline tickets without the need for an intermediary (see, e.g., [booking.com](https://www.booking.com), Skyscanner and Expedia) (Revfine, 2018). Each user will be able to access all of the necessary information for their travels by means of peer-to-peer transmissions, thereby eliminating the need for a central server. This implies that blockchain technology could enable transparent transactions, as all actions and activities will be visible to all users without the need of a third party to perform these activities (Beonprice, 2017; Calvaresi, Leis,

Dubovitskaya, Schegg, & Schumacher, 2019; Mohammad Ibrahim, 2009; Revfine, 2018; HITESH MALVIYA, 2019).

Intermediaries are responsible for verifying and documenting transactions to ensure that sales processes between sellers and buyers are carried out legally and that the relevant parties receive commissions for their services. Companies such as Uber, Lyft and Airbnb are currently playing the role of intermediaries as they ensure the reliability of their drivers or apartment owners. Intermediaries are also looking to create economic value for themselves (Kohler, Stribl, & Stieger, 2016). However, the intermediaries themselves are not always trustworthy. Customers' reliance on intermediaries has become a source of great concern for many people for several reasons, including the high fees the mediators charge or the fact they sell users' data. Reducing the need for intermediaries is one of this BCT's trends (Tapscott & Tapscott, 2016). Therefore, blockchain should be sought after in order to reduce dependence on intermediaries in several domains, such as the business sector and especially the tourism industry. In this study, a thorough investigation was conducted pertaining to blockchain technology and its future influence on the hospitality and travel industry. The main aim was to develop a blockchain-based framework that could increase the disintermediation level in this industry. The findings address a critical question on how blockchain technology can support the removal of new intermediaries from the tourism supply chain through the achievement of its main goal of developing a framework that will lead to an increased

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level of disintermediation. The greater demand for a model to reduce the time and cost associated with tourism-related travel and also to secure travelers' data justifies the need for a more effective and efficient method of running a tourism business. It is hoped that using this technology will increase the level of disintermediation in tourism and, by extension, reduce inefficiencies and increase data security in this industry.

The paper's will help industry practitioners understand the potential impact of BCT on the business model, business opportunities and the future of intermediaries in the tourism industry. In this study, experts were asked to predict and highlight the future of intermediaries after the implementation of blockchain technology. This study contributes to the tourism industry literature by discussing the usefulness of the blockchain as a disruptive technology that will revolutionize the tourism industry and particularly the status of intermediaries in a new business model. The findings will also help businesses develop their own strategies for handling the impact of blockchain adoption. Finally, the study contributes to the tourism industry literature by discussing why BCT is important to this particular industry.

This paper is organized as follows. First, an overview of blockchains and how they work is provided. This is followed by a review of the literature on why blockchains are important to the tourism industry and a review of the literature on the potential application of BCT in this industry. Next, the study methods are discussed in detail before the results and findings are presented. Finally, conclusions are drawn based on the findings.

2. Literature review

2.1. Overview of blockchain technology

Blockchain as a technology is a revolutionary invention that has attracted the attention of companies and governments around the world. Basically, this technology is a combination of data and transactions that are registered progressively and traced over a network of distributed ledgers in what is considered distributed ledger technology (Felin & Lakhani, 2018). Blockchain was launched as a disruptive innovative technology in 2008, along with the cryptocurrency Bitcoin (Böhme, Christin, Edelman, & Moore, 2015). Nakamoto (2008) proposed the concept of blockchain as being represented through the use of cryptocurrencies (e.g., Bitcoin). This technology operates as a peer-to-peer network that operates without a central authority. Ledgers are synchronized with the whole network and transactions occur without the need of third-party interventions (Hawlitschek, Notheisen, & Teubner, 2018; Lacity, 2018). This structure ensures that the system is open to

everyone wishing to make valid transactions (Drescher, 2017). The use of cryptographic algorithms means every node connected to the network is ensured a high level of security when making or validating transactions (Drescher, 2017; Iansiti & Lakhani, 2017; Lacity, 2018; Nakamoto, 2008). This ensures safer, anonymous, persistent, traceable and decentralized access to users (Nakamoto, 2008). An identification code, which is called a "hash", is contained in each addition made to the chain. Data can also be tracked with a higher level of accuracy (Seffinga, Lyons, & Bachman, 2017), which further strengthens a system's security. Fig. 1 presents the structure of blockchain technology.

Several technologies have been developed and used to make BCT more powerful. First, there is the smart contract (Shermin, 2017), which is used to facilitate an increased level of disintermediation. This type of contract is self-enforcing and self-executing and consists of a coded program that creates an agreement between several parties (Boucher, Nascimento, & Kritikos, 2017). Smart contracts are capable of influencing businesses because they are capable of enhancing a higher level of disintermediation (reduced need for intermediaries) (Seffinga et al., 2017; Önder and Treiblmaier, 2018), more-efficient projects implementation and they lay the foundation on which decentralized autonomous organizations (DAOs) can be developed (Boucher et al., 2017). DAOs are a group of organizations that, when combined, can function effectively as a single company that can be managed and implemented through a blockchain with little or no human intervention (Boucher et al., 2017; Science, 2014). For example, DAOs allow taxi companies to operate and own self-driving cars and use smart contracts to pay for fuel, insurance, repairs, spare parts, collect payments, and save on investments in new cars. Slock. it is another example which involves the provision of accommodation services using a universal sharing network, wherein a company can use smart contracts for ventures in the sharing economy that can have an impact on companies such as Airbnb (Menne, 2018). Smart contracts can also help companies automatically place orders, carry out operations and issue payments without the need for approvals. Through the use of these contracts' escrow features, two unknown parties can engage in a transaction that is based on trust. The application's role is to automate some minor tasks, such as programming a hotel room key (Pilkington, Crudu, & Grant, 2017); but, this could be upgraded to include large and complex transactions, depending on the nature of the transaction. Such upgrades could range from purchases, to the payment of salaries and other payments, to the issuance of rewards and points, and supply-chain management. These features point to why blockchain technology is so important for the tourism industry.

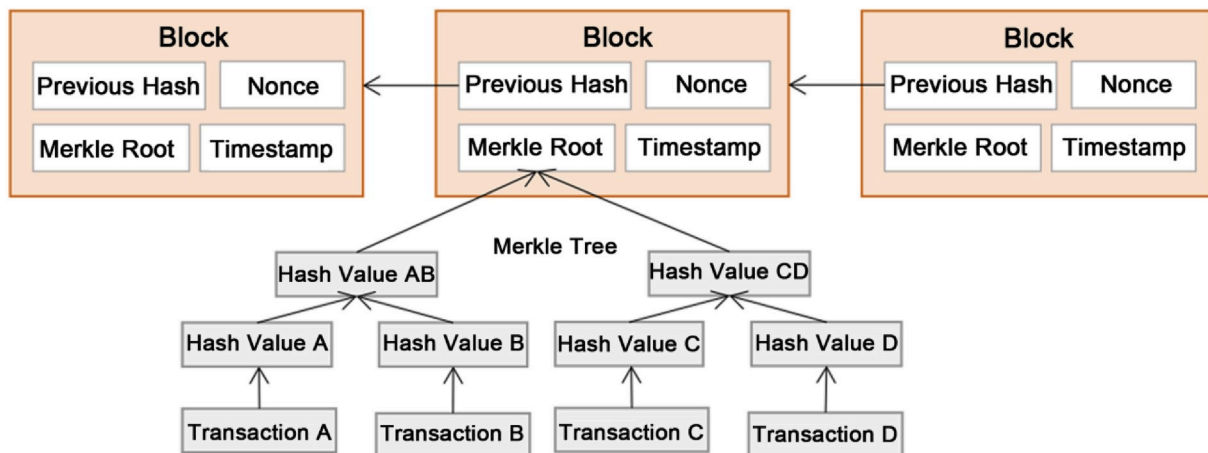


Fig. 1. The typical blockchain structure. Source: Adopted from: Bahga and Madiseti (2016).

2.2. What blockchain promises to the tourism industry

Global tourism has witnessed remarkable progress over the past few years. With the advancement of technology, some companies have exploited these technologies and come up with new models for running their businesses. Internet technology has led to a rapid evolution in the tourism industry. For example, the internet allows customers to search for and make their own travel arrangements online; it has also caused drift in that some companies, such as Uber and Airbnb, have moved from the conventional business model to a customer-to-customer model that is based on the concept of the shared economy. For customers' needs to be met, the tourism industry has resorted to combining technology, money, and knowledge and, thereby, an increased level of disintermediation (Colombo & Baggio, 2017). According to Önder and Treiblmaier, (2018), practitioners and experts have underestimated the internet's potential impact on future endeavors in tourism. Advancements in the hotel and tourism industry mean that competition is becoming fierce. So, for businesses to thrive in such a competitive environment, it is important for companies to have a competitive advantage.

The potential of BCT to lower costs, increase process efficiency, mitigate the risk of data deception, increase the level of trust among business partners, and reduce the role of intermediaries will affect all types of business operations. Therefore, it is importance to study all aspects of BCT and its interactions within and among industries so as to better predict future changes in the tourism industry (Hughes, Park, Kietzmann, & Archer-Brown, 2019; Melnychenko, Mazaraki, & Tkachuk, 2019). This industry is categorized by its diversification and the complicated business relationships that include partners, individuals, travel services and business processes, where competition is high. In order to constantly adapt to these conditions, it is necessary to adopt the latest technologies that will supply the information the industry needs to quickly change, adapt, and integrate and link the stakeholders involved in the industry, while also considering travelers' diverse needs and the increasing need for speed in service provision (Melnychenko, 2010; Melnychenko, Mazaraki, & Tkachuk, 2019). The tourism industry also has a huge number of stakeholders; e.g., tour operators and travel agents, airlines, hoteliers, insurance firms, payment service providers, government entities, and many others. This requires that these

accelerating processes must also come with transparency for all stakeholders involved (Melnychenko et al., 2019). The use of cryptocurrencies will support payment transfers without third-party assistance or extra costs.

DApps is blockchain's latest product. Its different types of business models have evolved and been integrated with blockchain to benefit consumers due to this product's potential to make blockchain effortless, including for businesses in the tourism sector. Tourism companies can use DApps to establish better platforms with which to connect and interact with their customers (Kennedy-Eden & Gretzel, 2012). Individuals can also use DApps on their browsers and smartphones to communicate with blockchain on a more regular basis. Blockchain technologies also have the potential to affect the tourism sector through their ability to support the management of transactions that range from sales and operations to administration and finance (Boucher et al., 2017). This could influence the tourism industry's development of smart destinations (Khan, 2018). Furthermore, several questions have been raised in the current literature on blockchain and its use in tourism. Such questions are associated with the operational aspects of blockchain technology, such as the fee structure of online travel agencies and global distribution systems, particularly in regard to overbooking and security, etc. Thus, it is crucial to gain insight on the role of blockchain in the tourism sector and its recent developments and trends in order to understand how these have affected the level of disintermediation in this industry. Fig. 2 highlights the traditional architecture of the typical business process involved in tourism. This will help us understand BCT's impact on this industry and its intermediaries.

For users to make direct transactions in tourism, trust is also a main factor. Users require a high level of security for monetary transactions and the exchange of information; they also wish to eliminate costs and enhance the type of transparency that will eliminate the need for third parties (Poorigali, 2018). According to Gu & Zhu (2018), enhanced trust increases disintermediation. Some travel sites combine reviews, ratings, photos, contact information, and opinions about the providers of tourism services (Leung, Law, Van Hoof, & Buhalis, 2013). Online user reviews can dramatically reshape the tourism industry by creating some companies and breaking others (Bassig, 2012). By endorsing tourism reviews before they are registered on blockchain, buyers increase

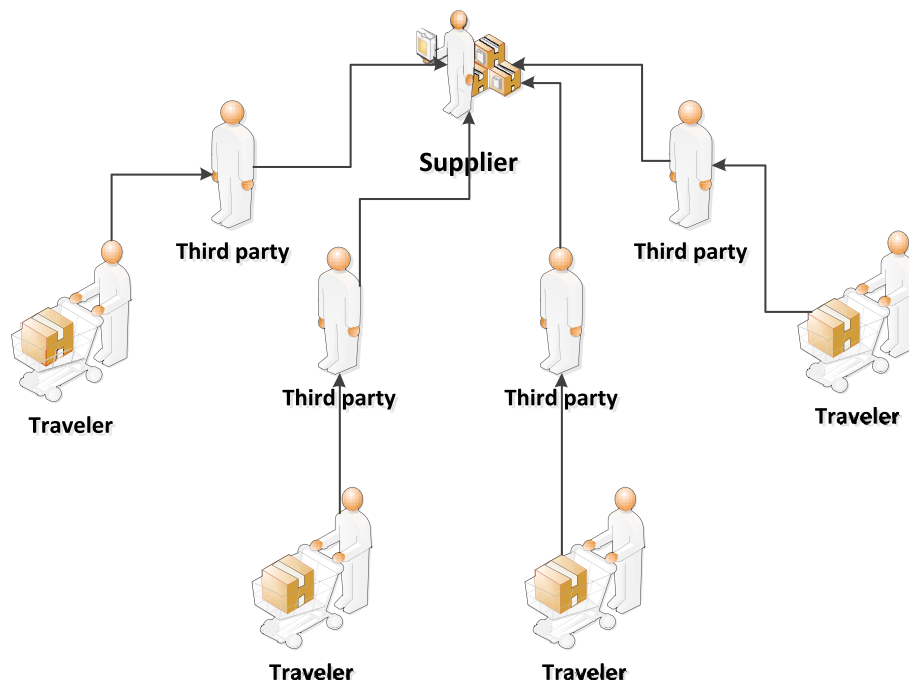


Fig. 2. Traditional architecture of tourism services.

transparency and credibility in an opaque world of customer reviews (Finyear, 2016). The purchasing decisions of online consumers are greatly influenced by the online reviews consumers provide. Novice users trust these online reviews as they consider them to be genuine (Filiari, 2016). However, the trustworthiness of these reviews is sometimes questionable because it is possible for industry players, like restaurants and hotels, to manipulate these centralized systems.

Peer-to-peer payments allow blockchain to open the door for direct communication among parties. OpenBazaar is an example of an app that uses blockchain to create peer-to-peer sites for eBay (Raval, 2016). Downloading this application to one's computer makes it possible to deal with OpenBazaar vendors without paying transaction fees. Here, the lack of protocol rules means that personal reputations are more important for business interactions than the fact the vendor and buyer are currently on eBay. Cryptocurrencies are used to facilitate a new kind of customer-to-customer transaction that was recently introduced to primary and secondary markets for tourism products and services (Calvaresi et al., 2019; Gu & Zhu, 2018). BCT will facilitate this consumer-to-consumer trade model in tourism (Sigala, 2017). Cryptocurrencies based on blockchain technology, monetary exchanges can be easily performed without the need for an intermediary. There is broad agreement that BCT will transform financial transactions as how information can be exchanged based on transparency, flexibility, and security. However, BCT will also affect intermediaries in terms of system simplicity and cutting operational costs (Filimonau & Naumova, 2019).

### 2.2.1. BCT applications for the tourism industry

Travelers are constantly required to reveal their identification in numerous stages during their journeys, from reserving, through boarding, right down to hotel check-ins. With the aid of blockchain, this procedure can be simplified and secured by showing each traveler's identification only one time. SITA is a travel-tech enterprise that provides IT support and telecommunications to the airline industry. This company has proposed a method which can support the streamlining of travelers' identifications. It uses blockchain tech to implement a single and secure biometric identity system that allows travelers to prove their identification through the use of a wearable or mobile tool during their entire journey. This means no more identification cards, passports, or drivers' licenses will be required. For example, a client might create a verifiable token that could be saved on a device, or attached to an individual, that contains their personal biometrics and different verifications on their personal statistics. Theoretically, the traveler could then be identified through the use of a biometric scan, coupled with a token's authentication. None of the traveler's information would need to be saved or viewed through local companies as all of the verifications would occur in the company's machine (Sita, 2016). Blockchain technology could be extraordinarily relevant in monitoring the movement of baggage, especially during international travel as, in many instances, a client's baggage changes hands more than once during their trip. The use of a decentralized database would make it easier to share monitoring records among companies (Revfine, 2018).

Large companies like Tourism Union International (TUI) have already started using blockchain technology to book and pay for reservations and other activities associated with their clients' travel (Sixtin, 2017). Some tourism companies that accept Bitcoins as a form of payment include Webjet, CheapoAir, Expedia, and One Shot Hotels (Chokun, 2013). In blockchain, cryptocurrencies are used for monetary exchanges and network peers verify these exchanges; this helps ensure greater traceability, security and accuracy (Boucher et al., 2017) at low costs (Schlegel, Zavolokina, & Schwabe, 2018). Apart from Bitcoin, other popular coins are available and in use to facilitate monetary exchanges, such as *Tether*, *Dash*, *LightCoin*, *BitcoinCash*, *LightCoin*, etc. Several small island destinations, such as the Marshall Islands, which are a presidential republic in free association with the United States, are making efforts toward creating their own cryptocurrencies or using other extant currencies (Kwok & Koh, 2019). An increasing number of

travel businesses operate using blockchain technology (e.g., Travalva (Travalva, 2018); Travelblock (Travelblock, 2018); Travelchain (Travelchain, 2018)). This allows travelers to make reservations and pay for their travel using cryptocurrencies instead of being required to exchange their currencies. By the end of 2018, CoinMarketCap had recorded over 2068 cryptocurrencies.

The German National Tourist Board uses Bitcoin, and JP Morgan Bank created a cryptocurrency called JPM Coin (Simms, 2019). Thailand has also become an engine of growth for the cryptocurrency market. Travelers who visit Thailand are usually worried about credit card fraud and are increasingly looking for traders who accept Bitcoin (Helms, 2017). Some travel companies, such as BTCTRIP1 and DESTINIA2, list their prices in BTC, making the payment process easier to use. In the case of DESTINIA, with a handful of exceptions (fiat payment upon arrival and airlines that accept credit card payment only), most products can now be purchased online with the use of Bitcoins. In the midst of a serious political and financial crisis in 2015, accompanied by a huge challenge to the traditional banking sector, Agistri, a Greek island, decided to test a new cryptocurrency through the restoration of blockchain-based NAUTILUSCOIN/DRACHMAE (Prisco, 2015). Drachmae Connect in Greece (ibid.) and Moldova Connect (a proposed project for Moldova) (Pilkington et al., 2017) were introduced. These services can draw on mobile money services in order to help travelers use their mobile phones to book discounted trips and pay for them in a cryptocurrency (Prisco, 2015). Table (1) shows some specific platform examples of blockchain technology being used in the tourism industry (Melnychenko et al., 2019; Revfine, 2018).

There are several perspectives on the impact of blockchain methodology on the tourism industry. This methodology can have a positive impact on review systems that can help create trustworthy rating systems to the benefit of travelers so they can either make or correct their decisions about tourism destinations (Önder & Treiblmaier, 2018). The power of cryptocurrencies, smart contracts, and DApps is that they can have positive effects on business deals (Valeri, 2020). Introducing Bitcoin as a cryptocurrency has changed how people perceive blockchain technology (Marr, 2017), due to the lack of trust in banking systems (Yandle, 2010). This latter problem has motivated consumers and businesses to look for alternatives, such as in cryptocurrencies (e.g., Bitcoin) (Marr, 2017; Yandle, 2010). Professionals in the tourism sector, including travel agents and agencies, are exploring opportunities for adopting blockchain technology in their business processes (Willie, 2019). In brief, we can recognize the positive impact of blockchain on this industry, either in its ability to manage transactions through the use of cryptocurrencies, or in other service areas (e.g., identity management, handling travel visas, baggage traceability, and loyalty programs) (Boucher et al., 2017; Nam, Dutt, Chathoth, & Khan, 2019). In addition, BCT will have a positive impact on other aspects of the industry, such as data sharing and trust computation (Niranjnamurthy, Nithya, &

**Table 1**  
Blockchain platforms in the tourism industry. Impact of blockchain methodology on the tourism industry.

Platform	Description
LockChain	Operates to rent out property No middlemen No commission fees
BeeToken/ Beenest	Home-sharing platform No commission fees Keeps users safe Payment, reputation, and arbitration protocols are all in place
Winding Tree	Baggage tracking via blockchain Easy, safer and more secure Transparent
ShoCard & SITA Trippki	Decentralized identity-management database Customer loyalty reward system
TUI Bed-Swap	Moving inventories between different points of sale and flex selling margins



Jagannatha, 2019). BCT can also be a critical success factor in smart tourism processes (Hou, 2017). Overall, this technology will definitely make significant contributions to the hospitality and travel industry’s positive outlook in the coming years (Willie, 2019).

Several aspects of the tourism model will benefit from blockchain technology. First, it offers the prospect of enhancing tourists’ experiences through interactions between tourism operators and travelers, where travelers can carry a unique identity that will show their purchase history, which will then be stored in a distributed ledger (Kwok & Koh, 2019) and thereby ease foreign currency conversions (Tkatchuk, 2018). There are several motivations for moving toward this model, such as reducing operational costs and cycle times, minimizing risk, creating revenue-earning opportunities, and reducing the cost of capital (Nir-anjanamurthy et al. (2019).

2.2.2. Tourism readiness for this model

There are significant differences between existing business models and blockchain. The effective integration of cryptocurrencies into blockchain’s business model will enable suppliers and tourists to use a variety of cryptocurrencies to gain more benefits (Nam et al., 2019). Doing so should motivate the adoption of cryptocurrencies where significant compensation is paid out in terms of reductions in costs (Parra-López, Bulchand-Gidumal, Gutiérrez-Taño, & Díaz-Armas, 2011). The adoption and expansion of full blockchain technology still requires a central agency to maintain a consistent network while, at the same time, preventing the occurrence of any illegal activities (Marr, 2018). Another issue to be considered is that interacting with various legacy systems, alone, requires a major investment, despite blockchain’s useful features (Revfine, 2018). Therefore, organizations should take care that all of the changes required be easily implemented into a business model so as to take advantage of blockchain’s technology. Further, adopting this technology requires substantial collaboration among tourism stakeholders (governments, tourists, businesses and destination marketing organizations) (Böhme et al., 2015; Kwok & Koh, 2019).

Briefly, it can be said that all sectors of the hospitality and tourism industry can be affected by innovations in blockchain technology. The industry’s future looks promising (Willie, 2019). The following trends provide insight into how blockchain can affect smart cities and tourism, for example, in such projects as those in Dubai and Switzerland (Nam et al., 2019; Seffinga et al., 2017). Blockchain can be strategically used in the accommodation sector, among travel agents and in food services. For example, the accommodation sector may include revenue management, inventory control, guest history, and financial management (Willie, 2019). Table (2) shows the possible uses of blockchain in the tourism industry.

**Table 2**  
Tourism sectors that are ready to introduce blockchain solutions.

Tourism sector	Blockchain uses
Accommodation*	- Revenue management - Inventory control - Guest history - Financial management
Travel agents and agencies †	- Cool Cousin of London - WebJet, based in Australia - Sandblock, out of France - Accenture, in Canada - Travelchain, in Russia.
Food services‡	- Food safety and security - Customer payments - Smart contracts - Food recalls - Product labeling

Sources: \* (Willie, 2019), (LockTrip, 2018); † (Liebkind, 2018); ‡ (Willie, 2019), (Radocchia, 2018)

2.2.3. Intermediaries in the tourism industry

Currently, intermediaries are playing an important role in businesses, particularly in the tourism industry. Bakos (1998) classified markets into three activities; namely those that match sellers and buyers that facilitate transactions and provide infrastructure for doing business. According to Giaglis, Klein, and O’Keefe (2002), markets will continue to face pressure to survive and a large number of businesses will be eliminated. Surviving in a competitive market will depend on the functions businesses perform and the value they add. In the tourism industry, the main intermediaries are tour operators and travel agents. Travel agencies are retailers, while tour operators are wholesalers. Growth in the number of travelers has led to the creation of new fields and opportunities for those interested in earning money in this field, such as intermediaries. Intermediaries are able to conquer specific areas within the tourism sector through the use of information technology and the internet, which makes it easier for them to introduce themselves and offer their services to prospective clients, while also providing information about what they can do to enhance their customers’ comfort during their vacations.

Technology has made it possible for intermediaries to assure their customers that they can reduce their stress by planning their travel activities for them, and all these customers need to do is pay for this service. For this reason, it can be said that intermediaries play a vital role in the marketing and distribution of tourism products as these are intangible products that cannot be stored. Thus, it is difficult to separate the intermediaries from the suppliers and travel agencies. In the travel industry, the job of the intermediaries is to make reservations and payments either to external or internal operations. Externally transacting payments and booking various tourism products entails providing services that comprise putting together trip programs from the various possible travel components (air, rail, car rental, etc.), to entertainment and other services. These processes are often managed using global distribution systems, such as Amadeus and Worldspan. These are intermediaries that provide the information required to book flights, register passengers’ names and book seats. Internal operations include booking and remitting payments for passengers’ tourism-related programs (those offered by travel companies). These systems include a database of information about the available flights, their components, timetables, prices, payment methods, booking, etc.

Most tour operators within these systems offer independent tours and are often connected to the internet and international distribution systems (Mohammad Ibrahim IRAQI, 2009). Many travelers rely on intermediaries to save them time and help them plan and make reservations for their trips. As there are positive aspects associated with using intermediaries, there are also negative ones. Due to the growing reliance on these systems, many concerns and disadvantages exist, such as the costs and commissions intermediaries charge and the fact that some companies sell users’ data to other companies, making it unattractive to use intermediaries. Travel services encompass areas such as the relationships between different providers, tourism products, destination advertising, marketing companies, tour operators and agents, etc. In brief, services in this industry include everything associated with agencies and functions that assist the prospective traveler make plans and book additional upgrades or services that will provide them with a pleasant experience (NAICS, 2017). Several initiatives strive to directly link stakeholders, such as suppliers and customers, and eliminate obstacles to market entry by removing intermediaries from the supply chain (Önder & Treiblmaier, 2018). This results in cost savings for both producers and consumers (Sachs, 2017), in addition to reducing the speed of the process and affecting transparency (Korpela, Hallikas, & Dahlberg, 2017). Blockchain is also used in the tourism supply chain in order to detect and prohibit fraud (Hackius & Petersen, 2017).

Peer-to-peer business models can be enriched through BCT through such factors as the shared economy (e.g., Uber, Airbnb, etc.) (Huckle, Bhattacharya, White, & Beloff, 2016). BCT also has the potential to disrupt the tourism industry’s current business model. One well-known

project is the hotel P2P model that combines BCT and smart contract technology in order to connect all hotels into one hotel hub (Riquelme, 2018). Tourism’s current intermediaries will have to compete with new entrants to blockchain-based tourism intermediaries online. Also, they will need to change their current business models to these new ones in order to compete with the new trends.

2.2.4. Theory of disruptive innovation

The theory of disruptive innovation can be used to explain the process of adopting blockchain technology (Bower & Christensen, 1995). This theory stipulates that disruption is a process that involves a small company with fewer resources successfully competing with major players in the market, where the key players continue to focus on making profits in a high-end market through the introduction of higher-quality products/services. Additionally, the successful new intermediaries are those that usually incorporate new business models into their products/services and do not focus on what the current players are doing. Here, with comparable features, such as convenience and lower costs, the number of new market entrants grows and become large. However, the current players must continue to find new ways of growing their businesses, as new entrants can evolve into major players that can overshadow them in the market; and their emergence as major players makes them disruptive innovators. In summary, blockchain technology can fundamentally affect current business models. For example, Touristik Union International (TUI) uses blockchain to update, distribute, and directly access data for hotels, and these are services that will remove the power of intermediaries (e.g., booking.com) (Alliance, 2019). Fig. 3 presents the role of intermediaries in the tourism industry.

The most significant difference between the current business model of online travel agencies and blockchain-based intermediaries is that cryptocurrencies can be efficiently and effectively integrated into their business models and, thereby, enhance suppliers and travelers’ use of a wide variety of cryptocurrencies so they can enjoy more benefits from their experience (such as in time and cost savings). However, if companies and individuals are faced with a large and complex mass of blockchains and cryptocurrencies, they can be tempted to continue using the systems they are familiar with (Deloitte, 2016). Blockchain adoption is also based on the current level of awareness and knowledge of technology, including of the processes that underpin it (Deloitte, 2016; Marr, 2018). In this why more research is needed from different perspectives so as to shed light on the overall picture of blockchain technology.

A variety of characteristics and benefits of blockchain technology are identified in the literature. The researcher has limited these characteristics to those that directly or indirectly relate to achieving this study’s research objective, which is to develop a framework that will lead to disintermediation in the tourism industry (Colombo & Baggio, 2017; Drescher, 2017; Gu & Zhu, 2018; Gupta, 2017; Hughes et al., 2019; Iansiti & Lakhani, 2017; Nam et al., 2019; Rabah, 2017; Seffinga et al., 2017; Önder and Treiblmaier, 2018; Yli-Huumo, Ko, Choi, Park, & Smolander, 2016). These characteristics and benefits are the core of the

proposed blockchain-based framework for an increased level of disintermediation in the industry. Table (3) summarizes these characteristics and benefits.

3. Research method

This study employed the qualitative research method. In this case, experts’ perspectives on BTC and their predictions for the outcomes of using BCT were found to be a suitable approach to answering the research questions (Bokrantz, Skoogh, Berlin, & Stahre, 2017; Iden, Methlie, & Christensen, 2017). The experts who participated in this study were chosen in order to obtain in-depth information on how BCT could have an impact on tourism intermediaries. The expert is a person who own a considerable knowledge on the basis of research, or

Table 3  
Characteristics and benefits of blockchain technology.

ZBCT characteristics and benefits	Description
Disintermediation	Reduce the industry’s dependence on intermediaries within blockchain processes
Non-repudiation	Show the integrity of blockchain
Automation	Fully automate interactions between stakeholders
Streamlined process	Re-engineer business processes with the blockchain standard
Processing speed	Increase execution speed due to the automation of the business process Reduced transaction time No single point of failure
Cost reduction	Disintermediation and automation lead to cost reductions Reduced cost of transactions
Trust	This includes trust in the integrity and security of payment processing Does not require intermediaries or third parties Prevents double spending Stakeholders can interact and transact with each other with a high level of security and assurance that their transactions and identities are safe To reduce the incidence of consideration around the trustworthiness of financial firms Stabilize the economy Transparency of all transactions without the need for intermediaries
Timestamps	Provide a proof-of-work of what happened before
Immutability	The chain of transactions cannot be tampered with
Less vulnerable	It is difficult to be attacked by malware and hackers
Transparency	Nodes on the blockchain network share the same master records and this leads to more accuracy and consistency among members of the network Increase in credibility
Decentralization	Stakeholders who are involved in the network do not need to know each other’s identities
Secure transaction	Transactions are controlled by secure algorithms that use public key encryption to reduce the risk of data fraud.

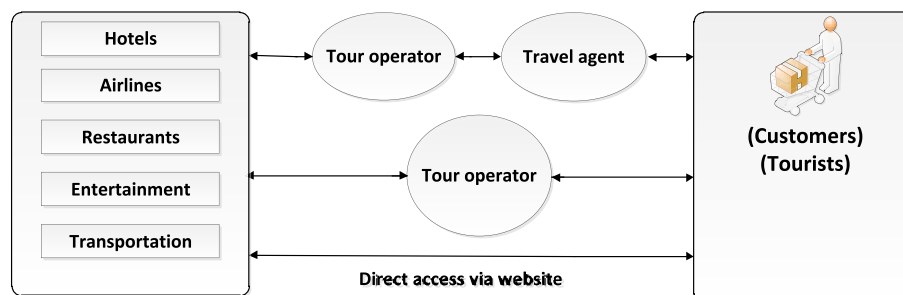


Fig. 3. Intermediaries in the tourism industry. Source: Adopted from (Piboonrungraj, 2012).

experience in a specific research area.

### 3.1. Research design and sampling approach

As a disruptive technology (Walport, 2016; Bhargava, 2019), the cryptocurrency market reached \$600 billion by 2017, the total amount of global spending on blockchain solutions reached \$2.1 billion by 2018, and the use of blockchain technology is expected to expand by 42.8% in 2020. However, there is limited information related to the development of a blockchain-based framework that could lead to an increased level of disintermediation. To accomplish this, researchers need to gain a deeper understanding of several parties that operate in the industry, particularly their familiarity and experience with blockchain technology (Creswell, 2014; Denzin & Lincoln, 2011). Based on the nature of this study, it was assumed that it would have been best to use the qualitative methodology to address any potential unknown variables and fulfill its research requirements (Creswell, 2014). In fact, blockchain technology is still in its infancy and researchers are still exploring its use in different industries.

This study depended on obtaining knowledge from participants' experiences with BCT. Their number of years of experience was an important criterion for counting as an expert in the field. This research selected respondents based on their having been working in this field for more than 10 years. The length of experience in the field was justified as these people could lend insight into blockchain technology and its potential impact on the tourism industry and, specifically on their intermediaries. Their level of expertise was also seen as enhancing the reliability of their answers. This approach created a context that was based on practical information that was obtained from experts (Taylor & Wallace, 2007). For this study, the researcher sought these experts' opinions on how they saw introducing blockchain technology as potentially affecting the future of intermediaries in the tourism industry. To achieve this, the study employed semi-structured face-to-face and Skype interviews that used open- and close-ended questioning (Creswell, 2014) on a number of experts in the field of the digitalization of businesses, particularly in blockchain technology. Interviewing experts in the field is an effective data collection tool, particularly in terms of exploring a new or emerging technology such as blockchain (Bogner, Chanson, & Meeuw, 2016; Littig & Pöschhacker, 2014). The intention was to gain a deep understanding of the knowledge of the role of blockchain technology in increasing the level of disintermediation in tourism. Obtaining qualitative information was more suitable to this study as only a few people had the required experience that allowed them to provide in-depth answers to the research questions (Saunders, Lewis, Philip & Thornhill, 2009).

The number of participants was decided based on the nature of the research questions. The criteria behind this was to reach the saturation point where no more new information could have been added (Seidman, 2006). The researchers did not manage to determine the number of potential participants in advance. Therefore, the saturation point for this research was achieved after interviewing six experts in the field of blockchain technology. To confirm this study's saturation point, the researcher continued to interview an additional three participants and determined that these people did not add any new information. The questions were prepared prior to the interviews; their focus was on the adoption of blockchain technology in the tourism industry. These questions included: 1) how these experts defined the current role of intermediaries; 2) how they felt blockchain technology would affect existing and new intermediaries; 3) how they felt existing business models could be enhanced through BCT; and then 4) asked their opinions on how blockchain technology would lead to increased levels of disintermediation, particularly in the tourism industry (Ayres, 2008; Creswell, 2014). The study mainly focused on the latter question. E-mails were sent to the experts who had been willing to participate in the study. These participants were informed via email about the purpose of study. The researcher conducted scheduled interviews that lasted an

average length of 45 min. To the best of our knowledge, this is the first qualitative in-depth research to investigate how blockchain technology is expected to lead to an increased level of disintermediation in the tourism industry.

Each interview began with certain questions related to the participant's attitude toward and perceptions about blockchain technology and its potential impact on the travel and tourism industry. Basically, there was a consensus on blockchain's potential impact on this industry. One respondent noted that "the popularity of blockchain is that it is used for cryptocurrencies, without clear cases of its use in other disciplines;" another respondent verified that "blockchain has a huge potential impact on almost every industry, and many applications will also be developed." These experts agreed that the travel and tourism industry needs to adopt the capabilities of blockchain technology: "There are several uses of blockchain technology in tourism, such as safe and secure transactions by using cryptocurrencies, reviews on the trustworthiness of tourism services, and directly dealing with service providers without the need for the services of intermediaries."

### 3.2. Data analysis

The researcher followed the data analysis with an iterative approach between the collected data, the literature on BCT, and the proposed framework of an increased level of disintermediation. The researcher summarized the responses of the participants who answered the prepared questions. The researcher also used a systematic approach in order to define the themes and the classifications of blockchain technology that achieved the study's goal in terms of investigating the potential for BCT to increase the level of disintermediation in the tourism industry. Comparative and frequency-counts analyses were also performed.

#### 3.2.1. Comparative analysis

The study employed constant comparative analyses (Duchscher, Judy & Morgan, 2005; Graham & Thomas, 2008) to compare the similarities and differences when developing the concepts. This type of analysis was used to compare differences between these experts' opinions and agreements and disagreements about particular cases. As for the participants' views, the expert in education (curriculum design/-innovative solutions implementation) stated that "Although blockchain and cryptocurrencies have received significant coverage, the transformative power of blockchain technology applications is not yet commercially available and only a limited number of companies have moved forward in their blockchain solutions, beyond the feasibility phase. There is also a limited number of companies that are ready to make worthy investments, other than the proposing a phase that will bridge the gap between the potential and real business value. One important factor for this challenge is resistant to change."

Support came from another expert who elaborated that, "Transforming blockchain ideas from the feasibility to the commercial stage is still problematic, particularly in regard to the fact companies will need to make notable investments for blockchain initiatives. There is a prospective business value, but there are current constraints to its providing solid benefits to the company. Companies are still afraid of adopting blockchain technology." The researcher concluded that "resistant to change" a common factor that was elaborated among these experts.

#### 3.2.2. Frequency-counts analysis

Frequency-counts analysis was used to determine the classes and items found from the responses in terms of how important they are to every concept that determines the role of blockchain in increasing the level of disintermediation in the tourism industry (Mat Isa, 2008). Counting repetitive occurrences was also a method used in this study. This method is used to quantify the textual data (Krippendorff, 2012). During the coding analysis, the counting was done based on how many experts mentioned certain factors in their responses to certain questions. Table (4) shows the frequency of the attributes of the blockchain tools

**Table 4**

Interviewees' views on the characteristics and benefits of blockchain that will lead to disintermediation in the tourism industry Saudi Arabia, 2019.

Attributes	E1	E2	E3	E4	E5	E6	E7	E8	X9	Frequency
Disintermediation	✓	✓	✓	✓	✓	✓	✓	✓	✓	9
Non-repudiation	✓	✓	✓							3
Automation	✓	✓	✓	✓	✓	✓	✓	✓	✓	9
Streamlined process		✓	✓	✓	✓	✓	✓	✓	✓	6
Processing speed			✓	✓	✓	✓	✓	✓	✓	7
Cost reduction	✓	✓	✓	✓	✓	✓	✓	✓	✓	9
Trust	✓	✓	✓	✓	✓	✓	✓	✓	✓	9
Timestamps	✓	✓	✓	✓	✓	✓	✓	✓	✓	9
Immutability	✓	✓	✓	✓	✓	✓	✓	✓	✓	9
Less vulnerable			✓	✓	✓	✓	✓	✓	✓	7
Transparency	✓	✓	✓	✓	✓	✓	✓	✓	✓	9
Decentralization	✓	✓	✓	✓	✓	✓	✓	✓	✓	9
Secure transaction	✓	✓	✓	✓	✓	✓	✓	✓	✓	9
Privacy		✓	✓	✓						3

Source: Based on the author's interviews with the study's participants.

mentioned in the interview responses. All of the experts agreed that these BCT characteristics and benefits could lead to increased levels of disintermediation in the tourism industry. This result is compatible with Wang, Singgih, Wang, and Rit (2019) in terms of BCT's potential to eliminate some intermediaries from this industry.

**4. Results**

**4.1. Demographic information**

Both genders were represented among the participants involved in this study, with almost 80% being male. Most were employed in technical, research and consulting work and played different roles within their organizations, such as being a member of the board of directors; in educational development/innovative solutions; a chief executive officer in a consulting firm; a senior manager; and an associate or full professor and university researcher. All of the participants were educated, ranging from holding a bachelor's or master's, to a PhD degree. Table (5) presents all of the related information on the respondents. Each had a sufficient understanding of blockchain technology, understood the business process involved in a tourism organization, had more than 10 years of work experience in their field, and they were researchers or consultants in blockchain technology. In this research, the respondents were selected through the use of purposeful and theoretical sampling methods in order to obtain experts with various types of experience related the issue under investigation. The experts were drawn from different domains (e.g., software solutions, consultancy solutions, academia and research).

**4.2. Attitudes and perceptions of experts on the role of intermediaries**

Regarding the experts' attitudes about and perceptions of intermediaries and their importance to the tourism industry, six participants disagreed about their importance; three of these six agreed that intermediaries are important to the tourism industry because they offer a great deal of help to travelers who lack tourism-related knowledge; and contrary to the opinions of the latter three participants, the consultants noted that, in the future, the presence of intermediaries will not be relevant since many companies are presently seeking to optimize their operations. Similar to the view of the first participant, the senior-level manager stated that intermediaries play a significant role in the tourism industry.

All nine participants agreed that intermediaries provide a competitive advantage to tourism companies as they offer more benefits to travelers. Concerning the privacy problem, on the question "Do you think intermediaries can sell your personal data to other companies?" all of the participants agreed that this could occur. This is supported by the educational developer, who stated that, "The majority of intermediaries

**Table 5**

Characteristics of the experts included in the study.

No.	Specialist	Gender	Experience	Designation	Level of Education
E1	Consultant	Male	10 years of experience in strategic transformation	Education imagineer/ implementing innovative solutions	PhD/e-business
E2	Industry advisor	Male	16 years of experience in the software industry	Senior staff software engineer/ architect	PhD/ software engineering
E3	Business analyst	Male	10 years of experience in software solutions	Senior manager	Master of science (Information Technology)
E4	Consultant	Female	10 years of experience in software development	Associate	Masters/ software engineering
E5	Business analyst	Male	15 years of experience training & business analysis	Senior manager	MBA
E6	Developer	Male	11 years of experience in software development	Head of department	Bachelor \computer science
E7	Consultant	Female	20+ years of experience in business innovation	CEO	PhD in business
E8	Consultant	Male	20+ years of experience business development	Member of board of directors	PhD\ tourism management
E9	University professor	Male	15 years of experience in e-commerce research	Head of department	PhD, professor in e-commerce

Source: Author's own data obtained from the study interviews.

sell users' data to earn profits and this is not acceptable; nobody wants their personal information to be sold." With regard to the reason people are still using intermediaries, all of the participants noted that the major reason is because of a *resistance to change*, as people are not willing to embrace new trends and developments.

**4.3. Blockchain technology adoption in the tourism industry**

In regard to the importance of BCT and how it could benefit the



tourism industry, all nine participants agreed that this technology would play an important role in this industry by helping increase its level of disintermediation. Participants agreed that blockchain has the capability of playing a long-term role in facilitating travel procedures. They recommended that a network should be established among the parties involved in the tourism industry and that this network should be willing to use blockchain technology. Overall, the participants perceived the benefits as being highly aligned with the findings in the literature. The BCT experts suggested that BCT could start to penetrate the tourism industry by demonstrating its ability to assist the industry achieve greater visibility. One participant noted the following:

“The impact of blockchain technology will touch our daily lives, particularly in how we travel. One of the most important aspects is improvements in transparency, the optimization of business processes, and security in transactions. Therefore, data security, immutability, and decentralization are advantages or characteristics of blockchain which can affect any business, including the travel industry.”

Another participant stated that “The potentiality of blockchain technology is that all information on the internet is public, dependable, secure, transparent, and increases consumers’ trust.” Expert 4 suggested that blockchain’s improved security would protect a variety of information sources related to different stakeholders in the process and will minimize the need for intermediaries. He said, “Decentralized systems will help service providers get rid of intermediaries. This is because of the capabilities of blockchain to share information securely and accessibly, and it will be less time consuming.” The powerful capabilities experts perceived about BCT is in the processing speed that results from greater automation. One expert said, “Blockchain has no single point of failure, and this will lead to reduced time for transactions due to the automation of business processes.” Security will also increase the level of trust among different parties who are not known to each other are carrying out transactions. The use of cryptocurrency in tourism activities is another pinpoint for blockchain. One expert stated, “There is a high possibility of using blockchain in the travel industry. Using cryptocurrencies as a payment method will be more secure and traceable due to the unchangeable nature of records. Such payments are not subject to third-party interference. There is no delay in transferring money between countries.”

BCT has several characteristics and benefits of that could lead to an increased level of disintermediation in the tourism industry. This characteristic provided answers to one research question: Whether using BCT in the tourism industry may have an impact on the industry’s business model and increase its level of disintermediation. As one expert stated, “Several applications of blockchain technology could be useful to the travel industry, such as smart contracts, single digital IDs, and the use of cryptocurrencies. Based on these applications of blockchain technology, it could highly benefit the travel industry to the level where it makes data secure and transparent; this leads to an increased level of trust among parties.” Another participant said, “Adopting blockchain can affect how tourists’ baggage locations are tracked and it is expected to make it possible for the stakeholders involved in the process to perform this tracking.” Another expert also said, “Blockchain could streamline and replace loyalty cards and it could also covert them into cryptocurrencies.”

The participants negatively viewed BCT’s impact on the increased level of disintermediation in terms of how some intermediaries will face challenges in sustaining themselves in the market. One expert said, “The potential of BCT to get rid of intermediaries is high. This is because BCT allows us to deal directly with suppliers, which will save time and money.” Overall, participants perceived streamlined processes, process speed, and automation as potential areas for blockchain. One participant pointed out that, “BCT will speed up the flow of information due to the automation that results from this technology.”

Blockchain’s transparency and security features are important to building trust in the tourism industry. These will also affect the role intermediaries play. Traditional intermediaries will face more

challenges in the market. BCT will also open the market for new intermediaries using the power of blockchain to replace traditional features. These experts also captured and assessed the potential of BCT to lead to an increased level of disintermediation in the tourism industry. However, these experts had different views on the characteristics of BCT that would lead to these changes in the industry’s business processes. This was mainly due to these participants’ different backgrounds. The researcher asked participants to rank the importance of these characteristics and the benefits that could lead to these changes. The following briefly describes what the participants had to say on this topic.

BCT is capable of changing the game in terms of the intermediaries’ activities and roles because intermediaries will no longer be able to retain users’ personal data. One expert stated that the role of blockchain in the tourism industry can be significant in the long run because it can help establish a link between all of the parties involved in this industry. This answer is equivalent what Melnychenko et al. (2019) proposed, where they noted that tourism intermediaries of have two choices: either to exit from the market or to change their strategic business models in order to sustain themselves in the market. However, participants evaluated the potential increased level of disintermediation in the tourism industry in different dimensions. Their answers are equivalent to the expectations of Cap Gemini /ANVR (2015), who stated that “The traditional travel agent and travel advisor is likely to disappear.” Also, one participant stated that, “Smart contracts that include blockchain technology are a key enabler. Businesses should link as much of their operations as possible with smart contracts. The smart contract will be the major component and tool of blockchain technology.”

## 5. Discussion

The main research objective was to develop a framework for the tourism industry that will lead to an increased level of disintermediation through the use of blockchain technology. The researcher determined four core categories of the tourist industry that would be affected by this technology; these are (i) the attitudes and perceptions of the tourism industry’s intermediaries; (ii) the nature and importance of blockchain technology; (iii) the characteristics and benefits of blockchain technology that will lead to an increased level of disintermediation in the tourism industry; and (iv) the role of blockchain technology in increasing the level of disintermediation. The research objectives of this study were outlined in order to lend deeper insight into blockchain technology and its potential role in increasing disintermediation. The aim, here, was to develop a framework for the tourism industry that will increase its level of disintermediation through the use of blockchain technology. This section discusses and explains the findings of this study, followed by the theoretical background of the findings.

The first objective of the study was to explore which characteristics and benefits of blockchain technology would lead to an increased level of disintermediation in the tourism industry. Based on the interview sessions with nine experts in blockchain technology, the study’s participants perceived blockchain as becoming very important in the near future. They mainly determined that this technology would play a powerful role in the tourism industry as travelers would benefit from its application. These experts listed some of the characteristics and benefits of blockchain as including immutability, which means the ability of the blockchain ledger to remain permanently preserved, indelible, and immutable in transactions. Immutability has the potential to turn auditing into a fast, efficient and cost-effective procedure, bringing more confidence and integrity to the data companies use and share on a daily basis. Blockchain is also inherently safe, secure, and uses strong encryption to give individuals ownership of an address and its associated encryption assets through a combination of public and private keys that are made up of groups of random numbers and letters. This solves the issue of stolen identities because the addresses are not directly associated with the users’ identities; it is also difficult to compromise these addresses. Private keys are more secure because they are much longer.

This means that blockchain provides a higher level of security for the individual user because it eliminates the use of weak and easy-to-hack passwords and identities on the internet. Transparency means that every single user inside the blockchain will be aware of all of their transactions; and immutability means that once the data has been written to a blockchain, no one, not even a system administrator, can change it. In addition to these characteristics, there are advantages in traceability, automation, faster business processes, cost reductions from decentralization, and privacy.

The study’s second objective was to explore through which blockchain technology new intermediaries could be removed from the tourism supply chain. The researcher proposed a question that is related to the study’s third objective, which was to investigate the role of BCT in enhancing existing business models. Both objectives were addressed through the question “How can blockchain technology be used to remove new intermediaries from the tourism supply chain?” All of the experts in this study agreed that BCT had the potential to increase the level of disintermediation and that this would have a positive impact on the industry. The results of this study support the assumption that blockchain technology could play a crucial role in removing new intermediaries from the tourism supply chain or in decreasing the number of new entrants by means of increased transparency and immutability. Intermediaries play a critical role and blockchain technology has the ability to play the role of an intermediary in the tourism industry. This would put the control of personal data back into the users’ own hands.

The results of this study show that blockchain technology is able to increase the level of disintermediation. However, this disintermediation must contain the following characteristics and benefits: immutability, security, transparency, privacy, and traceability. Also, by using smart

contracts and the crypto payment method, which are blockchain tools, and DApps, the level of disintermediation in tourism could be increased, thereby changing the roles of actors in this industry. Using BCT could also provide a direct relationship in which there will be greater trust and less need for third parties. This supports the scenario discussed by [Gialis et al. \(2002\)](#), who noted that electronic markets will continue to reduce transaction costs and this will lead to a reduced need for the services intermediaries provide. Based on the results of the study interviews, the researcher classified these characteristics and benefits into several groups, namely decentralization, trust, security, cost reduction, and transaction speed. [Fig. 4](#) shows the development framework that could lead to an increased level of disintermediation.

## 6. Conclusion

Blockchain is a powerful technology that offers advantages in increasing the level of disintermediation within industries such as tourism. This technology could touch several aspects of the travel industry, such as its business model, money-transfer systems, security, performance, and trust, etc. This study’s assessment of blockchain technology followed the qualitative method in order to achieve both the research objectives and to answer the questions posed at the outset of this investigation. Blockchain’s potential positive impact offers a good opportunity for other businesses to incur similar benefits from adopting this technology. This study will help practitioners in the travel industry become familiar with blockchain’s characteristics and benefits. They will recognize its usefulness and how it can become a necessary part of the technology they use. Relying on intermediaries has become of great concern for many people for several reasons (e.g., the cost, issues of trust

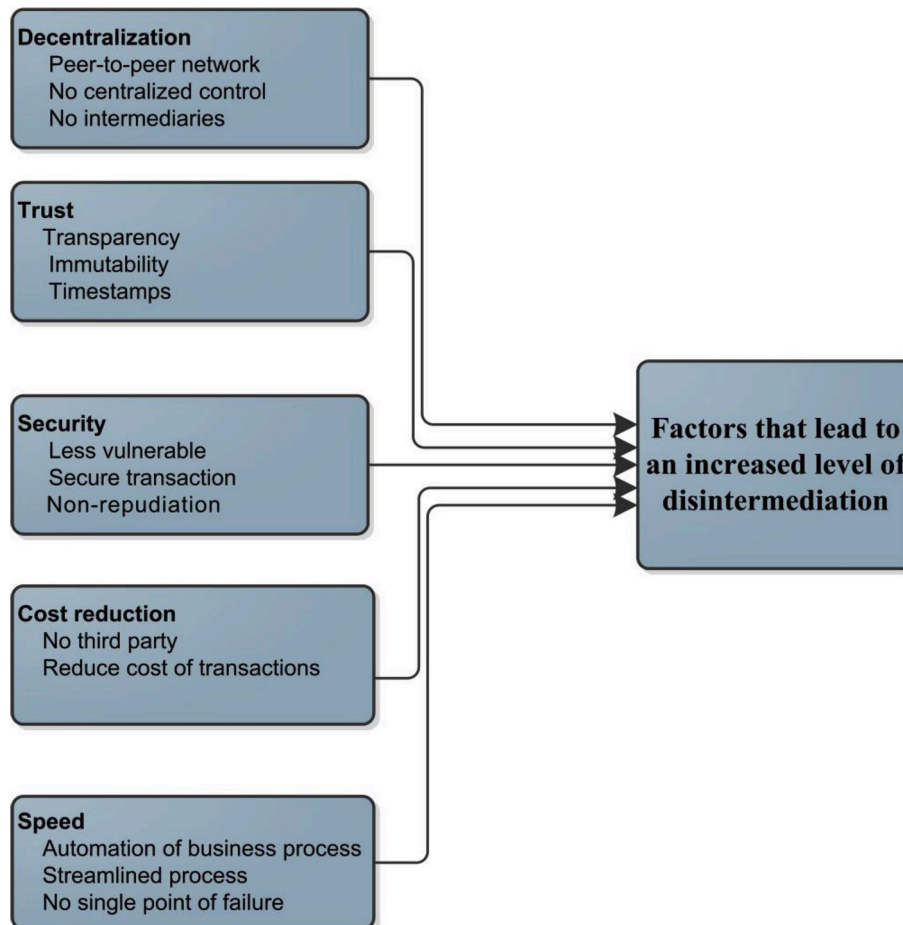


Fig. 4. Framework for an increased level of disintermediation.

and time, and the fact that consumers are already finding ways to circumvent intermediaries). Therefore, it is recommended that blockchain be integrated into tourism business models in order to reduce the number of intermediaries and the number of new entrants to the industry. This study makes a significant contribution to the tourism industry by providing a framework that will lead to an increased level of disintermediation. It also enriches the discussion on the characteristics and benefits of blockchain technology in relation to this particular aspect of the tourism business model.

Researchers on humanistic business and educational perspectives have proposed several frameworks. However, presently, there has been no holistic framework that addresses an increased level of disintermediation in the tourism industry. The most significant outcome of this study is the development of such a framework; the tourism industry can use it to not only increase its level of disintermediation but also to reduce the number of new entrants. The analytic categories that were developed in this study lend new insights into how to adapt the use of the blockchain to increase efficiencies in tourism. The study not only provides insight into the important asset blockchain technologies and cryptocurrencies like Bitcoin can be but it also points out that this technology needs to be managed in such a way that the industry can maintain a competitive edge in an ever-changing global environment.

A key finding of this study, which contributes to the body of knowledge, was how the use of blockchain technology facilitates efficiency for travelers in terms of and helping them reduce the time and cost involved in planning and preparing to travel to their destinations, to checking into their accommodations. The lesson to be learned by organizations is that blockchain facilitates the travel process and improves efficiency.

The study findings provide guidelines for industry professionals, researchers, leaders, and managers on how to adopt blockchain initiatives and technologies to support the development and execution of strategies that will enhance efficiency in businesses and industries.

Despite its findings, this study has limitations in that it was designed for the tourism industry. Other industries may be facing different issues related to adopting blockchain technology. As such, other studies are needed to confirm these results on a wider scale, such as through employing the quantitative method and comparing the results with the current findings. It is important to study the impact of blockchain technology and, specifically, cryptocurrencies and trust review systems that use blockchain methodology, such as the end consumer of tourism products and tourism practitioners. Other investigations are needed to shed light on investments in this technology. The main questions include who will invest in BCT? Why should businesses move to this new technology? Will it be necessary to make any changes to current business models? What about the scalability? And how does one maximize the benefits of blockchain?

### Impact statement

The impact of the study is to help industry practitioners understand the potential impact of blockchain technology on the business model, business opportunities and the future of intermediaries in the tourism industry. Also, the impact of blockchain technology that could touch several aspects of the travel industry, such as its money-transfer systems, security, performance, and trust. Blockchain's potential positive impact offers a good opportunity for other businesses to incur similar benefits from adopting this technology. The use of blockchain technology facilitates efficiency for travelers in terms of and helping them reduce the time and cost involved in planning and preparing to travel to their destinations, to checking into their accommodations. The study provides guidelines for industry professionals, researchers, leaders, and managers on how to adopt blockchain initiatives and technologies to support the development and execution of strategies that will enhance efficiency in businesses and industries.

### Declaration of competing interest

None.

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### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.tourman.2020.104125>.

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