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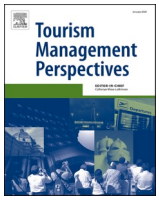

# Designing a tourism business model on block chain platform

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ABSTRACT

Today, blockchain is given attention in tourism, and research has begun about it. This study aimed to present a business model on blockchain platform. Blockchain is a shared distributed ledger that can lead to secure transactions in the tourism industry through a secure network. This research adopted a qualitative approach and relied upon the thematic analysis method. Data analysis showed that blockchain platform changes business models in tourism. That is to say the customer sector includes peer-to-peer exchanges and smart contracts, product and service sections include primary and secondary values, infrastructure management includes infrastructure as well as physical and human resources, the financial sector for revenues includes mining and earning national and international revenues and for costs includes the costs of setting up the platform on a blockchain platform, supporting and bringing about specialized development of the platform, and purchasing of a minor.

## 1. Introduction

One of the important developments in the digital arena is the emergence of blockchain. Although the use of blockchain has increased in recent years, like any potentially destructive system and technology, blockchain faces various obstacles in its adoption and implementation. It is still in the early stages of development and faces a variety of behavioral, organizational, technological, or policy issues (Crosby, Pattanayak, Verma, & Kalyanaraman, 2016; Lemieux, 2016; Yli-Huumo, Ko, Choi, Park, & Smolander, 2016).

However, many countries and governments are starting to invest on projects and regulate blockchain technology. Finland, Estonia, Denmark, Australia, Austria, Sweden, North Korea, the United States, China, Canada, the United Kingdom, the Netherlands, and Malta are countries that support digital currency (Holotescu, 2018; Levis, 2018; Nelson, 2018).

Blockchain first emerged in the financial sector with a prominent role and then was implemented in various fields such as trade, food and agriculture, humanitarian projects, management, cryptography, IoT, education, smart notary and real estate, energy, finance-banking, healthcare, sports or games, digital identity document registration, transportation and parking services, mobile phones, social media networks, and cloud storage distribution (Holotescu, 2018; White, 2017; Zambrano, 2017).

Much research in the field of tourism emphasizes the effect of technology, as it helps to continuously develop strategies to increase tourist satisfaction (Rejeb, Keogh, & Treiblmaier, 2020). The World Tourism Organization believes that in the near future, countries without the appropriate digital technology infrastructure will be practically eliminated from the cycle of global and regional tourism competition (UNWTO, 2020). Accordingly, blockchain has been considered in the tourism today, and research on it has begun.

Treiblmaier and Önder (2019) believe that because of the blockchain's feature in creating transparency, it is possible to fundamentally change the business relationships in the tourism industry and may even disrupt the business process. For example, at the beginning, the unfamiliarity of tourism business owners may reduce the level of trust required to establish business relationships in the blockchain platform, or it may lead to projected changes due to changes in transaction costs due to blockchain. It sometimes reduces prices and sometimes has increasing effects in other areas. So "Even though blockchain technology is at the infancy stage of development, tools such as cryptocurrencies, smart contracts, and Decentralised Applications have begun to influence tourism transactions" (Nam, Dutt, Chathoth, & Khan, 2019, p. 1).

According to what was mentioned above, in the not too distant future, blockchain has the potential to dramatically change the tourism industry. But it should be noted that even if the effect of blockchain on tourism is recognized as an important research topic that can lead to fundamental changes (Önder & Treiblmaier, 2018) the emerging field of tourism still lacks detailed research in this area (Rejeb et al., 2020). In

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their study entitled "the effect of blockchain on the tourism industry", Önder and Treiblmaier (2018) concluded that the current level of knowledge about blockchain and its potential implications for the tourism industry is low. Therefore, it is necessary to investigate it in detail. In addition, this research will help strengthen the theoretical basis for future studies in the field of blockchain and tourism. Researchers such as Erceg, Damoska Sekuloska, and Kelić (2020), Thees, Erschbamer, and Pechlaner (2020) and Tyan, Yagüe, and Guevara-Plaza (2020) have studied the use of blockchain in tourism, but their research has not led to the introduction of a new business model in tourism, although they believe that blockchain will create a new business model in tourism. Therefore, in order for the community to make good use of the blockchain capacity in tourism, it is necessary to redesign tourism business models in line with the blockchain. In this research, researchers seek to answer the main question that if blockchain technology is integrated with tourism business models, what changes it will make to current models. In addition, a more general question is that what changes the quality of the tourism business model will face.

The business model is a central concept that helps practitioners and researchers to understand the existing ways of doing business and how to change these ways for the benefit of the tourism sector.

According to Tripsas and Gavetti (2000), the mismatch between business models and technology leads to the loss of business. Acquiring value from a tourism business model depends on the introduction of technological innovation within the model so that the tourism business model is integrated with the new blockchain technology. Therefore, in this research, the answers to the following questions are emphasized:

1- What is the quality of the tourism business model according to the blockchain dimensions in the customer sector?
2- What is the quality of the tourism business model according to the blockchain dimensions in the proposed value (products and services provided)?
3- What is the quality of the tourism business model according to the blockchain dimensions in the infrastructure management sector?
4- What is the quality of the tourism business model according to the blockchain dimensions in the financial sector?

In this research, an attempt is made to redesign the business model canvas in the field of tourism in the blockchain platform, using the main concepts in the Osterwalder Business Model Canvas (2004) and to answer the above questions. It should be noted that this model will be conceptual and usable for all tourism businesses, and they can use these results to change the business model in various areas of tourism such as health, recreation, etc.

## 2. Literature review

### 2.1. Blockchain

The blockchain technology was raised by Stuart Haber and W. Scott Storrentta in 1991, but its conceptualization with Bitcoin was first introduced by Satoshi Nakamoto (Cong & He, 2019). In 2008, the mysterious creature spoke in a paper entitled "peer-to-peer" about the use of digital currency (bitcoin) and the use of organic digital databases as a distribution platform called blockchain (Lemieux, 2013). Thus, blockchain is a platform for bitcoin and digital currencies (Gupta, 2017). Bitcoin was introduced at a time when the global economy was facing an international financial crisis. Businesses could not trust the banking system and government institutions such as central banks, the treasury, etc., and choosing bitcoin was a good option for them; therefore, businesses accepted it (Nakamoto, 2008; Yandle, 2010). The blockchain contains a distributed database that holds a list of blocks chained to each other (Nakamoto, 2008). In other words, blockchain is a shared distributed ledger that promises secure transactions through a highly accessible and robust safe network with a large user presence. In summary, blockchain technology has the following features:

1- Distributed database (Distributed Ledger Technology/DLT): It refers to recording and sharing data across multiple data stores or ledgers (Collomb & Sok, 2016).
2- Peer-to-peer exchange: Peer-to-peer networks are a set of heterogeneous distribution resources that are connected by a network (Wray, Glauert, Hopper, Qa, & Qg, 1994). A very peer version of e-cash allows online payments to be sent directly from one party to another without having to go to a financial institution (Nakamoto, 2008).
3- Transparency with anonymity: Every transaction is transparent for every user in the blockchain network. Each user/node in the blockchain has a unique encrypted address that is done through encryption. Participants or users can decide whether to stay a stranger by sharing the public key with other members of their network or to share their identities with peers. Transactions between blockchain users occur through encrypted addresses (Iansiti & Lakhani, 2017). The time and date of each registration in this ecosystem is always known and sent without delay. For this reason, the registered transaction becomes transparent and identifiable for all participants in the blockchain system. Therefore, full transparency facilitates transactions (Stankovic, 2018).
4- Immutable data: When a new transaction is performed by a company, at the same time, and with an update or additional operations in the network, the updated database is registered and becomes an irreversible input so that each transaction is related to any transaction history before that, thus forming a chain of transactions (Douglas & Meijer, 2016). In other words, it is a way each transaction is encrypted on the blockchain and then validated by consensus (Nascimento, Pólvora, & Lourenço, 2018).
5- Smart contract: Blockchain data can have a large output for business activities with computational logic. Users can set algorithms and rules for their type of activity and business in a way that automatically triggers transactions between nodes or users. A set of these clauses and rules that are automatically enforced creates a smart contract (Douglas & Meijer, 2016).
6- Consensus: The consensus algorithm simply means methods for the members of a network to reach an agreement. As (Debus, 2017, p. 4) asserts,

   "Distributed Consensus Systems are a novel means of establishing consensus between multiple parties about some piece of information, such as ownership of an asset. Consensus is recorded by cryptographically signing data, thus proving its authenticity. Blocks of signed data can be linked to previous such blocks, thereby enforcing a temporal chain of blocks, giving rise to the term blockchain."
7- Decentralized systems: Decentralized and open systems enable individuals to fully possess and manage their identities, and this leads to the idea of self-sovereign identity systems (Ferrarini, Maupin, & Hinojales, 2018).

The main advantage of blockchain technology is the system decentralization because you do not need to work with an organization, third party, or central manager, the system works without intermediaries, and all participants and users in this blockchain make decisions. A centralized database is more prone to hacking, corruption, or accident (Tian, 2016). The process of database security can be time consuming and costly. Trust is created through decentralization, because there is no need to evaluate the credit of the intermediary or other participants in the network (Nofer, Gomber, Hinz, & Schiereck, 2017) and transactions can be independently verified and processed.

Other key features include timestamping, replication, digital signature (Nascimento et al., 2018), security (Willie, 2019), intermediary removal, transaction simplification, speeding up and reducing transaction costs (hospitalitynet, 2015), trust, flexibility, reconciliation, efficiency gains (Subbiah et al., 2018), and traceability (Tapscott & Tapscott, 2016).

According to Christensen (2013), blockchain is a destructive technology that brings new and different value propositions to market. He thinks a disruptive technology may not be important to customers today, but it may largely meet their needs in future, because there is a relationship between technical progress and changes in customer demand (Adner, 2002). At first glance, it may seem that disruptive technology is second compared to other products in the market, but they bring new values for customer, such as being cheaper, more practical, smaller/larger, and so on (Bower & Christensen, 1996).

Although blockchain is a new topic, it has good literature for reading, consulting, and reporting on various industries (hospitalitynet, 2015). Examples include supply chain management (Helo & Hao, 2019), property registration (Nascimento et al., 2018), food industry (Bumblauskas, Mann, Dugan, & Rittmer, 2020), education (Sharma, Yildirim, & Kurubacak, 2019; Tapscott & Kaplan, 2019), financial exchanges (Ducas & Wilner, 2017), banking industry (Guo & Liang, 2016), smart contract (Cong & He, 2019), accounting (McCallig, Robb, & Rohde, 2019), electricity and energy distribution network (Diestelmeier, 2019; Teufel, Sentic, & Barmet, 2019), health (Hölbl, Kompara, Kamišalić, & Nemec Zlatolas, 2018), **tourism and business model** (Aghaei, 2020); data storage (Kumar & Tripathi, 2020; Zhu, Qi, Zheng, Sun, & Chai, 2020), internet of things (Liu, 2018), fundraising (Cai, 2018; Zhao & Coffie, 2018); digital identity (Rivera, Robledo, Larios, & Avalos, 2017), transportation (Guhathakurta, 2018), military applications (Chedrawi & Howayeck, 2018), accommodation market (Wright, 2018), and oil and gas industry (Lu, Huang, Azimi, & Guo, 2019; Cai, 2018).

### 2.2. Business model

Business models are relatively new concepts in management studies (Al-Debei & Avison, 2010) dating back to 1957, but since the end of the twentieth century, especially in recent years, business models have grabbed the attention of academic researchers and industry experts (DaSilva & Trkman, 2014; Wirtz, Pistoia, Ullrich, & Göttel, 2016; Zhu et al., 2020). Although a single definition of the business model is not provided (Wirtz et al., 2016; Zott, Amit, & Massa, 2011), there are similar views hold by researchers in this field, including: 1) a story that explains how an organization works (Magretta, 2002) in which the boundaries of the business model go beyond the company; 2) the business models explain how companies do business comprehensively; 3) the activities of the focal company and its partners are the central part of the business model; and 4) in addition to creating value, it explains the amount of value absorption (Zott et al., 2011). defining the business model, Osterwalder (2004, p. 15) asserts,

"A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing a company's logic of earning money. It is a description of the value a company offers to one or several segments of customers and the architecture of the firm and its network of partners for creating, marketing and delivering this value and relationship capital, in order to generate profitable and sustainable revenue streams".

By this definition, a business model is a tool to explain how an efficient business works, the type of goods and services it offers to its customers, how it provides value to its customers, and what infrastructure should be used to provide that value.

The concept of Osterwalder business model has four dimensions, each of which has its own subset: 1) it is the product or the proposed value, i.e., in what industry does the business operate and what is its value proposition to the market? 2) Customer interface includes customer segments, customer relations, and channels, i.e., who are the customers, how can they add value to them and establish and maintain a relationship with them? 3) Infrastructure management that includes key activities, key resources, and key partners, i.e., what infrastructure is needed to provide value to customers? 4) Financial aspects (including revenue streams and cost structure), i.e., what is the share of revenue stream of total revenue? What are the costs associated with business? These four dimensions are intertwined with their subsets like 9 building blocks that together form a business canvas (Osterwalder & Pigneur, 2010). After they use the term canvas, they define the business model as follows, "A business model describes the rationale of how an organization creates, delivers, and captures value" (Osterwalder & Pigneur, 2010, p. 14).

### 2.3. Blockchain and business

One of the fascinations in analyzing technological innovations is the link between the business model and technology in a particular industry. Research has shown that maintaining long-held beliefs and mismatch of business models and technology has deadly consequences (Tripsas & Gavetti, 2000). On the other hand, technological innovations alone do not guarantee a company's success (Zott et al., 2011) or a competitive advantage (Johnson, Christensen, & Kagermann, 2008). Rather, the relationship between developing technologies and creating economic value (Chesbrough & Rosenbloom, 2002) as well as corporate performance is important (Johnson et al., 2008) and acquiring value from an innovation is essential to ensure business success (Teece, 2010). Influencing business models through blockchain technology may be a good example of the far-reaching potential of information technology (Bower & Christensen, 1995; Brynjolfsson & McAfee, 2014). The effect of blockchain technology may go far beyond some modified processes and several new products and services. A number of authors expect the consequences to have an impact on all business models (Swan, 2015; Tapscott & Tapscott, 2016). Holotiuk, Pisani, and Moormann (2017) findings showed that changes resulting from the introduction of blockchain are reflected in new services, new revenue structures, and ultimately new business models. Thus, with the adoption and integration of blockchain technology, researchers can gain a proper understanding of the compatibility between current and new business models, as well as the potential for new models (Holotiuk et al., 2017).

According to Christensen (2013), blockchain technology demonstrates disruptive capabilities because it currently offers features that may seem unusual or less appropriate, but that change and affect the industry in the long run. The results of (hospitalitynet, 2015) showed that all business model dimensions are affected by blockchain technology, and that the most important feature of blockchain is that it has a multidimensional effect. Blockchain provides features such as "increased operational efficiency, removal of intermediaries in transactions, micro-economics, crowdfunding, digital ownership and authentication of assets" (Parker, 2018, p.1). Blockchain can also change the role of trust. As a result, businesses need to focus more on customer relationships. Accordingly, blockchain will become a major component of occupations by 2025 (Preece & Easton, 2019). The results of this study will show how a new technology can affect business models in the tourism industry and provide a new perspective for the business model literature, especially in the field of tourism.

### 2.4. Blockchain and tourism

Gelter (2017) describes blockchain technology as "A revolutionary technology that will transform financial transactions in the future and greatly affects the tourism industry".

Blockchain in the tourism industry is always looking for innovative solutions to help increase competitive advantages, increase customer satisfaction, and improve performance, which can be seen in different parts of the industry. It creates unique opportunities for travel agencies to pursue their customer preferences and needs, create more personal, so-called peer-to-peer interactions, and gain more value by increasing loyalty (hospitalitynet, 2015; Treiblmaier & Önder, 2019).

Peer-to-peer interactions lead to trust and a sense of security, creating a good emotional experience for tourists. According to Patwardhan, Ribeiro, Woosnam, Payini, and Mallya (2020), this emotional experience will have a positive effect on tourists' loyalty. "Tourists'

perception of value is an antecedent of tourists' satisfaction" (Xie, Tkaczynski, & Prebensen, 2020, p. 11).

Many travel agencies use the blockchain platform in their work, such as Travelchain in Russia, Winding Tree in Switzerland, Cool Cousin of London, WebJet in Australia, Sandblock in France, Accenture in Canada (Liebkind, 2018), and TUI Group in Germany (Whyte, 2018). In mid-2018, Expedia Travel used bitcoin for its payments, and then it was used in the accommodation sector (for financial management and property listing), while "LockChain" (under the new name LockTrip) uses its cryptocurrency (LockTrip, 2018). The advantage of revenue management using LockTrip is the elimination of commission costs and the reduction of the risk of wealth loss due to exchanges (Willie, 2019). Blockchain offers many innovative benefits for the travel agency, including stable and secure transfer and sharing of customer/passenger information, on-line reliability, increased transaction security, and severe decline in lost or stolen records and transactions (Willie, 2019). Blockchain also has an advanced security advantage using highly advanced cryptography and computer codes. In fact, blockchain has the ability to manage all elements of the business transaction process in the tourism industry in a fast, transparent, and secure environment. For example, customers in restaurants use credit cards to pay, and they are responsible for the commission. With blockchain technology, not only this cost will not be deducted, but also there will be no delay in payment and receipt for restaurants. According to what some researchers (e.g., Raskin, 2017; Stankovic, 2018; Willie, 2019) have stated, the exchange of anything of value, which is part of assets and/or services such as property, money, ticketing or visa issuance, is facilitated in a safe and secure digital environment between tourists and hosts through smart contracts. Because the transparency created by this contract involves all parties to the contract, they can see all the information, and there is no need for a third party called a lawyer, the cost of mediation is practically eliminated.

Based on the foregoing points, it can be said with confidence that all the tourism industry sectors can be influenced by new innovations (Jayawardena, 2019) such as blockchain technology. As these can transform the future of this industry, researchers aim to explore different dimensions of tourism and integrate it with blockchain to paint a positive and forward-looking vision for the industry.

## 3. Methodology

This study has adopted a qualitative-exploratory research method, and the data have been obtained using qualitative strategy and theme analysis. The participants in this study were 22 people active in the field of blockchain and tourism. Among them, eight were faculty members of Iranian universities (five of whom had specialization in business management with a focus on technology, while three cases were in the field of tourism) and 14 others had a travel agency that had just entered the field of blockchain / cryptocurrency and used this technology to develop their business in tourism. Because blockchain is a new topic, especially in developing countries, the number of participants is definitely lower than other qualitative studies with a long scientific history. On the other hand, depending on the time and resources available, five to 25 samples would be sufficient for conducting interviews in qualitative research (Kvale, 1996).

In this study, semi-structured interviews were used to collect data. The interview questions were designed according to the Osterwalder's business model canvas, and the four main components of this model - i.e., financial aspect, customer, income, and proposed value - were raised, as listed in Table 1:

The interviews were conducted in person at the offices of the experts and faculty members. At the beginning of the interview, the purpose of the research and the researcher's moral obligations were explained orally to the participants, it was emphasized that the interviews would be used only for research purposes, and it was noted that the identity of individuals would not be disclosed in research reports. Each interview lasted about 30 min to an hour. Some interviews were recorded on a mobile recorder, while notes were taken for some others. All interviews were typed in Microsoft Office Word platform at the end and were then analyzed.

**Table 1**
Interview protocol and questions.

| No. | Research questions | Interview questions |
|---|---|---|
| 1 | What is the quality of the tourism business model according to the blockchain dimensions in the customer sector? | What changes does blockchain make to the customer and his attraction? Will our customers be different with the arrival of blockchain in tourism? What will be the type of communication with tourists? How will blockchain change communication channels? How will the blockchain platform change the role of travel agencies? |
| 2 | What is the quality of the tourism business model according to the blockchain dimensions in the proposed value (products and services provided)? | What is your definition of product and service, especially in the field of tourism in the context of blockchain? If we use blockchain in tourism, what kind of value do we offer to our customers? Which needs of tourists will we meet with the arrival of blockchain? What products and services can we offer to tourists in blockchain? |
| 3 | What is the quality of the tourism business model according to the blockchain dimensions in the infrastructure management sector? | What key resources do we need to use blockchain in tourism? What infrastructure do we need? Who are the key partners in the tourism business after the introduction of blockchain into tourism? Who are our key suppliers? |
| 4 | What is the quality of the tourism business model according to the blockchain dimensions in the financial sector? | In the world of blockchain, how does the flow of payments and receipts happen in the tourism industry? How is trust built between the recipient and the payer? How is trust built between the recipient and the payer? |

## 4. Data analysis

Data analysis was performed using the theme analysis process. Theme analysis is not only considered as a research method (Braun & Clarke, 2006; King, 2004) but also as a data analysis method. According to Guba and Lincoln (1989), 6 steps were used to analyze the data of this study. These steps were as follows.

In the first phase (familiarization), the sounds of the interviews were written and taken notes. Then, a thorough overview of the data was determined by reading the texts.

In phase 2 (generating initial codes), the content of the phrases or sentences was highlighted by shorthand labels or "codes" in order to describe them. At this stage, 350 codes were extracted. Table 2 shows an example (interviewee number 6) of this coding.

In phase 3 (searching for themes), the codes were looked over and patterns were identified, and then themes were introduced. Several codes were combined into a single theme.

In phase 4 (reviewing themes), a return to the data set and comparison of themes against it and useful and accurate representations of the data were performed.

In phase 5 (defining and naming themes), sub-themes and main themes were named by researchers using concise and easily understandable labels. At this stage, 26 sub-themes were extracted, turned into eight main themes and labeled, and then the final model was drawn. Table 3 lists this naming in the products and services section (value proposition) and Fig. 1 shows the business model on the blockchain platform in tourism industry.

In phase 6 (producing the report), the data analysis was written as

**Table 2**
An example of interview analysis and extracted concepts (Interviewee No. 6).

| Interview code | Product / service | Customer aspect | Infrastructure management | Financial aspect |
|---|---|---|---|---|
| **P6** | Providing pure, accurate and valid opinions, maintaining intellectual and working property of goods and services, open innovation and thinking that makes the user a part of the product, integrating service users and providers in a secure environment, achieving small transactions with a large number of customers and increasing micro-employment, elimination of intermediaries and reduction of costs for more affordable value proposition, increasing exports due to increased tourism, establishment of retail widely as opposed to traditional retailers, transparency in accommodation information | Solving customer problems, achieving small transactions with a large number of customers in the light of complete security, creating transparency for the customer, peer-to-peer transactions | Creating a clear framework for tourism trade and exchanges, building user-oriented networks and strengthening it by blockchain to compete with service companies, speeding up the work process and eliminating overtime in the designed infrastructure, culturalization for this technology in the tourism industry, Tracking in transportation | Changing the payment mechanism and removing the payment restrictions, changing the income model and seeking to reduce costs, facilitating money transfers |

results.

As can be seen in Table 2, interviewee No. 6 answered questions related to the four main aspects: customer, product and service, infrastructure management, and finance. The concepts extracted are also shown in this table.

Table 3 shows the main themes and sub-themes according to the total concepts extracted from the interviews in the products and services section (proposed value).

## 5. Results

The findings of this research are shown in Fig. 1 in the format of a business model for the tourism industry. The initial analysis of the interviews led to the extraction of examples and concepts, and then the main themes and sub-themes were named. As shown in Fig. 1, the researchers in this study kept the main concepts of Osterwalder's business model constant and used them to design research and interview questions.

The results of this research show that in the customer sector, three types of customers have been introduced, which include national, international customers and retailers in the domestic and global mass markets. Their communication channel is a kind of peer-to-peer chain and includes peer-to-peer exchange and smart contracts that lead to

**Table 3**
A sample of the extracted concepts and main and sub-themes of the second question (proposed value: product and services provided).

| Concepts | Sub-themes | Main themes |
|---|---|---|
| - Rapid peer-to-peer exchange in all types of exchanges (money and capital, services and information) with a user-centered approach in the tourism industry and real production to consumption<br>- Reduction of costs and speeding up work by eliminating intermediaries<br>- Sale of local products and handicrafts due to the increase in tourists<br>- Speeding up money circulation and increasing national income through potentially unknown exports<br>- Cultural exchange through the sale of cultural artifacts<br>- Maintaining the credibility of national tourism assets such as cultural-historical sites and artifacts through the consensus mechanism<br>- Increasing ideas and innovations in the field of tourism due to the preservation of their intellectual property<br>- Ensuring the accuracy of the identity of products and services | . Increasing potential exports of handicrafts<br>. Speeding up tourism services<br>. Increasing and maintaining the intellectual property of tourism products and services<br>. Enhancing and maintaining the digital identity of tourism products and services | Initial value of the product (tangible value) |
| - Transparency and confidence building in the mind and soul of the customer through accurate and valid information in the channels and communications of the tourism industry in order to make the customer loyal.<br>- Creating security for customers and tourism in matters such as the transfer of money, information, and services to others under the peer-to-peer exchange.<br>- Security in the mind of the tourist to cooperate and benefit from the internal and external customers<br>- Learning international languages directly from a foreign tourist<br>- Maintaining the security of all personal information of tourists through private and public keys, cryptography, distribution, and consensus mechanism<br>- The resilient infrastructure at the disposal of tourism businesses and the reliance on it as a result of the difficulty of changing the data with distributed nature of the blockchain<br>- Creating more transparency for tourism industry stakeholders<br>- Increasing users in the network of this technology due to creating trust, security, and transparency. | . Increasing trust in tourism products and services<br>. Increasing host and guest information from each other<br>. Information transparency in the field of tourism products and services<br>. Increasing the quality of the host life<br>. Increasing loyalty to tourism products and services<br>. Tourist information security | Secondary value of products and services (intangible value) |

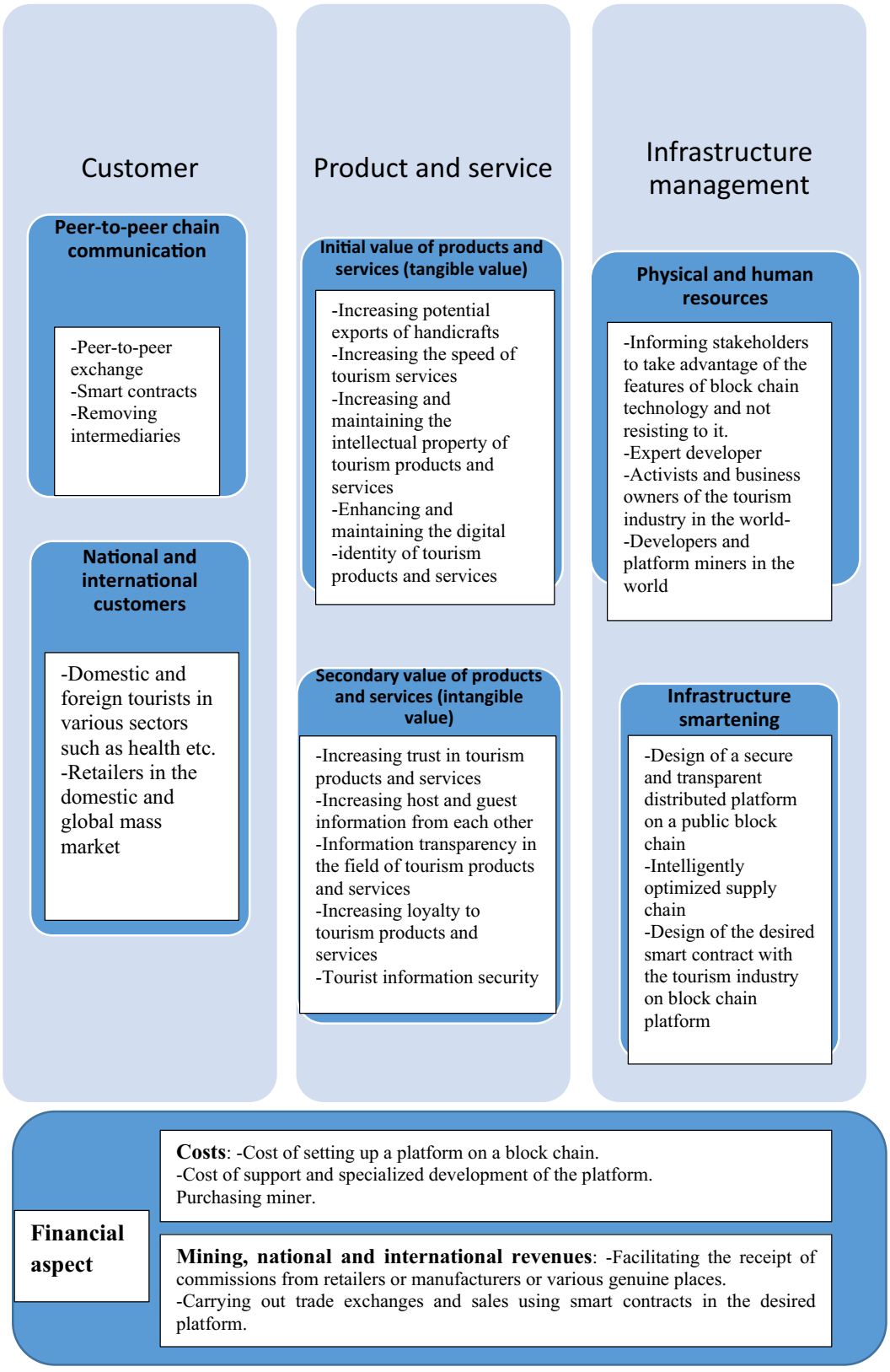


**Fig. 1.** Tourism business model on blockchain platform.

removing intermediaries. Using the blockchain platform in the tourism products and services section, two primary (tangible) and secondary (intangible) values will be created. These values are given in Fig. 1.

In the field of infrastructure management, the most important key activity of infrastructure intelligence and the most important resources are the appropriate physical and human resources with blockchain technology in the field of tourism.

Also in the financial sector, revenue streams include national and international revenues and mining. Finally, the cost of setting up and supporting the blockchain platform and purchasing the minor

constitutes the cost structure in the model.

## 6. Discussion

As mentioned above, one of the most recent technologies of the current decade is blockchain technology, which can affect all industries and businesses. "Blockchain has the advantage to be launched in part or all of a business" (Interviewee 2). In other words, if any company wants to use blockchain technology, it must consider the mechanism and type of its business and demands. Then, according to the features that this technology creates for businesses, it should decide whether it could be used for its business or not. One of the very potential businesses for most countries is the large tourism industry. It is clear that the business models of different industries must be up to date and in line with emerging technologies, and the focus of this research is on the tourism business model. To answer the research questions and according to Osterwalder's model and the results of the analysis, the dimensions of business in tourism can be developed based on the blockchain approach and application as follows.

### 6.1. Customer

According to Osterwalder (2004) model, in any business, the customer is considered as one of the main and important pillars. In the tourism industry, customers are also the core of the business. According to Peppers and Rogers (2004), the only value that business owners can create now and in the future is the value coming from the customer. Blockchain has the potential to create new markets with diverse customers, and if companies and businesses seek to adapt their existing customers to this disruptive technology instead of finding a new market, they will surely fail. According to Christensen (2013) Blockchain disruptive technology should be framed as a marketing challenge, not just a consistent technology.

Customers of the tourism industry, who are national and international voyagers, travel for different purposes. These can be related to business, health, politics, entertainment, etc. As stated by the UNWTO, in emerging economies and developing countries in 2019, technological advances led to the emergence of new business models that made travel more affordable and facilitated visas, therefore the arrival of tourists, especially international tourists in 2018, grew by 5% and reached 1.4 billion people. This figure is two years ahead of the UNWTO forecast (UNWTO, 2020).

These tourists also communicate with retailers as customers, and in this opportunity created by travelers, the retailers can offer quality products in the global mass market. "Travelers who are retail customers can establish a peer-to-peer chain communication with their destination" (Interviewee 4). Peer-to-peer chain communication will bring many benefits that will largely alleviate the concerns of many of its customers. One of these concerns is the lack of transparency and security in this type of exchange. In this regard, the interviewee 6 stated an example. "Suppose a person travels to another country for a leisure trip. During this trip, he arrives in a city that encounters very exquisite and unique handicrafts that he has never seen in other countries", he said. "He first uses this technology to check the authenticity and quality of the goods and then decides to buy or trade that type of handicraft". Despite problems such as currency restrictions or restrictions on the amount of cargo that each passenger can carries with himself, the tourist enters into negotiations with retailers using new methods and emerging technologies such as smart contracts, and makes its payment through digital currency to address past concerns and continue to trade or buy. Smart contract is a phrase invented by computer scientist and cryptographer Nick Szabo in 1994 (Stankovic, 2018). These smart contracts are done in a decentralized digital manual (Szabo, 1997) which eliminates intermediaries or third parties for tourists and hosts.

### 6.2. Products and services

If the tourism industry is going to develop and offer products and services to the community, it must enter the business world with the aim of presenting and creating a value different from its competitors. Blockchain technology is also deeply connected to the social, governmental, economic, educational, cultural, charity, and even identity principles, and reexamines fundamental questions such as "What is the definition of value?" (Holotescu, 2018, p. 278).

Therefore, in this research, the value is viewed differently. Based on the findings, the integration of tourism with blockchain will have two types of value for customers, namely the primary value that is tangible and the secondary value that is intangible. What is noteworthy is that intangible value will create tangible value and the basis for tangible value is intangible value.

### 6.3. Primary value of products and services (tangible value)

One of the most important issues emphasized in relation to the provision of services and products is creating value and being different from competitors. In the tourism industry, a dramatic difference can be made in this important arena with smart contract technology. The smart contract increases the reliability of the transactions mentioned by the interviewee 1. "Using smart contracts, all types of travelers go through the whole process of authenticating, purchasing, delivering goods, and paying for goods through digital currency", he said. Increasing the reliability raises the issue that smart contracts have several important advantages. On the one hand, it increases the speed of services, and on the other hand, it protects the intellectual property of a new product and preserves the digital identity of tourism products and services.

Interviewee 5 believed that "Even buyers or travelers no longer have to worry about protecting their goods or be worried about financial and transportation issues because with the use of smart contract technology in blockchain and its cooperation with IoT technology, all concerns would be eliminated and the traveler can continue his trip without any additional costs and without intermediaries". In this context, in addition to reducing costs and passenger concerns, we will not face an increase in the price of goods and services. As a result of this technology, the export capacity of goods through tourists and business owners who come to this platform will increase. In this regard, interviewee 9 said, "Using smart contracts, all businesses, both small and large, can offer and sell their products and services in this context, and selling products and services abroad means increasing export capacity and foreign exchange for the country of origin". According to the interviewees, one of the reasons for the reduction in costs and the increase in exports will be the elimination of intermediaries. Using blockchain technology, intermediaries are eliminated and this will be very tangible. Intermediaries often facilitate the communication of tourist destinations with their customers, and they are not necessarily evaluated or validated externally (Connell, 2006). According to Buhalis and Law (2008) and Marcussen (2008), increasing direct sales of travel products on the blockchain platform may simultaneously boost travel jobs, including airlines, as it may challenge intermediaries such as traditional travel agencies and tour operators.

Interviewee 21 stated, "In many of our travel efforts, we have seen unnecessary bureaucracies and intermediaries that have reduced our speed, energy, and even our motivation to travel, and perhaps even if there is discomfort and lack of motivation in providing services by different agencies, we will definitely cut off our next connections with those centers and go to other centers." Therefore, this issue can be considered as another concern of travelers and it can be said that the speed of service due to the issuance of licenses and the reduction of various bureaucracies in the blockchain platform will happen in the shortest time. Blockchain will also help protect the intellectual property of innovative ideas, products, and services by identifying each idea, product, or service through coding in a secure environment, and the innovative product and service idea providers operate with greater

confidence in the field of tourism with this technology. Blockchain also helps maintain the digital identity of people and products through the authenticity of a given person's identity or a given product or service, so that providers of products and services in the tourism industry and other potential industries are more eager to implement this technology in their business. All of this will happen in a secure blockchain environment with property traceability. The reason is that every transaction has a digital history that can be traced and verified in its origin, characteristics, and ownership, and native encryption - which is a strong security element - is embedded in the blockchain to prevent unwanted intruders on the intellectual property and identity of products and services (Tapscott & Tapscott, 2016). Blockchain can allow manufacturers and service providers to track the source of products and services and reduce costs and counterfeit goods and services.

### 6.4. Secondary value of products and services (intangible value)

Transparency is another valuable benefit that customers or travelers enjoy through this technology. For example, interviewee 3 believed that "The advantage of transparency throughout the trip is from the moment of buying a tour or ticket or obtaining a visa to purchases of destination products, as well as the authenticity of the expiration date of products and showing the quality of products sold at the destination". By creating transparency, customers will not only be able to obtain appropriate and accurate information about tourism products and services, but also, according to interviewee 7, "Through the exchange of information and peer-to-peer interaction, the amount of host and guest information will increase". In the discussion of transparency, information is easily observed and compared, and the integrity of the system is ensured, even in the face of slander or recklessness. The host and guest are able to view ledgers and analyze transactions (Tian, 2016). At the same time, it ensures anonymity (as in this study, preserving digital identity is considered a tangible value) by preserving the records behind the cryptography) Crosby et al., 2016). As a result, trust will be increased in tourism products and services.

Half of the interviewees believed that blockchain tourism would increase customer loyalty. In other words, when a business plans to sell its products and services, it must base its goal on customer loyalty and create a sense of satisfaction and loyalty in the customer. Trade and business development is achieved by attracting, retaining, and increasing customers. This is not possible but through providing excellent products, services, and after-sales services to customers, consumers, or travelers, which ultimately results in customer loyalty as the most important step in the marketing and sales process. Interviewee 10 stated "When commitments are automatically made through a smart contract, there are two options for customers: either it definitely leads customers to loyalty or they go to competitors to get a safer product or service that uses this technology". However, the interviewer of this research asked these people that as loyalty can be created in current businesses as well, why it is necessary to use a technology like blockchain. They generally believed that the concern of the customer and stakeholders was the full transparency of the product and service, which would be easily created in the context of a smart contract. For example, interviewee 8 addressed the supply chain (which will also be mentioned in the infrastructure management section) and stated, "But it must be said that in order for the customer's mind to move towards loyalty, business owners need to manage them with full transparency and trust as well as unique after-sales service which is facilitated by blockchain technology".

When we use full transparency in our transactions and business processes with blockchain technology, important and optimized events will happen for us. Thus, it can be said that transparency creates two important tools. The first one is a monitoring tool for the external stakeholders through which they can monitor the internal performance of a business to prevent corruption and ensure proper business processes (Grimmelikhuijsen & Meijer, 2014; Iansiti & Lakhani, 2017). The second one is a tool for cooperation between businesses and their stakeholders (Douglas & Meijer, 2016).

Although the pleasure of knowing and sharing information about destinations and other aspects of tourism is an important part of travel enjoyment (Douglas & Isherwood, 1979Douglas & Isherwood, 1996), another concern of tourists and business stakeholders is the lack of personal or occupational information security. Despite the technical mechanism of blockchain, it is easy to see that the only way to protect information security currently is encryption in a distributed platform that depends on the concentration of the tourism business. Although some (Lokøy & Nyberg, 2018) believe that because it is not possible to lead tourism to decentralization, it should be noted that decentralization increases the credibility of information. The reason is that eliminating collective records is impractical, and verified records of each transaction are only available to participants through public or private distributed ledgers (Crosby et al., 2016). In other words, blockchain can be generalized to enforce a set of agreed-upon rules that no one, neither users nor system operators, can violate (Douglas & Isherwood, 1996; Saberi, Kouhizadeh, Sarkis, & Shen, 2019).

A large amount of information is annually stolen from various businesses due to the lack of security. The violation and extraction of sensitive information (blocks) from the blockchain will be very difficult. This is because a blockchain uses highly sophisticated algorithms and computer modeling innovation frameworks in which computer hackers act insignificantly in violation of success (Orcutt, 2018). Violation of the blockchain may occur, but its realization has a very challenging outcome, and if it does occur, human error can be well traced (Schou-Zibell & Phair, 2018). This has led to a higher level of tourist trust and long-term relationships with tourists (Fyall, Callod, & Edwards, 2003). As Tham & Sigala (2020, p. 203) assert, blockchains and their cryptocurrencies (as a financial transaction capability) elevate trust and relational capabilities in an expedited and holistic manner, democratize participation in economic systems and re-distribute power and economic relations among actors by influencing the way data (the currency of the digital economy and the lifeblood of tourism) is collected, stored, exchange, owned and traded for co-creating value.

### 6.5. Infrastructure management

#### 6.5.1. Making infrastructure smart

In order to set up a proper process in the desired business and realize its goals, it is necessary to design and create a suitable and useful infrastructure. One of the most important infrastructures is the design of a secure and transparent distributed platform, which is the general blockchain. This platform provides a smart contract design for the tourism industry and on the other hand provides the necessary infrastructure to create an optimized smart supply chain. Interviewee 18 stated, "One of the most important issues for business tourists and small and bulk buyers is the lack of a secure, integrated, and transparent supply chain. Certainly, both the seller and the buyer have many problems in the traditional supply chain, including product abduction, product destruction by any factor, lack of transparency in product inspections and services at the time of shipment, and receiving various approvals from different organizations and even at the destination for delivery". These concerns and problems point to the lack of an optimized smart supply chain. Interviewee 11 pointed to the authenticity of the product and service and stated, "How should a consumer be aware of the authenticity of a product that has been produced and prepared thousands of kilometers away? How should he be aware of the safe transfer process? And there are hundreds of questions that can be comprehensively answered by creating an optimal smart supply chain". Interviewee 2 referred to the security of product and service and said, "For example, in the transportation sector, the smart supply chain helps customers to move their goods quickly and safely and at a lower cost. These services include negotiation rates, transportation preparations, transportation and its follow-up, carrier management, carrier reporting and evaluation, submission of executive reports and reports related to transportation,

etc." Moreover, interviewee 13 pointed to the necessity of recognizing the tourist needs through a smart supply chain. According to him, "The key to the survival of the country's tourism businesses lies in understanding the needs of tourists and other customers and quick response to these needs. Through blockchain, the needs of tourists can be identified". All of the above can be used to provide a smart supply chain by designing a smart contract in blockchain platform.

#### 6.5.2. Physical and human resources

To design and use this platform, skilled manpower in the field of blockchain and its development is required. In order for businesses in the field of tourism to move towards blockchain, it is necessary to raise awareness about this so that people have less resistance to the entry of this technology into the tourism business. This awareness promotes the professional development of business owners, motivates them to learn in the field of blockchain, and paves the ground for more people to learn and develop in this field. Interviewee 1 stated, "When it comes to this technology, there are concerns for both business owners and customers about how to use the technology to avoid stakeholder opposition". To be clear, embracing emerging technology to use and take advantage of its features has become a vital issue". Interviewee 10 noted the rapid advancement of technologies and their presence in businesses, and argued that the speed of blockchain training and learning needed to be increased. "Development and training are essential for different groups in the tourism industry: for legislators, policymakers, tourism business owners, and customers, wherever they are".

One of the questions asked was how to implement the tourism business in the blockchain platform? They believed that due to the emergence of this technology, it could be implemented in two ways. One is outsourcing and the other is hiring experts in the field of blockchain. Due to the size of the business, they can decide to choose one of the ways that has the highest efficiency and the lowest cost for the tourism business. What is important is that in order to improve the profitability and success of this business model for tourism, the management of the resource allocation process is mentioned as a very important position. Resources need to focus on innovation, and allocating them to needs that are not economically attractive today may pose a major challenge for tourism business owners (Willie, 2019).

### 6.6. Financial aspect

#### 6.6.1. National and international revenues and mining

Since every business is set up to incline revenue channels to stakeholders, it is possible to take a fresh look at the financial aspect that is coupled with blockchain technology. On the one hand, this model focuses on both the cost-based and the value-based approaches in this regard. Interviewee 10 believed, "If we look at the issue that intermediaries have been eliminated and commissions have been reduced, then this type of tourism, which is managed with the help of blockchain, is cost-based. On the other hand, through smart contracts, we can track products and services from production to distribution and consumption, which is the value-based approach".

Moreover, the nature of the tourism industry helps earn national and international incomes, which were done in different ways in the past. In the new blockchain space, this technology can be used in more cost-effective and transparent ways such as mining, reducing intermediary costs and converting past costs into profits and revenues, reducing business risk costs and converting those costs into profits and revenues, etc. For example, "For a passenger who makes a small or large purchase on a trip, he can settle b2b by paying via digital currency at the same time or through a smart contract at the place of exchange. One of the most significant benefits of transactions on the blockchain platform is peer-to-peer exchange that takes place without intermediaries and at the lowest possible cost (interviewee 7). Payments and receipts through digital currencies reduce costs such as SWIFT, bank intermediation, and exchange offices, and increase foreign exchange earnings as the exchange rate increases.

#### 6.6.2. Costs

The global payment system currently imposes a lot of costs on its users due to the presence of several intermediary banks in the payment process. In addition, in the current system, the speed of payments is very low. The advent of blockchain technology has made it possible for international payments to be made directly and at a very low cost. Blockchain technology offers a range of solutions that can develop alternative payment systems to the SWIFT system among users. Sometimes payments never reach their destination in the maze of international transactions in bureaucratic systems. International payment network users suffer from three problems. First, prices and foreign exchange rates are not finalized until funds are deposited in accounts. This poses a great risk to traders. Second, the need to rely on multiple banks to make transfers creates uncertainty about the timing, accuracy, and status of the transfer. Third, both the recipient and the sender must have an active bank account in the area where they live, which adds to the difficulty of using this method. The emergence of blockchain technology has made it possible for international banking to get rid of these problems. In addition, due to its distributed nature, this technology makes it possible to create decentralized international payment systems. On the other hand, every business needs a series of different costs to start and survive. According to the interviewees, the most important costs in the tourism industry in blockchain platform are the cost of launching blockchain platform, platform support, specialized development cost, and purchase of a minor. Of course, the costs of continuous advertising and the formation of various executive teams should not be overlooked. However, by implementing this technology in the tourism business, it is possible to put an end to many unnecessary expenses and consider them as income for all stakeholders (Interviewee 3). Blockchain technology is a general distributed ledger managed by a peer-to-peer network and can play an important role in eliminating costs, adding value, and helping manufacturers. In other words, this technology can help tourists stay competitive in a growing market.

## 7. Conclusion

This research has several theoretical implications. First, the results showed that the implementation of tourism in the blockchain platform creates new services, new structures, and finally a new business model in tourism, which is consistent with the results of (Holotiuk et al., 2017) research. Second, the proposed model - like the Osterwalder model - looks at the tourism business market with a systemic approach. In other words, the use of blockchain in one dimension of the model is also effective on other dimensions of business, which is rooted in the study of (Lokøy & Nyberg, 2018). Third, the results of this study showed that blockchain creates a unique opportunity to meet the needs of tourism stakeholders and customers through peer-to-peer interaction. Blockchain is the latest technology to develop this business through peer-to-peer exchanges and smart contracts to provide information transparency, create information security for tourists and hosts, and increase trust among tourists to travel to the countries that use this technology. This is also confirmed by the research of Hospitalitynet (2015), Önder and Treiblmaier (2018), and Patwardhan et al. (2020).

Tourism business activists form a peer-to-peer exchange between national and international tourists (customers) and hosts and eliminate intermediaries by designing a secure and transparent distributed platform in the context of public blockchain and designing smart contracts. This increases transparency and information security for both parties, thus maintaining the intellectual property of ideas and the digital identity of tourism products and services. Moreover, it helps increase the speed of provision, which not only increases customer loyalty and the demand for tourists to return to the destination country, but also increases economic benefits for the countries of origin and destination.

This study also presents several practical implications for managing

the tourism industry. What are more emphasized in the results of this research are two things, namely the elimination of intermediaries and the important role of smart contracts in the tourism business model in the blockchain platform. Although some interviewees suggested that the technology might expand the circle of market leaders or create new intermediaries, eliminating intermediaries does not mean eliminating travel agencies. Rather, it changes their role and refines their activities. Changing the role of travel agencies to a facilitator, the implementation of a blockchain platform paves the ground for smart planning. In other words, using smart contracts, performing all inquiries, obtaining the necessary permits (including visas), etc., preparing tickets (e.g., airplanes, museums, water parks, etc.), hotel reservations, and financial payments are done at lowest costs automatically. These are done using artificial intelligence and the Internet of Things. If the role of agencies is changed from intermediation to facilitation, the need to assess the credibility of the agencies by domestic and foreign evaluators will be eliminated and tourists decide on their tourist destination with the peace of mind. Blockchain also eliminates that part of the agencies' illegal activities that puts more costs on the client and the tourist through brokerage. In other words, with the implementation of the blockchain platform, all the events leading to the staying of people and going to the travel destination are done transparently without any distortions and changes. As a result, the extra illegitimate intermediation cost that may be due to non-transparency (which leads to lies and dishonesty by travel agencies and imposed on the passenger) will be eliminated. The main reason for this non-distortion and change is the decentralization of the tourism system through blockchain technology. This decentralization creates transparency and information security and then builds trust among tourists and guests, because the rules and procedures are defined and agreed upon by the parties involved in the smart contract and are done automatically. Overall, Smart contracts can help eliminate exceptions and reduce disputes.

Nonetheless, there are some general barriers to blockchain management that need to be removed. One is the low awareness of blockchain and the lack of specialists in this arena, which might be solved by the chambers of commerce, tourism education institutions, universities and academies of business and tourism through the provision of specialized training in the field of blockchain and tourism. The second is the lack of proper rules. Governments need to enact laws that facilitate the implementation of blockchain in potential businesses and travel agencies in different areas. Then they can more easily revise their business models. However, before doing that, researchers in any tourism domain in any country should address the pathology of creating the necessary platforms to place the tourism business model in the blockchain platforms, so that legislators can use it more easily to remove legal barriers to implementing blockchain in businesses, and policymakers in the tourism sector can easily identify policies and strategies in this domain.

## 8. limitations and further research

In this study, some interviewees mentioned two advantages of blockchain, namely sharing economic and crowdfunding/sourcing benefits. However, due to the definition and limitations of research objectives, these two issues were not addressed. The sharing economy on the blockchain platform doubles the prospects for the development of innovative tourism services. "The sharing economy refers to individuals offering their underutilized assets to others using digital platforms" (Bakker & Twining-Ward, 2018, p. 13). In addition, it points to patterns in which goods and services are made available to tourists without intermediaries. In other words, "The peer-to-peer based activity of obtaining, giving or sharing the access to goods and services, coordinated through community-based online services" (Hamari, Sjöklint, & Ukkonen, 2016, p. 2047). Therefore, according to (Babkin, Golovina, Polyanin, & Vertakova, 2018), economic operations in tourism are carried out directly and without intermediaries between the guest and the equitable host, which reduces their implementation time and cost. Researchers in their future studies can consider the concept or variable of participatory economics in designing a tourism business model in the blockchain platform.

Another advantage is that the blockchain platform provides a decentralized framework for crowdfunding (Baber, 2020) and crowdsourcing (Li et al., 2018) in various fields, including tourism, which was not addressed in this study. One of the important elements of Crowd BlockChain (CrowdBC) is smart contracts that can provide human and financial resources and investment in a decentralized and secure way (Yang et al., 2016) in tourism. CrowdBC creates an incentive mechanism based on users' past behavior, and applicants are asked to pay before receiving services. In other words, every agency, hotel, or even its staff has a reputation that can be recognized as one of the important resources of tourism requesters when choosing. Therefore, researchers are suggested to study the tourism industry in the context of CrowdBC in future.

Finally, the model deals with general concepts in tourism, and all tourism businesses in different fields can use this model canvas to use blockchain technology. This study opens the door for future researchers to conduct research in more specialized areas of tourism.

## Author statement

Hamidreza Aghaei was responsible for collecting data, conducting interviews, developing theoretical foundations about blockchain and truism, and writing up the discussions and conclusions. He also suggested the original idea and the title about blockchain and tourism.

Nahid Naderibeni was responsible for collecting library information, collecting and analyzing the data, writing up the manuscript, and revising the whole manuscript.

Asif Karimi has been involved in the conceptualizing the paper and he proposing the idea of designing a model using the Osterwalder ¨s Business Model.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.tmp.2021.100845.

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