

Sara Melkić / Nevenka Čavlek

The impact of blockchain technology on tourism intermediation

Abstract

Contemporary tourism has undergone many changes in the last decade, mainly due to expansion of the new technology. The use of new technology has had more positive than negative impacts on tourism intermediation, but none of them triggered a radical change. Blockchain technology has been one of the most discussed topics especially after 2016 due to its all opportunities, but also threats. Even though it is still somewhat unfamiliar, it is a form of technology which has a great potential to cause a revolution in traditional business activities, as it is predicted by futurists. For now, this phenomenon has only been recognized by bigger tourism intermediaries, technology-oriented companies. Such fast changes require even faster adaptations of all tourism intermediaries and this is challenging because most of stakeholders are not familiar with the use and the impact of blockchain. Therefore, in this paper the authors will try to provide answers by presenting a SWOT analysis of blockchain technology implications on activities undertaken by all participants in tourism intermediation. It implies to conclusion that everyone will face various challenges in its implementation which have to be considered seriously. The use and the general understanding of blockchain technology is still in an initial stage, so it is crucial that tourism research takes a proactive role in the exploration of this field of study. Furthermore, as trends are dynamic and evolve rapidly, the topic becomes particularly challenging for scientists in bridging practice into theory. Therefore, this theory-based paper on an overall assumption contributes to a better understanding of this phenomenon and raises the awareness for further research.

Key words: blockchain technology, tourism intermediaries, business evolution, SWOT analysis, research awareness

1. Introduction

Together with the world's economy, contemporary tourism is experiencing significant changes in recent years (Čavlek, Matečić, & Fejanić Hodak, 2010, p. 3), of which the major impact have megatrends with a significant impact on the activities and business processes in tourism. Besides affecting major economic, political, and social changes in the last decade the megatrends are also significantly oriented towards technology changes. This also include the increase of the importance of the new technology application, which is also emphasized in UNWTO 'The Goals of Sustainable Growth' which many world leaders agreed on (UNWTO, 2016, p. 5). Megatrends also emphasize the importance of the necessary adjustments to the dynamic surroundings, and the reliance on broad participants engagement with an innovative approach to the business (OECD, 2018a, p. 4). Therefore, the understanding of principal trends and managing changes in tourism are one of the crucial challenges in the future (UNWTO, 2011, p. 6).

When classifying 10 world global trends in tourism, *Horwath HTL Consulting* (HTL, 2015) highlights that in the next decade, the most disruptive trends will be the technological revolution and the development of digital distribution channel (on the supply side) and the rise of technologically aware generation (on the demand side). In addition to the technological acceleration increase driven by

Sara Melkić, MA, Institute for Tourism, Zagreb, Croatia; e-mail: sara.melkic@iztztg.hr

Nevenka Čavlek, PhD, Full Professor, University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia; e-mail: ncavlek@efzg.hr

globalization, the increase in the importance of security is often mentioned (Hendija, 2011, p. 76), so as the need for easier information accessibility and transfer (Čavlek, Bartoluci, Prebežac, & Kesar, 2011, p. 76). The amount of information in business is drastically increasing so the protection of the data is also being emphasized.

Information technology and tourism form an "intensive information system" (Čavlek et al., 2011, p. 71), from which a number of new information and communication technologies have emerged based on new business models. The traditional approach to the tourism activities is being slowly abandoned and it is transitioning into one where all the participants are increasingly involved in work processes. The information accessibility and the new technology development have changed the way of communicating in tourism and have led to greater data accessibility and the distribution of products and services at new tourism markets. Therefore, the reduction of the barriers (and greater independence, interactivity, dynamic, and flexibility) has also affected the need for greater data safety and privacy in the system (Zsarnoczky, 2018, p. 3). More than ever before, new technologies influence strategic business changes and transform the service offer in tourism. However, the intensity of changes to a large extent depends on the decisions of the companies which are ultimately independent entities, and which decided on implementing these changes. In addition, technologies provide a direct real-time approach to end-users, reducing organizational and distribution costs by reducing communication, commerce, booking and additional information provision to one channel.

2. Literature review: The impact of the modern technology development

2.1. The impact of the modern technology development on tourism

The usage of modern technologies in tourism is commonly defined by the usage of Web 2.0 technologies (Song, 2017) and fast-growing and increasingly important Web 3.0 technology. This experimental version of the new Web 1.0 and Web 2.0 technology provides the most dynamic two-way communication so far in which the main communication tool is data mining (Big Data). The process of the information and maximum credibility content exchange takes place in fully interactive and real-time between both supply and demand which are very active and included in all processes (Song, 2017; Kelessidis et al., 2009). According to Song (2017, p. 4), Web 3.0 technologies will change the future of tourism development, mostly in tourism intermediation. Innovative solutions and the digital revolution of Web 3.0 technology encourage P2P business, the concept of serverless computer networking and the need for authorization on a central server (Techterms, 2018, p. 1). With the support of the technical, human and legal infrastructure, Web 3.0 technology can be a strategic comparative advantage, which enhances the interaction between departments and functions, and thus ensures greater business productivity and better information cloud storage.

According to Yoon (2017, p. 6) and OECD's survey (2018, p. 13), the fourth industrial revolution (since 2015) brings innovation in contemporary tourism which mainly focuses on a range of emerging technologies that will have a strong impact by 2040. In addition to the future-facing technologies that make a major contribution to real-time interactions, greater personalization, and digitization through the integration of business partners into one virtual network, it also focuses on more efficient business process operations (automation) that will affect change in direct and indirect distributions. One of these technologies is the blockchain technology, which is already making changes in tourism and is penetrating into tourism intermediation.

The future of information – communication technology and tourism cooperation is more or less secure, although the innovations of the complete value chain in e-commerce in the complex tourism system, are much more complex than the innovations in other activities because they do not represent just a "cosmetic" change (Čavlek et al., 2010, p. 2).

2.2. The impact of the modern technology development on tourism intermediation

The radical changes in contemporary tourism make the 'big players' in managing business even bigger. Among these are travel intermediaries, which conduct two-way communication in the business, representing the most important distribution channel because they connect all the dislocated entities in the tourism market (on the supply and demand side). In addition to the numerous travel agencies on the market, the greatest importance is given to recognized tour operators, while with the expansion of new technologies, e-intermediaries emerge, most often as online travel agencies, which are insensibly replacing the traditional distribution channel (Cooper, Volo, Gartner, & Scott., 2018, p. 6). Their rapid development was contributed by greater independence of tourists, but also by the decline in the competitiveness of traditional travel agencies and tour operators, who, due to changes in the tourism market and surviving these changes (business and communication evolution), had to realize the importance of their implementation (Ruiz Gomez, Rodriguez Fernandez, & Navio-Marco, 2018, p. 243).

The tourism intermediation revolution is marked by a new 3T era (Travel, Tourism and Technology). New technologies in tourism intermediation are driving the rise in the importance of P2P business, transparency, digitization and automatization, and greater bipolarization of the market (dominance of the best, the downfall of the worst), causing changes in the way the business is managed. Since they represent a link in the distribution channel, any change also affects the tourism service providers and tourists. The inevitable digital transformation is constantly driving intermediaries towards self-driven adaptations and the tendency for innovation, but it mostly depends on the desires and ambitions of each individual business entities.

Even though radical changes in tourism intermediation are constantly stimulating numerous consolidation processes (horizontal and vertical integrations, market fragmentation), the application of innovative organizational structures and new business models (Čavlek, 2013, p. 7) the 'experts and futurists' predictions claims that travel agencies and tour operators have no future. The greatest reason for that is the difficult financial and labour adjustment and mastering new technologies whose change direction is still not quite firm and clear (Kazandzhieva & Santana, 2019, p. 341), despite their great ability on constant change adaptations. However, constant facing to the environmental threats in the pursuit of their elimination from the market has taught them how to fight and adapt (Goeldner, Ritchie, & McIntosh, 2000). Perceiving technology as a partner in providing technical support and security, and constant anticipation of tourism trends, is a logical solution to combat: the disappearance of existing tourism intermediaries, the emergence of new tourism intermediaries, and the changing role of existing traditional tourism intermediaries (Zekanović-Korona & Klarin, 2012, p. 64).

Considering the progressive changes in information and communication technologies, the question emerges: is there a Web 3.0 technology that will not be a partner, but a major threat to tourism intermediaries? Will this possibly be one of the most controversial technologies of today, the blockchain technology? Accordingly, the paper provides a brief theoretical overview of the definition of blockchain technology and its potential application in tourism intermediation. The main aim of the paper is to present a SWOT analysis of blockchain technology implications on activities undertaken by all

participants in tourism intermediation in order to raise the awareness of the need for further research in this scientific field.

3. Study area: Theoretical background on definitions and use of blockchain in tourism intermediation

3.1. Theoretical background on definitions of blockchain technology

One of the representatives of Web 3.0 technology that combines automation, security factor, efficiency and unimpeded information transfer in a P2P system is blockchain technology. It was created with the purpose of creating immunity to manipulation, which leads to greater confidence to computer systems (Navarro, 2017) and achieves absolute privacy of transaction of participants (Nakamoto, 2008). Blockchain technology is more recognizable by bitcoin system as one of its parts, and which represents self-organizing decentralized autonomous currency system that is based on a direct cooperative model and non-hierarchical democracy (Fair Coin, 2017). But bitcoin is only a small part of the entire blockchain technology.

Blockchain technology, which has changed the last decade, is one of the most common used terms in IT sector after 2016. The historical events flows have influenced the necessity of seeking unconventional but optimal technology that will support, among other things, cryptocurrency transactions and information. The main focus of such a contemporary information community is to emphasise the importance of confidential information and their protection in a way that computers (transaction entities) are networked without servers (intermediaries) within the P2P network (Hozjan, 2017, p. 1). In order to transactions be globally anonymous and fixed, they need the support of a decentralized, non-intermediary technology system (Pc Chip, 2017).

As a system on which bitcoin is based, blockchain technology (originally 'a block of chains') is a structure of recorded data, that is, a distributed database that can be used for many applications and cryptocurrencies, which is not managed by intermediaries as till now (Pc Chip, 2017). In addition, it represents a non-standardized and transparent base in a decentralized network that is accessible to everyone for writing, verifying and reading without the possibility of changing everything that has already been written (Investopedia, 2018). This transparent database thus allows everyone to have data, and to write and store all data (digital transactions, documents, etc.) (Pc Chip, 2017). Since it is distributed, it cannot be hacked to become inaccessible, which initially sparked interest in developing secure cryptocurrency transactions.

Bitcoin cryptocurrency has built its foundation on the idea that it is not owned by anyone, that it does not have a physical address and that no one controls it, but that it is at the same time free to use by anyone in the world, anonymously, without the need for registration, authorization or account opening (Badurina, 2017). Blockchain technology is based on the same principals, that is, an automated database to support the complete transmission of not only transactions but also other information. It is a system that has provided anonymity to currency and information owners, but with public accessibility and visibility sequence of transactions and performed data transfers (Prathyusha, Kavya, & Sree Laxmi Akshita, 2018, p. 232; Blockgeeks, 2018; Baur, Cahill, & Liu, 2018).

The underlying IT factors on which blockchain is based are, in addition to P2P networking (serverless computer networking) and distribution system (automated and confidential system without central authority), cryptography (computerized transaction verification and connecting and transitioning

memory into virtual chains), Proof of work and Proof of stake algorithms (for data mining in transaction identity verifications), and scalability (Badurina, 2017; Marr, 2018). Therefore, blockchain can be justified as a successfully globally distributed, seamless, chronological database that resides on a network of partners (nodes), that is supercomputers (miners) (Heđi, Špeh, & Šaraboh, 2018, p. 104). Although the system is based on open source standard databases, the data is encrypted by algorithms that keep it protected against manipulation (Hrvatski Bitcoin Portal, 2018). With such decentralized control, the nature of the open network remains in the hands of users. Therefore, all transactions are dependent on the participants in the network, while the user is responsible for the security of his or her own finances and data, thus eliminating any need for dependency on the intermediary function (Heid, 2013, p. 4).

In addition, as the whole blockchain system has the purpose of sharing information, it also has the role of protecting data and their decentralized storage to protect integrity and immunity to manipulation, ensuring secure transactions, and avoid technical transaction errors (Pc Chip, 2017). Blockchain ensures high security in the authenticity and accuracy of real-time national and international transactions, synchronized processes (simultaneous distribution), public transactions with anonymous transaction participants, resistance to hacking and data theft, no maximum limit on transaction amount, non-existent or very low transaction flat fees, payment of transaction fees by customers rather than businesses, exemptions from the state's tax system, inability to delay payments or freeze accounts. However, according to Sharma (2018) and Baur, et al. (2018) blockchain is still not legally regulated and controlled, there is no user trust, no possibility to correct wrong transactions, no ability to store an infinite amount of data, has non-organized databases, is not a scalable and fast enough system that is completely resistant to technical errors.

The usage of blockchain technology can be done in 3 different systems (networks) depending on the purpose and need (Nomura Research Institute, 2016, p. 26): public, private (useful mostly for internal networking within one company) and consortium (extended private, useful for networking with more companies collaborating together). A private blockchain system can have all the important business information about an organization (contracts, licenses, trade secrets, strategies, etc.), while a consortium blockchain has all the information of that organization connected to other business partners and organizations (transaction data, communication information, contracts, etc.). Although private and consortium blockchain could revolutionize internal and external business, according to experts, they are a big target for hackers trying to get into blockchain application systems (Marvin, 2017). However, all types of blockchain networks have been hacked in the last ten years, but not a single system has been cracked, as fooling the system means controlling 50% of the total global processing power, which is financially completely unprofitable (Badurina, 2017).

Blockchain and its application has evolved over time within 3 development phases (Blockchain 1.0, Blockchain 2.0 and Blockchain 3.0) (Reiff, 2018) like Web technology (Allen, 2017), which has made it possible to extend cryptocurrency transactions to smart contracts, operating segments, digital identity and systems. The development of blockchain technology has influenced the creation of new opportunities and new business models (Parikh, 2018, p. 1341) within every industry, including tourism. In addition, the development of blockchain technology simultaneously improves existing systems and develops new blockchain start-ups across all industries (Prathyusha et al., 2018, p. 232). However, given the insufficiently clear definition of blockchain, it is difficult to fully grasp whether blockchain is merely technical technology support for systems or a completely new intermediary.

3.2. Theoretical background on use of blockchain technology in tourism intermediation

According to UNWTO (2016, p. 5), blockchain technology has great potential for a significant transformation of the tourism and travel industries, but since 2017 it also plays a key role in the survival or demise of tourism intermediaries. Its application, efficiency, and usefulness are not very known to tourism intermediaries, and the knowledge of it among all participants (tourism service providers, intermediaries and tourists) is reduced to a minimum. However, some tourism intermediaries (e.g. TUI Group) have begun to explore the possibilities and to test implementations through data transfer and have managed to increase the quality of service (TUI Group, 2018). In addition, they are already negotiating the takeover of some blockchain start-ups, which are public P2P network sharing economic systems that can replace any online travel agencies that are today in direct competition with tour operators. The use of blockchain technology is more complex in tourism intermediation, since its system consists not only of intermediaries (tour operators, travel agencies, online travel agencies), but also of other intermediaries-institutions that intermediate transactions between these participants (e.g. banks).

Given the fact that blockchain technology is a technical support for business development of other tourism intermediaries rather than a new intermediary taking over their role, different blockchain technology systems (public, private and consortium) can be implemented between a tourism intermediary and a tourist, a tourism intermediary and tourism services provider and within the organization of tourism intermediaries. In such proposed systems, tourism intermediaries and tourists may avoid involving other intermediaries, such as banks. However, there is a danger of building a blockchain that will avoid tourism intermediaries and directly connect tourism service providers with tourists in the P2P system, but not within online travel agencies. In this case, these are new forms of 'pure intermediation' that does not know the terms of transaction fees, emergencies or added value.

Therefore, the implementation of blockchain in tourism intermediation can be created in an inter-organizational environment (in a public blockchain-using start-ups that connect tourism service providers and tourists in a P2P system, a system between a tourism intermediary and a tourist; or in a private blockchain-systems within a tourism intermediation organization, tourism intermediation and tourism service providers systems (partners)), but also within the organizational environment (in a consortium blockchain-systems of organization between tourism intermediaries and tourism service providers (partners)).

If blockchain technology is observed as a business technical support, it can have financial and non-financial applications in tourism. The financial implementation of cryptocurrencies can ensure smooth international digital transactions (Turudić, Milić, & Šturina, 2017, p. 201) between all companies in intermediation, most notably between tourism service providers and intermediaries, and intermediaries and tourists. Real-time deposits and withdrawals eliminate any waiting situation, payment delays, and reduce transaction costs, risks and currency manipulations. This ensures the elimination of the grey economy where tourism service providers often require intermediaries to pay part of the agreement in cash. But the problem occurs at the moment when the idea needs to be turned into reality. Namely, until cryptocurrencies are accepted as an official financial instrument, it is unlikely that tourists will use them, and if they do not use them, then they cannot be used by tourism intermediaries either.

One of the most important applications are the undeveloped smart contract system, through which the entire tourism intermediation system can, in real-time, more easily and quickly sign and change contracts, send invoices, insurance, travel, and other documents within the inter-organizational and

intra-organizational system. This automates all the processes, reduce the number of unnecessary meetings between companies, which were based on the exchange of documents or signing contracts, but also ensures that errors in administration are minimized. Also, any doubts about the reliability and professionalism of a business partner (e.g. a new hotelier-partner) with whom, for example, the tour operator has not had the opportunity to do business can be eliminated. This allows all businesses to communicate and enter into partnerships without interruption, while making sure that they will not be played out.

Online travel agencies can still use the sharing economy, as in the past, but also take part in an independent computer system that has the opportunity to finally become a pure P2P application, which connects tourists and tourism service providers without transaction costs. If online travel agencies decide to set up and implement this approach, it will certainly at least for a while remove the competitors of independent enthusiasts who have already launched such blockchain start-ups. If they decide to take such a step, they will have to find another way of financing, which is very questionable at the moment. If existing online travel agencies do not start their own systems, it is most likely that such individuals will permanently eject them from the market. Given that the sharing economy systems so far have not weakened tour operators and travel agencies, it is to be expected that the blockchain system should not be considered as technical support either.

By revising the supply chain, all tourism intermediaries could be better informed about the authenticity and originality of the products and services provided by their partners (Blockgeeks, 2018). It will increase the confidence of the partners towards tourism intermediaries that will make the tourists loyal customers. In addition, all members of the intermediation system will be able to see the price changes, which will leave no space for bargaining and manipulation, that will be squeezed out of transparency.

By protecting intellectual property, innovative tourism arrangements (Prathyusha et al., 2018, p. 232-237) and tourist offers will be developed more freely and there will no longer be a risk of the theft of ideas from competitors and the sending of documents to other addresses. Although this type of situations in tourism intermediation is rare, the above will also help eliminate the risk of copying and redistributing files related to partnership agreements.

Blockchain ensures that all documents and information are permanently stored in the system (Blockgeeks, 2018c) and that they are systematically saved. It can help reduce paperwork in offices because all information is stored on computers, but with the assurance that all of this information will not disappear or be altered as a result of computer failure. Certainly, such an opportunity can only improve business and provide an overview of situations.

Using blockchain, tourism intermediaries can more accurately and quickly determine market trends, but also buy cryptocurrencies with fragmented online tourists' activity data (Prathyusha et al., 2018) to create better business travel arrangements, strategies, and policies. In addition, in such and all other transactions, businesses and tourists alike can use blockchain to more easily manage their identities for the benefit of protecting personal information. By using closed blockchains system, the data can be stored by authorized persons, which prevents the misuse of data or theft of passenger information.

Data management and identity management can be of great benefit when licensing electronically and issuing airline tickets, for example. Namely, tourism intermediaries often have a number of professionals in their network (tour guides, travel managers, transportation companies) who need licenses, special courses, etc. To reduce the inconvenience of performing poorly or any unexpected situation the system itself updates the validity of their data. In this way, legal conflicts of contractual business are reduced

and any possible fines that, in the case of an error of a travel manager for example, a travel agency or tour operator would have to bear. Travel agencies, on the other hand, have their airline tickets issued immediately and have no need to print on paper.

If the cryptocurrency system is accepted by tourists and tourism intermediaries, there is no doubt that loyalty programs would be exploited, which could also increase tourism intermediaries' turnover and tourists' consumption increase associated with creating the higher experience. By collecting and updating points in the system, tourists would be encouraged to consume the products and services they choose. On the other hand, creating different partnerships between fast-growing travel industries, with any other industry, can only be a win-win situation.

Any cancellation of accommodation or the situation of overbooked flights and capacities with contractual obligations can create high costs between tourism intermediaries and tourism service providers. As data updates take place in real-time, management can quickly change tactics and make decisions about further steps. According to tourists, such tourism intermediaries become much more professional, and any possibility of changing the tourist arrangement by the intermediaries is avoided. Such an open exchange principle can be financially beneficial, and overbooking can be avoided.

Tourists' reviews as one of the most important factors in the decision to purchase a tourism product or service can also help intermediaries in carefully selecting the services they will provide to their client. A transparent and honest way of rating and commenting can only improve the quality provided and prevent mutual dissatisfaction.

Although the potential application in tourism intermediation is very wide, it is currently only in the initial stages of development. These are just some of the opportunities that tourism intermediaries can use in their business within or outside the company, networking with other partners. The possibility for setting up blockchain start-up in tourism intermediation (if they can be implemented in this way at all), such as market trends forecasting systems, loyalty program systems, and review systems. However, despite all the potentials, most of them will be used for the purpose of the technology implementation, while the idea of blockchain start-ups and applications in a pure sharing economy is already a big novelty in the 'intermediary world'. The above is true unless the blockchain proves to be a 'pure mediator' who takes over the role of 'pure intermediation'.

4. Research methodology

For a better understanding of blockchain technology use by tourism companies in general and by all stakeholders involved in tourism intermediation, secondary data were obtained through a thorough literature review and from other available data sources. Various secondary data were used during the writing process: books, publications of national and international organizations and statistical institutes, reports from chambers of commerce, agencies' market research, expert and academic articles, newspaper articles, master's theses, official websites of associations and similar. This created a necessary general theoretical background through semi-structured SWOT analysis. It covers issues related to business internationalization and automation, transparency and security, distributive real-time synchronization, interaction and new business models. This qualitative analysis is focused on all potential impacts (positive and negative changes) that blockchain technology might cause on activities undertaken by all participants (together and individually) in tourism intermediation: tour operators (TO), travel agencies (TA), online travel agencies (OTA), tourists (customers) and tourism service providers (suppliers). A theoretical framework plays an important role as a basis for this semi-empirical part of the study.

Guided by a relevant theory and an indirect observation about the implementation of blockchain technology in tourism intermediation, SWOT analysis gives an overall assumption for better understanding the possible impacts and it is an adequate tool which contributes to a better understanding of this phenomenon in the terms of possible risks and challenges.

5. Results and discussion

SWOT analysis highlights the most important internal strengths and weaknesses (Table 1), as well as external threats and opportunities (Table 2) of the impacts on the implementation and the use of blockchain technology on participants in tourism intermediation. According to the topic, the stated analysis studies tourism intermediaries (tour operators, travel agencies and online travel agencies), tourists (customers) and business service providers (suppliers). In order to provide answers to some questions and doubts regarding the theory of blockchain technology in tourism intermediation, the authors present implications on activities undertaken by all participants. It should be noted that only some aspects are taken into account as assumptions that may affect participants in blockchain technology, but there will certainly be plenty of impacts when researched more thoroughly.

Table 1
An overview of the internal environment of the impacts of blockchain technology on tourism intermediation-strengths and weaknesses

INTERNAL ENVIRONMENT	
STRENGTHS	WEAKNESSES
<p>ALL TOURISM INTERMEDIARIES</p> <ul style="list-style-type: none"> • Business Automation (accounting, transaction tracking system, information, contracts) • Decentralized and real-time network with greater security, data quality and business process efficiency • Big data analytics system • Trust in new partners-lower risk of possible fraud • Dynamic values exchange • Paying online in cryptocurrencies and avoiding overbearing of travel managers with big amounts-Global payment method-International business • Reduction in transaction fees • Reducing bureaucracy, paperwork, meetings, but with greater systematicity and business overview • Inability to modify data • Still not part of the tax system • There is no maximum limit on the transaction amount 	<p>ALL TOURISM INTERMEDIARIES</p> <ul style="list-style-type: none"> • Nobody has good knowledge of the technology • The complexity of technology, but also its incompleteness and sophistication • Lack of system scalability-the ability of the system to adapt to the increased data processing requirements • Management and employee ignorance • Lack of leadership and supervision bodies • Technological immaturity of the enterprise • It is not completely determined who in this system is profiting and who is losing-taking technology for granted • Conflicts with existing systems • Conflict with GDPR legislation • Larger blockchain means more security but less scalability and speed • Lack of knowledge, experience and skills • Reduced attempts to do business in the grey economy due to indelible records • Business practice are constantly changing and the blockchain is not changing • Lack of pilot projects to better understand the technology
<p>TOUR OPERATORS (TO)</p> <ul style="list-style-type: none"> • Some TO have already started implementing blockchain • It is easier to get information about the desires and needs of clients-products and packages customization – arrangements • Excess financial resources-increased investment in R&D and employee training • Elimination of central authority-banks... • Better interaction with providers within the network-B2B quality control, B2C-with tourists, and within businesses 	<p>TOUR OPERATORS (TO)</p> <ul style="list-style-type: none"> • Familiarity with the topic, but lack of complete vision • The largest tourism intermediaries have the most difficult and complex tasks • Implementations-long-term process • Any errors within the system can be fatal to TOs-Too much interdependence of all companies
<p>TRAVEL AGENCIES (TA)</p> <ul style="list-style-type: none"> • Elimination of central authority-banks... • Better interaction with providers within the network-B2B quality control, B2C-with tourists, and within businesses 	<p>TRAVEL AGENCIES (TA)</p> <ul style="list-style-type: none"> • Unfamiliarity with the topic and lack of vision • Too much reliance in traditionally business due to the lack of revolutionary technology so far

Table 1 Continued

ONLINE TRAVEL AGENCIES (OTA)	ONLINE TRAVEL AGENCIES (OTA)
<ul style="list-style-type: none"> • Awareness of potential threats and investing in new forms of blockchain start-ups which encourage OTA to do only in pure P2P system 	<ul style="list-style-type: none"> • Partial familiarity with the topic, but not clear enough vision • The only possible way to implement technology is to launch a start-up which makes trust issues in communication with tourists and service providers
TOURISTS	TOURISTS
<ul style="list-style-type: none"> • Complete independence from tourism intermediaries and complete independence-expulsion of intermediary-pure P2P business • Real-time offers overview, booking and paying for services • Better interaction with tourism intermediaries if they adopt the technology • Increasing the experience of tourists – clients 	<ul style="list-style-type: none"> • Instead of businesses, they are the ones who pay the transaction fee • Unfamiliar with the subject • Customers who prefer to be served rather than having to become part of the system themselves and indulge in new technologies • Fear of the unknown and the error leads them to dissatisfaction
SERVICE PROVIDERS	SERVICE PROVIDERS
<ul style="list-style-type: none"> • Real-time offer updating that results in real-time P2P bookings • Potential number of major bookings • Maintaining popularity and relationships with other B2B partners 	<ul style="list-style-type: none"> • Misunderstanding drives them to cancel hooking up • Unwillingness to change • Elimination of opportunities to earn money in the grey economy

Source: Authors' compilation.

Table 2
An overview of the external environment of the impacts of blockchain technology on tourism intermediation-opportunities and threats

EXTERNAL ENVIRONMENT	
OPPORTUNITIES	THREATS
ALL TOURISM INTERMEDIARIES	ALL TOURISM INTERMEDIARIES
<ul style="list-style-type: none"> • The growing need for blockchain technology • New markets and new consumers • Media coverage • Improvement of e-commerce and ICT in business (faster transactions, business processes...) • Learning from the financial industry with experience in applying blockchain • Start-ups as potential investors are looking for new opportunities in applying technology • Monetary democratization • Developing a true sharing economy • Eliminating the need for trust • The revolution of politics and the legal system • The revolution of the distribution chain in tourism intermediation • Greater digitalization in tourism as a key to greater readiness to adapt to change • Better understanding of the market and creating better, more creative and personalized services 	<ul style="list-style-type: none"> • Hypeciklus blockchain on tourism intermediaries due to media influence-balloon risk • Legal and regulatory conflicts with the use of technology in the tourism business • Unwillingness of political establishment and hostile countries to approve technology-not illegal but not even recognized • Not adopting technology at the level of the entire tourism system-"unusable" technology • Lack of technology testing • Possible technical failures and risk of computer viruses • The devastating consequences of meta hackers expanding their knowledge of blockchain technology • Quantum computers that may be able in the future to decrypt data • Fear of technology adoption and management by "elite"- "Big Brother" • Many jobs will disappear • Uncertainty due to ignorance about the possible magnitude of technology impact • Research and testing that negates technology • Non-adoption of technology due to unsustainability and excessive environmental costs
TOUR OPERATORS (TO)	TOUR OPERATORS (TO)
<ul style="list-style-type: none"> • Market growth with new products and services, with new consumers / clients, with an expanded network of partners, with acquisitions of other companies 	<ul style="list-style-type: none"> • Emergence of new competitors (independent enthusiasts)
TRAVEL AGENCIES (TA)	TRAVEL AGENCIES (TA)
<ul style="list-style-type: none"> • Work of domestic TAs in an expanded international environment-expansion of international business • Ability to use blockchain with no other competitors 	<ul style="list-style-type: none"> • Blockchain TO as a major threat to business downturn or TA collapse • Policy and legal system that are tailored to TO, not TA • Acquisitions and mergers of numerous TAs • Poor non-financial support from other institutions

Table 2 Continued

ONLINE TRAVEL AGENCIES (OTA)	ONLINE TRAVEL AGENCIES (OTA)
<ul style="list-style-type: none"> Investment in the development of new blockchain start-ups will offer something completely new and different to the tourism market 	<ul style="list-style-type: none"> Blockchain TO and TA or new forms of P2P OTAs as major threats to business decline or OTA collapse TO and TA oriented policy and legal system rather than an OTA
TOURISTS	TOURISTS
<ul style="list-style-type: none"> Independent control, access and management of all data related to their journey Access to a historical overview of all realized travel arrangements between tourists and tourism intermediaries 	<ul style="list-style-type: none"> Obtaining distorted and inaccurate information about the application of blockchain technology in tourism intermediation
SERVICE PROVIDERS	SERVICE PROVIDERS
<ul style="list-style-type: none"> Collaboration with new and different partners that will provide them with new sources of revenue Expanding partner network 	<ul style="list-style-type: none"> Lack of financial support from other institutions Obtaining distorted and inaccurate information about the application of blockchain technology in tourism intermediation

Source: Authors' compilation.

The results show that some changes will affect only some participants in the distribution channel of tourism intermediation. On the other side, some changes will be common among all participants. Therefore, SWOT analysis shows that everyone will face various challenges in its implementation (business internationalization and automation, greater transparency and security, distributive real-time synchronization and interaction, new business models...) in intra-organizational and inter-organizational (P2P and B2B) systems. Although traditional distribution channels continue to be important in B2B business, blockchain technology is also expected to influence the growing importance of P2P business. Although this will improve direct communication and business in the intra-organizational system, changes will occur in the inter-organizational environment (most notably with tour operators and travel agencies). All the positive and negative changes have to be considered seriously in the phase of its implementation.

In addition, it is important to emphasize that the implementation of blockchain can change the role of participants in tourism intermediation (through transactions, logistics and support), as well as their relationship with other intermediaries (structural, procedural and organizational changes). However, what the blockchain certainly cannot have a comparative advantage in is consulting, which is the most valuable part of the tourism service provided by the intermediaries. Whatever new technology will emerge on the market, the advisory role has never been questioned so far. It represents the added value of intermediaries who gain the trust of their clients by taking care for them, addressing emergencies, and raising the quality of their services by making them valuable in comparison to the invested value for money.

However, the role of online travel agencies can be changed forever. Specifically, with the development of blockchain start-ups by independent blockchain entrepreneurs, the purpose of having applications and companies for online tourism intermediation can disappear forever. The creation of new applications introduces a pure P2P business, behind which there is no online travel agency (intermediaries-people), but a network of computers which, as an intermediary, approves every transaction execution without taking into account transaction fees. Online travel agencies can create their own blockchain start-ups to prevent direct competition from entering the market and their downfall. But the question arises how such an online travel agency can then be funded and sustainable. Therefore, the future of online travel agencies will remain very uncertain and, unlike all other travel agents, most questionable. According to Önder and Treiblmaier (2018, p. 341) intermediaries such as online travel agencies will probably be removed from e-tourism supply chain. In addition, the influence of the blockchain must also take into account other providers of tourism intermediation (e.g. banks), which also change the model of traditional business.

Accordingly, the relevance of the SWOT analysis is difficult to assess given that the theory often raises the question of whether blockchain will be a kind of technical support (technology partner) that will influence the creation and implementation of new business models and new start-ups, or whether it will be a new intermediary who will change all other participants in tourism intermediation from the market (service providers, tour operators, travel agencies, online travel agencies, tourists, other participants-banks, etc.). In addition, the question is whether the blockchain will be an individual start-up or will it encourage the development of new start-ups?

6. Conclusions and implications

Contemporary tourism has undergone many changes in the last decade, mainly due to expansion of the new technology caused by globalization. The use of new technology has had more positive than negative impacts on tourism, but none of them triggered a radical change.

Blockchain technology has been one of the most discussed topics especially after 2016. Blockchain has a great potential to bring about revolutionary change in traditional business of tourism intermediation. Although the use of this technology is still in an initial stage of research, it may result with radical changes in business processes and activities in the entire tourism distribution channel. This phenomenon has already been recognized by some bigger tourism stakeholders, mostly by eminent and technology-oriented tour operators. Therefore, it is crucial that tourism research takes a proactive role in helping all stakeholders to better understand what the new technology offers to them and where are the major challenges.

Authors used a SWOT analysis as a research method to show what kind of challenges every participant in tourism intermediation may face in its implementation in the intra-organizational and inter-organizational systems. However, the relevance of the SWOT analysis cannot be verified considering that the theory does not clearly identify blockchain technology as a technical support (technology partner) or as a new, independent 'pure intermediary'.

Rapid changes require faster adaptation, and this is challenging for both, IT specialists and tourism intermediaries, because most of stakeholders are not familiar with the use and impact that blockchain technology may have on tourism intermediation. As IT experts are not specialists in tourism field and vice versa, the cooperation between them becomes *conditio sine qua non*. If blockchain technology will not be fully recognized by tourism companies, major changes will not even occur in tourism intermediation. Otherwise, tourism intermediaries are still in the position to choose whether the blockchain technology will be their partner or will become their major threat. Moreover, "the companies that know how to adapt to this new way of working will be those that gain in the market, those that give their back to these technologies will have a future in which they will have less and less importance" (Ruiz Gomez et al., 2018, p. 243).

Taught by frequent technology changes, travel intermediaries are accustomed to the constant struggle that involves not just "cosmetic changes". Considering the uncertainty future of blockchain in tourism intermediation, participants need to provide the technical, human and legal infrastructure, but still having in mind the emergence of new technologies. However, despite all the changes, the identity of tourism intermediaries as professional travel advisors will continue to be their greatest strength.

7. Limitations and suggestions for future research

The main limitation of this study lies in the hypothesis that blockchain technology will succeed and will be disruptive as predicted by futurists. Therefore, the paper is based on an overall assumption and it cannot be compared with previous studies. Additionally, it is written by experts in tourism field without very specific IT knowledge.

Although blockchain is identified as a challenging and explorative field of study, there are almost non-existent in the field of tourism intermediation for better theoretical understanding. This research is one of the first that deals with the impact of blockchain technology on tourism intermediation, focusing on theoretical and practical issues. This theory-based paper contributes to a better understanding of this phenomenon and necessary steps towards common theory, opens up a wider debate of its importance and raises the awareness for further research.

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