Review Paper

Examining Stakeholder Collaboration Intention with Blockchain OTA for Online Hotel Reservations: Case of Taiwan

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Abstract: This study aims to bridge the gap between academia and the actual application of blockchain technology in the industry. In-depth interviews were undertaken with two blockchain online travel agency (OTA) operators, six hotel/bed and breakfast owners or managers as well as three end users who had booking experience with blockchain OTAs. The interviews explored the management perceptions regarding blockchain technology in five areas, including performance expectancy, effort expectancy, social influence, facilitating conditions, and how trust level influences the collaboration intention towards blockchain OTAs. Most managers agree blockchain enhances organisational performance and could simplify operation procedures. Blockchain OTAs could take up technical tasks and reduce small and medium-sized hospitality organisations' investment and labour cost on IT systems. However, star-rated hotels hesitate to work with blockchain OTAs because they are start-ups. They do not trust these newly established business models could be sustainable in the tourism ecosystem. This study is the first study that empirically examines the perceptions of Taiwanese hotel managers and customers towards blockchain technology and blockchain OTAs. Further, it sheds light on managers' attitudes towards collaborations with start-ups.

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Introduction

According to the World Tourism Organization (UNWTO) (2022), the tourism industry registered a 4% growth in 2021 after the COVID-19 pandemic; however, it is still 72% below the pre-pandemic level of 2019. The new millennium also initiated the digital economy, entailed by the information revolution (Babkin, Golovina, Polyanin, & Vertakova, 2018; Sigala, 2017) which introduced new forms of travelling ecosystems with money, technology, and knowledge (Belousova, 2018; Colombo & Baggio, 2017; Sun, Law, & Tse, 2016; Zsarnoczky, 2018). Hotels rely on online travel agencies (OTAs) to expand their market share (Caliskan, Kutlu, & Kimiloglu, 2013; Lee, Denizci, & Law, 2013; Raab, Berezan, Christodoulidou, Jiang, & Shoemaker, 2018). Hence, the relationship between OTAs and hotels attracts significant attention in both academia and industry (Erdem & Jiang, 2016; Park & Allen, 2018; Yacouel & Fleischer, 2012).

As an emerging new socioeconomic system, the sharing economy continues to gain popularity among individuals (Zervas, Proserpio, & Byers, 2017), as well as the tourism industry (Ert, Fleischer, & Magen, 2016; Lee, Chan, Balaji, & Chong, 2018; Pazaitis, De Filippi, & Kostakis, 2017; Pizam, 2014; Tussyadiah & Pesonen, 2016). Peer-to-peer service providers such as Airbnb and Uber have captured customers' attention as new and disruptive business models (Önder & Treiblmaier, 2018; Yuan & Wang, 2016), and have also affected hotel revenue (Akbar & Tracogna, 2018; Farrell & Bensinger, 2016; Oskam & Boswijk, 2016). The backbone of the ecology of the sharing economy is the mutual trust between sellers and buyers (Lampinen, Huotari, & Cheshire, 2015; Möhlmann, 2015). Despite the importance of trust in the sharing economy, no valid solution to this issue existed until the rise of blockchain technology (Önder & Treiblmaier, 2018; Swan, 2015; Tapscott & Tapscott, 2016; Yli-Huumo, Ko, Choi, Park, & Smolander, 2016). Although blockchain technology has been incorporated into many business operations, known cases of application in the tourism industry and pertinent research remains limited (Chang, Walimuni, Kim, & Lim, 2022; Treiblmaier, Leung, Kwok, & Tham, 2021). Treiblmaier (2021) further proposed that meaningful framework or models as well as theories on the application of blockchain technology in the tourism sector should be developed. To address this call, this present study is designed to provide empirical evidence on the core characteristics of blockchain technology and how it can be incorporated into tourism operations.

Literature Review

What is Blockchain?

According to Treiblmaier (2018), "blockchain is a digital, decentralised and distributed ledger in which transactions are logged and added in chronological order

with the goal of creating permanent and tamper-proof records'' (p. 3). Literally, a blockchain is formed by a "chain of blocks", and blocks are digital ledgers which record information on transactions within a network and a block will be formed once a certain amount of transactions is recorded (White, 2017). Blockchain has been widely acknowledged as a major disruptive innovation in business and society (Naughton, 2016; Reijers & Coeckelbergh, 2018) when it debuted in early 2009 as bitcoin, the cryptocurrency. Since then, this technology has developed far beyond what people had expected (Huckle, Bhattacharya, White, & Beloff, 2016; Kwok & Koh, 2019). As "the first native digital medium for value" (Pazaitis et al., 2017, p. 106), many people believe that blockchain can revolutionise many industries as well as aspects of our daily lives (Zhao, Fan, & Yan, 2016). According to Swan (2015), there are three stages of blockchain technology development, namely digital currency (Blockchain 1.0), digital finance (Blockchain 2.0) and digital society (Blockchain 3.0). Despite the potential of blockchain technology to re-engineer our business operations and personal daily life, empirical research about this technology is still scarce (White, 2017). Recent research mainly shed light on three issues: system efficiency, security and its applicability in various industries (Zhao et al., 2016), including the tourism industry (Nam, Dutt, Chathoth, & Khan, 2019). According to Kwok and Koh (2019), the largest share of investment in blockchain technology goes to hospitality and tourism and thus warrants more academic investigation.

Four major technologies underpin the emergence of blockchain: peer-to-peer networks, cryptographic algorithms, distributive data storage and decentralised consensus mechanism (Pazaitis et al., 2017; Yuan & Wang, 2016). Generally speaking, blockchain technology functions as a distributed ledger or database, wherein transactions are chronologically coded into blocks with a timestamp (Gupta, 2017). More importantly, the decentralisation of the blockchain technology allows each transaction to be verified by all members and consensus is reached in the block (Boireau, 2018; Dogru, Mody, & Leonardi, 2018) which can effectively exclude counterfeiting and fraud (Efanov & Roschin, 2018). As such, the advent of the blockchain technology can be seen as a breakthrough for the trust issues plaguing the Internet (Andreessen, 2014; Efanov & Roschin, 2018; Tapscott & Tapscott, 2016) because trust will be built on smart contracts which are operated by computer algorithms instead of interpersonal relationships (Boireau, 2018). Smart contracts serve as the activators of data stored in blockchain which will self-verify, self-execute and self-enforce by algorithms, once the distributed consensus conditions are met without the intervention of third parties (Yuan & Wang, 2016). Moreover, being an open and distributed ledger, blockchain technology can keep track of all transactions efficiently, verifiably, and permanently (Iansiti & Lakhani, 2017). When data is confirmed by every node across a peer-to-peer network, the stake of hacking public ledger may be too high to realise (Boireau, 2018) and therefore, its immutability can be ensured.

Blockchain and its Applications in the Hospitality and Tourism Industry

Under the umbrella of new business models of smart tourism (Wei, Wang, & Liu, 2020), blockchain technology has been posited as beneficial for the operations of the tourism industry (Demirel, Karagöz Zeren, & Hakan, 2022; Rana, Adamashvili, & Tricase, 2022; Irannezhad & Mahadevan, 2021) and is considered a prominent driver of transformation in the industry (Inkson & Minnaert, 2018; Irannezhad & Mahadevan, 2021). Andrei and Sharon (2019) also proposed that blockchain technology can reshape the financial system of tourism industry, for example, the smart contracts implemented by the technology can make purchase of travel product easier and more reliable (Belousova, 2018; Dogru et al., 2018) because when the pre-configured condition documented in the smart contract is fulfilled, payment will be made automatically in a transparent manner. Specifically, once an individual books hotels and airline tickets through an online travel agency, all the transactions will be autonomously, accurately and immediately executed once the contractual terms are met, which not only secures payment but also optimises room and seat sales (Dogru et al., 2018; Pilkington, 2016). In the European Union, for example, travellers are able to exploit blockchain technology to plan their transportation and accommodation, as well as make payments (Lewrick, Link, & Leifer, 2018). Specifically, blockchain technology removes the barriers to trust, and facilitates peer-to-peer business models in the tourism industry (Önder & Treiblmaier, 2018); it also makes instant (seven transactions per second and each transaction takes 10 minutes to be confirmed) and frictionless (no intermediaries required to process transactions) currency exchange feasible (Tapscott & Tapscott, 2016). Dogru et al. (2018) suggested blockchain technology can, firstly, help hotels improve their service by providing seamlessly integrated service without intruding guests' privacy. Second, it can be used to track food to enable restaurants maintain quality control as well as food safety, and finally to help airlines and hotels modify their loyalty programs which may have caused more problems than the services they provided (Kowalewski, McLaughlin, & Hill, 2017; Udegbe, 2017). More importantly, blockchain technology can be beneficial in promoting a sustainable tourism industry (Erol et al., 2022; Önder & Gunter, 2022; Özgit & Adalıer, 2022) as consumers are keener to pay premium costs with the smart contract (Demirel et al., 2022). Low costs was also identified by Strebinger and Treiblmaier (2022) as one of the main reasons for travellers who use blockchain technology for travel plans.

The Unified Theory of Acceptance and Use of Technology (UTAUT) in Hospitality and Tourism Research

UTAUT is a model on users' acceptance of technology compiled and developed by Venkatesh, Morris, Davis, and Davis (2003) who referred to eight existing models

and theories namely, Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), Technology Acceptance Model (TAM) (Davis, 1989), Motivation Model (MM) (Davis, Bagozzi, & Warshaw, 1992), Theory of Planned Behaviour (TPB) (Taylor & Todd, 1995), combined TAM and TPB (c-TAM-TPB), Model of Personal Computer Utilization (MPCU) (Thompson, Higgins, & Howell, 1991), Innovation Diffusion Theory (IDT)(Roger, 2003), and Social Cognitive Theory (SCT) (Bandura, 1986; see Mills, Bolliger, & McKim, 2018). It has been validated by previous studies (Mulik, Srivastava, & Yajnik, 2018; Wu, Fang, & Lai, 2019), including tourism-related research (Sharma et al., 2020). Particularly, Antoniadis, Spinthiropoulos, and Kontsas (2020) proposed that UTAUT is an appropriate framework to explore insights on the successful exploitation of blockchain technology in tourism. Pertinent studies claimed that UTAUT has predictive efficacy of 70% to pinpoint end-users' use of technology. Venkatesh et al. (2003) further pointed out that 70% of behaviour intention in addition to 50% of actual use can be identified by UTAUT. Moreover, Francisco and Swanson (2018) proposed a user acceptance model on blockchain acceptance with four main effects for user intention and usage towards blockchain including performance expectancy, effort expectancy, social influence, and facilitating conditions with trust as the mediating effect. Trust influences people's attitude towards technology (Baki, 2020; Tseng & Fogg, 1999) and inter-organisational collaborations (Bruneel, Spithoven, & Clarysse, 2017). Nevertheless, Chang et al. (2022) identified facilitating condition as the most important factor for stakeholders' acceptance of blockchain technology intourism. Strebinger and Treiblmaier (2022) also adopted UTAUT to explore the underlying reasons why some travellers choose to use blockchain technology in their travel plan. They aimed to understand how traveller traits influence decisions and they reported that young males were keen to try new technology in their travelling.

With UTAUT, most previous studies (e.g., Nuryyev et al., 2020) relied on quantitative data to address the issue of using blockchain technology in the tourism and hospitality industry. However, empirical evidence extracted from qualitative research to examine how they work in practice, particularly from the perspective of providers, hotels and customers is still in need. As the use of blockchain in the tourism industry and hospitality is still at a very early phase (Nam et al., 2019; Yuan & Wang, 2016), multiple facets of the application of blockchain technology in the hospitality and tourism industry can be revealed and described through a variety of lenses. Based on the background and the purpose of this study, the research question formulated is:

RQ. At what level do Taiwanese stakeholders accept blockchain technology in hotel reservation?

To address this research question, the interview process used is described in the methodology section. Results of qualitative data analysis are presented and discussed followed by the conclusion and suggestions for future research because of the limitations of the current study.

Method

We designed the current study to gain a deeper understanding of the potential facilitators and barriers to the adoption of blockchain technologies by the practitioners of the tourism and hospitality industry in Taiwan. This study conducted in-depth face-to-face interviews to explore and understand the thoughts and ideas from tourism practitioners and users towards blockchain technology. At the onset of this study, the CEO of the first OTA that adopted blockchain technology (hereafter blockchain OTA) in Taiwan was contacted. After the purpose and process of this study were explained, the CEO agreed to join in the interview together with the Marketing Manager as well. To obtain opinions from hotels, six hospitality managers were invited to the interview. Among these six hotel/bed and breakfast owners or managers, three of them were clients of blockchain OTAs whilst the other three were not. During the interviews, participants were encouraged to express their personal opinions towards blockchain technology and share the operation procedure of their affiliations. Additionally, the researchers also invited three customers who had prior booking experience with blockchain OTAs to participate in the interview.

Interview questions were developed on the basis of previous research and all the questions were reviewed by a panel of three experts (two professors from the tourism and hospitality programme and one professor from the computer science department) to ensure appropriateness and soundness. The process of formulating the interview questions (please refer to the Appendix for the questions) was in accordance with the Delphi method and after three rounds of revisions, experts' opinions reached convergence. Interviews were conducted between August 2018 and November 2018. Each interview lasted around 40 minutes and the audio was recorded for transcribing. In the interviews, if any unexpected information was revealed, the researchers did follow-ups until saturation was reached (Silverman & Marvasti, 2008). The first interview took place at the headquarters of the blockchain OTA, and interviews with the six hotel owners or managers were conducted at their offices. Three individuals who had experience using blockchain OTAs were recruited from the official Facebook page of the blockchain OTAs, and they were interviewed at a café near their offices or residences. All these interviews were conducted on an individual basis in Mandarin and the background information of the interviewees are presented in Table 1. All transcript data were manually analysed by the researchers.

Table 1. Background information of interviewees

Interviewee Code Sign	Position	Affiliation	Background
DO	Chief Executive Officer	Blockchain OTA	He is the founder of this blockchain OTA in 2016
WO	Marketing Manager	Blockchain OTA	He has been in charge of the marketing promotion for this company for 3 years
SF	Marketing Manager	A five-star hotel in Taipei City	She has been in the hotel industry for 30 years and mostly worked for the marketing department
HF	General Manager	A five-star hotel in Taichung City	He is the general manager of this 400-room hotel which is owned by his family
CF	Manager	A four-star hotel in Kaohsiung City	He is a senior executive of this 298-room hotel who started from junior level and reached senior management level in 32 years
AN	Finance Manager	A hotel in northern Taiwan	He has been a finance officer of a 80-room hotel for 5 years.
BE	Owner	A hotel in eastern Taiwan	He acquired this 30-room hotel 11 years ago. This hotel's target customers are young independent travellers
DS	Manager	A B&B in southern Taiwan	She used to work at a four-star hotel in Taipei City for 5 years and has been working at this B&B since 2017 as the general manager.
RC	Customer	A university student living in Taipei	He is a junior student of a private university in Taipei City.
YC	Customer	An office lady residing in Taichung	She is the assistant to the General Manager of a technology company around the age of 34.
JC	Customer	A sales manager of a furniture company	He is in his early 50s and is always away on business trips

Each interviewee was assigned a code letter and the verbatim texts were coded with the code and date of interview. For example, the interview with DO on

September 28 would be coded as DO-0928. With the interviewees' agreement, interviews were recorded. Additionally, field notes were taken by the interviewer to cross-check with the audio files when transcribed. The verbatim transcripts were sent back to the interviewees to check if the verbatim transcripts reflected what they referred to in the interviews. Moreover, the researcher's interpretation of data was shared with interviewees to discuss and clarify possible misunderstandings.

The current study employed the customised UTAUT for blockchain adoption framework (Francisco & Swanson, 2018) to account for the factors that emerged from the group interview data. Furthermore, attention was paid for themes raised by the practitioners that were not included in the proposed model. As such, insightful information derived from interviews not only provide a qualitative evaluation of the UTAUT model, specifically on the applicability of blockchain technology in tourism from the practitioners' perspectives, but also can provide information about the key issues of this particular technology to increase the acceptance rates in the tourism industry. This study took, namely the conceptual framework presented in Figure 1, as a starting point and tested it qualitatively by collecting data in order to find out what factors impact Taiwanese tourism stakeholders' collaboration intention towards blockchain OTAs.
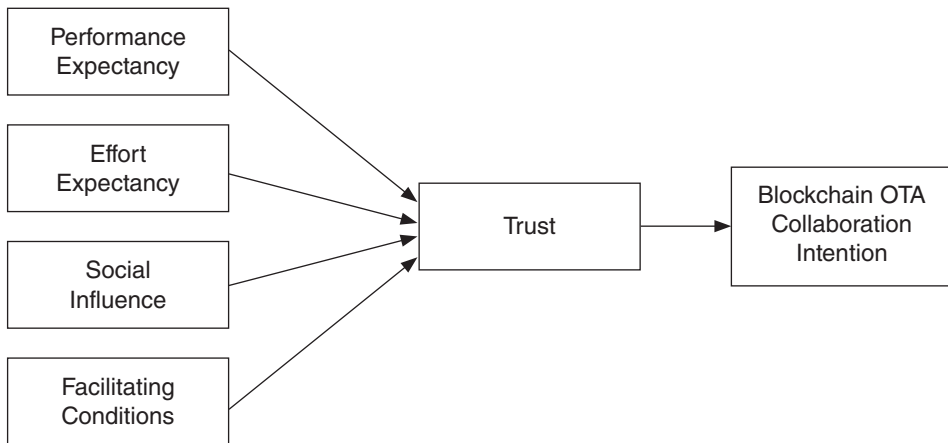
Figure 1. Conceptual framework of this research

Findings

Stakeholder Acceptance of Blockchain

In Taiwan, blockchain technology and bitcoin has become a popular issue in the past years (Yeh, Lu, & Hu, 2017). With its reputation as the very first OTAs to use

blockchain technology, thanks to media exposure (Navis & Glynn, 2010), many hotels as well as bed and breakfast establishments approached blockchain OTAs to seek partnership. Moreover, travellers were also aware of this new trend of booking accommodations for their trips. Comments from OTA operators, hotel/bed and breakfast managers as well as customers were inductively analysed and three reasons for using blockchain technology were categorised, namely cost, service and solutions.

Managers' performance expectancy of blockchain

Unlike most popular OTAs that are non-Taiwanese companies, this blockchain OTA can communicate with local hotels in local languages and understand the organisations' needs. The blockchain OTA mainly provided services, rather than technology, that brought their clients closer to them. Furthermore, hotel owner BE mentioned *"…blockchain technology is the way that facilitates or enhances their service to hotels"* (BE-1021) because of the decentralised nature of blockchain which makes hoteliers feel that they can control the operation on the internet, and which helps them trust the OTA. DS commented further:

> *"It was quite challenging for me to deal with OTAs. According to my own experience, they were not easy to negotiate with…I did not think our relationship with big OTAs was fair."* (DS -1101)

AN who owns a hotel expressed that:

> *"…other OTAs sometimes take advantage of us, for example, I set the room rate on our official website for say 100 USD per night, but other OTAs informed them that the room was sold at the rate of 30 USD per night and they could not do anything about it. I filed the complaint, but the OTA told me that they have the right to do it without their clients' permission. Afterwards, I moved my business to blockchain OTA."* (AN-1111)

Business operators are always looking for a way to reduce cost and increase their profit margin. Before the advent of blockchain OTAs, they would use the services of other OTAs which some interviewees admitted they could not afford. They expect better services or more affordable deals for them.

> *"I understand the importance of OTAs in helping us post information on the platforms for travellers. However, I am with this company, which can offer similar functions at a better price, so I just take my business to them."* (DS-1101).

Moreover, some interviewees expected that their employees' workload can be eased up. As CF put it *"...experts said that blockchain technology can be helpful with some routine errands and our staff can be released from these duties…"* (1002).

Organizations' effort expectancy towards blockchain

Blockchain OTA uses blockchain technology to stream the data stored in various databases or systems and keeps all data in a distributed ledger. All stakeholders (hotel owners, operation side, travel intermediaries, and even consumers) are able to see the details of every transaction and its timestamp. Hotel manager AN said that *"…we don't need to worry about double bookings or other related problems"* (AN-1111); accordingly, the issue of trust can be taken care of as a result of the transparency afforded by the blockchain technology.

Given the ever-changing trends of travelling, the number of backpackers or independent travellers has increased, and one important characteristic of such travellers is that they prefer staying at a local hotel or Airbnb accommodation to experience or immerse themselves in the local culture (Akbar & Tracogna, 2018; Belousova, 2018; Yannopoulou, Moufahim, & Bian, 2013). As YC mentioned *"I do not like to stay at a fancy big-name hotel because I love to experience local culture…I can locate more detailed information about small hotels from the blockchain OTA"* (YC-1109). This new type of traveling has led to a new market and ecosystem of the online hotel booking system. This was confirmed by one of the hotel operators:

> *"When we were working on the project with blockchain OTA, we had the chance to provide services to independent travellers. They normally have tight budgets for their trip and their expectations on accommodation were a clean place to stay, shower, and change. Service was not the main concern for accommodation selection."* (DS-1101)

The blockchain OTA has its own cloud database and private blockchain network, which can perform data analyses for clients, and the results of these analyses show that on average, the profit margin of their clients has increased by 20% to 30% since they have been with them. Accordingly, blockchain technology also fulfils interviewees' performance expectancy. Moreover, two services can be separately calculated (i.e., booking engine and Property Management Services) for future clients to plan their budgets. More importantly, *"…they get to switch to different plans according to their financial situation"* (WO-0928). The hotel manager who needs to prepare financial reports and plans for her supervisor shared that:

"It is easy to understand and user-friendly. With this system, my boss realizes how much money their company would need to invest and what kind of service they could get in return." (DS-1101)

Social influence of blockchain on customers

With regard to customers, most of the interviewees expressed that they can trust other customers' comments on a hotel. Young customer RC pointed out that *"…I know that once you leave a remark on blockchain, there is no way that you can change it"* (RC-1112). Moreover, customers do not need to worry about fraudulent transactions when using blockchain technology, which may also alleviate the level of trust. YC indicated that:

"I used to have some bad experiences with other OTAs before. There was one time I went to Japan and I booked a room through one OTA but when I tried to check-in, the front desk could not find my reservation information. Another time I was double charged by the OTA and the hotel. I filed a complaint to the OTA and finally got my money back. I did not expect something like this would happen." (YC-1109)

She further pointed out that she has never had this kind of problem anymore ever since she started using blockchain OTA. Furthermore, as interviewee AN highlighted, *"what we really care about is greater profit margin, in other words, we aspire for better services at lower costs,"* (AN-1111) which is naturally a primary concern for business operators.

Facility condition in the current accommodation industry

As the participants from both the hotel and customer groups were not experts in blockchain technology, hence, most of the responses were from the blockchain OTA CEO:

"Many people have heard of how blockchain works, for example, hash-based cryptography, Merkle Signature Schemes and Byzantine fault-tolerant algorithms, but we are not going too far into the technology part. All these aforementioned schemes are to create unchangeable records of transactions with timestamps on a peer-to-peer network. Our company adopts these technological advantages and applies them to its online hotel booking system, which streamlines data from various platforms." (DO-1101)

Although there are many innovative affordances offered by the blockchain technology to the online hotel booking system, the practice of using blockchain technology in hotel operations still lacks evidence. Star-class hotels do not see the necessity of using this technology. CF from a four-star hotel in Kaohsiung stated *"…I think our hotel will be ok without blockchain technology…"* (CF-1002). A five-star hotel manager in Taipei City SF echoed a similar point: *"blockchain is good but it is like 'sufficient but not necessary condition' to our hotel for the time being, especially when there are still security issues…"* (SF-1003). As blockchain is still at its early stage, four- and five-star hotels may adopt this technology in the future, but most likely they will wait for more established OTAs. They may feel more comfortable working with known OTAs because if any security issues were to occur, it will be easier to handle them. Even so, BE admitted that when blockchain technology is used by hotels, facilitating conditions and reduced costs are interrelated with each other. He elaborated on this:

> *"If I know that using this technology can reduce my costs of operation significantly, my competitors would definitely know this as hotel business is a small circle; on the other hand, the OTA told me that my competitors started to work with them because of the fact that the costs will be reduced. I did not buy it in the first place and after I tried, it turned out to be true…the spreadsheet showed that the costs did drop…"* (BE 2012)

In terms of the use of cryptocurrency in their hotel operation, most of the blockchain OTA's business partners have yet to accept any digital currency for reservation or transaction, although the blockchain OTA has encouraged their partners to do so. BE pointed out that *"digital currency may be convenient, but I prefer the old school way"* (BE-1021). From the financial department perspective, they are expected to learn how to manage the compilation of real cash flow and cryptocurrency which will increase their workload. AN expressed, *"…I do not have extra time and effort to do extra work of combining two systems into one and figure out how to file tax for the hotel"* (AN-1111).

The points raised by the WO from blockchain OTA supported the abovementioned statement:

> *"Small hotels or bed and breakfasts, have limited capability and resources to design and maintain their official websites, so they usually outsource to professional web designers or use the online booking system of OTAs."* (WO-0928)

Meanwhile, the CEO of the blockchain OTA clarified this:

> *"To be honest, our clients did not care whether we used blockchain technology or other technology, they only cared whether they were able to benefit from using our service."* (DO-1011)

Trust level for blockchain

When a hotel starts a partnership with OTAs, it aims to have more channels of marketing so that customers can plan their trip easier. Therefore, the technologies offered by OTAs may not be their primary concern; instead, the market share of an OTA does matter, especially from a hotel's marketing perspective. Most blockchain OTAs are start-ups and thus have not built up a reputation in the market yet. As SF said *"…working with a small OTA will be risky to our hotel…"* (SF-1003) and hotel manager HF elaborated further on this:

> *"I like to expand our businesses through working with various partners including OTAs. However, I am not sure if working with a start-up is a good idea because OTAs will be different because they will acquire some personal information of our customers/guests."* (HF-1024)

Furthermore, another hotel manager CF explicitly stated that *"blockchain technology may have its advantages but we just simply don't see its full applicability yet…"* (CF-1002).

For the three hotels which have done business with blockchain OTAs, their partnership actually commenced from personal friendship; in other words, their trust is based on the OTA, instead of the blockchain technology per se. Hotel owner BE stated that *"I have been acquainted with the CEO of this OTA for more than a decade and I trust him more than the technology…"* (BE-1021). The general manager DS addressed the isseue by pointing out:

> *"I personally do not know blockchain OTA before; actually, I have never heard of them. It was my boss, the owner of this B&B, who decided to partner with this company. I think he knew some people in this company…since it was his decision, we started to use this system and it turned out pretty good. Blockchain technology did help me manage this B&B in a more effective and efficient way…I think blockchain technology has already earned my trust."* (DS-1101)

The case of finance manager AN is a little bit different. He understood how blockchain technology works and hence trusted that it could be advantageous in terms of hotel management. For this reason, he convinced the owner of his hotel to work with the blockchain OTA:

> *"Because of my finance background, I am quite familiar with the trend of FinTech which includes blockchain. However, my knowledge about blockchain technology at that time was mainly about cryptocurrency which I hesitate to use even today. One day, I watched the news talking about this blockchain OTA and I realized it could be of great help to me. It took awhile for me to convince the owner to adopt blockchain…I would say I trust blockchain technology because of my own experience."* (AN-1111)

Nevertheless, blockchain OTAs still face an uphill task in securing partnerships with star-class hotels. The three managers of star-class hotels were quite familiar with the trend of emerging technologies, and they have all heard of blockchain. Nevertheless, their hotels are not planning to partner with blockchain OTAs yet. One of the reasons could be the nascent stage of the blockchain technology, particularly its applicability in the online booking system. Taiwanese owners are reluctant to be the first mover, especially in technology adoption (Leung, 2019) because they do not trust that new technology is stable and reliable. Five-star hotel manager HF pointed out:

> *"I think blockchain technology is trendy; nevertheless, I do not see its applicability in hotel booking just yet. Maybe in the future, blockchain technology will be adopted by major OTAs, its current form is still not ready to be used at least by our hotel."* (HF-1024)

Even though blockchain technology is renowned for its security because of distributed ledger technology (DLT), it is still not immune. No one can guarantee the invulnerability of blockchain, including the blockchain OTAs themselves. As pointed out by DO *"…to be honest, blockchain is generally safe but not risk-free"* (DO-1011). Furthermore, CF highlighted:

> *"Our hotel was interested in the blockchain OTA in the first place because my boss said that this system is safer but after I checked with the CTO of our hotel who advised me to hold because you know the "51% attacks" does potentially happen especially while the number of parties on blockchain is not too big."* (CF-1002)

When this security issue was asked to customers, JC raised had an interesting point:

> *"It seems that data on the internet would be breached in either way, I'd prefer that my data would be stored in big OTAs instead of blockchain OTA because big OTAs usually have extensively larger databases and blockchain OTA's database should be much smaller. It is like one small fish in a big pond and one big fish in a small pond…you know what I mean…"* (JC-1112)

HF from a five-star hotel reiterated the same as he stressed that "*I only go with big companies in terms of cybersecurity*" (HF-1024). For small hotels or bed and breakfast. security issues may not concern them too much as DS pointed out, *"we can't afford big OTAs and blockchain OTAs may have some possible security concerns. We can live with that…"* (BE-1021).

Findings elicited from the qualitative data are presented as a conceptual model (Figure 2).
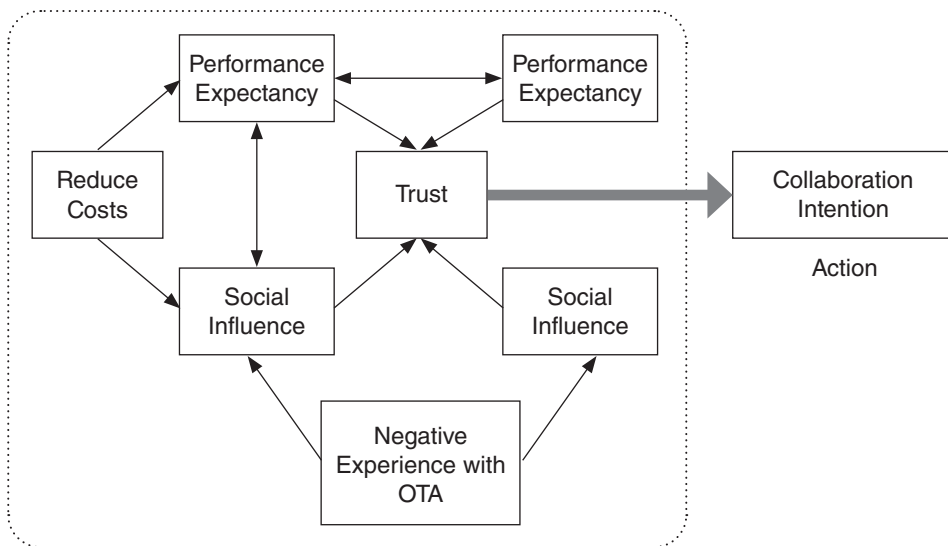
Figure 2. Conceptual model of the present findings

Discussion and Implications

Blockchain technology creates new opportunities for the sharing economy, by altering conventional e-commerce operations through effective and efficient reallocation of resources (Pazaitis et al., 2017), including the tourism and hospitality industry (Miraz, Hasan, & Masum, 2020). The emergence of sharing economy services

such as Uber and Airbnb has changed how people plan their trips. As mentioned by YC, providing support to small hotels and avoiding branded hotels appears to be a new and popular trend amongst the younger generations. Nevertheless, the essence of the sharing economy cannot be optimised without mutual trust between service providers and users. Blockchain technology can deal with the trust problem effectively as stated by Hawlitschek, Notheisen, and Teubner (2018).

Nevertheless, as blockchain technology is still in its infancy in practice (Yuan & Wang, 2016), some hotels managers (e.g. DS and AN) hesitate to adopt or collaborate with organisations using it. More empirical evidence is still needed to extend the understanding of its applicability in the tourism and hospitality industry (Önder & Gunter, 2022; Thees, Erschbamer, & Pechlaner, 2020). Furthermore, the decentralisation of blockchain, that is, distributed ledgers, can further alleviate the problem of trust, which is engendered by peer-to-peer business models or hotels in their relationship with online travel intermediaries. On the other hand, trust also plays a role in inter-organisational collaborations. Blockchain technology is a newly developed platform, so traditional organisations might not take the lead to adopt.

As mentioned by Finance Manager AN, he understands the advantages and potential about blockchain; therefore, he trusts blockchain could help his hotel, which is in line with the sentiments expressed by Demirel et al. (2022), "the advantage to traditional payment and hotel services is that the contract can be updated and secured in the blockchain" (p. 1896). On the other hand, start-up organisations can take the lead as pioneers to test these new technologies so that they could become future leaders once their strategy is proven successful. However, more than half of the start-up organisations often do not make it to their fifth year (Smallbiztrends. com, 2019). Our interviewees reflect a similar standpoint that most well-established organisations may hesitate to collaborate with newly developed organisations as they worry the collaboration would not last long, or they would get into trouble if the business partners close down.

The customers in this study demonstrated a positive attitude for blockchain as a reliable system to trust, which corroborates with the findings of Miraz et al. (2020). The growth of individualism in tourism will likely lead to personally shared experiences being important in future marketing strategies (Zsarnoczky 2018), which may create a long-tail effect (Brynjolfsson, Hu, & Smith, 2006) in the hospitality industry to help small-scale hotels stay in business. Any members of the blockchain who post discriminatory reviews will be identified by everyone else and blacklisted (Cheng & Foley, 2018).

As pointed out by Filimonau and Naumova (2020), blockchain technology will entail collaborative business models in the tourism and hospitality industry. From the opinions shared by the interviewees, most of them agree blockchain could enhance organisational performance and simplify operation procedures. For small and

medium-sized hospitality organisations, blockchain OTAs can handle the technical tasks for the reservation system to reduce the investment and labour cost for IT systems. This is especially so as small-scale hotels and lodgings are usually short on employees with expertise in e-commerce or database management. Before the advent of blockchain technology, they would collaborate with general OTAs. Nevertheless, incompatibility between the various platforms usually encourages an overbooking strategy (Ye et al., 2017) to ensure a high occupancy rate (Dong & Ling, 2015). However, such strategy carries the risk of the hotels damaging their reputation. As such, blockchain-based booking systems may be able to solve this problem with decentralised ledgers and smart contracts, which echo the concept of compatibility and transparency in IR 4.0 (Belousova, 2018; Khanna, Sah, Choudhury, & Maheshwari, 2020). This is the major reason given by one of the interviewees in choosing to collaborate with a blockchain OTA to avoid overbookings and receive complaints from customers.

One other reason blockchain technology can be of great help to both hotels and OTAs and/or meta sites is its capability to create distributed consensus among various parties (Greenfield, 2017). OTAs, such as Booking.com, take approximately 25% of the per night price from each transaction that is made through their platform (Seigneur, 2018). To decrease the operation cost, hotels in this study try to be less reliant on OTAs because of hidden information and the interaction between them and OTAs, which can be solved with blockchain technology.

The findings of this qualitative research offer both theoretical and practical implications. The theoretical implications lie mainly in advancing our knowledge of the UTAUT model. Firstly, based on the interpretation of the interview data, the relationship between constructs of performance expectancy and effort expectancy were found to be two-way and so is the relationship between performance expectancy and facilitation conditions. Such relationships were identified and analysed through qualitative data. Prior studies (Attuquayefio & Addo, 2014; Zhou et al., 2019) have shown the bilateral associations between these constructs and this present research confirms that such associations are still accountable for the practitioners' acceptance of blockchain technology in tourism sectors. Interestingly, the present research reveal some new information, specifically how the factor "reduced costs" is associated with "performance expectancy" and "facilitating conditions", which to our best knowledge, has not been fully explored yet. As claimed by Zhong, Coca-Stefaniak, Morrison, Yang, and Deng (2022), "One of the motivating factors for the hospitality industry to adopt smart technologies is to reduce costs and improve efficiency" (p. 1067). Thus, reduced costs is indeed a very critical factor of performance expectancy and facilitating conditions on whether blockchain technology should be adopted or not. On a similar vein, facilitation conditions would also affect the reduced costs. In other words, the Economic Order Quantity concept by Riza, Purba and Mukhlisin (2018)

can also be applied to the supply and demand balance of blockchain technology usage in the tourism and hospitality industry.

In terms of the relationship between social influence with others, as the business scale of blockchain technology in the tourism industry is still small, not much influence can be exerted. Accordingly, social influence can only affect the trust that hotel operators and owners have towards blockchain-based OTAs. Equally important, their negative experience of working with OTAs would play a decisive role in the facilitating conditions and social influence of their decision to adopt blockchain technology for their operations. Nevertheless, all the predictors of UTAUT would lead to one variable, trust, which also leads to the collaboration intention with blockchain-based OTA. As presented by the research model, trust is placed in the central position of the model as a potential mediator and all the predictors of UTAUT need to go through trust to reach their collaboration intention. Even though this present research employed the qualitative design, possible mediators can still be identified as what Laparidou, Middlemass, Karran, and Siriwardena (2019) did in their research.

As for practical implications, the present study highlights that the most salient benefit that blockchain technology can bring to hotel operations is solving the problem of lack of trust in the traditional operation and management. All the predictors of UTAUT need trust as the mediator to the participants' collaboration intention and such a finding reflects the work of Iqbal, Jose, and Tahir (2022), which included trust in their UTAUT model. Based on the findings of this present study, gaining trust should be the primary task if blockchain technology is fully accepted by the practitioners of the tourism and hospitality industry, particularly when they try to use peer-to-peer transactions in the sharing economy. However, as Francisco and Swanson (2018) put forth, pertinent research on the applicability of blockchain technology usually generates more research questions than it actually solves. Blockchain technology has taken care of the trust issue but its integration with traditional operation remains unsolved. Furthermore, five years have gone by since the interviews took place, and the application of blockchain technology in the tourism and hospitality industry is still limited even as development technologies continue to introduce newly emergent topics. Further, the non-fungible token (NFT) in metaverse tourism will become another appealing research topic in the near future (Ante, 2022).

Conclusion and Limitations

As highlighted earlier, blockchain technology is still at its development stage and still far from maturity (Yuan & Wang, 2016). Intense research on technology perspectives as well as novel applications in business, particularly in the hospitality and tourism industry are still needed. It should be noted that as the hospitality industry moves from Blockchain 1.0 towards Blockchain 2.0 and 3.0, an increasing number of new business models in the field of hospitality and tourism industry will emerge. Perhaps

it is yet too early to gauge if blockchain or any other pertinent technologies will drastically revolutionise the business world. However, it is worthy to dedicate our efforts to exploring more potential advantages and possible disadvantages before blockchain technology is adopted widely in the tourism and hospitality industry. The purpose of this study is not to examine a conceptual model using statistical analysis but to demonstrate context-dependent patterns. Furthermore, this study focused on the early stages of the process of creating legitimacy and the formation of alliances, but not the performance of alliances (Binz, Harris-Lovett, Kiparsky, Sedlak, & Truffer, 2016). Nonetheless, this case study may serve as a starter to attract more academic investigations. As Yin (2003, p.120) asserted, "the goal (of a case study) is not to conclude a study but to develop ideas for further study." Future studies may continue to examine the alliance performance of the innovative blockchain technology-based online hotel booking system.

This study empirically confirmed that trust plays an important mediation role in the UTAUT model. For small and medium-sized hospitality organisations, their trust level for start-up organisations is higher than star-class hotels. Hospitality stakeholders, especially Taiwan-based, hesitate to be the pioneers of new technology (Leung, 2019), and they do not trust newly developed organisations as their first five-year failure rate is high. This study also reveals that the relationship between small-scale hotels and OTAs is changing. Transparency in marketing and operation strategies of hotels as well as OTAs will be expected by all stakeholders. Furthermore, smart contracts of blockchain technology may expedite the development of the sharing economy which will possibly innovate the tourism and hospitality industry in the near future. These implications call for more empirical studies for further exploration.

One major limitation of a single case study is the generalisability of the findings and certain information-processing biases (Eisenhardt, 1989); therefore, caution should be taken when referring to the results of this case study. It is advisable to design a large-scale study with quantitative data to secure the issue of generalisability. Another limitation of this study is that no information was collected from the standpoints of end users whose experience of using blockchain OTAs will be pivotal in designing better versions of the next booking system. As such, future studies may focus on exploring clients' feedback with a ground theory design and develop a conceptual model. Furthermore, whether or not the use of cryptocurrency will be accepted by the hospitality and tourism industry worldwide was not covered by this current study; however, potential risks on the safety, tax and price stability may be engendered (Kwok & Koh, 2019).

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APPENDIX

Questions for hotel operators/managers/owners:

1. What do you think of the experience of working with blockchain technology OTAs?
2. How does blockchain technology help you in terms of the operation and management of your hotel?
3. What kind of preparation that your hotel needs to do to integrate blockchain technology with your current system? Both information system and employee training.
4. What was your perception or understanding about blockchain technology before your hotel started to work with it?
5. How did you know about this specific OTA and why did you want to have partnership with them?
6. What do you think the most important changes or benefits that you have had since your partnership with this OTA?
7. What was your previous experience of working with other OTAs?
8. What do you think of the performance of blockchain technology in terms of helping your operation and/or management?
9. Please name three advantages and disadvantages that you think about the adoption of blockchain technology in your operation.

Questions for travellers:

1. Why did you choose this OTA in the first place?
2. What was your experience with other OTAs and what about this OTA?
3. What do you think of blockchain technology? How about in travel planning?
4. What is your reflection about the performance of blockchain technology in your travel plan?
5. After this trip, how are you going to evaluate this OTA and blockchain technology?
6. How did you find out this OTA?