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BLOCKCHAIN IN HOSPITALITY AND TOURISM INDUSTRY WAY FORWARD

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Abstract

The paper discusses the scope and impact of blockchain technology-BCT adoption in travel and tourism. Based on a review of literature and the few adoptions of Block chain technology in hospitality and tourism the paper reflects that BCT truly captures benefits and enhances the effectiveness of this technology and growth potential of hospitality and tourism industry. Starting with fundamental understanding of blockchain framework and systematic structure, functioning and scope of a blockchain system the paper discusses the critical factors, potential drivers and challenges of its adoption in the hospitality and tourism industry. The paper highlights the scope and use of blockchain in tourism and hospitality industry. In the post Covid time there exist big dilemmas in tourism and hospitality industry dealing with the disruption in its value chain which requires blockchain technology to smoothen its value network. Further, more empirical work is required in this regard to strengthen the hospitality and tourism industry. The paper suggests research gaps and directions for possible future studies that facilitate strengthening, sustainability and feasibility of supply chain in hospitality and tourism industry. Blockchain technology has definite potential to strengthen, sustain the competencies and transform the hospitality and tourism industry. The applicability of blockchain in hospitality and tourism industry embarks up its salient features like transparency, anonymity; integrity, decentralization etc enable more secure end to end customer management systems. An interaction within the supply chain structures facilitates customer movement with tourism and hospitality physical kiosks.

Keywords: Tourism, Hospitality, Blockchain.
JEL CODES: O33, O35, Z32

Introduction

Last decade has witnessed mega-financial disruption in form of Global financial crisis in 2007-08 followed by global economic disruption with covid-2019. The global value chain, supply chain and several business models collapsed and struggled to sustain amidst the pandemic.

The need for blockchain technology was amplified and its application in several value chains and business models was felt as critical plug in. This need for blockchain emanates from the basic fundamental that blockchain can potentially alter the basics of data storage and use making its transparent and secured. Pre pandemic era witnessed the disruption in supply chain across sectors that were becoming leaner, cleaner, and smarter. Cost cutting was a potent tool to enhance cashflows and profits. Pre Covid the disruption in value chain had commenced and across globe, the companies were competing to become as lean as possible, streamlining costs and gestation lags, and realigning operational flows, thereby maximizing comparative advantage strategies.

Companies were creating competencies and advantage by simply realigning supply chain activities in countries for specific advantage. The pre Covid value chain took advantage of country comparative parities, products and services were located or shipped to destinations to merely take advantage of value chain anomalies and then return to domestic country to be sold to the consumer at high price. The tourism and hospitality industry also suffered as services across countries came with out of the box pricing and opaqueness. Further the hospitality and the tourism domain composed of several distinct sub-sectors (e.g., e-business, information retrieval, online purchasing, marketing, website analysis, and e-research methods) which in itself acted as separate distinct verticals without any interaction with any activity in the value chain creating logs, blocks and mispricing and misinformation.

The rise of digital consumers, the growth of artificial intelligence (AI) techniques, the heterogeneity of digital platforms is defining a new dimension for trust and security (Florian Hawlitschek, Benedikt Notheisen, and Timm Teubner 2018). Considered to be "the key building block of society", trust plays an essential role in the formation and consolidation of business interactions and relationships (Clare Inkson and Lynn Minnaert 2018).

Blockchain deployments are inclusive, interoperable, and have integrity for strengthening supply chain in this era. As per IDC's Worldwide Blockchain Spending Guide, the European blockchain spending of $1.4 billion for 2020 is expected to showcase growth at 58% CAGR by 2023 (Dragov, La Croce & Hefny, 2020). Blockchain technology has shown immense promise to realign the global network amidst Covid (Nish Kotecha & Shawn Muma 2020).

The emphasis of all business models is to imbibe the internet of things, digitalization, artificial intelligence (AI), including technology like blockchain in their business design to steadily grow and sustain their cash flows. Blockchain has revolutionized several industries, including finance, supply chain, healthcare sector and the hospitality and tourism industry. Capacities in Blockchain are unlimited including its decentralized approach.

Due to its decentralized technology, technology features like inscrutable data infrastructure, openness, and cryptanalytical encoding tools makes the business activity decentralized with transparency, creativity, and less cost. The once created blockchains do not leave any room for modification as it requires huge effort and resources to design business transactions. Once a business transaction is created in blockchain environment it is authenticated. Once verified it is encrypted to sequential transactions in the value chain with a hash. Each hash is unique and is the identity code of the transaction which makes it unique and unduplicatable. Any manipulating to alter the existing hash sends alerts to all members thereby blocking any attempt by hackers or competitors in the value chain to change the encrypted data. Once hashed the data on blockchain is then made available to all users and stakeholders in the value chain network. Once generated data is the authenticated data and validated by all stakeholders in the network.

Blockchain technology has emerged to provide several cases wherein it tackled the Covid 2019 crisis struck businesses. Businesses especially that dependent on physical supply chain like hospitality and tourism and required feel good factor at all levels were benefitted more with blockchain technology. Customer and data movement became smoother and value creating as data moved through blockchain technology. Role of middlemen and idle information and parallel information was removed at all points.

In this paper, we focus on the hospitality and tourism industry which has been badly hit during the pandemic. The underlying technology of blockchain uses latest computer technologies, data ledgers with end to end encryption, decentralized distribution to all end to end users and network points, secured from end to end and requires minimal investment. The smartness and openness and security of blockchain aim at reducing all overlaps and redundant information which are big problem in hospitality and tourism industry. Differentiation between relevant and irrelevant information and pricing is the key to customer satisfaction, delivery of service and pricing of end service. The algorithmic and encrypted blend of blockchain technology is being touted as a disruptive innovation of the internet era. From an application standpoint, the ultimate capability of this technology is the ability to authenticate transactions chronologically, including but not limited to facilitating transactions for products and services, reservation and booking activities, payment clearing, supply chain management, entering into contractual agreements as in financial, banking and e-commerce sectors (Anderson, 2016; Crosby et al., 2016).

Cryptocurrencies is the initial and most popular application of blockchain technology, wherein virtual currencies are designed to use cryptography for secure payments, trading and investments. Blockchain's replicated and decentralized database treated as global ledger and tracks and communicates transactions between participants. Blockchain technology reduces any risk or loss as each transaction source

and end user is distinctly hashed and encrypted and cannot be duplicated as in currencies like Cryptocurrency (equities and stocks) (Biella and Zinetti, 2016). Blockchain technology is not limited to cryptocurrencies. the blockchain has now several emerging applications as its platforms is found to provide interactions among companies, organizations, communities, stakeholders and even nations (Gupta, 2017). Blockchain technology thereby eliminates any overlaps, duplication reducing probability of fraud and errors. With so much transparency and clarity value chain becomes more efficient and secured. This reduces overall value chain cost and facilitates sustainability of supply chain, slags, lags, vendor management, customer management, control systems and competitor management to facilitate more efficient supply chain management (Pilkington, 2015; Wright and De Filippi, 2015; Davidson et al., 2016; Hackett, 2017).

This paper proposes a systematic literature review to evaluate, identify the theoretical concepts, framework and implementations of the Block chain technology in the tourism and hospitality domain. The paper discusses the results of the analysis; augment the understanding of the current state, benefits, and challenges of BCT application in hospitality and tourism.

Review of Literature

A blockchain can be defined as a "a digital, decentralized and distributed ledger in which transactions are logged and added in chronological order with the goal of creating permanent and tamperproof records" (Treiblmaier 2018).

Table 1: Blockchain characteristics (cf.Treiblmaier 2019)

Characteristics	Explanation
Immutability	Data in blockchain cannot be changed. Tampered data can be easily recognized and eliminated
Transparency	Data on a blockchain is visible to users. They share same view on data
Programmability	Programmable blockchains allow specification of rules that are automatically executed in case prespecified conditions occur
Decentralization	Blockchain technologies do not rely on centralized control point. Consensus protocols define how dispersed entities agree on what should be written onto a blockchain and the prevailing stare of truth.
Anonymity	The visibility of identifying data in blockchain ranges from full anonymity over pseudonymity to full identity.
Consensus	A consensus mechanism is applied to achieve agreement on state of a network including the validity of transactions and how decisions can be made.

The hospitality and tourism industry is a fixed asset intensive industry that requires rigorous innovation and upgradation (Colombo, E., & Baggio, R. (2017). With

current disruption the digitalization has affected their operations blocking fundamental innovations (Treiblmaier and Onder, 2018). During pandemic the hospitality and tourism industry has been affected badly which is expected to pick up post Covid. Covid has created the rise of the digital customer and brought about paradigm shift in the security landscape of customer relationship management, customer database management and online transactions. This in turn has resulted in creation of e-payment gateways, third party payment gateways. The competency of hospitality industry has faced serious challenges wrt to interest rate liberalization, narrow profit margins, volatility in earnings and free-cash-flow (Madanoglu et al., 2018; Ozdemir and Kizildag, 2017), the flaws, gaps and leakages in operational supply chain, seasonality impact in value chain flow, skewness and kurtosis in tourism expenses and spending, hospitalization expenses, diagnostic and medical tourism expenses, and consumer spending patterns and inconsistent non-sustainable capital expenditures (Kizildag, 2015; Barreda and Kizildag, 2015; Kizildag and Ozdemir, 2017; Dogru and Sirakaya-Turk, 2017; Ozdemir et al., 2013; Madanoglu et al., 2012). Blockchain can help eliminate the weakness of this industry by making it decentralized, transaction immutability, resiliency against cyberattacks and fault tolerance and permission-less, promoting the formation of multi-center guest operations and customer service and weakly intermediated loyalty programs and review and rating systems. The hospitality and tourism sector is now emphasizing on the implementation of blockchain systems (Pilkington et al., 2017). The technology and sustainability connect in tourism has created scope of research in the sector (Sigala, 2018). Digitization and technology convergence have created platforms like digital marketing, virtual reality, air travel, bookings, diagnostic and virtual consultancy, etc., which make tourism and medical tourism more viable as business model for firms. It has been shown that there exists positive impact of various technology applications on tourism sustainability (Ali and Frew, 2014), especially in smart cities and smart destinations where emphasis is to create sustainable tourism development (Gretzel et al., 2015). However, this study is very descriptive, as it technological features of blockchain can "automate" existing tasks like blockchain payment or contracting system that automates existing processes and service delivery systems (Nikbakht, E., Shahrokhi, M. and Corriette, A. (2019).

Research Methodology

The paper two-step research methodology starting with a broad review of all major contributions in field of blockchain technology-BCT application. First an online search was initiated based upon specific keywords like "blockchain", "blockchain technology", "travel industry", "hospitality sector", "blockchain and travel", "blockchain applications in hospitality", etc. We ensured that the keywords were mentioned in a paper's title or abstract. 56 papers were identified.

The papers were then categorized into the following categories "blockchain and travel" and "blockchain and hospitality industry". The papers were also filtered on basis

of publication time period. Selected papers were from last 6 years. ScienceDirect and Scopus are the websites used for searching publications (refer figure). Data crunching and subsequent analytics has been performed using tools provided by Scopus (Davide Calvaresi, Alevtina Dubovitskaya, Jean Paul Calbimonte, Kuldar Taveter, and Michael Schumacher 2018).

While selecting the papers following inclusion criteria have been considered: A) Relevance: The primary studies should define their contributions in the context of blockchain technology employed in the tourism-related systems. B) Objective: The purpose of primary studies has to refer to applying blockchain technology in business firms creating better value chain in terms of transparency, loyalty, traceability, commitment, security, and trust in tourism and medical tourism. C) Theoretical basis: The primary studies should provide at least one of the following elements: [visionary formulation, theoretical definition, system design]. D) Business application: The studies should provide at least one of the following elements: [practical implementation, tests, critical analysis, evaluations, or discussion].

Important Milestones-Cases Created in hospitality and hotel industry Using BCT

Rezchain by Webjet limited

Webjet limited is digital travel firm headquartered in Australia. Webject is one of the prominent online travel agency based in Australia founded in 1998. In 2019, it adopted Rezchain, a blockchain based technology software co-created with Microsoft, to remove information anomalies in booking and customer service. The software aligns travelers, hotels and agents in terms of any booking, timing, and anomalies. All specification related information asymmetry is removed regarding price, booking status, currency conversion rates, room type, medical service, type of bed and room, special request etc. since its inception Rezchain has smoothened the settlement process between suppliers and travel partners, aligned different IT platforms of different end users in the value chain like hotels, travel partners, agents, hospitals etc.

Sandblock-SAT

Sandblock-SAT is a blockchain technology based on Ethereum hashing, and facilitates small companies and businesses to join large companies' loyalty programs. It helps users maximize points collected through loyalty programs where loyalty rewards are distributed in form of Cryptocurrency. SAT is Sandblock's share currency and is used as index or benchmark for all companies' loyalty tokens. So different companies peg their Branded Token to the SAT. This controls token value volatility and streamlines the loyalty and reward based system to customers through SAT.

The Known Traveler Digital Identity System-KTDIS

KTDIS is a joint platform developed by Accenture and the World Economic Forum that collects and hosts information from frequent international travelers. KTDIS provides travelers digital data like biometric, e-passport to border regulatory authorities, car rentals, hotels, airlines, agents etc for law enforcement, border security, entry exit compliance, immigration, aviation security, hotel, taxi bookings etc. the travelers' digital data is encrypted and distributed across to stakeholders. Mostly it uses Zero knowledge proof-ZKP capabilities as verification technology. ZKP is cryptographic algorithm that helps users to verify information without disclosing it. ZKP is actually not a real time encryption but a binary means of coding data on blockchain with data as either yes or no.

TravelChain

TravelChain is a decentralized blockchain platform created to access and validates smart data for travelling purpose. It allows users to collect and monetize travel data, and receive tokens as compensation for sharing with travel service providers. TravelChain is grapheme based blockchain which unlike other standard blockchain bifurcates data as public which is available for all users, and private which is controlled by public keys to secure data for specific users. The traveler's information is obtained by providing reward to travelers in form of travel tokens, discount and vouchers. The travel related businesses purchase customer data and provide discounts, rewards and better customer experience customized to the traveler data.

Maintenance, Repair, and Overhaul (MRO) blockchain

SITA World Tours, in 2019-20 entered into strategic alliance with the key airline industry competitors namely Bollore Logistics, Cathay Pacific, FLYdocs, HAECO Group, Ramco Systems, and Willis Lease Finance Corporation, supported by Clyde & Co with sole objective to use blockchain technology to digitally track, trace, and record the movements and maintenance of aircraft parts especially manufacturing, logistics and smart contracts and share the information with players in the value chain like airlines, lessors, equipment manufacturers, logistic suppliers, maintenance suppliers etc. The blockchain technology used is maintenance, repair, and overhaul (MRO) blockchain.

TUI Bed-Swap: TUI, the largest tourism company in the world and has strong portfolio of tour operators, travel agencies, hotels, aircrafts, airlines, cruise liners, online portals connecting major holiday destinations across globe, was among the first to truly commit to blockchain technology, through the launch of 'Bed-Swap'; an in-house Blockchain project. The technology facilitates TUI to allocate beds as per demand and shift the beds across users as per availability and demand.

LIF-Token by Winding Tree

Winding Tree is a non profit firm that aims to create is an existing open-source demand and supply side marketplace for inventory tracking in travel distribution network through use of LIF currency based on blockchain that connects buyers and suppliers directly. Several airline companies, including Air New Zealand and Lufthansa, have already entered a partnership with the platform, with advantages including example of a blockchain booking and baggage a lack of third-party involvement with booking procedures, and greater transparency and traceability when it comes to baggage tracking services. Winding tree has floated LIF which is like Cryptocurrency using blockchain. LIF is a token based on ERC827 token open standard and is based on Ethereum framework. LIF is based on Ethereum, but unlike Ethereum it can be used to bundle services and products like hotel reservation with car booking and flight booking. LIF tokens also minimize foreign currency fees when travelling across countries.

Conclusion

Blockchain technology post Covid has got the much desired impetus and desired motivation to be adopted in the industry especially service industry like hospitality and tourism. Although still in its nascent stage but companies across globe especially in hospitality and tourism industry are rampantly adopting blockchain in its supply chain to sustain it in the long run. Researchers across the world are working towards creating applications and frameworks involving the applicability of blockchain in the travel and tourism industry. The consequence of the rapid research being conducted in the past few years has led to an increase in acceptance of blockchain thus resulting in new and relevant use cases from within the travel industry. The integration of blockchain ensures enhanced customer data privacy and the facilitation of paperless travel experiences. The paper discusses significant insights to its readers regarding the importance of blockchain technology in the travel and hospitality industry. The aim of the research was to explore blockchain technology from the perspective of the hospitality industry. The work identifies the extent of research that has been conducted for the past five years in areas of blockchain technology and its integration with the travel and hospitality industry. The paper presents important case studies from the hospitality industry that facilitates the researchers to study the trend and way forward for blockchain adoption. Furthermore, it allows all of us to think about further questions to investigate. What are the challenges of the adoption of blockchain technology in the hospitality industry? How integration with blockchain contributes towards revenue generation for the hospitality industry? However, the paper presents itself as an interesting contribution towards existing literature and will assist readers in exploring new avenues and adding advancements to the current scientific research.

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