Blockchain and Tourism

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Abstract:

Blockchain technology came into existence after the introduction of concept of Cryptocurrencies. This is platform which records the transactions in chronological order on the online platform. The main feature of this technology is that the information once entered can never be changed or erased and even order can never be altered. Blockchain has numerous applications in different fields. Tourism industry also couldn`t kept itself aside of its usages.The paper focuses on the concept of Block chain and its applications in tourism industry.

Keywords: Concept of Blockchain, Blockchain and Tourism, Cryptocurrency and Blockchain, Tourism and Online Transactions, Tourist reviews.

Introduction:

Due to wide potential of Blockchain in storage, data transparency, security and improving transaction capabilities, it has been created many excitements within many industries and fields.Blockchain has created a new form of reliable Internet where the information can be distributed but cannot be copied or altered. According to Don & Alex Tapscott, Blockchain revolution, 2016 “The Blockchain is an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value”.

A Brief History of Blockchain:

Blockchain technology made its public debut inthe year 2008, when a white paper “Bitcoin: A peer to peer electronic cash system” was released under the name of Pseudonym Satoshi Nakamato (whose true identity is still unknown).

Bitcoin came into existence on 03rd Jan, 2009, When Satoshi Nakamato mined the first Bitcoin Block and received 50 Bitcoins as reward. The first recipient of the Bitcoin transaction was Hal Finney, who received the 10 Bitcoins through the world's first Blockchain transaction done by Satoshi Nakamato on 12th Jan. 2009. Earlier it was believed that Blockchain and Bitcoin was one, but in the year 2014, the more Applications of Bitcoin was realized rather than Cryptocurrency transactions.

Blockchain technology is considered as the open and decentralized electronic ledger where transaction is recorded between two parties permanently without needing the third party authentication that leads to reduction in transaction cost.

Blockchain's implications diversified more than as a Cryptocurrency transaction electronic ledger into different areas too after the launch of Ethereum Blockchain by Vitalik Buterin in the year 2015, that could be used to build "Smart Contracts" Ethereum is able to record other assets too such as loans and other contracts that can be processed on the basis of set of criteria established in this blockchain.

How Does Blockchain Work:

As the Blockchain is the distributed, decentralized, public ledger. A step wise process is to be followed for making entries in this public ledger. It includes:

1. Say person A is requested for a transaction.
2. One block is created for this transaction.
3. This block is sent to the nodes in the network.
4. Nodes validate the transaction.
5. Nodes get rewards for their proof of work.
6. After validation, the block is added to the blockchain and transaction is completed.

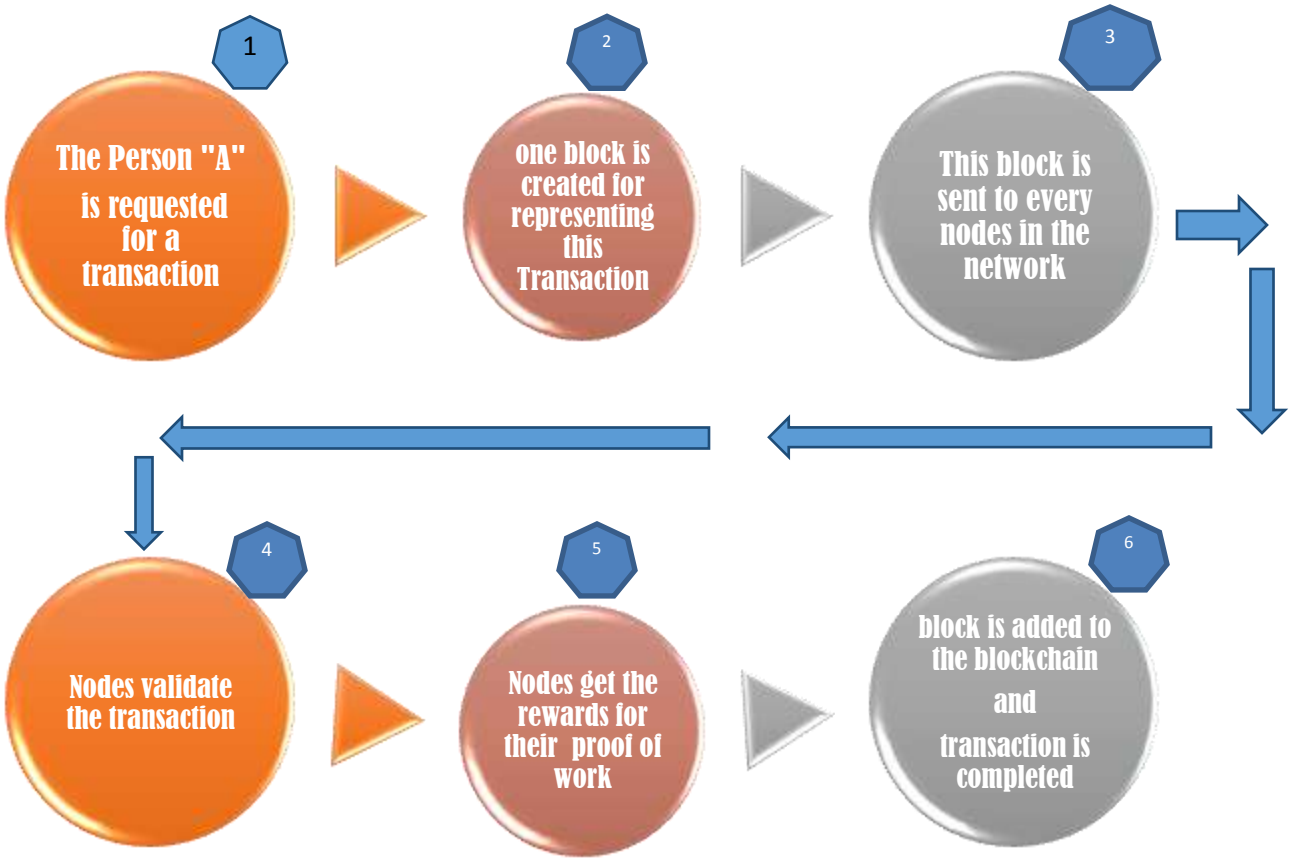

Figure 1. How Does Blockchain Work

In the internet commerce, for validating the transaction, the role of third party is appreciated and most believed. These third parties are the trusted financial institutions which charges high transactional cost in return.

But blockchain uses cryptographic proof instead of trusting in the third party. The transactions are protected through a digital signature. The transaction is sent to the receiver`s "public key" by using sender`s "private key". In order to make the transaction successful the sender has to prove the ownership of the cryptocurrency by using "private key".Each transaction performed is broadcasted to every node in the network and recorded in public ledger after validating the transaction. There is a need of verification of each transaction before adding in the public ledger.

The verifying nodes validate the ownership of the sender`s cryptocurrency through digital signature verification and the owner has sufficient balance of cryptocurrencies to be transacted as well.

A blockchain is essentially an online public ledger where all the transactions and digital events already executed are published among the participating parties. All the transactions in the ledger is entered after the verification done by majority of participants in the system. Once the transactions or events entered, these can never be erased. Every individual transaction done, has a certain and verifiable record in the blockchain.

Blockchain and Tourism:

Blockchain is the decentralized, secured and non-alterable public ledger, provides security and stability to the transactions done. Due to its decentralized nature the information stored in this ledger never go offline or lost through accidental deletion or malware attack and even the minute details of the transactions are traceable.

The travel and tourism industry needs to pass customer details to the distinct suppliers and some risk of losing the personal information of the tourists always involved. Financial transactions are also the vital part of this industry and loss of money as transactional cost.

Blockchain provides all the solution of securing the information regarding the tourists keeping the personal identity of the clients hidden as it is decentralized storing mechanism. It also has a praiseworthy solution of financial transactions too, as it avoids third party involvement and loss of bucks as transactional commission.

Table: 1 (Blockchain Applications in Tourism and Different Blockchain Companies Associated with the Respective Application)

S. No.	Blockchain Applications in Tourism	Blockchain Company/ Companies Associated with the Respective Tourism Application	Product Description of the Blockchain Company
1.	Authenticated Reviews and Opinions	Explorio	Users provide reviews, answer questions and submit travel tips.
2.	Disintermediation	Winding Tree	Online Booking Hub
3.	Peer to Peer Transactions	Emphy	Direct Contact of host and guest.
4.	Baggage Handling and Tracking	Proxiair	Handling Baggage in modern, transparent and accessible way.
5.	Inventory Management System	✓ Lockchain ✓ TUI Bedswap	Payment, Property management and other aspects of booking.

6.	Smart Contracts	Arise Travel	To provide platform for making smart contracts.
7.	Loyalty Programs	KrisPay	To provide loyalty benefits to frequent clients.
8.	Smart Cities and Smart Tourism	JUICECHAIN	Better Guidance and assistance.
9.	Travel Digital Identity	✓ Showcard & Sita ✓ Accenture	Travel digital identity system.

Authenticated reviews and opinions

People chose hotels, restaurants, or movies based on the "wisdom of the crowd" (Veloso et al., 2019). The reviews available influence the consumer`s purchasing behavior. Data authenticity seems to be a big challenge these days, as these can be altered by the suppliers for business benefits.

As blockchain is a decentralized system, the reviews and opinions of the customers cannot be altered by the industry players such as hotels and restaurants. In order to have fair online reviews, a common review and rating system which provides individuals with traceable identities could be created as part of the blockchain (Önder & Treiblmaier, 2018).

Various blockchain companies like explorio and futourist were the major blockchain startup for providing decentralized travel reviews platform that rewarded its users for contributing and curating high-quality travel content.Traveler`s high quality travel content contribution was confirmed by the explorio`s community by giving upvoting and downvoting these contents. Travelers in response incentivized with the tokens which were redeemable during subsequent visits.

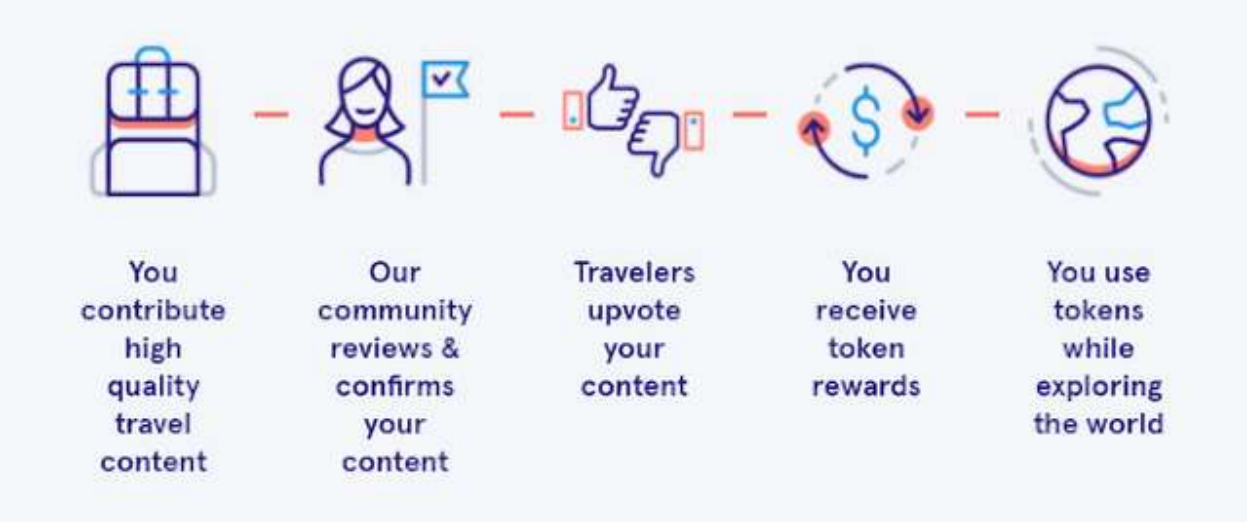

Figure 2.Explorio`s unique solution for authenticated review writing (Source: www.steemit.com)

Disintermediation

In the centralized financial system, financial institutes play a major role in transacting the payments securely and efficiently. But these institutions charges heavy levy as transaction cost. For centuries, financial institutions have played important roles in mediating and structuring economic transactions that would otherwise be difficult to execute due to transaction costs (Benston and Smith, 1976; Chen and Bellavitis, 2020).

Travel and tourism industry involves very complex networks to be followed for providing services to the clients by suppliers. These networks charge a huge amount as service commission both from suppliers as well as clients in the centralized system. Here blockchain provides the solution to save this amount as commission through its decentralized system.

Blockchain plays an important role by providing peer to peer transaction facilities to reduce the amount charged as the service commission. Blockchain technology can reduce transaction costs, generate distributed trust, and empower decentralized platforms, potentially becoming a new foundation for decentralized business models (Chen and Bellavitis, 2020).

Winding Tree is a completely decentralized platform (like the Internet) where suppliers can showcase their products and services without a need to go through an intermediary (like GDSs)(winding tree, 2020). This blockchain company seems to be an open market place where suppliers and clients engaged in business directly without any interruption of intermediaries.A number of suppliers are available directly to the clientsi.e.onlinetravel agents. The controlledinventory of the suppliers are available to the online travel agents on the blockchain platform in an automated manner.The customer oriented itineraries can be developed out of these available inventorieswithout going through rigorous process with each and every company and paying any transaction fee for providing that service.

Peer to peer transaction (P2P)

A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without the burdens of going through a financial institution (wright, 2008). In order to manage electronic transaction in blockchain technology, there is no need of any central authority like bank. Digital signature play an important role as discussed earlier.

Emphy,a blockchain company, providing platform for direct meeting of travelers and host through smart contracts. The guests are being offered rented properties by the host for staying at the destination visited.Emphy provides all the solutions of the problems faced by both host and guests. Through blockchain technology, Emphy with smart contract provides easy, safer and affordable way to rent properties during vacations via connecting host and guest directly.

Figure: 3. Emphy Business Model (Source: www.emphy.io)

After approval of contracttraveling can be initiated.The business involves peer to peer transaction between the host and guests with nominal transaction commission. All the transactions are done through Emphy Coin.

Baggage Handling and Tracking:

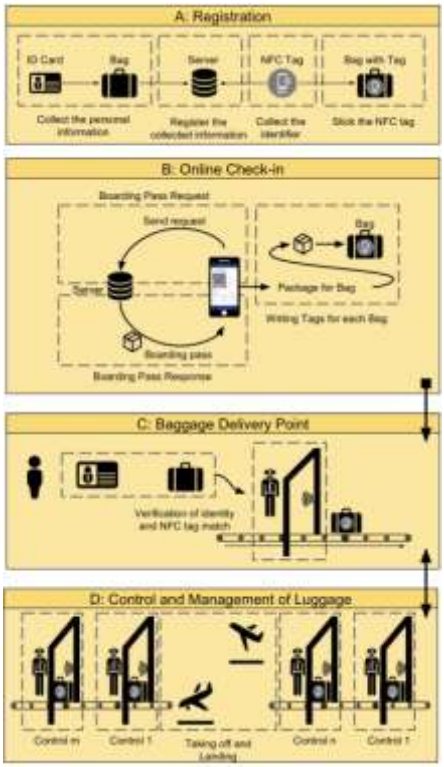

Figure: 4 Luggage management system through Blockchain (Source:https://dl.acm.org)

1. The luggage is registered at the counter in the airport with the personal information of the luggage holder and a NFC tag is issued to it.
2. The information of the luggage holder is attached to the tag.
3. Theluggage having tag attached droppedat the airport baggage delivery point where the identification of the passenger is verified.
4. The state of the luggage is updated at each control point, until received back by passenger at arrival point.

Proxiair is the leading blockchain based company provide logistic solutions based on patented RFID technology used by Airline industry for tracking and securing thetravelersluggage.

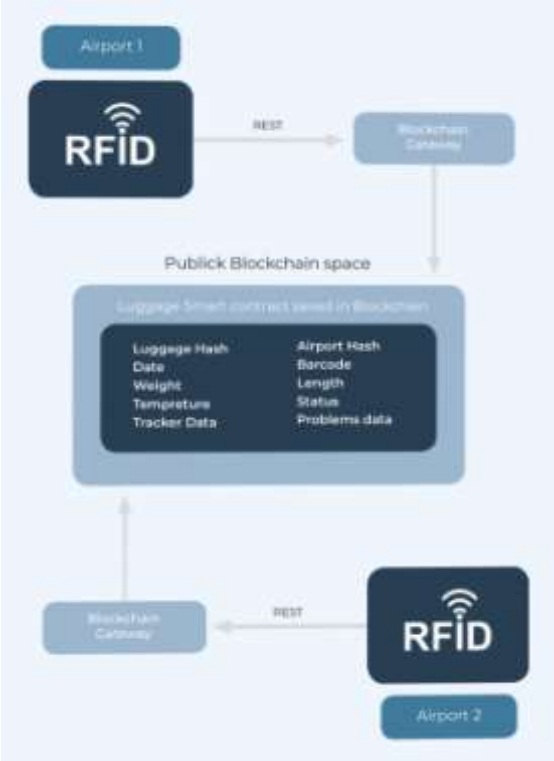

Figure: 5.Proxiair Blockchain Model (Source: proxiair.com)

With the help of RFID and blockchain technologies, the luggages can be easily live tracked. The aim of the Proxiair is to use of RFID technology with blockchain for improving the quality of luggage management, baggage security and time of baggage transfer.

Inventory Management System

Inventory management system is used in managing the rooms in hotels through blockchain technology through an intermediate server system.The intermediate server system communicates with at least one online travel agency (OTA) module and/or at least one booking engine using Ethereum-based smart contracts for confirming and processing a room reservation event(Wang and Hseih 2019).After the successful transaction of room reservation, this system updates this transaction and a blockchain is formed by multiple nodes server. Property management system through blockchain prevents the overbooking issue as single successful transaction occurs one time.

A blockchain based inventory management system comprises of

1. Property management system
   a) A host transceiver: To receive a successful transaction.
   b) A host non-volatile computer readable memory: For keeping the record of rooms managed under this system.
   c) A host computerprocessor:for updating the copy of room inventory recorded after successful transactions.
2. An intermediate server system : it consists of
   a. An intermediate transceiver:for receiving a room reservation event after adding a new block to chain proceeded through successful transaction.
   b. An intermediate non- volatile computer readable memory: for storing the smart contracts generated based on Ethereum, storing the record of room inventory and storing the chain of blocks and most recently added block contain all the updates of successful transactions.
   c. An intermediate computer processor: for confirming that the room reservation event does not allow overbooking of rooms' inventory.

TUI is the world's leading tourism group. The broad portfolio gathered under the Group umbrella consists of strong tour operators, 1,600 travel agencies and leading online portals, five airlines with around 150 aircraft, over 400 hotels, 18 cruise liners and many incoming agencies in all major holiday destinations around the globe (tuigroup.com,2020). The company started to use the blockchain based system to maintain the records of hotel bed inventoriesin real timeunder BedSwap project. The room inventories can be easily managed across markets within few seconds without the need for an intermediary to manage the information.

Smart Contracts

The Concept of smart contract was introduced by Nick Szabo in 1994.A blockchain-based smart contract or a"smart contract" for short, is a computer program intended to digitally facilitate the negotiation or contractual terms directly between users when certain conditions are met(Liyanage et al., 2019). It helps in exchanging money, property, shares etc. which are having values, in a transparent and conflict free manner without the interruption of middle man.

Arise travel through its block chain based project offers the decentralized marketplace where hotels and travel agents come together to transact directly without the need of any traditional contract. It facilitates hoteliers to set the commission rates dynamically to the distributors on the bases of time of year, room occupancy or the type of room being offered to sell.

The platform providethe available rates from hotels associated with the rate of commission and the distributors can decide which hotel to promote to the potential guests.

Loyalty programs

Sometimes it is difficult for companies to control and estimate the liabilities related to redeeming the loyalty points earned by the customers. There may be the possibilities of lack of uniformity in rewarding and redemption options. Many times there is possibilities that customers may neglect the points rewarded and sometimes the unawareness of the consumers regarding redemption of reward points, resultant into disconnection of the firm into nil.

Blockchain provide the solutions to these problems. As blockchain provides a unique algorithm-token to each transaction. Blocks are created with each secure and verifiable transaction associated with tokens. As in the case of airline industry, after adopting this technology, the airlines are enabled to quickly add and maintain loyalty partnerships without adding complexity and creating easier redemption process. Hence an ease for travel company and customers as well.

The Singapore airlines was the paramount in starting of block chain based loyalty program in association KPMG Global and Microsoft companies. The KrisPay, a digital blockchain wallet, launched by The Singapore Airlines for its KrisFlyer members under frequent flyer program. It converts air miles into digital currency. KrisPay is a mobile app where KrisFlyer miles are converted into KrisPay miles. Initially the reward system was live with arrangements at 18 merchants including Esso ServiceStation, Pizza Hut, coffee shops, and beauty stores so on. The merchant partners are increasing day by day.The merchant use the customer’s KrisPay QR code for reward redemption.

Smart cities and smart tourism

A smart city uses information technology to integrate and manage physical, social, and business infrastructures in order to provide better services to its dwellers while ensuring efficient and optimal utilization of available resources(Biswas et.al., 2016).

Figure : 6.Smart city areas having blockchain impact (Source: ficci.in)

In India, in the year 2015, Smart Cities Mission was launched to promote sustainable and inclusive cities providing core infrastructure and decent quality of life to its citizens.

Blockchain presents an opportunity to make this initiative of smart city more secure, transparent, efficient way. The above figure shows the different areas of smart city having blockchain impact in city management in efficiently and effectively way.

Juicechain is a cloud based blockchain based company. The company implemented its blockchain based projects in the city of Rijeka, Croatia. Here in this project it enabled the end users to manage tickets for bus ride, coupons for a drink and vouchers for the next beach party.

Travel digital identity

The rapid rise in international travel, increasing securityrequirements and limited growth potential all affect the traveller journey and cause pain points for governments, businesses and travelers(weforum, 2018).

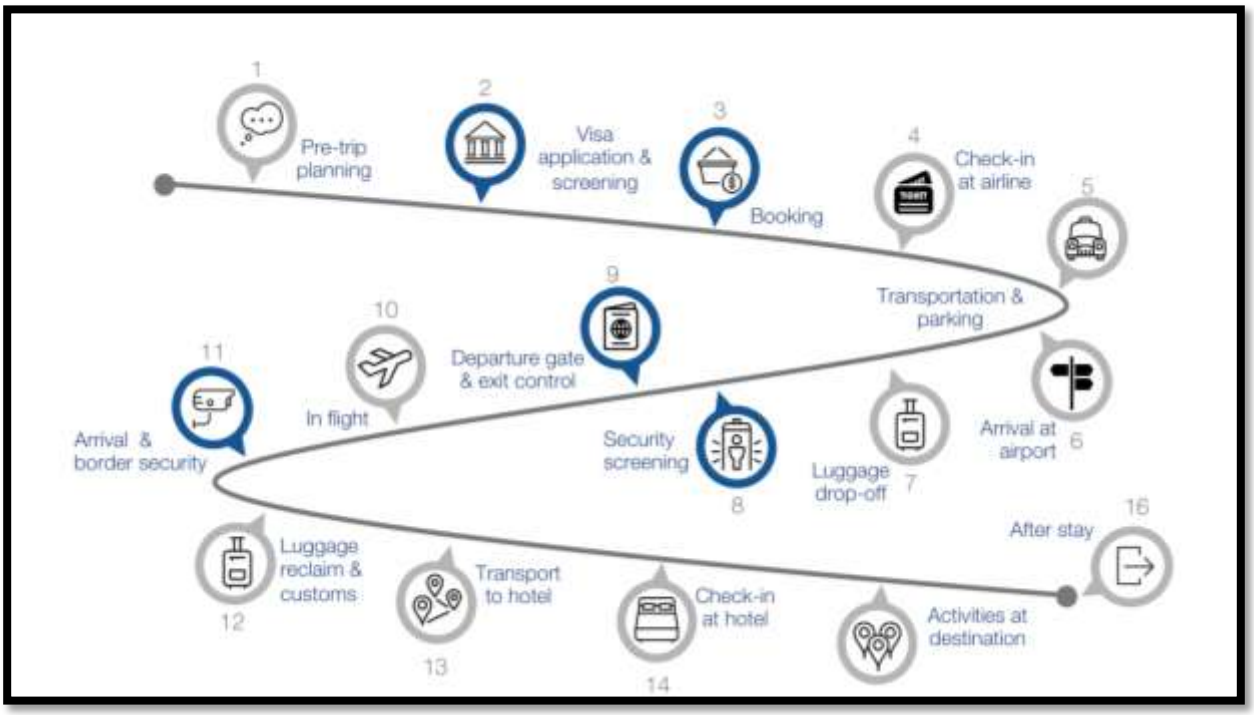

Figure: 7 Major areas where identity of the travelers are required during journey

(Source:weforum.org)

The above figure shows the main steps of travel journey and five of these with darkcoloredmentioned points where showcase oftraveler identity is requires and bit hassle too.

But identity management through blockchain enables everyone to access the personal data easily from a distributed, authenticated ledger system where information has already been stored.

Through blockchain identity management system, Shocard and SITA have proposed to revolutionize the travel industry. Although the project is on early stage but it may be a revolution in the travel industry while providing the travel identity at hotel and airport check without consuming unnecessary time and efforts.

Conclusion

Blockchain can contribute a lot in the travel and tourism industry. Being decentralized, secure and non alterable public ledger, it provides security and stability to the transaction done.Travel and tourism industry is a service industry and blockchain plays an important and trustworthy role in providing more tourist friendly services either in pre travel arrangements or post travel experiences. Presently Blockchain is on its initial stage of growth andfurthermore contribution of this technologyare expected to beidentified in the development of travel and tourism industry.

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