

**EXPLORING THE DISINTERMEDIATION EFFECT OF
BLOCKCHAIN TECHNOLOGY ON THE TOURISM
INDUSTRY**



Master's Thesis Presented by Imaan Faker (FKRIMA001)

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ABSTRACT

Researchers and practitioners believe that blockchain technology (BCT) will have a substantial impact on all industries, including the tourism industry. Blockchain technology is open-source software that allows the creation of an immutable, distributed ledger (record of transactions). One of the immediate effects recognized by researchers in this domain is that blockchain technology has the potential to remove intermediaries such as Online Travel Agencies (OTA's) and Global Distribution Systems (GDS), thereby disrupting the industry as it stands. This is known as the disintermediation effect. This domain is largely regarded to be in its infancy at both practical and academic levels, hence several researchers are calling for a more systematic and rigorous approach to have a big impact on the development process of this technology for the tourism industry. To address this request, this qualitative study explores disintermediation as a core characteristic and effect of applying blockchain technology to the travel industry. This research aims to strengthen already scarce research in this domain, and thereby move forward blockchain tourism research. It employs a case study design guided by a blockchain-based framework which specifies five factors necessary for an increased level of disintermediation. A modified version of the framework is presented as findings reveal that intermediaries are becoming more innovative in entering the blockchain market, and therefore further sub-factors can be identified based on how disintermediation is currently being introduced in this industry.

Keywords: blockchain technology; travel and tourism; disintermediation; intermediaries; online travel.

DEDICATION

I would like to dedicate this thesis to my parents. This paper is a testament to the hard work and dedication you have instilled in me to gather the strength to complete this goal.

To my father: Thank you for the inspiration.

To my mother: Thank you for the endearing support.

ACKNOWLEDGEMENT

To my supervisor, who has not only been there to provide me with guidance for this research but has been so accommodating and open to my ideas. Thank you so much.

Furthermore, I would like to express my gratitude to my work colleagues for providing support to complete this research in between demanding work projects and a worldwide pandemic.

PLAGIARISM DECLARATION

COMPULSORY DECLARATION:

1. This dissertation has been submitted to Turnitin (or equivalent similarity and originality checking software) and I confirm that my supervisor has seen my report, and any concerns revealed by such have been resolved with my supervisor.
2. I certify that I have received Ethics approval (if applicable) from the Commerce Ethics Committee.
3. This work has not been previously submitted in whole, or in part, for the award of any degree in this or any other university. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works of other people has been attributed and has been cited and referenced.

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CHAPTER 1: INTRODUCTION

1.1 Background

Blockchain technology (BTC) is believed to possess the power to revolutionize industries and consumer habits at a global scale (Agrawal, et al., 2018). Recently, it has become a topic of discussion in both research and industry, with some authors declaring that it is expected “to become the fifth disruptive computing paradigm after mainframes, PCs, the internet, and mobile/social networking” (Onder & Gunter, 2020, p. 2). Coupled with related terms such as *cryptocurrencies*, *smart contracts*, *tokens* and *Web 3*, blockchain technology, for the first time, provides a native value settlement layer for the internet through the absence of intermediaries (Voshmgir, 2020). Consequently, some scholars propose that this technology paves the way for entirely new business models and organizations (Risius, 2017; Aghaei, Naderibeni, & Karimi, 2021). In a 2019 journal article on the influence of blockchain technology on the travel industry, Willie (2019) reported that there are over 2 000 types of cryptocurrencies. However, as of January 2022, there are over 17 000 types of cryptocurrencies according to a leading blockchain index, CoinMarketCap (2022). This shows how the industry has accelerated through a period of just two years. Against this backdrop, it holds merit to shine a spotlight on research that focuses on the wider ramifications of blockchain technology beyond the financial industry (Risius, 2017).

Blockchain technology is a decentralized cloud-based and open-sourced distributed database that links all records by consensus (Kwok & Koh, 2018). Originating as a peer-to-peer (P2P) cryptographic payment system, popularized through the cryptocurrency *Bitcoin*, the benefit of blockchain technology has evolved into much more than just a cryptocurrency constrained to the finance industry (Kwok & Koh, 2018; Onder & Gunter, 2020). Its facilitation of real-time transactions of digital assets on a distributed ledger has made it a compelling tool for private, secure, and efficient contracts or data storage (Kwok & Koh, 2018). This has led to several research calls to understand the possible applications of blockchain technology for specific industries, where it is believed to influence and provide strategic benefits for all sectors in the future (Onder & Gunter, 2020).

The removal, or rather, decreased dependence on intermediaries in the tourism supply chain has been recognized by researchers as one of the immediate effects of blockchain technology in the tourism sector (Önder & Treiblmaier, 2018; Rashideh, 2021). That is, the removal of intermediaries such as Online Travel Agencies (OTAs) or Global Distribution Systems (GDS)

from the tourism supply chain (Rashideh, 2020). It has the potential to solve customer issues such as trustworthiness, high fees mediators charge, and selling users' data (Rashideh, 2020). Therefore, intermediary service providers are most likely the organizations whose business models will first be disrupted by blockchain-based, automated solutions (Önder & Treiblmaier, 2018). Rejeb & Rejeb (2019) affirm that this technology will cause radical changes in tourism transactions and will reposition powers in favour of industry players who take the best advantage of disintermediation capabilities and deliver high customer value and satisfaction. This research delves further into this phenomenon.

Further applications for the tourism industry include the use of blockchain technology for loyalty programs as rewards to guests, where loyalty tokens are issued in a fast and secure manner (Onder & Gunter, 2020). Other possible applications involve the airline industry for tracking luggage or having digital IDs that replace passports (Onder & Gunter, 2020).

1.2 Problematization and need for research

Despite the acceleration of blockchain technology at both academic and practical level within the past few years, research for the tourism industry is still largely regarded to be in its infancy, with relatively few applications throughout the system (Erceg, Sekuloska, & Kelic, 2020; Rashideh, 2020). Several researchers are calling for a more systematic and rigorous approach thereof to have a big impact on the development process of this technology for the tourism industry (Risius, 2017; Ozdemir, Ar, & Erol, 2019; Treiblmaier, 2021). Treiblmaier (2021) specifically speaks to the dire need for overarching frameworks and theories that are still missing to help understand and predict the implications on a higher level as opposed to just single cases. A blockchain-based framework for an increased level of disintermediation developed by Rashideh (2020) is, possibly, the first framework of its kind for the travel industry. An additional research paper by Aghaei, Naderibeni, & Karimi (2021) was found that present, possibly, the first blockchain tourism model compared to a traditional tourism model.

It, therefore, comes as no surprise that although disintermediation is being identified by early researchers as the first effect of this technology on the tourism industry, there are scarce examples of empirical and theory-driven research, let alone research on the strategies and tactics that current and future industry players can apply to benefit from blockchain technology or, at least, lessen the damage it causes to their business (Risius, 2017). For this reason, the following research questions and objectives are deemed necessary for the advancement of research in this domain.

1.3 Research question and objectives

The **primary research question** for this paper is: What are the disintermediation effects of applying blockchain technology to the travel and tourism industry?

This research **aims** to strengthen and move forward already scarce blockchain tourism research, particularly in the area of disintermediation which is both a core characteristic of blockchain technology as well as an immediate effect on the travel industry. It is hopeful this will increase awareness around the impact and understanding of the effects of disintermediation for the travel industry and its research community.

The research objectives are:

1. To identify ways disintermediation has the potential to occur and is currently occurring in the blockchain travel industry.
2. To identify strategies that current and future industry players can apply to benefit from blockchain technology or, at least, lessen the damage it causes to their business.
3. To devise a conceptual model that supports and extends the scarcity of frameworks in the travel and blockchain research domain.

This study employs qualitative case study research. Case study writers employ multiple forms of data collection (Creswell & Poth, 2018), and as such a variety of online sources have been assigned to inform this study. The suitability of online resources has been discussed in the literature review as well as the data requirements sections. Data is analyzed using directed content analysis, a type of content analysis useful in cases where incomplete prior research can be supported and extended (Hsieh & Shannon, 2005). As such, findings are “directed” by Rashideh’s (2020) blockchain framework for an increased level of disintermediation. This novel framework provides five factors that lead to disintermediation in the travel industry and has therefore been selected as a suitable guideline for focusing on disintermediation. While Rashideh’s (2020) study encompassed a forecasting approach by interviewing experts on their predictions of blockchain technology within the travel industry, this study will seek insights into what organizations are currently undertaking and experiencing while working in this field (namely blockchain-based travel services). For this reason, three cases have been identified as suitable for this study, which are then analyzed to present its findings.

1.4 Role and significance of this research

Firstly, this research goes beyond the impact that the Internet has had in assisting the travel industry, such as the Internet of Things (IoT), and provides theoretical and managerial

considerations for a next-generation technology that has the potential to disrupt current business operations (Antoniadis, Kontsas, & Spinthiropoulos, 2019). It also provides a forward-thinking approach to dealing with new technology as opposed to maintaining long-held beliefs that hamper the potential of an organization's competitive edge (Aghaei, Naderibeni, & Karimi, 2021).

Secondly, as opposed to exploring a mix of *potential* applications of blockchain technology within the travel industry, of which there have been plenty of studies (Aghaei, Naderibeni, & Karimi, 2021), this research focuses on a particular characteristic of blockchain technology and the effects of it for the travel industry. To the best of knowledge, the disintermediation framework used to guide this study is the first of its kind that is set in the travel industry, which Rashideh (2020) has also found to be true. This study therefore provides another perspective for this needed systematic way of conducting disintermediation research. In tangent with this, there is a critical need for more information on the relationship *between* developing technologies and it is therefore important to provide more insights into the relationships of actors in a blockchain travel ecosystem (Aghaei, Naderibeni, & Karimi, 2021)

Thirdly, by using a case study design and the use of online content, it provides a different approach to contributing to research in this domain. The opportunity to take advantage of the plethora of information provided online will remain for as long as the internet exists, regardless of industry (Kuljis & Kim, 2010). The researcher has taken advantage of this, in a way that is still informed by prior academic research, guidelines and frameworks. As Treiblmaier, (2021) has stated, blockchain technology is accelerating at a tremendous pace and what is important for the research community to help keep up, is to focus on its fundamental characteristics which will remain the same.

Lastly, the tourism and hospitality industry has been severely affected by the Covid-19 pandemic. As a result, potential future tourists face higher prices and experience higher risk aversion in such uncertain times (Onder & Gunter, 2020). This has resulted in the increased use of the internet for both personal and business use, thereby also boosting digitization and placing blockchain at the forefront of technological development due to its characteristics discussed in this research (Onder & Gunter, 2020).

1.5 Structure of thesis

The structure of this thesis (illustrated in **Figure 1** below) consists of five phases, guided by the Creswell & Poth (2018) research process framework. **Phase 1** involves communicating the

background of the research (including the research questions, aim and objectives). It also includes a review of the literature because this informs the perspective of the research and provides motivations embedded in the literature for the sections to come. Additionally, phase 1 also includes the conceptual model for this study, based on the literature review. **Phase 2** involves positioning this research in its philosophical realms to communicate the researchers' beliefs that have guided this study. **Phase 3** presents the research strategies and approaches, informed by the previous two sections. **Phase 4** describes the data required, how it will be collected and chosen (sampling), analyzed and well as important ethical considerations for this study. **Phase 5** discusses the findings informed by all previous phases.

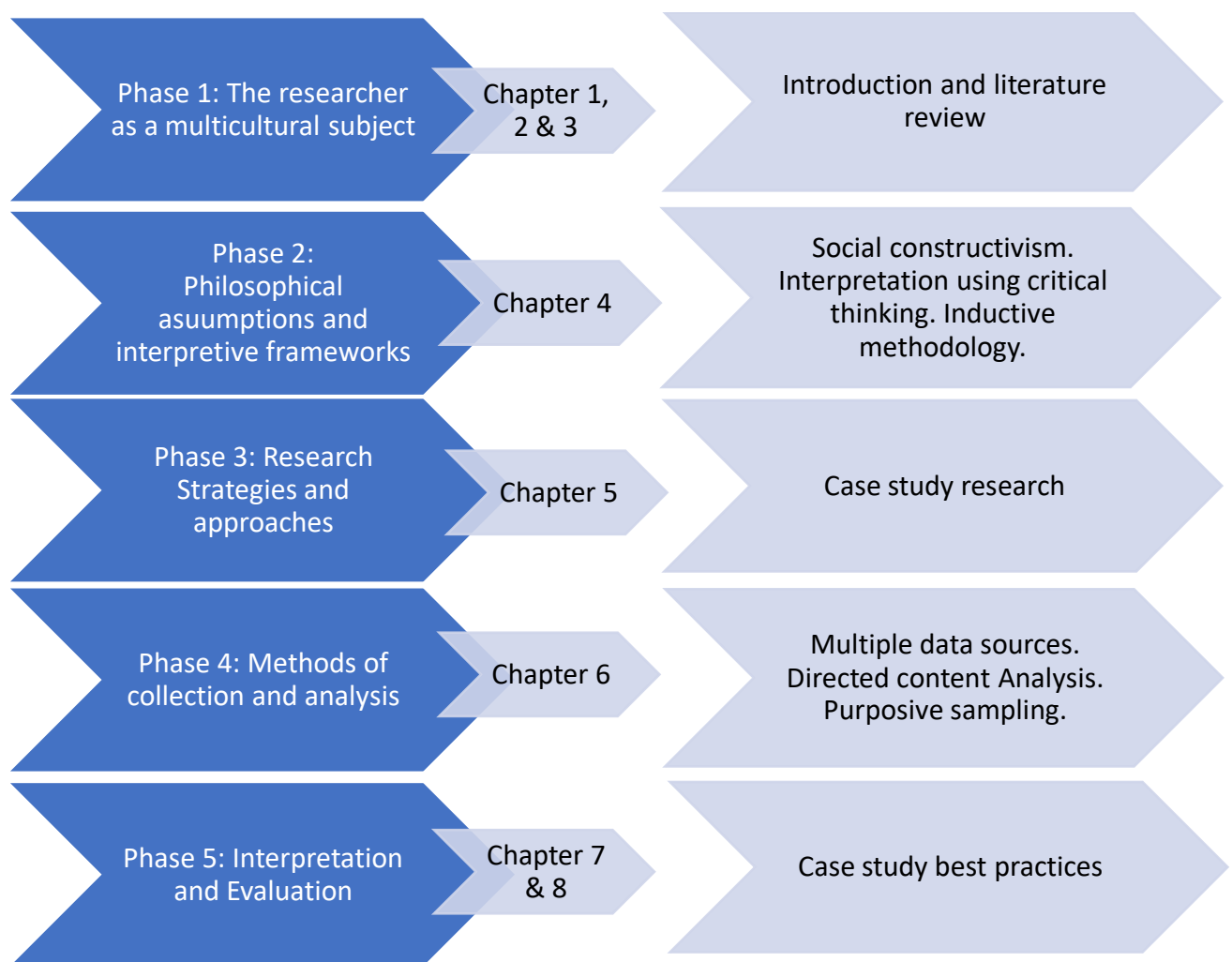


Figure 1: Research process for this study

CHAPTER 2: LITERATURE REVIEW

2.1 Paper collection for literature review

This literature review is initiated by the concepts communicated in the main research question and objectives. The literature review process is guided by five stages on how to conduct systematic literature reviews, summarised in **Table 1** below. This process by [Oosterwyk, Brown, & Geeling \(2019\)](#) was devised through a “synthesis of the existing body of research” on how to conduct a literature review and therefore embodies a comprehensive guideline that is deemed appropriate for this study.

Major stages	Activities applied to this study
Stage 1: Define the protocol	<ul style="list-style-type: none"> • Research question, objectives and therefore key concepts drafted. • Type of review: <i>Narrative</i> and <i>New Perspective</i>
Stage 2: Search the literature	<ul style="list-style-type: none"> • Search strings (terms): “blockchain in tourism”, “blockchain in travel”; “disintermediation in blockchain technology” and “blockchain travel frameworks”. • Sources: Databases indexes - university library website, Research Gate and Google Scholar. • Time restriction: Articles published from 2015 onwards.
Stage 3: Select the papers	<ul style="list-style-type: none"> • Searching continued until no more relevant articles were being found. • Papers further screened for suitability for this study. • Full review of selected papers conducted thereafter. • Process repeated several months later to identify and incorporate new literature.
Stage 4: Analyse, synthesise and interpret the data	Literature analysed to identify state of research in this domain, theories, concerns etc.
Stage 5: Write the review	Structural elements built upon the outcomes of the literature analysis and how it answers the research question and objectives in a logical manner.

Table 1: Literature review stages (adapted from Oosterwyk, Brown, & Geeling, 2019)

Based on the authors’ descriptions of the types of literature reviews, it was determined that this literature review on travel and blockchain would fall under the *Narrative* or *New Perspective*

type of literature review. This is because the literature review requires the development of insights and angles into a phenomenon that is considered new by both practitioners and academics (Willie, 2019), and consequently requires a flexible approach to identify the current state of knowledge in this domain and its gaps.

Published peer-reviewed research papers were searched for using the search strings “blockchain in tourism”, “blockchain in travel”; “disintermediation in blockchain technology” and “blockchain travel frameworks”. Research indexes were used to ensure that not only articles within a wide range of journals are searched, but also to minimize publication bias. This included the university library website which has access to over 400 databases, ResearchGate, and Google Scholar which is undoubtedly one of the biggest research indexes in the world. Searching for suitable articles within these indexes continued until no more relevant articles were found (that is until no more research papers that focused on the combination of both blockchain technology and tourism or travel were found). Only articles published from 2015 were considered. This was necessary to align the search strategy with the nature of the study which is in a field that is fast-changing and therefore current and newest discoveries were sought.

After screening the papers for suitability of this study, a total of 19 articles directly focused on blockchain within the travel industry and all were considered. This was not only necessary due to the novelty and shortage of the research search string combinations, but also because many of the papers found included valuable information which speaks to many sectors of the travel industry and not only one. Because blockchain interest is accelerating at a fast pace not only practically within industries but also in academia, this literature search was repeated several months later. Another 11 articles were added, bringing the total amount of articles which focused on blockchain within the travel industry to 30 articles.

Each paper was analyzed and synthesized to produce the structural elements of the literature review in the next section. Where necessary, additional searching of literature was made to support ideas. For example, searching for “blockchain research frameworks” to find papers which focused on blockchain frameworks. This brought the total number of references for the literature review to 40 papers. Additional references were sought for other sections of this study to provide theory-backed motivation for the research methodology sections.

2.2 What is blockchain technology and its related terms?

Understanding from a high-level perspective how blockchain technology (BCT) works and what capabilities it possesses helps the analyses of the literature (Tavares, Correia, Restivo, Faria, & Aguiar, 2018). The intention of this section, much like existing studies undertaken in the tourism-blockchain domain, is to provide an understanding of the technology and not necessarily deep-dive into a debate on terminologies which may be more suited to another discipline based on technicalities, such as computer science. Treiblmaier (2021) supports this idea and states that because blockchain technology is constantly transforming, applied researchers in the blockchain and tourism domain should focus on understanding the specific features offered by blockchain technology, as opposed to the terminology of blockchain.

Blockchain technology is an open-sourced software that allows the creation of a large, decentralized, and secure database that contain records arranged in a block structure (Ozdemir, Ar, & Erol, 2019). It is largely believed that Nakamoto (2008) proposed the original application of blockchain through the idea of Bitcoin, which is the first type of digital currency (or “cryptocurrency”) characterized by a peer-to-peer cash system (Risius, 2017; Willie, 2019).

Blockchain technology mainly consists of three components: block, ledger, and distributed system. Ozdemir, Ar, & Erol (2019) explain that the blockchain is a set of **blocks** that is comprised of a record of the transactions. Thus, transactions are collected inside blocks that are appended to the blockchain. Blocks are chained together with cryptographic hashes. Each block (except the first) contains the hash of the previous block. The blockchain ensures integrity by chaining blocks of transactions together in such a way that altering any block breaks the link with the next block. All the blocks together are called the **ledger**. A ledger is an auditable log of the entire transaction history. In the ledger, each transaction is attached to a specific user code or pseudonym. Blockchain technology allows all interested parties to maintain their own copy of the ledger that is therefore decentralized and replicated without a central trusted institution or intermediary to process or maintain the authorized record. The ledger is stored in a **distributed system** that is a single platform whereby two or more individual players work with each other. All players can send and receive messages to the system, and each of them has his/her identical copy of the ledger. Tavares, Correia, Restivo, Faria, & Aguiar (2018) illustrates the above in **Figure 2** below:

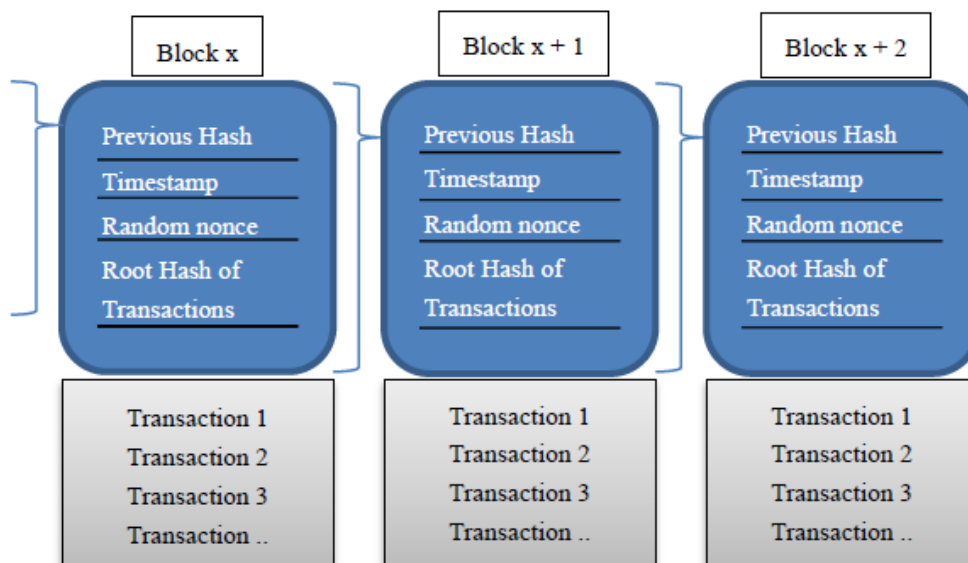


Figure 2: How blocks connect in a blockchain (Tavares, Correia, Restivo, Faria, & Aguiar, 2018).

Characteristics of blockchain

Although blockchain technology and its impact on all sectors are new Willie (2019), the concept itself, its characteristics and benefits have been researched by several scholars in the past. The major characteristics of blockchain include disintermediation, security, automation, immutability, trust, costs, and traceability (summarized in **Table 2** below) (Nam, Dutt, Chathoth, & Khan; 2019). Such characteristics significantly improve the security and auditability of transactions (Antoniadis, Kontsas, & Spinthiropoulos, 2019).

Strength	Explanation
Disintermediation	The peer-to-peer nature of the network means that a central authority is not needed.
Security	The use of public-key cryptography provides a high degree of confidence and security. The networked nature also provides a more resilient system with no single failure point.
Automation	Blockchain can facilitate greater autonomous actions, such as smart contracts, increased efficiency, and accuracy.
Immutability	The data on the network are connected to preceding data, meaning any attempt to alter data requires significant adjustments to multiple areas.
Trust	With no third parties needed to be involved in a transaction, greater trust is possible, and parties can deal directly with one another.
Costs	Costs can be cut due to third-party removal.
Traceability	Transactions on the blockchain network can be traced to authenticate their origin and path.

Table 2: Major blockchain characteristics (Nam, Dutt, Chathoth, & Khan; 2019)

While this research does not focus on the history of blockchain technology (summarized in **Table 3** below), understanding its evolution helps to place this research in the context of where

it stands now. The first generation of blockchain (such as Bitcoin) was created for cryptocurrencies only, that is, for monetary transactions (Erceg, Sekuloska, & Kelic, 2020). The blockchain infrastructure that cryptocurrencies were built on offered very few built-in tools to automate transactions (Bodo, Gervais, & Quintais, 2018). This brought about the second generation (such as the Ethereum network), enabling users to write complex software (namely, smart contracts) that interacts with the distributed ledger (Bodo, Gervais, & Quintais, 2018). The current, third generation of blockchain is characterized by decentralized applications (DApps). These allow persons to interact with the technology in more systematic and accustomed ways through browsers and smartphones (Erceg, Sekuloska, & Kelic, 2020).

Category	Characteristics
First-generation blockchain	Cryptocurrencies—transfer, remittance, and digital payment system
Second-generation blockchain	Smart contracts, the entire slate of economic, market and financial applications which are more complex than simple cash transactions—stocks, futures, mortgages, smart contracts
Third-generation blockchain	Application beyond markets, finance, and currency, especially in government, health and science area.

Table 3: Blockchain evolution (Erceg, Sekuloska, & Kelic, 2020)

Smart contracts

With the previous section as context, when referring to disintermediation as a result of blockchain technology implementation, it was brought about in the second wave of blockchain development, typically through smart contract implementation. How disintermediation is achieved through smart contracts is explained further:

The term “smart contracts” is a term that was coined by computer scientist and cryptographer pioneer Nick Szabo in 1994 (Willie, 2019). Szabo recognized the power of a decentralized digital ledger and how it could be used for binding contracts within the world of commerce (Willie, 2019). Smart Contracts are programs that are automatically executed within the blockchain if the terms of the contract are fulfilled (conditions are met) (Antoniadis, Kontsas, & Spinthiropoulos, 2019; Bodo, Gervais, & Quintais, 2018). The terms of delivery or purchase of a contract are entered into a form of “computational commands” as described by Varelas, Georgitseas, Nechita, & Sahinidis (2019), or rather, “logical expressions” as described by Antoniadis, Kontsas, & Spinthiropoulos (2019). When the terms (rules, procedures, and penalties) of the contract are fulfilled, the contract can be executed automatically without intervening intermediaries ((Willie, 2019; Varelas, Georgitseas, Nechita, & Sahinidis, 2019).

Accordingly, smart contracts can facilitate the exchange of property, wealth, inventory, and anything of value (assets and/or services) in a safe and secure digital environment (Willie, 2019).

The role of tokens in smart contracts

A smart contract facilitates exchange, but this requires information on what is to be exchanged in the first place. This is where tokens come in. A token can be defined as a digital representation of virtually anything that token aims to fulfil and has various purposes such as validating transactions, representing asset ownership and so forth (Oliveira, Zavolokina, Bauer, & Schwabe, 2018; Treiblmaier, 2021).

Although beyond the scope of this paper, understanding tokens, and other blockchain-related concepts for that matter, is critical in understanding their value in the wider world of “blockchain technology (Treiblmaier, 2021). The paper on understanding blockchain tokens by Oliveira, Zavolokina, Bauer, & Schwabe (2018) is a great starting point for gaining an understanding of what tokens are and how they are classified. Additionally, Voshmgir (2020) dedicates a significant portion of her book titled “*Token Economy: How the Web3 reinvents the internet*” to explain what tokens are, and how they are secured, classified, controlled, offered and sold.

2.3 Understanding travel intermediaries, intermediation, and disintermediation

As a simplistic explanation, intermediaries “connect providers of travel and tourism services with those who make use of the services” (Čavlek, 2013, p. 193). They are the actors responsible for verifying and documenting transactions to ensure that sales processes between sellers and buyers are carried out legally (often with added travel benefits) and that the relevant parties receive commissions for their services (Rashideh, 2020). Risius (2017) further specifies that an intermediary is the intermediary service provider, as well as the applications and processes that connect the service provider and the consumer.

Travel agencies are always at the core of the largest intermediation influence in the travel and tourism industry, which has evolved into Online Travel Agencies (OTA’s) with the rise of direct selling to consumers and increased proximity to customers, enabled through internet use (Čavlek, 2013; Pencarelli & Dini, 2017). Travel agencies can sell many products and services such as hotel and other accommodation bookings, flight bookings, transport bookings, car rentals, holiday packages, travel insurance and so forth (Čavlek, 2013; Ślusarczyk, Klaudia, & Kot, 2016). Some OTA’s specialise in certain offerings such as *Airbnb* which focus on home

rentals, whereas others provide broader offerings such as *Booking.com* which offer accommodation and flights (Garcia, Anjos, & Dogan, 2022).

Disintermediation is the removal (Antoniadis, Kontsas, & Spinthiropoulos, 2019); or rather, decreased need for such intermediaries (Rashideh, 2020). This concept within the travel and tourism industry is certainly nothing new because analysts have been predicting the disappearance of intermediaries since the 1970's (Čavlek, 2013) due to the advent of the internet and further the rise of Web 2.0 technologies (Pencarelli & Dini, 2017). It can also very quickly be seen as a negative phenomenon but as is the case with any business, the ability of a business to adapt to market changes and respond to external threats can change their competitive position drastically (Čavlek, 2013). With this being said, the way intermediaries conduct business and the role they play has been adapted to the market through the years, but their function (which is to connect travel and tourism services with users) remains the same (Čavlek, 2013).

Considering the above, the reorganisation and formation of new intermediaries will continue as long as the internet evolves (Rashideh, 2020; Pencarelli & Dini, 2017), and the introduction of blockchain and smart contracts, adds an even bigger complexity to the industry. Blockchain technology not only has the potential to affect these external transactions and intermediaries but also travel organizations' support of internal management transactions that range from sales and operations to administration and finance (Rashideh, 2020). In the context of blockchain, these processes must come with transparency for all such stakeholders involved (Rashideh, 2020). It would therefore serve the travel industry well to understand the role and potential value of disintermediation. If anything needs to be learnt from the past, it's that the ability to exploit the potential of new technologies determines not only how the new technologies are perceived (threat or opportunity), but also whether the intermediary survives (Pencarelli & Dini, 2017). On this note, how are existing (yet still early) researchers in the blockchain travel domain saying it will impact the travel industry?

2.4 Potential value and opportunities of disintermediation through blockchain technology

Researchers are saying that the greatest advantage of disintermediation through blockchain technology is cost because third-party service providers (such as lawyers, brokers, and agents) are no longer required, or it can be reduced through smart contracts (Willie, 2019).

Additionally, the use of cryptocurrencies will support payment transfers without third-party assistance or extra admin costs (Rashideh, 2020). Rejeb & Rejeb (2019) explain this applied to the travel industry: Hotel establishments operating on traditional models pay approximately a commission of close to 20 per cent to intermediaries such as Booking.com. Not to forget also that any costs resulting from the intermediation are generally paid by the final consumers. With the implementation of blockchain technology, such costs that intermediaries impose on their customers can be reduced.

Disintermediation as a result of blockchain implementation also enhances trust in the system (Antoniadis, Kontsas, & Spinthiropoulos, 2019). Intermediaries are not necessarily, or traditionally (before the inclusion of blockchain technology), evaluated or validated externally (Aghaei, Naderibeni, & Karimi, 2021). Therefore, with blockchain technology implementations, moral hazard among geographically dispersed entities can be reduced, building trust between the engaged parties, and thereby eliminating risks (such as sharing of data) that are associated with middlemen (Antoniadis, Kontsas, & Spinthiropoulos, 2019; Rashideh, 2020). Willie (2019) also emphasizes this trust benefit by stating that blockchain therefore offers an alternative, moving the trust needed from an entity to the technology itself (Tavares, Correia, Restivo, Faria, & Aguiar, 2018).

Disintermediation also reduces the opportunity for errors (Rashideh, 2021). Ślusarczyk, Klaudia, & Kot (2016) found that the biggest threat to continued cooperation within the supply chain of a tourism product is bearing the consequences of the errors of other links of the supply chain. This was followed by the dependence on partners in the cooperating online travel system. Because blockchain eliminates, or rather, reduces intermediation, such errors will be eliminated or lessened through the consistency and automation that smart contracts enable (Rashideh, 2021).

It is very important to reiterate that blockchains' peer-to-peer connection implies the circumvention of intermediaries between two parties, or the elimination of traditional intermediaries if they do not adapt (compete, substitute, or collaborate) for such technological advancements (Nam, Dutt, Chathoth, & Khan; 2019). For instance, a travel agent now must struggle to compete with consumers who can book hotel rooms, cruises, rental cars, and flights directly from the providers or through a travel site that allows them to compare an exhaustive list of options. A DApp (Decentralized Application) is technically an intermediary that facilitates blockchain transactions and therefore the business model of an intermediary may

change and become more open (Nam, Dutt, Chathoth, & Khan; 2019). Likewise, a site such as Expedia is essentially an intermediary. It buys hotel bookings in bulk at a discount and resells them to consumers, earning revenues on the markup. However, such companies would now need to relook at their business model and make necessary technological and structural changes.

2.5 Describing a blockchain-based travel system

LockTrip is just one example of a blockchain-based Online Travel Agency (OTA) for accommodation. Another example includes *WindingTree* which is a blockchain-based Global Distribution System (GDS). The former is described by [LockTrip \(2018\)](#), to provide some context and understanding of how a typical blockchain-based travel system may function.

The primary benefit of using *Locktrip* (as told by the company) is that users have a decentralized blockchain-based travel marketplace that reduces various middlemen throughout the booking journey and therefore costs can be driven down. As depicted by the central icon in **Figure 3** below, the organization has developed a decentralized ledger, called the LOC ledger, which hotels/property providers and customers can perform transactions with. The LOC ledger, which runs with its LOC token can perform various transactions triggered through smart contracts deployed on the Ethereum blockchain. Customers can convert other currencies to LOC and vice versa. Some of the transactions that can be performed with the LOC ledger include booking placement, booking confirmation, deposit holding, deposit release after checkout etc. Since the ledger is decentralized, middlemen associated with such functions are greatly reduced, and individualized pockets of ownership of such functions (and therefore data used to process it) are shared.

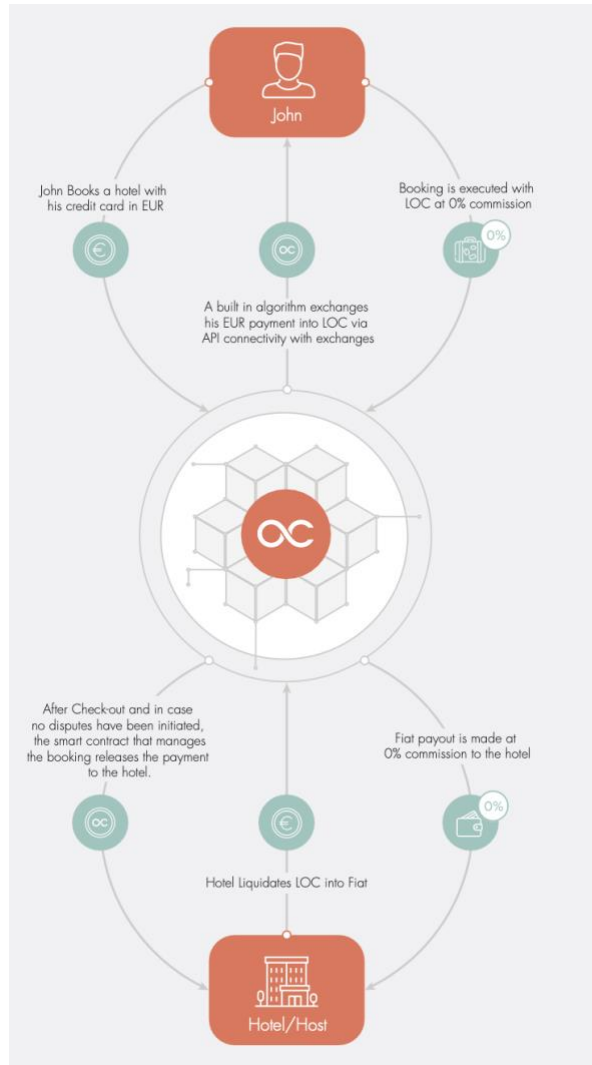


Figure 3: Interaction with Locktrip decentralized ledger, LOC (LockTrip, 2018)

On a more technical level, in a paper by [Zhang, Hang, Jin, & Kim \(2021\)](#), a proposal is made for how various business services for the tourism industry can interoperate with each other to enhance overall capability (**Figure 4** below). While the proposal is based on a private blockchain, the figure provided below provides insight into how blockchain-travel systems could work. The API services and intermediary proxy allow communication between the clients (computers) and business services depicted in the functional layer. Although the figure is simplified for illustration purposes, this functional layer represents the vast number of traditional intermediaries whose processes are now automated, and possibly much less human intervention is needed.

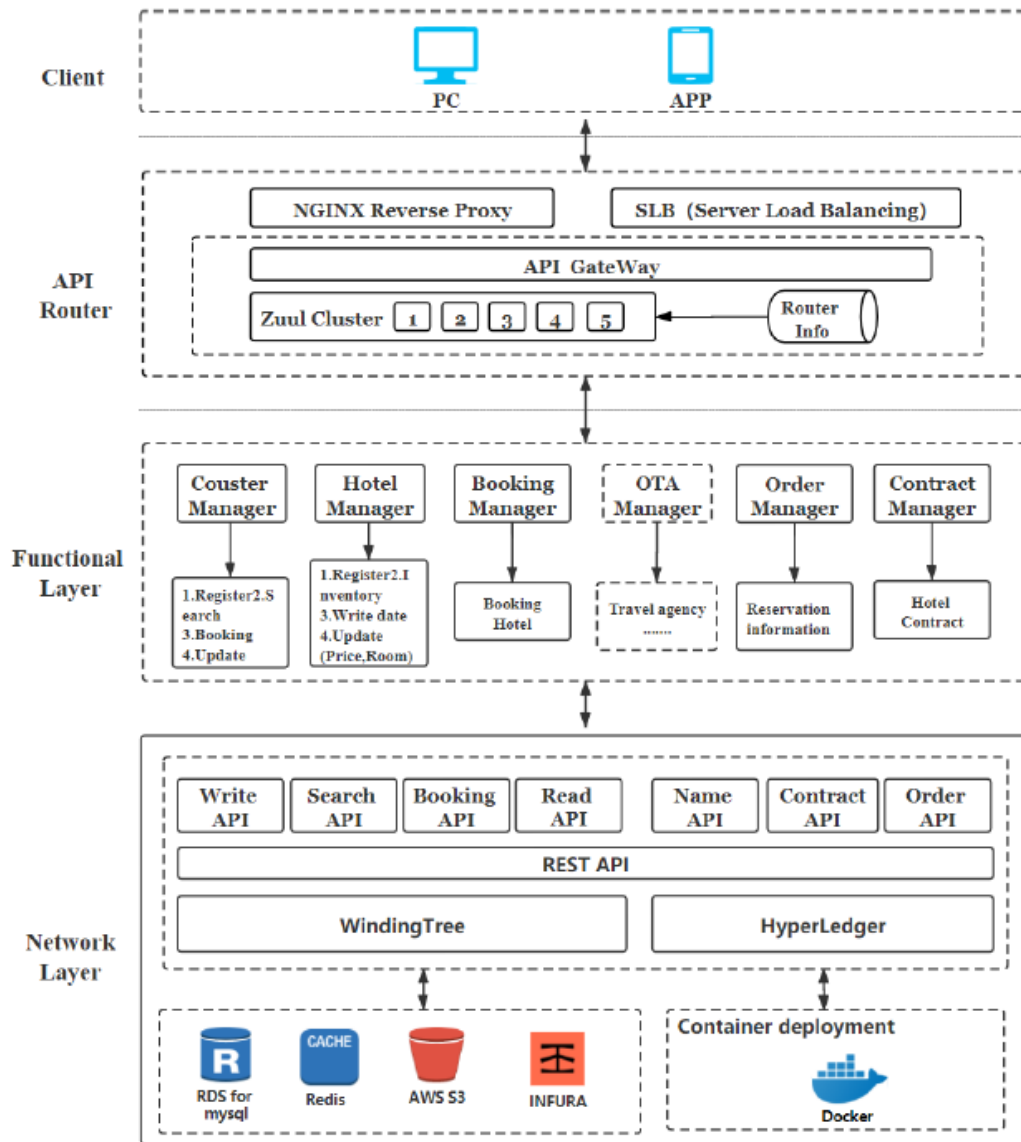


Figure 4: Blockchain tourism system depicting tourism services interoperability (Zhang, Hang, Jin, & Kim, 2021)

2.6 Research undertaken in tourism and blockchain technology

Some researchers claim that blockchain is a disruptive technology alongside artificial intelligence and machine learning (Antoniadis, Kontsas, & Spinthiopoulos, 2019), while others claim that it is a foundational technology alongside the internet, and social networking due to its potential to bring about new economic and social systems (Onder & Gunter, 2020). Nevertheless, from different perspectives, there is consensus that it has the potential to impact every industry, and for the travel industry specifically, reengineer the distribution of travel products and services (Rejeb & Rejeb, 2019). Researchers also tend to agree that blockchain will have an integrated approach to current systems (Onder & Gunter, 2020). That is, it won't

instantaneously wipe out intermediaries (such as Online Travel Agencies and Global Distribution Systems) players in the industry, but solutions will exist integrated within current systems for some time.

Erceg, Sekuloska, & Kelic (2020) go as far as to say the tourism market will, maybe completely, switch to blockchain technology. The authors further state that commercial use of blockchain is going to advance from an experimental stage to presenting solutions to real-world problems, where big companies will recognize the possibility of using it for finding solutions to current problems.

Despite the growing importance of the subject as mentioned above, only a few researchers have done studies concerning blockchain applications in the tourism and travel industry (Ozdemir, Ar, & Erol, 2019) and it is still largely viewed as an emerging topic with minimally explored potentials (Kwok & Koh, 2018). Rashideh (2020) found that a reason for this is “resistance to change”, a common factor shared amongst experts within the blockchain travel industry and therefore the travel industry is afraid to adopt this technology.

Kwok & Koh (2018) provide an overview of identifying the potentials of blockchain technology (Figure 5 below), which can also be seen as potential use cases for blockchain in travel. As shown, blockchain in tourism will present different opportunities for several stakeholders in the tourism industry:

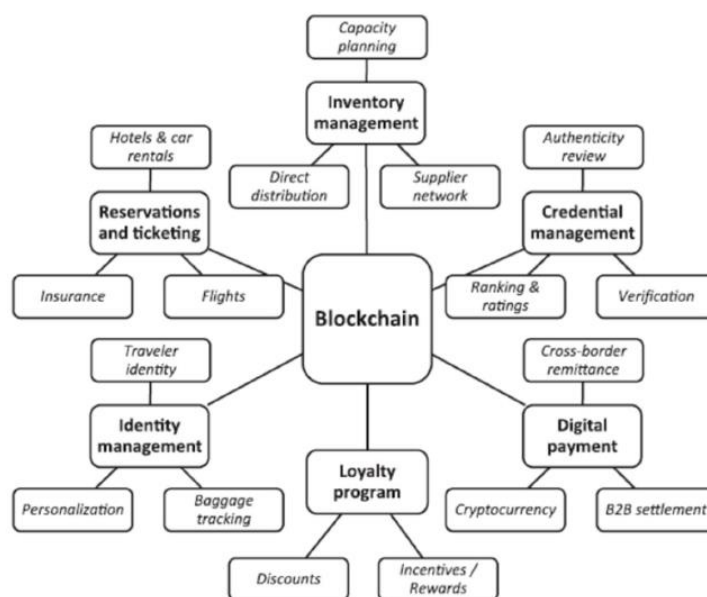


Figure 5: Overview of key blockchain applications to enhance tourism (Kwok & Koh, 2018)

Önder & Treiblmaier (2018) provide three high-level propositions in the tourism research community to aid in the closing of gaps of research in this industry, which are intended to be further refined and elaborated by the tourism research community. The first proposition was for more research in blockchain for customer reviews of tourism products to influence consumers' buying decisions. The second proposition was for more research into the adoption (building up of trust) of cryptocurrencies for customer-to-customer (C2C) transactions. The third proposition was for more research on the disintermediation effect of blockchain on the tourism industry. Similarly, researchers Rejeb & Rejeb (2019) and Rashideh (2021) explore the role of blockchain technology in trust-building, promoting disintermediation, ensuring secure travel-related transactions, loyalty programs, traceable tourism products and activities, and reliable online travel reviews. Willie (2019) also provides high-level research propositions in the tourism industry and structures it according to three tourism sectors (accommodation, travel agents and agencies, and food service). Other researchers such as Agrawal, et al. (2018) and Ozdemir, Ar, & Erol (2019) provide several practical application examples on how blockchain has been emerging in the tourism industry, how to start implementing blockchain technology and evaluating application solutions that enable researchers and decision-makers to assess blockchain applications.

It is evident that several researchers are maintaining the importance of blockchain technology in the tourism industry. However, as one may gather from the paragraphs above, many such articles provide an overview of the emergence and potential gaps for research in this domain and there is still a dire need for more focused research into all these opportunities. Authors Önder & Treiblmaier (2018) have been advocating for more research in this domain to bring about more comprehensive research that will lead to theoretical frameworks and research propositions. This research is therefore a response to such calls. The next section explores how this research aims to help close this gap.

2.6.1 Disintermediation research in the travel-blockchain area

Tyan, Yagüe, & Guevara (2020) as well as Treiblmaier (2020) have provided an overview of research in the blockchain-travel domain where they, collectively, list the following researchers to have contributed to disintermediation articles in the travel and blockchain domain: Rashideh (2020); Calvaresi, Leis, Dubovitskaya, Schegg, & Schumacher, 2019); Önder & Treiblmaier (2018); Pilkington (2017). Notwithstanding the fact that there is a possibility some studies may have been missed, only one of these researchers has placed disintermediation as the focal point of their study: Rashideh (2020).

With the above being said, blockchain technology at both a practical and research level has greatly accelerated through the years and due to this, the technology may have advanced by the time this study is published. However, this should not prevent the development of frameworks and theories in this domain because it helps researchers understand why certain issues and phenomena occur, and it contributes to historical information to make better predictions for the future (Treiblmaier, 2021).

2.6.2 The role of web content for blockchain academic research

Growth in Web 2.0 technologies has led to a plethora of different types of online content which provides unprecedented opportunities for researchers to access and analyze data available on the web without being confined to traditional methods such as interviews, surveys and focus groups (Kuljis & Kim, 2010). Logically, several researchers have delved into its suitability for academic purposes since the inception of the Internet. Rightfully so, a common trend amongst early researchers in the blockchain-travel domain is that existing academic papers often make use of web-based content as their data source or to demonstrate examples and opportunities for applications in this industry.

Some examples that have used web-based content include Ozdemir, Ar, & Erol (2019), Agrawal, et al. (2018) and Erceg, Sekuloska, & Kelic (2020) who based discussions and findings on existing solutions through information found online to bring it into the academic space. This is because there is not a lot of academic research on this niche topic and using web sources offers a bridge between what is available on the internet and what is in academic literature. This is supported by Irannezhad & Mahadevan (2021) who reiterate that is a relatively new technology, and given that use cases are mostly limited to proof of concept and have not been fully adopted by the industry, empirical assessment of case studies is not feasible yet. Regardless of this, researchers still need to seek out empirical information if possible (Risius, 2017; Ozdemir, Ar, & Erol, 2019; Treiblmaier, 2021).

Only a handful of researchers have been able to obtain empirical data from participants who work in the blockchain-tourism industry. This includes but is not limited to, Aghaei, Naderibeni, & Karimi (2021) who interviewed blockchain-tourism industry participants to develop a blockchain tourism business model, as well as Rashideh (2020) who interviewed participants who have worked in the tourism industry for a long time and were researchers in blockchain technologies.

2.7 Research Framework and theory for this study

When a new potential disruptive technology emerges, there is a tendency to try to solve every problem with that technology (Tavares, Correia, Restivo, Faria, & Aguiar, 2018). Identifying an existing framework can provide a reference point by demonstrating where the interest in the technology exists and where it can be missing (Tavares, Correia, Restivo, Faria, & Aguiar, 2018). With this in mind, this section highlights a suitable framework to help focus the study and ultimately answer the research question appropriately.

While surveying the papers used for this literature review, the researcher found that because research on blockchain within the travel industry is still considered new, the scope of papers lacks the use of theoretical frameworks (either newly presented or used as a basis to conduct research). For this reason, the papers used for this literature review were expanded to include the search string “blockchain research frameworks” to find an appropriate framework for the research being presented. Researchers such as Önder & Treiblmaier (2018) also call for more theoretical frameworks and research propositions to create a comprehensive tourism blockchain research agenda. Additionally, a paper by Risius (2017) also advocates for more research in blockchain at an intermediary level. This paper by Risius (2017) structures the insights of the current body of research on blockchain technology, outlines the present research scope as well and outlines disregarded topics through a comprehensive framework. It was through such processes of trying to find blockchain frameworks that Rashideh’s (2020) paper was discovered, which subsequently and theoretically became a contribution to this research. A subsequent literature search was undertaken at a later stage, as mentioned in the literature paper collection section at the start of this chapter, and this led to the discovery of another, more recent study by Aghaei, Naderibeni, & Karimi (2021) in which a blockchain tourism model is compared to a traditional tourism model. The objectives of the study by Aghaei, Naderibeni, & Karimi (2021) was closely aligned with the objectives of this study by delving deeper into the inner working of the blockchain-tourism business, touching on blockchain-based intermediary processes in the travel industry. One could argue that this research supports or extends the conceptual business model of Aghaei, Naderibeni, & Karimi (2021) as well, although Rashideh’s (2020) framework was regarded as being more suitable for focusing this study, which is described in the following paragraph.

Rashideh’s (2020) framework for an increased level of disintermediation highlights that five main factors lead to disintermediation within the tourism industry: *Decentralization, trust, security, cost reduction, and transaction speed*. These factors (illustrated in **Figure 6** below)

also function as the characteristics and benefits of disintermediation within the travel industry (Rashideh, 2020). The framework is based on the Theory of Disruptive Innovation. This theory stipulates that disruption is a process whereby smaller companies with fewer resources can successfully compete with major players in the market (Rashideh, 2020). Therefore, current players must continue to find new ways of growing their businesses that usually incorporate new business models, as new entrants can evolve into major players that can overshadow them in the market (Rashideh, 2020). A prime example of this is Travalva as discussed in the previous section. Travalva was founded as recently as 2017 yet offers the same flight and accommodation booking services as several players in the market which has been around for a relatively longer time (Travalva, 2021).

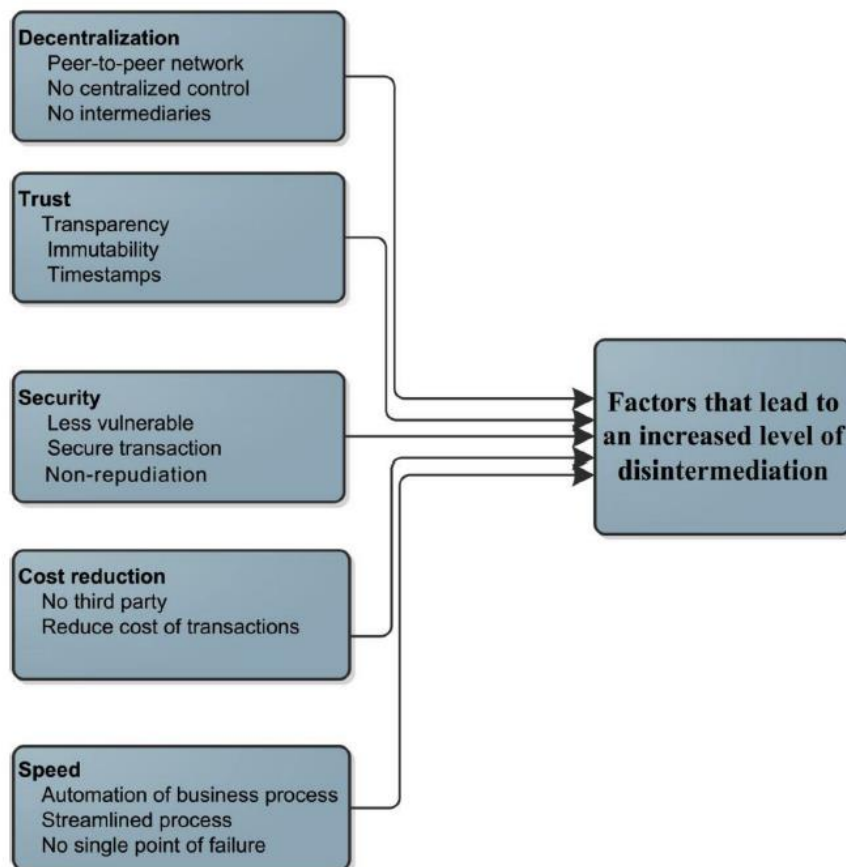


Figure 6: Factors that lead to disintermediation in the tourism industry (Rashideh, 2020)

While disintermediation as a result of blockchain technology implementation can take place in all types of industry sectors, presently there has been no holistic framework that addresses an increased level of disintermediation in the tourism industry specifically, besides the one presented by Rashideh (2020) (Rashideh, 2020). For this reason, the framework has not been extensively used, but the factors used in the framework echo the characteristics, nature, and

potentials of blockchain discussed in the first two sections of this literature review. [Treiblmaier \(2021\)](#) also advocates for the need to focus on the core characteristics of blockchain technology to create meaningful frameworks, which is what this framework by [Rashideh \(2020\)](#) does. For such reasons, alongside its context that is placed in the travel industry, this framework is regarded as suitable for this research.

[Rashideh \(2020\)](#) recommends that blockchain be integrated into tourism business models to reduce the number of intermediaries and the number of new entrants to the industry. Likewise, [Risius \(2017, p. 14\)](#) suggests that: “By identifying the value propositions and the limitations that blockchain technology offers compared to established intermediary services providers, research can also shed light on which business models are actually going to be challenged by blockchain-based systems”. [Aghaei, Naderibeni, & Karimi \(2021\)](#) have attempted to respond to such calls and presented a tourism business model on a blockchain platform. It is through this combination of [Rashideh’s \(2020\)](#) framework and other authors such as [Risius \(2017\)](#) and [Aghaei, Naderibeni, & Karimi \(2021\)](#) calling on more blockchain intermediary research that this study is responding.

2.8 Challenges in blockchain technology

Much of the literature review up until this point has been aimed at focusing on the opportunities of blockchain technology for the tourism industry. However, the blockchain industry itself is notwithstanding some major challenges that influence the uptake of this technology for all industries. The purpose of this next section is to highlight some of these challenges.

Legal and regulatory issues

Legal and regulatory issues are undoubtedly one of the main topics of discussion in terms of the employment of blockchain technology, particularly around cryptocurrencies ([Erceg, Sekuloska, & Kelic, 2020](#)). Several papers have attempted to discuss various aspects of this, including Challenges related to vague regulatory rules and definitions, the need for regulatory rules to protect issuers and investors yet concern for innovation hindrance, the cost of complying with regulation and so forth. Granted, this technology is relatively new in its applications in the real world and is accelerating at a rapid pace. At the time of writing this research paper, Europe’s Markets in Crypto-Assets (MiCA) framework is underway which is the first comprehensive legal framework that regulates the crypto-assets market for the whole of Europe ([Ferreira & Sandner, 2021](#)). Several other countries have made regulatory efforts to control cryptocurrencies, but MiCA is notably more comprehensive. This framework will make

clear the regulations companies need to comply with if they want to issue crypto-assets or participate in this type of market. This framework will also replace existing national frameworks applicable to crypto assets (Ferreira & Sandner, 2021).

Technical issues

Onder & Gunter (2020) provide four major challenges of blockchain adoption. These are the complexity of the technology, its very own technical aspects, concerns about its scalability, and the need for supportive and effective policies. Onder & Gunter (2020) do, however, believe that the overall economic benefits of blockchain (particularly in the areas of identity verification, monetary transfers, property registries, and smart contracts) will outweigh these challenges by remodeling existing economic practices for the internet age.

Social issues

Beyond the fact that blockchain technology is relatively new and its future is uncertain considering the previous challenges mentioned, other serious social issues have come with it, including opportunities for fraud in cryptocurrency transactions (Baker McKenzie, 2018). Numerous South Africans allegedly fell victim to a massive fraudulent scheme involving BTC Global, where more than 27,500 people are reported to have invested between ZAR 16,000 and ZAR 1.4 million with BTC Global with the promise of up to 50% interest each month (Baker McKenzie, 2018).

Environmental Issues

Another topic that is frequently associated with blockchain is the presumably high amount of energy consumption involved in its operation (Treiblmaier, 2021). This is a result of the proof of work (PoW) algorithm that is frequently used in public and permissionless blockchains as part of the consensus mechanism. However, as Treiblmaier (2021) has briefly noted, most recent enterprise blockchain applications do not even apply this mechanism and it should not be an obstacle to advancing academic research in the blockchain-tourism industry.

CHAPTER 3: CONCEPTUAL MODEL FOR THIS STUDY

This chapter is dedicated to highlighting the conceptual process of this paper. The existence of a conceptual model is helpful to ensure research is given order and that it communicates the process to achieve its completion to its readers (Green, 2014). Many researchers have found that research articles do not make their theoretical or conceptual models explicit in relation to their study (Green, 2014). However, this does not mean that they do not have such a model, but that it may be embedded in the literature review (Green, 2014).

A conceptual model is a system of assumptions, beliefs, theories, and concepts that support and inform the research (Maxwell, 2005). Green (2014) has discussed that the concept of conceptual models and theoretical models vary in interpretations amongst researchers and what is more important is how the model is backed up by existing theories, beliefs, and concepts of other researchers to answer the research question.

With the above understanding of what is expected of a conceptual model, one for this study is illustrated in **Figure 7** below and then discussed. Green (2014) has found that there are two main ways in which researchers use conceptual models in qualitative research. The first is in the design of the study where, if it is explicit, the framework can often be found as a section as a result of the literature review (as the case with this chapter). The second way researchers utilize theoretical and conceptual frameworks is to use their research for the development of a framework (which is an outcome and objective of this research).

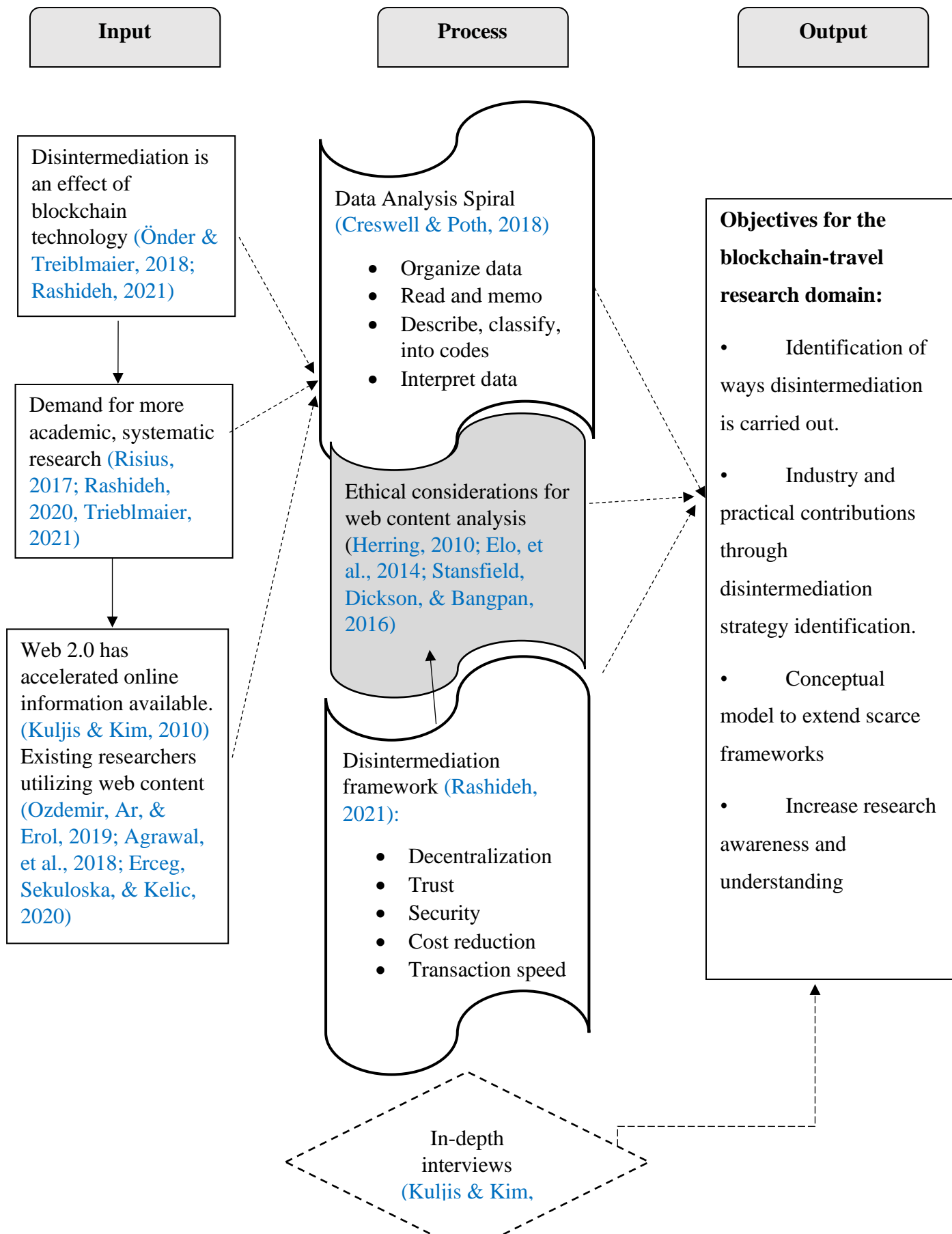


Figure 7: Conceptual model for this study

The conceptual model illustrates the key findings, beliefs, theories, and concepts coming out of literature regarding the combination of blockchain and travel research, particularly in the area of disintermediation, and how these ideas relate to each other in a systematic way that will answer the main research question and objectives. To help organise these ideas, the *Input-Process-Output* (I-P-O) model by McGrath (1964) is used. This model is suitable based on the purpose of a conceptual model that is provided at this point of the research. That is, as mentioned by Green (2014) above, to clearly communicate the components of the process taken to answer the research.

Inputs:

Disintermediation is a core characteristic of blockchain technology and researchers in the travel-blockchain domain have identified it as being one of the immediate effects on the travel and tourism industry (Önder & Treiblmaier, 2018; Rashideh, 2021). These same researchers are echoing the dire need for more research because at this stage it is very minimally explored across all sectors of the industry.

There is clearly an interest between the plethora of information available online and early researchers in this domain: Many have brought practical examples from website sources in the academic space due to the novelty of research in this domain. Some examples include Ozdemir, Ar, & Erol (2019), Agrawal, et al. (2018) and Erceg, Sekuloska, & Kelic (2020) who based discussions and findings on existing solutions through information found online to bring into the academic space. This is certainly not a new phenomenon with the innovations of Web 2.0 technologies that have accelerated the amount of information available online (Kuljis & Kim, 2010), and should be used in a way that is as credible and trustworthy as far as possible (Kuljis & Kim, 2010).

Process:

Studies that hope to take advantage of web content for its methodologies need to embed it in existing frameworks and theories to ensure research is carried out in a way that is credible and trustworthy, at least as far as possible for the researcher. The *Data Analysis Spiral* is a framework by Creswell & Poth (2018) that represents the fundamental phases of analysis necessary for content analysis. Web content is not a typical traditional data source (such as interviews or observations); therefore, it is extremely important to place efforts on ethical

considerations when utilizing this type of data source. For this reason, informed by existing studies such as [Herring, \(2010\)](#); [Elo, et al., \(2014\)](#); [Stansfield, Dickson, & Bangpan \(2016\)](#) and [Cilliers & Viljoen \(2021\)](#), best practices and guidelines on conducting web content analysis is plugged with the *Data Analysis Spiral* in the conceptual model diagram.

Through a literature search, it was discovered that [Rashideh's \(2021\)](#) framework for an increased level of disintermediation is possibly the only known travel and blockchain-based framework at this stage. It therefore holds merit to incorporate this into the conceptual model to help guide which factors should be further investigated. However, this should not be at the expense of having a limited ability to see other key findings in content ([Creswell & Poth, 2018](#)). For this reason, it is plugged into the *Data Analysis Spiral* to be used at the classifications and coding stage only.

Output:

The output of the conceptual model coincides with the overall objectives of this study. By bringing more systematic research into this space, the novel disintermediation framework by [Rashideh \(2021\)](#) for the travel industry can be inspected, supported and extended. As far as the researcher is concerned, a study like this has not been conducted yet and hopefully, it provides a different perspective in a domain that requires more academic input.

CHAPTER 4: PHILOSOPHICAL ASSUMPTIONS

Philosophical assumptions are the underlying beliefs in a research study that influence the theories made in that research (Creswell & Poth, 2018). The researcher needs to acknowledge and understand how philosophical assumptions shape beliefs, which ultimately impacts the outcomes of research, especially qualitative research (Creswell & Poth, 2018). Additionally, acknowledging the philosophical stances also helps to align the views of the researcher versus the reviewer, Creswell & Poth (2018, p.19) explain: “When the assumptions between the author and the reviewer diverge, the author’s work may not receive a fair hearing”.

Creswell & Poth (2018) provide a comprehensive discussion of four types of philosophical assumptions, all of which should align with each other through the study, namely: ontology, epistemology, axiology, and methodology view of the researcher. Holistically, these answer the overall question: “How do your beliefs guide your actions as a researcher?” (Creswell & Poth, 2018). A summarised visual of the philosophical stances for this particular study is provided in **Figure 8** below, followed by its discussion and motivations.

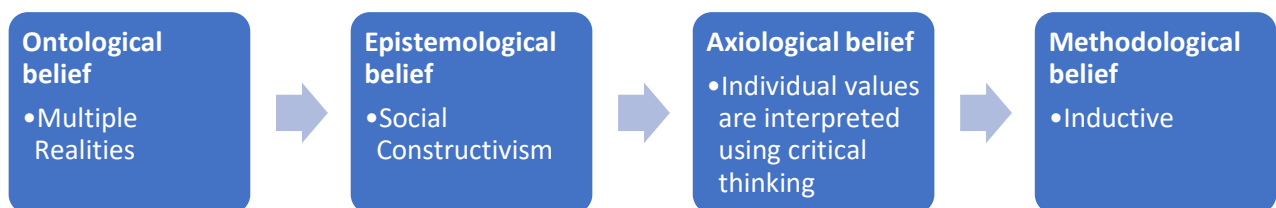


Figure 8: Philosophical considerations for this study

4.1 Ontological View

Ontology refers to the researchers’ view of reality (Creswell & Poth, 2018). It answers the question: “What is the nature of reality?” (Creswell & Poth, 2018). This view is either through reporting on multiple realities, or it is the view that reality can exist by itself, independent of other views of reality (Creswell & Poth, 2018). These two positions are referred to as “nominalists” and “realists” by Neuman (2014).

The purpose of this research is to find out more about the phenomenon of disintermediation in the blockchain travel industry. As already discussed in the literature review, such research is largely regarded as new and underdeveloped because most research is still exploratory. The

researcher therefore recognizes the need to report on various forms of evidence (including existing literature) to build up enough data and points of view for the study and contribute to existing scarce research in this domain. It would require information from sources that are specifically knowledgeable on the subject, and it cannot simply be observed or objectively measured by the researcher (Creswell & Poth, 2018; DeCarlo, 2018). This study is therefore **qualitative**. Qualitative collection generates data in the form of words instead of using numbers; and such data is then interpreted, lending itself to be **subjective** in nature (DeCarlo, 2018).

With the above being the case, the researcher recognizes the need to report on **multiple realities**. Creswell & Poth (2018) explicitly state that qualitative research reports on multiple realities and that the researcher needs to welcome this idea of multiple realities not only from himself but also from the individuals being studied as well as the readers of the study (Creswell & Poth, 2018). Consequently, multiple forms of evidence in themes, using the actual words of different individuals and presenting different perspectives (everyone's experience may be different) are involved.

4.2 Epistemology View

Epistemology refers to how the researcher knows reality- what counts as knowledge and how knowledge claims are justified (Creswell & Poth, 2018). It answers the question: How is reality known? (Creswell & Poth, 2018). It can follow a positivist view on the one end, or a social constructivist view on the other end (Creswell & Poth, 2018; DeCarlo, 2018).

The information required for this research involves consultation with various sources for various perspectives ("multiple realities"). Therefore, the epistemology stance needs to welcome the notion of "multiple realities" as well (Creswell & Poth, 2018).

Positivism is guided by the principles of objectivity, knowability, and deductive logic (DeCarlo, 2018), and it is based on well-researched theories (Creswell & Poth, 2018). Considering this, positivism is not the epistemological view of this study as it would be contrary to the subjective ontology view discussed previously. Additionally, it may simply be too early to have such views in a research domain where theories and frameworks are largely considered underdeveloped for several stakeholders of the travel industry (e.g., payments in travel, loyalty programmes, accommodation, transport etc.). It is noted that Creswell & Poth (2018) specifically refer to "postpositivism as opposed to "positivism", however, the essence of the definition provided above remains the same to keep this section uncomplicated.

Considering the above, the epistemology view suitable for this study is **social constructivism** (also known as interpretivist research). This view emphasizes the need to understand or interpret individuals within their subjective meanings and experiences, hence their “social construct” (Creswell & Poth, 2018). The researcher intends to interpret the meanings others have about the world by ultimately developing theory or patterns of meaning, as opposed to discovering that meaning objectively (Creswell & Poth, 2018).

4.3 Axiology View

The axiology view refers to this value stance taken by the inquirer (Creswell & Poth, 2018). It answers the question: How are the values of the research expressed? (Creswell & Poth, 2018). As mentioned above, this research follows a subjectivist view and therefore it is interpreted using critical thinking and within the context of the data being studied. The researchers’ values are therefore presented through their understanding, informed by “multiple realities”, which have been modified and evolved as more understanding has accumulated over time (Aliyu, 2015).

4.4 Methodology for this study

Methodology refers to the procedures (or process of the research) used in the study (Creswell & Poth, 2018). It answers the question: How is the research conducted? (Creswell & Poth, 2018). The appropriate methodology for this study welcomes (aligns with) the views of the philosophical stances discussed above.

Firstly, the overall research purpose is considered: Research purpose can be classified into three categories: Exploratory research, descriptive research, or explanatory research (Neuman, 2014). Exploratory research is used when the subject is new, there is little research available on the topic, and consequently one wants to become more familiar with it (Neuman, 2014). This contrasts with descriptive research where ideas are well known and then specifically described to define and clarify them, or explanatory research where already well-known ideas are researched to find out why they happen (roots and causes) (Neuman, 2014). Given the contexts around the scarcity of research in this domain (particularly discussed in the problematization area in the introduction, as well as the literature review section which discusses the landscape of current research in this domain), it is without a doubt that this research domain is still in its early exploratory stages and therefore **exploratory research** is appropriate for this study. The goal of exploratory research is to go more in-depth about an idea and its areas to create more scope for future research to investigate and is therefore not

conclusive (Neuman, 2014). Accordingly, the overall research question is exploratory as it implies that the effect of disintermediation is still to be *explored* for the travel industry: *What are the disintermediation effects of applying blockchain technology to the travel and tourism industry?*

The overall purpose of this research guides the process of research (methodology) it will follow, and this can mainly fall into two main directions: Inductive or deductive. An inductive approach is when research moves from vague ideas towards identifying theoretical relationships which can later be refined and elaborated more precisely (Neuman, 2014). On the other hand, a deductive approach is when research starts with ideas (theory) and moves towards being evaluated so that it is confirmed and tested, and is testable (Neuman, 2014).

Because the researcher does not intend to base this entire study on an existing theory (as is the case with deductive research), this research follows an **inductive approach**. Creswell & Poth, (2018) provide further confirmation by explaining that an inductive approach is used when an author wants to explore a topic, understand it more in-depth and convey such understanding as a result of the researchers' experience in collecting and analyzing the data. It goes without mentioning that this supports the exploratory views expressed above.

CHAPTER 5: RESEARCH STRATEGY

5.1 The research design chosen for this study

Creswell & Poth (2018) has published extensive research on qualitative research designs since the 1980s. Their book titled *Qualitative Inquiry and Research Design* largely shapes all methodology sections for this research for consistency purposes, supported by other researchers where appropriate. Through the years these authors have identified five types of research designs that appear consistently over the years: Narrative research, ethnography, grounded theory, phenomenology, and case studies. Beyond the need for different research perspectives echoed throughout the literature review sections, these five types of case studies were compared for suitability in terms of their research focus, type of research problem best suited for, unit of analysis, and so forth. There are some overlaps between the different types of research designs but the fundamental difference lies in what the design wants to accomplish: What the design wants to accomplish should coincide with what the research study wants to accomplish (guided by its research question, aims and objectives (Creswell & Poth, 2018)). With this providing context as to how research designs were compared, **case study research was deemed most suitable**. Case study research is a qualitative approach in which the investigator explores a real-life, contemporary bounded case, or cases (systems), over time (Creswell & Poth, 2018). Case study research is best suited for research problems where the researcher wants to go more in-depth and gain a better understanding (Creswell & Poth, 2018). It therefore complements the philosophical considerations discussed in the previous chapter which is further informed by the research question and the aim of this study.

A reminder of the research question for this study and its aim is provided below:

The **primary research question** for this study is: *What are the disintermediation effects of applying blockchain technology to the travel and tourism industry?*

The **aim of this research** is: *To strengthen and move forward already scarce blockchain tourism research, particularly in the area of disintermediation which is both a core characteristic of blockchain technology as well as an immediate effect on the travel industry.*

The words “*What are...?*” in the research question, and the words “*strengthen and move forward already scarce blockchain tourism research*” in the research aim imply that something is still to be explored, discovered, and strengthened, requiring more in-depth investigation into the problem. Furthermore, as discussed in the literature review, research in

this domain is in its infant stages and mainly exploratory, even more so in the academic sphere (Onder & Gunter, 2020). Therefore, based on such research intentions and needs within the academic space, case study research is identified as appropriate.

Research designs such as narrative research (that explores the life stories of an individual in chronological order) and ethnography (that describes and interprets a culture-sharing group) have not been deemed suitable for this particular study because their research problem and objectives do not seek to study a specific individual or group of individuals within the context on their life and draw inferences from it (Creswell & Poth, 2018). Research designs such as grounded theory (where theory is grounded based on empirical data gathered from interactions being studied), as well as phenomenology (where the essence of an experience becomes a phenomenology), are also not deemed suitable based on the comparison of case study research when it comes to considering data sources, the unit of analysis and sampling. For instance, to succinctly answer the research questions and aims of these alternative designs, the researcher would need to have direct access to data by observing relationships between individuals and technologies within companies, which may not be possible for geographical and organizational privacy reasons. With such considerations in mind, these alternative research designs were deemed less suitable and unrealistic despite also being suitable for qualitative research.

CHAPTER 6: METHODS OF COLLECTION AND ANALYSIS

6.1 A description of the cases

An important feature of case study research is that the case needs to be bounded or described within certain parameters (Creswell & Poth, 2018). As a starting point, through the literature review process, the researcher can already gauge what constitutes a case under consideration for this study. Namely, travel companies with blockchain technology integrations. For the sake of this research, such companies will be called “blockchain travel companies”. The sampling section will further discuss the parameters of the cases.

6.2 Data Requirements

Data sources (and consequently collection and analysis) for case study research design are emphasized using multiple forms to provide an in-depth case picture, in comparison to a research design such as phenomenology or ethnography research that can require only interviews or observations (Creswell & Poth, 2018). The multiple forms of data typically include interviews, observations, documents, and artefacts (Creswell & Poth, 2018).

The definition of an artefact is not unpacked by Creswell & Poth (2018) which has left the researcher undecided about whether certain sources belong in the documentation or artefact data categorization. For this reason, the researcher sought an external definition for this: An artefact is a self-contained work result that has a context-specific purpose and includes a physical representation, and syntactic and logical organization of content (Fernández, et al., 2019). This definition of an artefact provides a reason as to why certain sources are not simply included as part of a documentation data source. A summary of the overview of data sources is presented in **Figure 9** below, followed by its discussions in the following section.

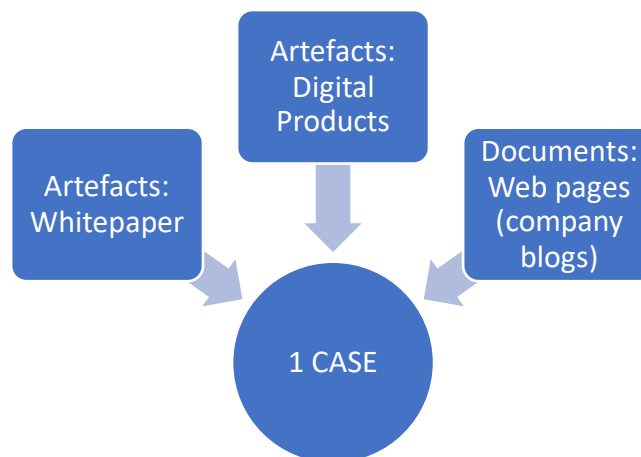


Figure 9: Overview of data sources for this study

6.2.1 Data Sources and Collection Methods

Data Source 1: Whitepapers as artefacts

At this stage of academic research in the blockchain travel domain, it is commonplace for research papers to include references to technical whitepapers. To simply name a few, researchers include [Onder & Gunter \(2020\)](#); [Treiblmaier, Blockchain and Tourism, \(2020\)](#); and [Zhang, Hang, Jin, & Kim, \(2021\)](#).

Whitepapers provide insight into the said blockchain solutions (existing or proposed) and offer deeper insight into the way the organisation works. Indeed, the original proposed peer-to-peer cash system (Bitcoin) by [Nakamoto \(2008\)](#) was a whitepaper. [Liua, Tsaia, Bhuiyanh, & Yang \(2020\)](#) succinctly explain:

The whitepaper of blockchain product is a textual carrier of blockchain technology, which covers the technical implement, functions and performance of the blockchain products, market prospects, as well as detailed introduction of the company and team. Analysis of the whitepaper is an important way to fully evaluate blockchain products.

With the above being said, although whitepapers can be very time-consuming due to their length of pages, this data source is crucial in understanding not only how the solutions work from both a technical perspective and organizational perspective, but also the way this domain (namely, the domain of blockchain and travel) is taking shape.

The collection method for this data source would involve downloading the official whitepaper documents from the websites of the applicable cases under analysis.

Data Source 2: Online (digital) products as artefacts

Working online products will be examined to determine how early (yet existing) players transact in this domain and subsequently carry out disintermediation throughout the travel industry. [Creswell & Poth \(2018\)](#) particularly make mention of physical artefacts as a data source but because the nature of this study involves web-based technology, namely blockchain technology, the online equivalents are being sought, which would be the online products of such companies. The collection method for this data source would involve visiting and using online digital products to gain a better idea of how blockchain technology is integrated into these systems.

Data Source 3: Documents (web pages)

Companies self-publish their articles for a variety of reasons including informing the public of new business plans, new feature releases, insights into industry challenges and so forth. Therefore, articles published by the chosen cases will be used to find any supplementary information that provides more insight and context for the cases. The collection method for this data source would involve surveying the company articles and downloading the appropriate ones for further analysis.

6.2.2 A note on the suitability of data sourcing requirements

While case study research employs the use of multiple forms of data including interviews, observations, documents, and artefacts (Creswell & Poth, 2018), this research is limited to the use of two, namely artefacts and documents. Both sources can be retrieved online. Reasons for the choice of these two data sources have been discussed previously in the literature review section under *the role of web content research for academic research*, but since online sources are not traditional sources of data, the suitability of web-based content is further investigated by the researcher. This was necessary not only to confirm the appropriateness of the data source but also to assist in following best practices when completing the sections to come. For instance, using online content as a data source involves ethical considerations that differ from traditional methods such as interviews.

Firstly, using web-based data allows a researcher to access data that is difficult to access by traditional means (such as questionnaires surveys and interviews) and it offers an alternative thereof (Creswell & Poth, 2018). As discussed in the literature review, only a handful of researchers have been able to obtain empirical data from participants who work in the blockchain-tourism industry, such as Aghaei, Naderibeni, & Karimi (2021) and Rashideh (2020). Researchers therefore have to rely on other means to gain information access and by using web-based content, the researcher can use public information and contribute to existing research without being excluded from the body of research based on access to data (Kuljis & Kim, 2010). This reality has proven to be true for the researcher of this study, who experienced a dropout rate of suitable participants during the interview process. Utilizing data obtained from the web comes with its own set of advantages and ethical concerns, as with any other type of data source and collection. Such concerns are discussed in its dedicated section further on in this study. However, despite this, scholars such as Creswell & Poth (2018) encourage

individuals designing qualitative projects to include new and creative data collection methods that will encourage readers and editors to examine their studies.

Secondly, growth in digital technologies in Web 2.0 has led to a plethora of content online that is not being used (Kuljis & Kim, 2010). Using web content allows the researcher to not only source a large quantity of data as opposed to using traditional methods of data sources but also obtain other views to support existing research (Kuljis & Kim, 2010). Additionally, the use of web content is suitable because physical means of storing documents or artefacts is simply not the norm with companies that provide online technologies such as blockchain technology. It needs to be emphasized that although the data source of this study is sourced from websites, the literature review and its theoretical underpinnings are still largely embedded and motivated by peer-reviewed literature. Having access to such data has allowed the researcher to assess and build on existing research, such as determining whether the cases under analysis echo what is in literature, whether there are new areas to explore and so forth.

6.2.3 Data collection instruments

The data sources do not require data collection instruments to evaluate their credibility because such sources live on the sites of the selected cases as discussed previously. In terms of other instruments to guide this study, it would be the conceptual model presented in Chapter 3, which also includes the Rashideh (2021) framework that is used as a guide to identify factors that lead to disintermediation.

6.2.4 Unit of analysis and unit of observation for data collection

These two items concern what the researcher observes in the course of their data collection and what they hope to be able to say about those observations (DeCarlo, 2018). A **unit of analysis** is the entity that the author wants to be able to say something about at the end of the study and a **unit of observation** is the item (or items) that the author observes, measures, or collects in the course of trying to learn something about the unit of analysis. More specifically, the unit of analysis will be determined by the research question, while the unit of observation will be determined largely by the method of data collection that the author uses to answer that research question (DeCarlo, 2018). Creswell & Poth (2018) further motivate that the unit of analysis for case study research design is suitable for both single or multiple events, programs, activities, or individuals.

Based on the explanations provided above, the **unit of analysis** for this study is travel companies which operate in the blockchain technology domain. As outlined in the introduction,

the research question for this study is: *What are the disintermediation effects of applying blockchain technology to the travel and tourism industry?* It is therefore this group of travel and tourism companies that have implemented blockchain technology that the author wants to be able to say something about at the end of the study, and that findings are later drawn upon.

It is the artefacts and documents that have been sourced from the web that discuss disintermediation within this group that the researcher will collect data from to answer the research question and for this reason, web content and artefacts are the **unit of observation**.

6.3 Sampling design

6.3.1 Relevant target population

The population group is “who” the author wants to be able to say something about at the end of their study (DeCarlo, 2018). This research aims to help demystify the potentials and unknowns of what disintermediation means for the travel industry as a core characteristic and effect of applying blockchain technology. Therefore, **the target population is all blockchain-based travel companies around the world** because it is this group that the author wants to be able to say something about at the end of this study.

6.3.2 Sampling frame

Researchers use a sampling frame as an intermediate point between the overall population and the sample that is drawn (DeCarlo, 2018). A sampling frame is a—real or hypothetical—list of participants from which a sample will be drawn (DeCarlo, 2018). Additionally, case study researchers typically study current, real-life cases that are in progress so that they can gather accurate information not lost in time (Creswell & Poth, 2018).

With the above in mind, the sampling frame for this study is informed by CoinMarketCap and CoinGecko. These are examples of two leading cryptocurrency market aggregators (Dalton, 2020). Market aggregators gather information from around the world and display it in a user-friendly way (typically for investors) (Dalton, 2020). The purpose of this study is not to analyze specific market events in the cryptocurrency space; therefore, any market aggregator is seen as suitable if the platform offers an extensive list of cryptocurrencies to be able to find the most companies which operate in the blockchain or tourism industry. The use of two market aggregators is merely for comparison purposes to see if the one lists any more blockchain-based travel companies than the other. Both CoinMarketCap and CoinGecko allow a user to filter by tourism categories:

- CoinMarketCap: <https://coinmarketcap.com/view/tourism/>
- CoinGecko: (<https://www.coingecko.com/en/categories/tourism>)

It is from these two lists that the researcher will identify (through their tokens listed on the platform) the companies considered as cases and therefore find documents and artefacts about.

6.3.3 Samples and sampling strategy

A sample is the group of people you successfully recruit from your sampling frame to participate in your study (DeCarlo, 2018). In qualitative research, the overall type of sampling used is purposeful sampling (Creswell & Poth, 2018). This is where a researcher begins with specific characteristics in mind that they wish to examine and then seeks out research participants who cover that full range of characteristics (DeCarlo, 2018). Additionally, due to its multiple forms of data, more than one sampling strategy can be used in a single study for case study research (Creswell & Poth, 2018).

Sample and sampling strategy for each case

The research design chosen for this study is case study research. Therefore, each case under analysis for this study would be a sample.

Maximum variation as a sampling strategy for case study research is strongly suggested by Creswell & Poth (2018). In line with purposeful sampling, this strategy consists of determining in advance some criteria that differentiate the participant's (Creswell & Poth, 2018). It increases the likelihood that findings will reflect differences or different perspectives, which is important for a qualitative researcher who infers from one case to another (Creswell & Poth, 2018).

To ensure that each case is similar (for a fair comparison between cases), the supply chain of a tourism product will be focused from the point of view of the two largest influences on the shape and functioning of the entire travel chain (Ślusarczyk, Klaudia, & Kot, 2016), namely travel agencies who offer hotel and flight services. This means that the companies chosen will need to provide, at minimum, basic travel agency services such as flights and accommodation. As highlighted in Kwok & Koh's (2018) diagram in the literature review, blockchain has potential in several areas within the tourism industry, such as identifying management for baggage tracking but for purposes of focusing this research in a fair way amongst cases, the boundaries described above are necessary.

Sample and sampling strategy for artefact data source

The sample for the artefact data source is the digital product with its accompanying whitepaper. Because these will be determined by the cases identified for this study, the **maximum variation** sampling strategy is also applied to this data source.

Sample and sampling strategy for documentation data sources

The documentation data source is treated differently than the artefacts one because not all web pages will be seen as suitable for this study. It is bounded by its ability to provide information on disintermediation as a result of implementing blockchain in the travel industry. The sampling strategy for this data source is therefore **random purposeful sampling** because all articles have a chance of being chosen, but those chosen as suitable will be on the condition that they meet the disintermediation requirement described by [Creswell & Poth \(2018\)](#). The random purposeful strategy is ideal for adding credibility to a sample when the sample is too large ([Creswell & Poth, 2018](#)), such as web pages obtained online. The researcher would need to survey for the suitability of certain articles and for this reason, a sampling strategy such as convenience sampling is not regarded as suitable for this study. Convenience sampling is where the researcher gathers data from whatever cases happen to be convenient ([DeCarlo, 2018](#)).

Content that is published on personal blogs that live off the organizations' official website will not be included, likewise, any articles published from company social media accounts (such as Twitter and Facebook). Consequently, this protects the researcher from any personal and ethical considerations which are further discussed in the Ethics and Access section.

Furthermore, because blockchain research and applications have vastly accelerated in the last two years, as discussed in the introduction and literature review, only articles published post-2015 will be considered to find the most relevant and updated information.

6.3.4 Sample size

For case study research [Creswell & Poth \(2018\)](#) suggest that no more than four or five case studies in a single study be used because any number over one dilutes the level of detail that a researcher can provide. This study will make use of **three cases**. This number should provide enough information and variation valuable for qualitative research ([Creswell & Poth, 2018](#)). In correlation with this, the artefact data sources will therefore also consist of three digital products and their accompanying three whitepapers.

The sample size for the documentation data source (web pages) is not explicitly known at this stage because it depends on which cases are chosen and how many articles such cases

(organizations) have online. Additionally, articles will be screened for their relevance and suitability before being selected and this will further impact the number of documents chosen. The sampling can therefore change during a study depending on needs that arise, so researchers need to be flexible, but despite this, researchers need to plan as much as possible for their sampling strategy (Creswell & Poth, 2018).

6.4 Data analysis

6.4.1 Data analysis technique

Web data comes in a variety of formats and is mostly unstructured and for this reason, content analysis lends itself as the most appropriate method to analyze such data (Kuljis & Kim, 2010). With the rise of online communication, content analysis techniques have been adapted and applied to internet research, hence “web” content analysis, however, the fundamentals of content analysis remain the same through the years (Creswell & Poth, 2018).

Content analysis is a research technique for making replicable and valid inferences from data to their context and can be used in both qualitative and quantitative studies (Kuljis & Kim, 2010). When applied to qualitative research, content analysis is similar to textual analysis in that it is typically based on an individual’s perspective (interpretive) and it often does not utilize statistics for data analysis (Kuljis & Kim, 2010).

Hsieh & Shannon (2005) have identified three distinct approaches to Content Analysis: conventional, directed, and summative (comparison provided in **Table 4** below). Based on their research, it is determined that this study falls under the directed approach, where analysis starts with a theory or relevant research findings as guidance for initial codes (Hsieh & Shannon, 2005).

<i>Type of Content Analysis</i>	<i>Study Starts With</i>	<i>Timing of Defining Codes or Keywords</i>	<i>Source of Codes or Keywords</i>
Conventional content analysis	Observation	Codes are defined during data analysis	Codes are derived from data
Directed content analysis	Theory	Codes are defined before and during data analysis	Codes are derived from theory or relevant research findings
Summative content analysis	Keywords	Keywords are identified before and during data analysis	Keywords are derived from interest of researchers or review of literature

Table 4: Major Coding Differences Among Three Approaches to Content Analysis (Hsieh & Shannon, 2005)

Directed content analysis is useful in cases where existing theory or prior research exists about a phenomenon that is incomplete or would benefit from further description (Hsieh & Shannon, 2005). It is guided by a more structured process than in a conventional approach, and existing theory or research can help focus the research question (Hsieh & Shannon, 2005). The main strength of a directed approach to content analysis is that existing theory can be supported and extended. Applied to this study, Rashideh's (2020) blockchain framework for an increased level of disintermediation will be used as the "existing theory or prior research". At this stage it should be well known by the reader of this study that existing research in the blockchain and travel domain is largely lacking, let alone research with a specific focus on disintermediation. In addition, as research in an area grows, a directed approach makes explicit the reality that researchers are unlikely to be working from the naive perspective that is often viewed as the hallmark of naturalistic designs (Hsieh & Shannon, 2005). Kuljis & Kim (2010) make a similar point in that reliability is improved through validity of data that is identified through a mechanism or coding scheme and categories.

6.4.2 Data Analysis Process

Data analysis is not off-the-shelf. Rather, it is custom-built, revised, and "choreographed" and qualitative researchers often "learn by doing" (Creswell & Poth, 2018). Additionally, the process is not linear but rather iterative in nature (Creswell & Poth, 2018). With this in mind, Creswell & Poth (2018) have provided a "general contour" of qualitative data analysis, known as *The Data Analysis Spiral* which represents the phases of analysis (Figure 10 below) and will be considered for the entire data analysis process.

To extract maximum benefit out of the data, the researcher also sought studies which utilised web content as its source of data to gauge how such research was conducted. Examples include Marek & Skrabut (2017) and Kuljis & Kim (2010) who used web content analysis to explore case studies. Additionally, available literature in the blockchain-travel domain was also consulted because several existing researchers have utilised web-based sources (refer back to the literature section to view the discussion of *the use of web content in academic literature*). Lastly, literature that is dedicated to discussing how to conduct web content analysis in the most ethical way possible such as Herring, (2010); Elo, et al., (2014); Stansfield, Dickson, & Bangpan (2016) and Cilliers & Viljoen (2021) was also consulted and incorporated.

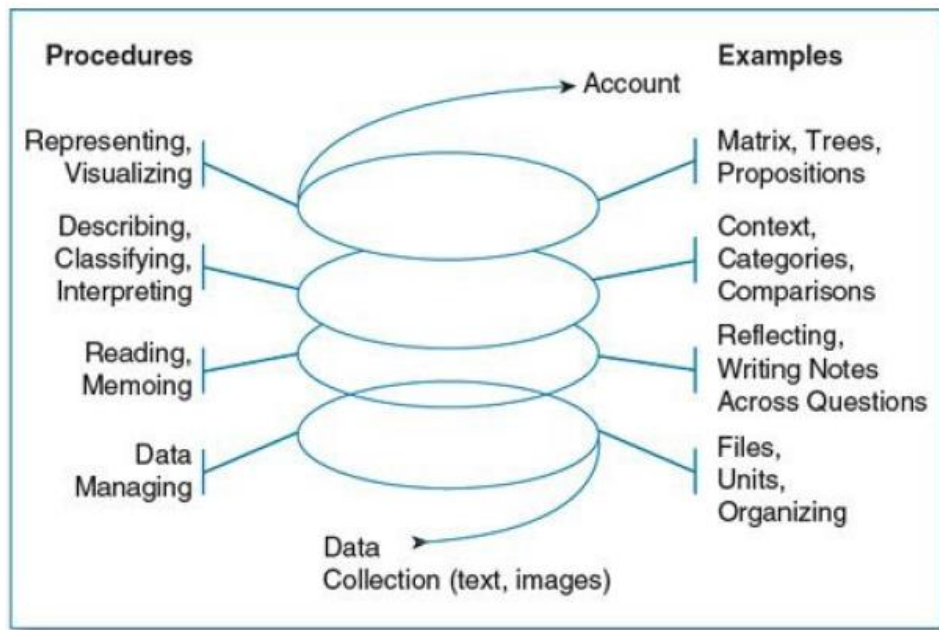


Figure 10: The Data Analysis Spiral (Creswell & Poth, 2018).

Data Analysis Process (Discussion)

The process begins by organizing the data with reliable computer programs and converting files to appropriate text units (represented by the first loop). This is extremely important due to the voluminous amount of data that qualitative research can generate. Applied to this study, this involved identifying the content that is suitable for this study and transferring it to suitable and reliable software.

Moving onto the second loop, the researcher needs to critically read through the data overall, and then go further by making notes about significant thoughts, key ideas, or concepts. Applied to this study, this involved reading through the text saved and making notes as described above. [Creswell & Poth \(2018\)](#) disregarded predetermined questions at this stage to “see” what interviewees said. Applied to this study, this principle will also be applied to reduce being confined to certain ideas.

Moving onto the third loop, the researcher needs to interpret the data, form codes, and build detailed descriptions thereof. As already discussed in the *data analysis technique* section, this research follows a directed content analysis process where codes are defined before and during data analysis. It is therefore at this stage where the [Rashideh \(2020\)](#) framework is used and ideas from the previous loop are compared and organised. The factors of the framework would become the codes for this research. Detailed descriptions and interpretations of the codes in light of the researchers’ views based on findings are determined in this stage. Detailed

description means that authors describe what they see (Creswell & Poth, 2018). Interpretation means that the researcher makes sense of the data as a whole (considering all data and codes) and also links interpretations to the existing literature in this domain (Creswell & Poth, 2018). The researcher has avoided counting the number of times an idea, and subsequently, a code occurs because this study is qualitative and not quantitative. Unless it significantly contributed to a finding, then the use of rank order comparisons of the frequency of codes can and has been used (Hsieh & Shannon, 2005). For instance, the researcher can describe the number of times a certain code was represented for a specific disintermediation factor. Creswell & Poth (2018) caution that counting conveys a quantitative orientation of magnitude and frequency contrary to qualitative research.

The last spiral represents the visualization of findings from the previous spiral. As a reminder, the *Data Analysis Spiral* is iterative as is only being referred to as “the last spiral” for explanation purposes. A comparison table was presented to classify the cases. Additionally, the relatively new and scarce disintermediation framework for the blockchain-travel industry is strengthened.

6.4.3 Data capturing, data storing and data destruction

Some of the most popular qualitative analysis software (for capturing, analyzing, shaping, and storing data) include MAXQDA, ATLAS.ti, NVivo, and HyperRESEARCH (Creswell & Poth, 2018). NVivo is provided by the institution that the researcher belongs to and has therefore opted to utilize this software. However, while conducting data analysis, this was changed to an Excel spreadsheet because the cases and their accompanying supporting text could also be listed in Excel rows in a simple and familiar way to the researcher. This was appropriate because the process used for qualitative data analysis is the same for hand coding or using a computer: The inquirer identifies a text segment or image segment, assigns a code label, searches through the database for all text segments that have the same code label, and develops a printout of these text segments for the code. In this process, the researcher, not the computer program, does the coding and categorizing (Creswell & Poth, 2018).

Data was stored on the researchers’ personal computer. A backup file was kept securely on the researchers’ cloud storage (provided by the institution) and updated each time it was worked on by the researcher.

In line with university policy and procedures in terms of ethical requirements, specifically the UCT Research Data Management Policy, all research data collected will not be stored for a

period longer than two years following the date of publication for this study. Such data will therefore be deleted, and the researcher will schedule an appropriate reminder for this. The reason for the storage of such data is to enable the research data to be discoverable, to allow other researchers to understand the data, and possibly re-use it. Additionally, the researcher may at some stage require the data for unforeseen reasons such as recognition for the effort involved in collecting and analyzing the data. Any data that can be accessed by anyone other than the researcher, will follow strict ethical guidelines as discussed in the following section (for instance, no personally identifiable information will be accessible).

6.4.4 A note on ethical concerns

Regardless of the approach to qualitative inquiry, a qualitative researcher faces many ethical issues that surface during data collection, analysis and dissemination categorizing (Creswell & Poth, 2018). It therefore holds merit to have a dedicated section for this, perhaps more so because this study does not employ traditional data sources such as interviews or observations, but rather, the use of web content. This was necessary to answer the research question and its objectives without blocking researchers from contributing to studies in this domain. As mentioned in the data analysis process, literature that is dedicated to discussing how to conduct web content analysis in the most ethical way possible, such as Herring, (2010); Elo, et al., (2014); Stansfield, Dickson, & Bangpan (2016) and Cilliers & Viljoen (2021), was also consulted and incorporated.

The first and most important consideration is whether the data sources would be regarded as public or private information and whether informed consent is still necessary if the information is considered public. Personal information is any data that could potentially identify a specific individual. Based on the framework guidelines by Cilliers & Viljoen (2021), it was determined that the data gathered for both data sources (artefacts and documents) would not require consent from the publishers of articles that are collected nor the creators of the artefacts, for the following reasons: Firstly, the data is sitting in the public domain, not a private domain. Sharing of information published on company sites has the purpose of sharing such news and is therefore not regarded as private information because anyone can access this data without special rights or access permission. Secondly, data sources do not meet the requirements for human participant research. If the data collected by the study focuses on the content and not the individual who posted the content without collecting data from the page owner, the unit of analysis is the page rather than the profile owner (Cilliers & Viljoen, 2021). In the sampling section, it was noted that no personal blogs and articles published from social media accounts

(such as Twitter and Facebook) will be considered for this study and therefore considerations around requiring consent or concealing identity from vulnerable groups are not applicable for this data source. Vulnerable groups may include children under 18, economically disadvantaged, racial minorities, prisoners and the elderly (Cilliers & Viljoen, 2021).

When it comes to the mere use of web content, there are concerns about how transparent, accountable and reproducible the process is (Stansfield, Dickson, & Bangpan, 2016). The researcher has documented every step taken for this research, as far as possible. The researcher has also sought literature which guides how to conduct website searching, in a way that fosters transparency and accountability which have been integrated into its respective sections throughout this study. This includes guidelines by Stansfield, Dickson, & Bangpan (2016) who outline stages during such a process, its challenges in terms of transparency and accountability, as well as guidance on how to overcome such challenges. The stages are divided into the planning phase, the executing the search stage, as well as the screening for information stage. Additionally, the continuous change of a website's content can lead to potential problems with data collection; however, as Kuljis & Kim (2010) suggest, this can be overcome by rapid data collection and downloading website content, which has been applied to this study. This, in turn, has informed decisions around the timeframe of this research, namely that this research is cross-sectional.

Furthermore, the internet-based research ethical guidelines (IBREG) framework by Cilliers & Viljoen (2021) has been considered throughout the entire process of gathering internet data sources. This framework provides ethical guidelines including legalities of gathering data, privacy expectations of online data, study population considerations when planning online data gathering, data considerations and data storage of internet-based sources.

Lastly, there is no doubt that information found online may lack detailed explanation and it is for this reason that this is carefully noted in the limitations of this research. Particularly the outcomes of using this data are not intended to be final and it intends to inform further research, particularly in-depth interviews (where those knowledgeable on this topic will be consulted). Still, claims made online were checked as far as possible against the actual digital products. For example, if the functionality was announced and described as doing one thing, then the researcher investigated the actual product and whether such functionality did exist.

6.5 Ethics and Access

The previous section focused on ethical concerns throughout the study due to its suitability of discussing the data requirements, sampling, and data analysis process. However, ethical considerations need to be kept in mind throughout the entire research journey and extend to the beginning of a study, during a study, as well as before publishing a study (Creswell & Poth, 2018). This section discusses any ethical issues that have not been discussed in any of the previous sections.

6.5.1 Ethical issues before conducting this study

Before conducting research, the researcher should seek ethical approval for the research through the university (Creswell & Poth, 2018). The researcher of this study has successfully sought ethical clearance from the Ethics Committee of the University of Cape Town (UCT). This process entails submitting an application form to be reviewed by the UCT Commerce Faculty Ethics in Research Committee, who assesses whether the research proposal and intentions meet university policy and procedures in terms of ethical requirements. More information about this application can be found at the following URL:

<http://www.commerce.uct.ac.za/com/Ethics-in-Research>

6.5.2 Ethical issues during this study

During a study, the researcher should seek ethical approval from those involved in the collection of data (Creswell & Poth, 2018). This has been addressed in the *note of ethical concerns* section.

6.5.3 Ethical issues before publishing this study

The final write-up of the study acknowledges all contributors to the study. A list of references has also been attached. The author has also declared any conflicts of interest concerning the research, authorship, and/or publication of this study, which are none at this stage. The author has also declared any funding contributions to the research. At this stage, the author has not received any financial support for the research, authorship, and/or publication of this study.

CHAPTER 7: RESEARCH FINDINGS, ANALYSIS AND DISCUSSION

7.1 Findings for the process of case identification

As per sampling frame requirements, crypto market aggregators were filtered by their tourism categories. Thereafter each token in the tourism category was investigated individually to determine whether they are suitable samples, particularly looking into which organizations behind the tokens listed offer hotel, flights, and other travel agency services (thereby functioning as a current OTA in the blockchain-travel domain).

Appendix A lists all crypto tourism listings that were investigated. Tokens that have met sample requirements were placed in the first rows of the table, and the first three tokens listed (also illustrated in **Figure 11** below) were chosen as cases because they met all sampling requirements. Cases that have been identified as suitable for this study are Travala, XcelTrip as well and Tratok. Their tokens are Travala, XcelTokenPlus and Tratok respectively.

Appendix A further provides a description of each token listed, along with other information that helped inform its suitability for this study. For instance, data sources for this study include the whitepapers and digital products which is paramount in having access to comprehensive information about the organization, its blockchain ecosystem, its token and how the organizations partake in the disintermediation on the whole. A listing such as Starworks Global (STARX) which also aspires to be a blockchain-based Online Travel Agency, may be well into developing their blockchain ecosystem and provide supporting company documents thereof. However, because no consumer-facing products are available yet, the researcher can't corroborate and relate what is communicated in company documents with what is offered to the travel consumer. Such organizations still demonstrate potential competitors in the pipeline.

Tokens that did not have working websites, consumer-facing products or equivalent platforms of information were immediately placed at the bottom of the list in red due to the same reason above of needing access to detailed information about their tokens. There may be several reasons why such organizations are not active in providing comprehensive information. Perhaps simply because these organizations are in the very early stages of conception and development. For instance, it was seen that some of these organizations reached the stage of coin sales and listing them on exchanges, but they have not reached a stage whereby they have wallets, apps, websites and so forth. These tokens were nonetheless still listed in case they're needed for future documentation as well as to show a holistic view of other possible contenders in the space.

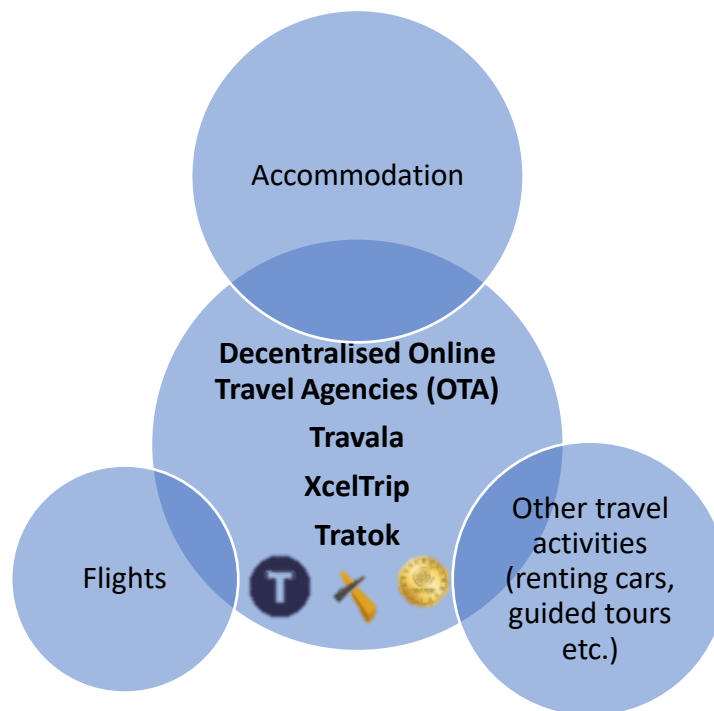


Figure 11: Sampling requirements met by cases

While the purpose of the investigation described above was to identify suitable cases, an overview of the current state of the tourism blockchain market can already be observed. The researcher was able to map the current layout of key blockchain tourism applications, based on [Kwok & Koh's \(2018\)](#) diagram of key potential applications of blockchain technology, shown in **Figure 12**. The mapping is not meant to represent a clear-cut approach because some tokens may spread across multiple areas, however, they have been placed where such organizations have communicated their main focus to be.

The majority of current industry players reside in the reservations and ticketing areas, confirming prior exploratory research that one of the first areas blockchain has the potential to disrupt is the disintermediation of online travel agencies (OTAs) or Global Distribution Systems (GDS) from the tourism supply chain ([Rashideh, 2020](#)). However, what is also interesting to see is the emergence of variances in the blockchain reservation and ticketing industry. For instance, Touriva (TOUR) and Trips Community (TRIPS) aim to offer a travel-booking platform for non-hotel industry bookings without intermediaries such as Airbnb; and Heron Asia is a travel-booking platform for a specific destination (wellness retreat). While the organizations behind such tokens are still very much in their infancy stages and their success to launch is therefore still to be proven, they demonstrate the appetite for interest in this area as potential competitors in the pipeline. Competition is less in inventory management as well

as credential management. As seen through the investigations of the cases, companies in the blockchain-travel space may develop such services themselves as part of their travel ecosystem to decrease dependency on third parties or strengthen the usefulness and integration of their native tokens. This makes sense since blockchain decreases disintermediation and therefore cuts out middlemen and admin roles that reside in supply chains. Nonetheless, there are roles existing players have in bridging the gap between traditional travel systems and blockchain-based travel systems, depending on the technology integration decisions made by such companies.

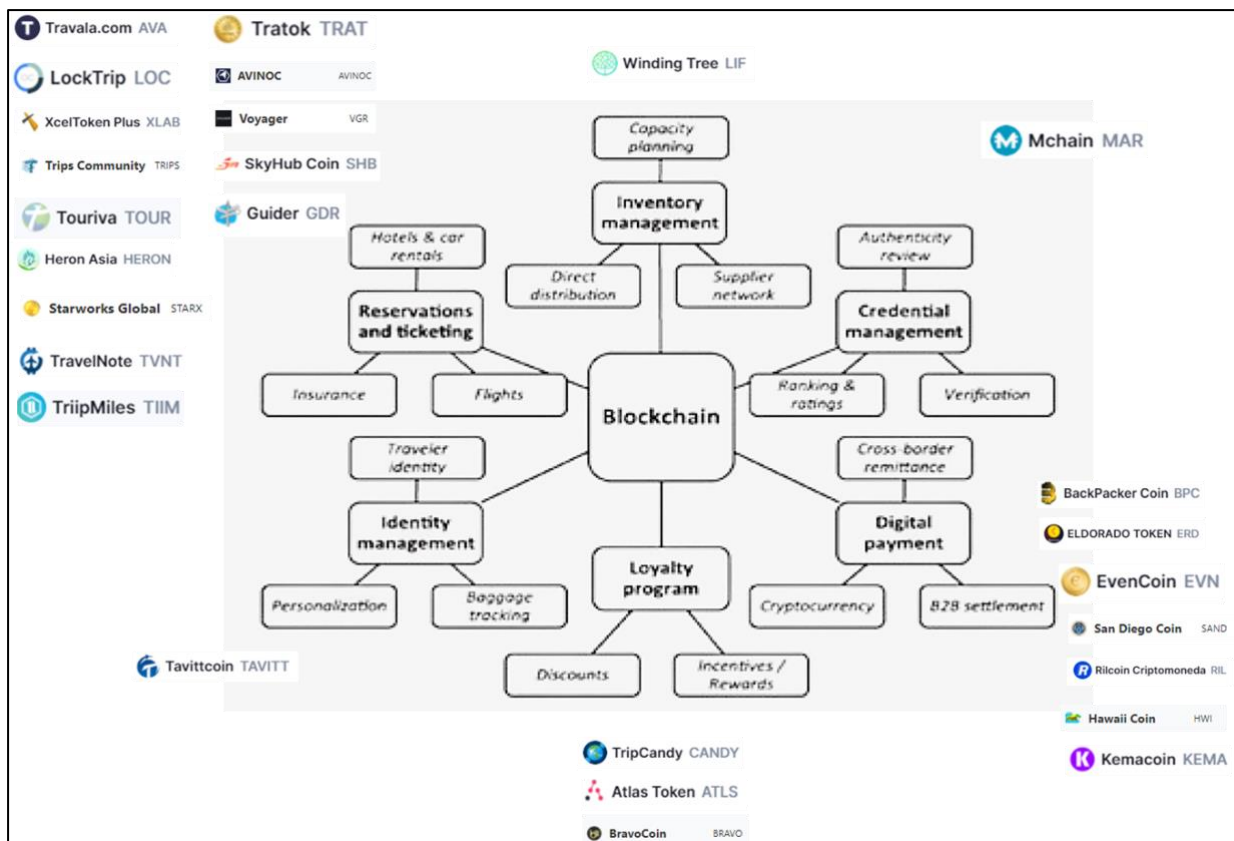


Figure 12: Mapping of current tourism-blockchain participants

Through the process of identifying tokens, it was also seen that it is common for the organizations behind the tokens listed to advertise their partnerships with leading existing players in the tourism industry such as Agoda, Booking.com, Amadeus and Expedia. This leads one to believe that the success of blockchain-based travel products is largely dependent on partnerships with existing online intermediaries and confirms literature that some travel businesses may not become obsolete, but their business model will change. That is, existing OTA’s will become a supplier to blockchain-based companies by providing data to them. While this is a great phenomenon that indicates existing players are already adapting to

blockchain technology, future research needs to delve deeper into these partnerships to ensure that a competitive environment is fostered. Without such fostering, the current tourism issues associated with high barriers to entry would then simply exist with a new technology. On a similar note, some existing travel blockchain platforms have been built on an app accessible within certain geographical locations only. Current industry players therefore need to apply some caution to not exclude certain countries from taking advantage, partaking, or simply becoming familiar with this new decentralized technology. This does not apply to countries that have outright banned the use of cryptocurrency transactions.

The following sections will present the disintermediation findings of the study. Through the data analysis discussion on directed content analysis, [Hsieh & Shannon \(2005\)](#) maintain that the theory or prior research used will guide the discussion of findings. In relation to this study, this refers to the five factors outlined in [Rashideh's \(2021\)](#) framework that has been identified as the chosen framework for disintermediation within the travel industry. The framework consists of five factors: *Decentralization, trust, security, cost reduction, and transaction speed*. Based on such guidelines, coding began immediately with the five predetermined codes, and it was therefore also seen as suitable to structure the findings of this study according to the five disintermediation factors. The analysis and findings of directed content analysis offer supporting and non-supporting evidence for a theory, and data that do not fall into predetermined codes are identified and analysed further to determine if they represent a new category or a subcategory of an existing code ([Hsieh & Shannon, 2005](#)). Furthermore, [Creswell & Poth \(2018\)](#) caution against the use of numeric data in the findings of a report meant to be qualitative. For this reason, numeric data is only provided if it supports the qualitative data.

7.2 Findings for the process of article identification

Following data source requirements, articles were also analysed for this study. The number of articles identified as suitable for each case was similar for Travala as well as XcelTrip and vastly different for Tratok. This is because Tratok is in a different phase of its product roadmap and therefore has less to report on. Nonetheless, Tratok is still seen as a valuable source for this study due to the scarcity of cases which satisfy the requirements of this study. For Travala, over 400 articles were surveyed and 14 were identified as suitable for this study. For XcelTrip, over 500 articles were surveyed and 20 were identified as suitable. For Tratok, 15 articles were identified and 5 were seen as suitable for this study. The vast difference between the amount of articles surveyed and the amount of articles chosen was due to the purposes of such articles which did not match the purpose of this study. Specifically, for all cases, the large majority of

such articles were dedicated to partnership announcements, high-level product development updates on the platforms, cryptocurrency news in general, as well location suggestions based on the usage of cryptocurrencies the platform supported. This is opposed to providing further information into how the technological aspects of the company work. Where high-level product development updates were given, it was mainly announcements thereof, not accompanied by further explanations thereof.

7.3 Description of the cases under analysis

All three cases are OTA'S in the travel industry. All three cases offer similar overall goals: To lower transaction fees, eradicate the need for middlemen, save time on bookings and result in more profit for service providers and savings for consumers.

Additional rows have been added to the token classification order to illustrate the extent of the ecosystem of these platforms.

Travala

Travala is a leading blockchain-based platform for hotel and accommodation booking (CoinMarketCap, 2022). Travalas' system is displayed in **Figure 13** below. While its system supports several major tokens, its system is led by its AVA token designed to integrate into various services on the platform (Travala, 2021). Tokens are stored in the users' wallet and the user can then use those tokens to directly make bookings, earn loyalty points and various other services without going through intermediaries (Travala, 2021). As also depicted in the figure, Travalas' AVA token runs on a blockchain called the Binance Smart Chain (BSC), which allows Travala to build and run smart contract-based applications (Travala, 2021).

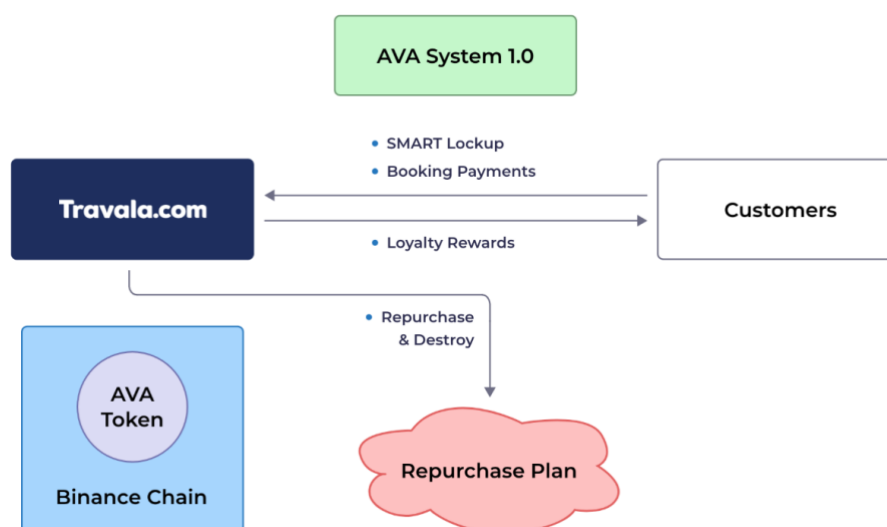


Figure 13: Travala System 1.0 (Travala, 2021)

7.4 Factor 1: Decentralization

Decentralization was the most common concept referred to for Travala and XcelTrip. Both cases have chosen a "progressive decentralized" model. That is, decentralized technologies are slowly incorporated into traditional ways of conducting services in their travel ecosystem, as opposed to all at once. With this being said, none of these cases are truly decentralized yet. Although, it is communicated as their long-term vision.

It is important to note that an organization may undertake a completely blockchain-based approach to compete with existing players in the industry or they may integrate blockchain-based solutions for certain functions within their product or organization. An organization may decide to choose the latter for various reasons such as providing an additional service to customers or to get their foot in the market and slowly start competing with competitors. One example of this is CheapAir, which solely offers payment in various cryptocurrencies for flight and hotel bookings (through a cryptocurrency payment provider called BitPay). Nevertheless, as mentioned in the second previous literature section, regardless of which way companies decide to go, they would need to relook their business model and make necessary technological and structural changes.

“We at XcelTrip recognize that the road to decentralization is paved with challenges. As the technology is still in its infancy, we feel that the path should be taken judiciously with technology and solutions that make sense now, with infrastructure and designs in place to adopt innovations as they mature. In other words, we believe in progressive decentralization.”

- Xcel Trip whitepaper

“The progressively decentralised model underpinning the Community Vote will provide the community with a mechanism to determine aspects of Travala.com’s future, with AVA token holders able to vote on how funds in the Community Pool are spent”

- Travala Whitepaper

Key takeaways for this factor include that incentivization for all parties in a blockchain travel ecosystem is paramount for disintermediation to be beneficial for all parties.

The removal of intermediaries is the main driver for finding purpose for these organizations.

Mutual relationships are emphasized in all cases under consideration for this study.

Additionally, it was found that only one industry player has a blockchain-based travel ecosystem. The other two cases have integrated blockchain solutions. This highlights the scarcity of truly blockchain-based companies in this domain, as well as the need for more conversation around what it means to be truly decentralized and therefore different from existing peer-to-peer digital travel booking platforms (or OTA's).

XcelTrip is similar to Travala in that it has a gradual decentralized approach where blockchain technologies are gradually integrated into the travel ecosystem, as opposed to all its services being blockchain-based and therefore decentralized from the very beginning. It is a term described by XcelTrip as “progressive decentralization”. The author found that XcelTrip was the only one that emphasized how decentralized is and will be achieved throughout the entire travel ecosystem, and therefore the only one that truly spoke to the decentralization aspect of blockchain technology. Such information is important to convey how such travel systems are different from the existing peer-to-peer digital travel booking platforms or OTA's. Tratok's aspects of decentralization are implied through their paper discussions and diagrams. Tratok has a decentralized implementation from the beginning where all exchanges happen via blockchain-based tokenization. Without saying much about how the decentralization processes will work, Travala does make it clear that they have a mix of centralized and decentralized solutions, which at this stage is mainly linked to payments and loyalty points.

A sub-factor of the [Rashideh \(2021\)](#) disintermediation framework is that peer-to-peer networks lead to disintermediation. While this is true, it needs to be noted that one fundamental service that cannot be completely automated is live support. Tratok has invested in this as well as Travala and XcelTrip. Other companies hoping to enter this space need to know that while blockchain technology is centered around peer-to-peer connections and cutting out intermediaries, one intermediary that cannot be replaced is a dedicated support team with human interaction because automated bots cannot always provide users with the answers they are looking for.

Additionally, at the moment, listing properties on the different platforms is a manual process (no use of an automatic/smart contract process). This is therefore not democratized and decentralized as blockchain technology has claimed to be since someone needs to vet out applicants and then only start the listing process. With this in mind, the idea of an easy entry

to market (particularly by cash-strapped or smaller organizations) is under question. Consequently, there is an opportunity to investigate what should go into the application of listing smart contracts (from the supplier point of view) so that anyone who meets such requirements can be part of the ecosystem too.

Incentivization (where users get rewarded with crypto for completing blockchain-based tasks) has been a key force in trying to increase user adoption.

7.5 Factor 2: Trust

Trust, together with the following factor of security are critical factors that lead to disintermediation. Without these, blockchain travel solutions will not be used by consumers as well as vendors. *Transparency*, as a sub-factor of *Trust* in Rashideh's (2021) disintermediation framework, went hand-in-hand with the cases under analysis. That is, where trust was discussed, transparency was discussed and vice versa. Consideration was made for transparency to be its separate factor because there were found to be many facets to transparency. Additionally, there is a philosophy of transparency in all areas of business for the cases under analysis. However, because transparency aims to invoke trust or vice versa, it was not separated as a factor.

Key takeaways for this factor include that trust is not guaranteed by implementing the blockchain technology itself and its related setups, such as building exchanges to reflect transactions made thereof. It extends to setting up tangible transparency strategies to influence its customers, suppliers, and investors. These involve transparent communication channels such as social channels, price transparency built into the products that the end user sees, transparency on how the said travel ecosystem functions, transparency on business updates such as partnerships and so forth. In fact, the transparency on partnerships was the most communicated and documented type of transparency for the cases under analysis. When a partnership was made, it was announced.

All these points are certainly a step towards creating a trustful ecosystem, however, it needs to be noted that none of the cases under analysis have revealed nor elaborated on how the technology (blockchain) itself is integrated to ensure trust. For example, blockchain technology promises that smart contracts allow transactions to be made without the intervention of several middlemen who may handle or have access to the transaction data. For the cases under analysis, is user data protected by automatic smart contract processing or is transactional data being manually handled? If the former, for which user tasks or journeys are smart contracts being

used? Is one able to see how specific user data flows through the users' journey? A reader cannot easily decipher this. Given the newness of this domain, all answers would, of course, not be revealed or answered right away, but it is an important one since direct transactions are a fundamental characteristic of blockchain technology.

As discussed in the first sections of findings, over Travala 400 articles were surveyed, 500 XcelTrip and 13 Tratok articles were surveyed and only a small fraction of these were suitable for this study. This is because most of such articles were dedicated to partnership announcements and providing some context, or marketing, to said partnership. Further research can investigate the supplier landscape of current OTA's to not only provide more information on which services they provide but also to provide an overview of suppliers who have managed to adapt their business models.

Although beyond the scope of this paper, loyalty points and reviews are also largely discussed and are an important part of establishing trust. Travala's loyalty program is called the SMART Program (discounts, loyalty, and bonus rewards).

Immutability and timestamps were not much discussed in all cases. These factors appear to be assumed as inherent in the blockchain technology itself hence it's not discussed as being something the organization communicate specific strategies for.

7.6 Factor 3: Security

This factor goes hand-in-hand with the previous factor. There is a stark awareness of security in all cases. Similarly, to the previous factor, security is not guaranteed by implementing the blockchain technology itself, such as the unlikelihood of being able to hack an exchange, for instance. A large part of enforcing trust and security involves building security strategies and subsequently security features into the ecosystem. This differs from typical security measures such as credit card fraud or phishing attempts. It is security features catered specifically for blockchain technology ecosystems. For instance, Tratok introduced two industry-defining security features which solve multiple purposes for security and safety: The lock and unlock function and the confiscate function. These are security features put in place to not only protect the organizations' funds but also to cooperate with regulators to help combat fraudulent activities.

7.7 Factor 4: Cost reduction

Discussions around cost reduction were demonstrated through the comparison of intermediary layers in traditional online bookings vs. peer-to-peer bookings done on blockchain-based

platforms. Additionally, cost reduction is primarily motivated from the customers' point of view, as opposed to the organizations benefitting from cost reduction in the use of blockchain technology. An illustration of traditional costs from XCelTrip is provided in **Figure 14** below.



Figure 14: Transaction fees in the traditional online booking process

All three cases charge commission fees for vendors to be listed on their platforms. Tratok charges a 1.5% commission, Travala has stated their fees currently average 10% of the booking value, and XCeltrip has stated that they charge a small commission about half that of current OTA's. This will likely be the case for a while because such platforms have operating costs to cover, and there is a dependency on current industry accommodation and flight vendors to provide existing travel data.

There is, however, a need to demonstrate how final prices to consumers are made up and displayed to users in the new blockchain travel ecosystems. What was found to be different about the *cost reduction* factor was that even though cost reduction was often mentioned, it wasn't quite demonstrated how the final amount is arrived at with process diagrams, strategies tactics and so forth, unlike the other factors. For now, what is made transparent for consumers in terms of costs are the final transaction amounts which are also made available to the public on token transaction exchanges. The cases compare how the final price consumers pay is built up in a traditional travel-booking process, but don't demonstrate the equivalent of how the final price for consumers on any of these blockchain travel systems is arrived at. In the same way that cryptocurrency-friendly platforms are describing ways current OTA's have hidden costs, they need to describe their own price makeup as well. Exact amounts do not need to be disclosed but some transparency beyond a "peer-to-peer" process is lacking in this factor compared to others. This is important because, with the amount of OTAs available to an

ordinary user of the internet, it can be difficult to see how a user would simply swap to a platform that offers blockchain or cryptocurrency options. After all, the user may simply wait for a price drop or visit another OTA site. Therefore, the cost reduction advantage needs to be apparent to the end-user or else it may not be much different to existing OTA's. It also needs to be proven that costs are actually cheaper for the end user and perhaps this could be a suggestion for further research.

7.8 Factor 5: Transaction Speed

Transaction speed conversations for the cases under analysis concerned the underlying blockchain technology itself. For instance, Travala introduced integration with the Bitcoin lightning speed protocol to process cryptocurrency payments faster, and Tratok has spoken about near-instantaneous processing of funds including the refund of bookings (as a characteristic of blockchain technology) as opposed to any other new factors or sub factors that came from the data sources.

7.9 Conceptual model of findings

In directed content analysis, findings either offer a contradictory view of the phenomenon or further refine, extend, and enrich the theory (Hsieh & Shannon, 2005). This evidence can be presented by showing codes with exemplars and by offering descriptive evidence (Hsieh & Shannon, 2005). Such findings have been discussed above, and a newly proposed model for this study, based on Rashideh's (2021) framework for an increased level of disintermediation, is presented in **Figure 15** below.

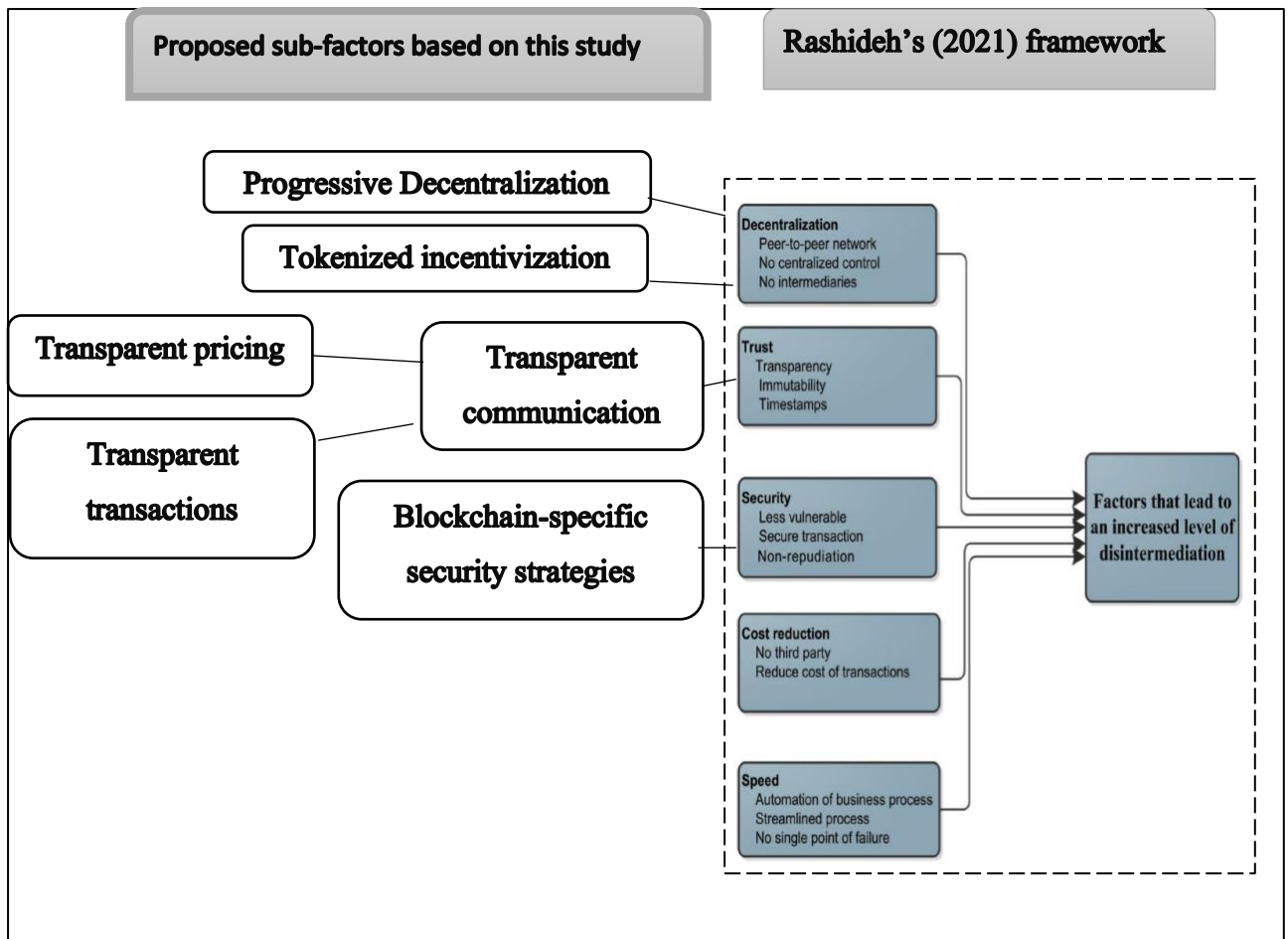


Figure 15: Conceptual model of findings for this study

7.10 Summary of findings

What is currently being seen in the travel industry is that the ROLE of the intermediary is changing as they are becoming more innovative in entering the blockchain market. The leading way that this is being done is by offering users gateways into the blockchain world. For example, offering users token-based loyalty points or offering certain cryptocurrencies as a means of payment. Consequently, the roles of those working within such departments in travel and tourism companies are changing. There are certainly intentions to build complete blockchain-based ecosystems which could remove or alter more intermediary roles in this industry. However, for now, current academic research that suggests intermediaries will be “removed” is far from being the case... rather, it is changing.

Some disintermediation factors appeared more prominently within the data such as *decentralization, peer-to-peer networks, no intermediaries, trust, transparency, security, less vulnerable, secure transactions, cost reduction, no third party, and reduced cost of transactions*. Factors that hardly appeared in the data were *no centralized control, immutability,*

timestamps, non-repudiation, speed, automation of business processes, and no single point of failure. This is significant for the fact that either 1) these companies need to address these factors or 2) these companies don't feel the need to address them. The prominence of some factors and the lack of others have been addressed in their respective sections.

It is also important to note that blockchain in travel brings about an entire ecosystem of new terms and concepts for employees to become familiar with. Examples include *circulating supply, burn rates of tokens, swapping tokens, staking tokens* and so forth. It would require a culture shift to understand such terms and concepts to provide such services to the customers that use them. This is notwithstanding new tech roles that are required. The road to disintermediation is therefore not a quick one whether it be for new organizations or existing organizations seeking to integrate it.

As a final note, beyond the framework that was utilized to frame the findings, two constant topics of discussion amongst all cases were legalities around the use of cryptocurrency exchanges as well as the impact of the COVID-19 pandemic. The implementation of blockchain technology, or rather the use of cryptocurrencies, is a worldwide issue but what is a testament to the perseverance of these organizations is its ability to withstand uncertain regulations around cryptocurrency exchanges as well as uncertainty around the restrictions caused by the Covid-19 pandemic.

CHAPTER 8: CONCLUSIONS

The rise of Internet technologies has accelerated production in the travel and tourism industry, and several of its intermediaries have had to adapt to such market changes. Such change comes again, through the introduction and implementation of blockchain technology. This study explored the disintermediation effects of blockchain technology on the travel industry. Disintermediation is the process of removing intermediaries (“middlemen”) in the processes between sellers and buyers and it is regarded (by early researchers) as being one of the immediate effects on the travel industry when implementing blockchain technology.

While blockchain research has been accelerating in the finance industry due to its association with cryptocurrency markets, the technology is minimally explored for the travel industry. The consensus amongst existing researchers in this domain is that research is undoubtedly in its exploratory stages and lacks a clear academic focus. To address this, this study investigated this phenomenon by answering the following research question: *What are the disintermediation effects of applying blockchain technology to the travel and tourism industry?*

This paper highlights the fact that new entrants have entered the travel industry who have the potential to compete with current players, overtake current players, or create entirely new markets in the future should blockchain become more mainstream. These new entrants carry out disintermediation by either cutting out actors altogether or replacing existing actors with automated solutions (namely through smart contracts). Such new organizations are investing in a technology believed to play a fundamental role in future, while other industry players are not, demonstrating changes taking place in the travel industry.

The findings of this research have revealed that certain factors are necessary for disintermediation. Some factors are appearing more prominently within these existing blockchain-travel organizations, while others are not. The factors that appear more prominently may indicate that these factors are easier for organizations to achieve, whereas the factors that appear less prominently may not yet be viable for these companies to carry out disintermediation effectively. For example, issues of speed and the existence of a centralized authority for technology that supposedly has no central authority.

Another huge advantage of early comers on the blockchain travel space is that even though consumers can search for the best deals themselves (and better price deals) early comers in this space offer a window into the blockchain and cryptocurrency worlds that traditional online

travel intermediaries are not doing. They therefore become specialists in providing blockchain-based travel solutions. This provides several values to consumers curious about the space such as providing crypto payment gateways, participating in the crypto economy, and earning loyalty points through the process. Additionally, it allows smaller organizations to become active partners with the world's largest airlines (because they offer specialist technological knowledge) that may not have been attainable otherwise.

This is exploratory research and as such its results are not intended to be absolute, but it highlights such factors that researchers and organizations can work on to truly fulfil the promises of blockchain technology.

Theoretical contributions

A novel disintermediation framework was supported and extended from another perspective. What differentiates this study from previous research is that it examines how organizations in this domain are currently being run and contributing to disintermediation, as opposed to most of the previous research that provides a hypothetical or forecasting approach for the industry in general. By doing this, this study highlighted *how* disintermediation is being conducted and is planned to be achieved. For instance, current disintermediation research does not include the importance of token incentivization to encourage the use and re-use of the products, contributing to less dependency on existing third parties in the industry for incentivization.

With this being said, these findings can be used to gain more perspective and information in preparation for further research, particularly in-depth interviews since information found online may lack detailed explanation. Those knowledgeable on this topic can be consulted to find out how factors that appear less prominently can be tackled by organizations and what the implications are thereof.

8.1 Limitations of this research

The limitations and future research suggestions of this study need to be noted. Firstly, this research does not cover all the aspects of the functioning of the supply chain of a travel company. It covers the two largest influences ([Ślusarczyk, Klaudia, & Kot, 2016](#)) on the shape and functioning of the entire chain: hotels and travel agencies. Several other travel activities affect a travelers' experience such as visa applications, travel healthcare, baggage tracking and so forth. Thus, there is still much to be explored and applied.

Furthermore, this study looked at blockchain travel from the view of Online Travel Agencies. Further research can investigate the view of its suppliers. For instance, how are suppliers integrating with such systems to adapt their business model, how are transactions processed and how are such services paid for?

Although systematic precaution to reduce bias in this research has been taken, it is emphasized that this research is exploratory and the main motivation behind using web content as a data source is to take the academic research further despite having limited access to empirical data. It is therefore recommended that this research be taken further to develop more informed questions before interviews and be used to aid the researcher in following conversations and probing for more appropriate information during the interviews. Thereby combining a more modern method of data collection with a traditional method for collecting data and maximising perspectives which will strengthen this research domain. Such suggestions, because of the limitations of web-based content, are well embedded in literature such as [Kuljis & Kim \(2010\)](#).

Secondly, with the emerging use of the technology, either integrating with pre-existing solutions, replacing legacy systems, or innovating new implementations would require extensive testing, deploying, exploration, and maintenance ([Tavares, Correia, Restivo, Faria, & Aguiar, 2018](#)). Rigorous case studies that strengthen contacts with the industry and provide a detailed description of solutions need to be provided ([Treiblmaier, 2021](#)). This was not possible in this study due to having web content as a source of data. With this being said, it is difficult to obtain information from people who work in the industry without the researcher already having contacts who are willing to share detailed learnings on projects. There is a critical need for extensive academic exploration by hospitality and tourism scholars to collaborate with industry practitioners to strengthen its application ([Erceg, Sekuloska, & Kelic, 2020](#)).

It is important to note that while blockchain networks are widely known as public networks, they can also exist as a consortium blockchain or a private blockchain, where the network is partially decentralised ([Rashideh, 2021](#)). In a private network, users are not anonymous, and permission is required (from an entity) for users to have a copy of the ledger and participate in confirming a transaction. In this way, the network is still centrally controlled as there is essentially still a “middleman” approving the transactions ([Rashideh, 2021](#)). This research focuses on cutting out, reducing, or replacing the manual middleman and consequently does not cover private or consortium blockchains.

Lastly, this research does not cover the legalities of blockchain technology in various countries. Although blockchain promises to solve the trusted third-party issue, it is still required that the regulation and authorities enforce by legal means any dispute that may arise (Tavares, Correia, Restivo, Faria, & Aguiar, 2018). Research is already being undertaken to look at blockchain applications within a specific country and context and this will continue to be vital to pursue.

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**APPENDIX A: FINDINGS TRAVEL AND TOURISM TOKENS FOR
CONSIDERATION**



No.	Token and ticker	Focal Travel Area	Short Description	Product live? (yes/no)	Product link
1	 Travala (AVA)	Reservations and ticketing	Travel-booking platform for accommodation, flights, and activities with cryptocurrencies. Functions as an Online Travel Agency (OTA).	Yes	https://www.travala.com/
2	 XcelTokenPlus (XLAB)	Reservations and ticketing	Travel-booking platform for hotels and flights with cryptocurrencies. Functions as an Online Travel Agency (OTA).	Yes	https://www.xceltrip.com/




3	 TRATOK (TRAT)	Reservations and ticketing	Travel-booking platform for booking hotels, flights, or renting a car. Functions as an Online Travel Agency (OTA).	Yes.	Google Play store: Tratok Travel company website: https://tratok.com/
4	 LockTrip (LOC)	Reservations and ticketing	Travel-booking platform for booking hotels and other accommodation. Functions as an Online Travel Agency (OTA).	Yes	https://locktrip.com/
5	 TriipMiles (TIIM)	Reservations and ticketing	Separate travel-booking platforms for accommodation and travel activities (experiences). Functions as an Online Travel Agency (OTA), without flights.	Yes	https://stay.triip.me/ https://experience.triip.me/




6	 Guider (GDR)	Reservations and ticketing	Travel-booking platform for the traveller to directly book and pay for a travel guide.	Yes	https://guider.travel/en
7	 Trips Community (TRIPS)	Reservations and ticketing	Travel-booking platform for non-hotel industry bookings without intermediaries. Functions as an Online Travel Agency (OTA). Similar to Airbnb.	No	N/A Company website: https://www.tripscommunity.com/
8	 Touriva (TOUR)	Reservations and ticketing	Travel-booking platform for non-hotel industry bookings without intermediaries. Functions as an Online Travel Agency (OTA). Similar to Airbnb and Trips Community mentioned above.	No	N/A Company website: https://touriva.info/index.html






9	 Heron Asia (HER)	Reservations and ticketing	Travel-booking platform for accommodation, flights, activities, and other travel services associated with a specific destination (wellness retreat).	No	N/A Company website: https://heron.asia/
10	 Starworks Global (STARX)	Reservations and ticketing	Travel-booking platform for accommodation and flights. Functions as an Online Travel Agency (OTA).	No	N/A Company website: https://www.starworksglobal.com/
11	 AVINOC (AVINO)	Reservations and ticketing	Travel-booking platform for business aviation, allowing users to book a business or cargo flight directly, just like an airline ticket. Functions as an Online Travel Agency (OTA).	No	N/A Company website: https://avinoc.com/


12	 TripCandy (CAN)	Loyalty Program	A cryptocurrency loyalty rewards program for booking and accommodations. Users book through hotel partners listed on the website and earn cash back.	Yes	https://tripcandy.app/
13	 BravoCoin (BRA)	Loyalty Program	Offers a decentralized and incentivized review platform: Pays its community for writing and rating reviews of restaurants, hotels, service providers, video games etc.	Yes-app only, certain countries.	Google Play store: BravoCoin: Nearby Restaurants, Hotels & Services Company website: https://bravocoin.com/

14	 Winding Tree (L	Inventory Management	A B2B decentralized travel marketplace . Offers a directory and direct access to: Airlines, hotels, and travel agencies. Functions as an alternative to (Global Distribution Service (GDS) and Online Travel Agency (OTA) distribution.	Yes	https://marketplace.windingtree.com/
15	 Tavittcoin (TAVI	Identity Management	Travel destination recommendation service (recommends places to visit and hotels to stay at), amongst other travel services in the pipeline.	Yes	https://tavitt.com/

16	 BackPacker Coin (BPC)	Digital payment/Credential management	A multi-coin wallet (particularly BPC and BTC) to secure, manage, and exchange cryptocurrency with the aim of reducing currency conversion issues while travelling.	Yes-some app stores only.	Google Play store: BackPacker Company website: https://backpackercoin.com/
17	 Rilcoin Criptomoneda (R)	Digital Payment	A Venezuelan cryptocurrency, focuses on uplifting the tourist market	No	N/A Company website: https://www.rilcoin.org/
18	 Kemacoin (KEM)	Digital Payment	A cryptocurrency that can be used to pay for goods or services, earn extra income, and can be traded for other digital currencies to be used at vacation spots.	No. Only wallet available at this stage.	N/A https://www.kema.io/

19	 Mchain (MAR)	Other (spans credential management, digital payments, loyalty program etc.)	Offers smart contract technology that allows shops to generate their own Smart Contracts and create their own token, which they can offer to their customers exchange it for products or services which they commercialize. Points system, event tickets, etc.	No. Only wallet available at this stage.	N/A Company website: https://mchain.network/
20	 ELDORADO TOK (ERD)	Digital Payment	A bill payment gateway through which people can access bookings such as reservations for vacations.	No	Company website (link not currently working): https://eldoradotoken.com/
21	 Hawaii Coin (HW)	Digital Payment	A cryptocurrency for Hawaii.	No	Unable to find company website.

22	 San Diego Coin (SAND)	Digital Payment	A cryptocurrency for San Diego.	No	Company website (link not currently working): https://sandiegocoin.org/
23	 ATLAS TOKEN (ATLAS)	Loyalty Program	An incentivized review platform: Pays consumers, content creators, and suppliers for advice and reviews.	No	Company website (link not currently working): https://atlas.world/
24	 TravelNote (TVN)	Reservations and ticketing	Travel company. Functions as an Online Travel Agency (OTA) by customizing travel budgets and services.	No	N/A Company website (link not currently working): https://ico.travelnote.io/
25	 Voyager (VGR)	Reservations and ticketing	A travel-booking platform. Functions as an Online Travel Agency (OTA).	No	N/A Company website (link not currently working): https://voyagerclub.io/ru
26	 Evencoin (EVN)	Digital payment	A self-mining currency in conjunction to even numbers of Ethereum block.	No	N/A Company website (link not currently working): https://www.evencoin.io/

27	 Skyhub Coin (SH	Reservations and ticketing	Travel-booking platform. Not clear which services specifically. Functions as an Online Travel Agency (OTA).	No	N/A Company website (link not currently working): https://skyhubcoin.com/
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APPENDIX B: ETHICS APPROVAL

Commerce Ethics in Research		Powered by Submittable
Project title (this will be recorded on your clearance letter)	Exploring the disintermediation effect of blockchain technology on the tourism industry	08/26/2021 id. 21075651
	by Imaan Faker in Commerce Faculty Ethics Applications FKRIMA001@myuct.ac.za	
Original Submission		08/26/2021
Applicant status	Student	
Retrospective ethics approval is not granted by the Commerce Faculty. By ticking this box, I confirm that I have "not" begun data collection, and will not do so, before this proposal has been granted ethical clearance.	checked	
Health research	The Commerce Faculty Ethics Board is not registered and may therefore not grant approval to applications that are covered in the Health Act of South Africa and are defined as health research, which includes any research which contributes to knowledge of: - the biological, clinical, psychological or social processes in human beings; - improved methods for the provision of health services; - human pathology; - causes of disease(s); - the effects of the environment on the human body; - the development or new application of pharmaceuticals, medicines and; - the development of new applications of health technology. Any application fitting these criteria will be declined, and the applicant referred to the Faculty of Health Sciences.	
Department	Department of Information Systems	
UCT student number	FKRIMA001	
Degree being studied	Master of Commerce: Information Systems	
Telephone number	845694599.0	
Email address	imaanf20@gmail.com	
1. PROJECT DETAILS	n/a	
Project title (this will be recorded on your clearance letter)	Exploring the disintermediation effect of blockchain technology on the tourism industry	
Supervisor name(s)	A/Prof. Adheesh Budree	
Supervisor email address(es)	adheesh.budree@uct.ac.za	
Will any human subjects be interviewed or surveyed in this research?	Yes	
Co-researcher(s) names	N/A	
Co-researcher(s) email addresses	N/A	
Review track	Normal	
Brief description of the research project	Researchers and practitioners believe that blockchain technology (BCT) will have a substantial impact on all business sectors, and many of these effects will flow into the tourism industry. Blockchain technology is open-sourced software that allows the creation of a large, decentralized and secure database that contain records arranged in a block structure. One of the immediate effects recognized by researchers in this domain is that blockchain technology has the potential to remove intermediaries such as Online Travel Agencies and Global Distribution Systems, thereby disrupting the industry as it stands. This is known as the disintermediation effect. To address this phenomenon, this qualitative study explores the disintermediation challenges when implementing blockchain technology in the travel industry. It employs case study research guided by a blockchain-based framework which specifies five factors necessary for an increased level of disintermediation. The aim of this research is to help demystify the potentials and unknowns of applying blockchain technology within the tourism industry, thereby contributing to the advancement of travel-industry research for this relatively new technology.	
Data collection method	Interviews Secondary data Observation	
Research proposal and other supporting documents	EXPLORING_THE_DISINTERMEDIATION_EFFECT_OF_BLOCKCHAIN_TECHNOLOGY_ON_THE_TOURISM_INDUSTRY.docx Appendices_ABCDEF.pdf	
2. PARTICIPANTS	n/a	