TOURISM AND HOSPITALITY MANAGEMENT

SUBJECT: Degree Thesis

SEMESTER: 7

BLOCKCHAIN TECHNOLOGY LEADING TO AN INCREASED DISINTERMEDIATION IN THE TOURISM INDUSTRY

Student Name	Ana Soto Viñas & Andrea Horcasitas
Student ID no.	17017 & 17065
E-mail address (HTSI)	ana.soto@htsi.url.edu andrea.horcasitas@htsi.url.edu
Lecturer	Esther Binkhorst
Lecturer E-mail address (HTSI)	esther.binkhorst@htsi.url.edu

HT
SI

TABLE OF CONTENTS

• **Abstract:**

• **Acknowledgements**

1. Chapter 1: The Basic Outline to this Research: 4

1.1 Context of the research: 5

1.2 Identification of the research problem: 6

1.3 Originality and contribution to knowledge: 6

1.4 Aim and objectives: 7

1.5 Structure of the study: 8

• Chapter 2: Blockchain; State of the Art in the Tourism Industry: 9

2.1 What blockchain is 9

2.1.1 Cryptocurrency's role 10

2.2 How blockchain could facilitate and boost innovation 12

2.3 How blockchain solutions for tourism can change the intermediaries' role 15

2.3.1 How a decentralized online travel platform bears the potential to provide equal market power to all operators 17

2.4 Consider the opportunities that blockchain and intermediaries provide in the tourism industry 18

2.4.1 The shift in social inequality 21

2.5 Literature map: 23

2.6 Conceptual framework: 24

• Chapter 3: Data Assortment Mechanisms: 27

• Overall research design: 27

• Data collection techniques and research instruments: 27

• Research context and participants: 27

• Data analysis: 28

• Ethical considerations: 29

• Chapter 4. Findings and discussion: 30

• Chapter 5. Conclusions, limitations, and recommendations: 41

5.1 Conclusions: 41

5.2 Recommendations: 43

5.3 Limitations and further research: 44

• References: 46

• Appendix:

Appendix 1: Interview Transcript 1

Appendix 2: Interview Transcript 2

Appendix 3: Interview Transcript 3

Appendix 4: Interview Transcript 4

Appendix 5: Interview Transcript 5

Appendix 6: Interview Transcript 6
Appendix 7: Evidence of Data Collection
Appendix 8: Consent Form 1
Appendix 9: Consent Form 2
Appendix 10: Consent Form 3
Appendix 11: Consent Form 4
Appendix 12: Consent Form 5
Appendix 13: Ethics Form

FIGURES

- Figure 1. Scope of the Objectives' Research [8]
- Figure 2. Cryptocurrency Transactions' Process [11]
- Figure 3. The categorized findings according to their source [31]
- Figure 4. Blockchain Technology Waves [34]
- Figure 5: Table showing how the objective proves or disproves the main hypothesis [42]

• Abstract:

Will blockchain improve the user experience and eliminate intermediaries in tourism?

In this paper, the creators examine how a technology that is rapidly being adopted across multiple industry sectors offers numerous benefits to the tourism industry while it simultaneously transforms the role and value proposition of key players. Indeed blockchain technology may revolutionize the entire tourism industry. The convergence of the increased consumer access to data, disruptive technology and a constantly evolving tourism industry will drive significant changes in both the delivery and consumption of tourism. As consumers' access to information increases, they become increasingly aware of their options and their demand for transparency increases, accordingly. Disclosure and procurement of information are powerful tools, highly influencing where and how consumers choose to spend their money. In particular, the authors analyze how this accumulated intelligence presents compelling solutions that might potentially void the need for one of the sectors' giants: intermediaries.The travel industry continues to improve as it keeps up with and integrates new intelligence. Due to the development of new accessible and ubiquitous technologies, tourists progressively prescind from certain services. Blockchain unleashes knowledge that was previously tightly controlled exclusively by intermediaries, empowers consumers to take control of myriad factors comprising their decision making process and, by extension, their experience. New plans of action responding to consumer demands must be implemented and refined continuously in order to assimilate the innovative changes. The principal discoveries of this paper contain findings that elucidate why blockchain innovations applied to tourism are still in a relatively embryonic stage, and why it will play a more consequential role in the near future. Moreover new business models in the sector are now able to implement customer-to-customer models. The essential goal of this paper is to break down how the application of blockchain will alter the current market dynamics of the tourism sector. It's been proven that blockchain innovation offers critical advantages to the travel industry since it can be harnessed to dramatically improve consumer loyalty and enhance the general user experience. The authors assess whether the need for intermediation will prevail, as well as recommend topics for potential additional research. The authors present and base their findings on information compiled by previous studies, as well as through primary research ascertained via interviews with relevant industry professionals.

• Acknowledgements

First and foremost, we would like to give our sincere gratitude to our thesis supervisor Esther Binkhorst who has given us constant support and constructive criticism through the making of this degree thesis. She has also provided us with recommendations for potential interviewees and has contacted them herself to let them know two students of hers were doing a thesis on the topic of blockchain. We are grateful for her guidance, her motivation with this topic and for all her contributions which has made this process much more dynamic and enjoyable.

Furthermore, we would also like to thank the School of Tourism and Hospitality Management (HTSI) for these four years for providing us with excellent teachers and classes that have made us the professionals that we are today, as well as providing us with the opportunity to write a degree thesis that will help us in our professional careers. Moreover, we would also like to give a special thanks to Gilda Hernández who has been the teacher for the subject of the Degree Thesis for helping us overcome our thesis related struggles and giving us helpful resources and tips.

Additionally, we would like to express our gratitude towards our classmates, teachers and family members, who have been supporting us throughout this unique semester, having to juggle both online classes for the first time because of Covid-19, and this degree thesis. They have shown tolerance and patience when it was needed the most, due to this unprecedented situation. We really have appreciated their understanding and their motivational support which has helped us continue to work hard.

Finally, we wanted to extend our deepest recognition to the industry professionals who have given us the opportunity to interview them to have a better perspective and understanding of the applicability of our thesis topic in real life. We want to thank them for their honesty and open mindedness as some of the questions could be considered controversial within the tourism industry. Due to the current situation, many were not able to give us an interview but still helped in recommending us other professionals who could.

1. Chapter 1: The Basic Outline to this Research:

The initial hypothesis guiding this research goes as follows:

BLOCKCHAIN TECHNOLOGY COULD LEAD TO AN INCREASED DISINTERMEDIATION IN THE TOURISM INDUSTRY.

1.1 Context of the research:

Describing how blockchain technology works is simple, yet grasping the actual range it has in terms of what it can do, is more complex. According to Bettina Warburg's TED talk, blockchain technology is a decentralized information base that stores a vault of advantages and exchanges over a distributed organization. It's fundamentally a public registry that is able to answer who possesses what and who executes what. The exchanges guarantee 100% security through cryptography, and after some time, that transactional history gets secured by blocks of information that are then cryptographically connected together and safeguarded. This makes an unchanging, unforgeable record of the entirety of the exchanges in this organization. For every computer within the network, this record is repeated. (Warburg, B, 2016)

As Warburg says: "Not an app. Not a company". It's an open framework that stores numerous sorts of benefits. Basically, the transactions are publicly stored for all parties and then duplicated over and over again, making it quite impossible to tamper with. It can be thought of as a universal platform that has the ability to store and confirm any information stated about any person from any source (Warburg, B, 2016).

The way this technology plays a fundamental role in interactions and trade, is that by being an open infrastructure which holds many kinds of assets, you can reveal the variety of attributes that are in your specific interest by uncovering the cryptographic confirmation that these subtleties exist and are approved. Warburg made the convincing statement as follows: "Having this kind of portable identity around the physical world and the digital world means all kinds of human trade can be done in a totally new way." A shared reality can be brought forth stemming from the distrust in each other. Human trade, exchange of currency, a wide range of computerized and physical resources; blockchains give us the mechanical capacity of executing in an absolutely new way (Warburg, B, 2016).

Nowadays, with the impact of Covid-19 the intermediaries in the tourism industry have had to quickly adapt and become more digital in order to financially survive this pandemic. However, with the restrictions of travel and the increasing number of Covid cases throughout the world, tourism will face a long term recession that will lead to millions of companies having to, at least temporarily, close down. However, whenever there is a new challenge there is a new opportunity. The new traveling processes and restrictions have made the action of traveling a lot less enjoyable and just provoke more added stress amongst travellers. This anxiety is present in every interaction along the customer journey, like boarding a flight, checking in and out, using the room's amenities and overall being exposed to other travelers (Dalrymple, M. et al., 2020). This is the reason why intermediaries of the tourism industry, especially OTAs, have an opportunity to give the client, through their services, a more relaxed trip from beginning to end (R.P., 2020).

Now more than ever, users are more comfortable booking a flight ticket or a room through the internet, especially now since Covid-19 has acted as a catalyst for the world to digitize transactions even more than before. Therefore, all tourism related intermediaries, not just OTAs, will have to face an even greater challenge to keep their market share (Warburg, B, 2016).

1.2 Identification of the research problem:

Given the blockchain database's ability to enable the connection between the sellers and the buyers without the need of an intermediary to fix the contract, questioning the need for intermediaries if buyers can connect and buy directly from airlines or hotels (Quinby, 2018). Therefore, this question is highly relevant nowadays in the hospitality industry as the research is directly related to how this new technology can put in danger the future of intermediaries like OTAs.

In terms of how relevant it is to the rest of the industry; the lack of intermediation will unavoidably alter the sector. Companies will benefit economically, considering they won't have the expense that comes with working with an intermediary, and the employment structure in the tourism industry will most likely transform as well.

Furthermore, taking into consideration the pandemic, companies in general are already on thin ice, verging on bankruptcy. Therefore, potentially accelerating the process that inevitably

leads to the nullification of intermediaries. This means that with the combination of advantages and opportunities blockchain technology has to offer, the need for them to exist will cease altogether.

1.3 Originality and contribution to knowledge:

With this degree thesis there will be a contribution to the expansion of the information available about this relatively new topic. Academically speaking, this could prove helpful to hospitality and tourism students. Furthermore, by interviewing specialists about blockchain as well as workers in the industry to see the threats and opportunities this new relationship presents, providing relevant information for those looking to work in the tourism industry, especially, intermediaries.

Moreover, this is a topic that has not been fully integrated into our society yet as it is relatively new. By conducting this research there will be a better understanding of how it works. This particular topic has not been taken on by any other student in our university as a degree thesis, making it more complex in terms of corroborating, yet granting us originality.

1.4 Aim and objectives:

In this study there is going to be a research done on how blockchain solutions will change the need for intermediaries in the tourism industry, such as Online Travel Agencies and Global Distribution Systems, due to the ability the suppliers have to directly connect with the buyers and implement a contract. There is also going to be an explanation on the role that cryptocurrency plays in making the need for intermediaries less essential by having an easier and safer way to execute purchase transactions. Moreover, as a result of the elimination of those intermediaries, the power will shift back to the suppliers given the change in structure. To go more in depth in the topic, there is going to be a research on how a decentralized online travel platform bears the potential to provide equal market power to all operators. Since the elimination of intermediaries will leave a dent in the tourism industry, there will be a consideration on the shift in employment positions with the benefits that blockchain provides in this matter.

In a nutshell, the objectives will be the following:

1. **Investigate what blockchain technology is**

   1.1 Research the role that cryptocurrency plays
2. **Investigate how blockchain could facilitate and boost innovation**
3. **Research how blockchain solutions for tourism can change the intermediaries' role**

   3.1 Research how a decentralized online travel platform bears the potential to provide equal market power to all operators
4. **Consider the opportunities that blockchain and intermediaries provide for the tourism industry companies**

   4.1 The shift in social inequality

Figure 1: Scope of the objectives' research

Objective	Methodology	Goals
1	Research secondary data.	Read 7 scientific articles.
2	Research secondary data.	Watch 5 informative videos (TED talks).
3	Research and interviewing professionals from intermediaries and blockchain companies.	Reach out to at least 4 professionals in the blockchain community + 3 professionals in the tourism industry.
4	Research secondary data.	Research 5 scientific articles.

1.5 Structure of the study:

In the chapter that follows there is going to be a collection of data that will later prove our hypothesis. Therefore, there will be an in-depth analysis of a variety of scientific articles, readings, videos, etc. What is to be expected of this chapter is essentially a thorough examination of experts' views and data recollection on blockchain technology as well as intermediaries' infrastructures. The goal is to gain enough information to connect and prove how one has the potential to abolish the other.

In the third chapter, there is going to be a continuation of the research by reaching out to professionals who can provide firsthand knowledge on either blockchain technology or their standpoint on where the intermediaries' future lies. This will hopefully give feedback on what the beliefs of the intellectuals in the tourism industry are; in terms of how much blockchain will expand as well as their opinion on the initial hypothesis.

In the fourth chapter, the resulting data of the combination of the research will be presented by providing the unbiased results that will collectively determine whether the hypothesis is right or wrong. This will be where one can consult how the final conclusion was reached.

Finally, the fifth chapter will be the outcome of the previous one, meaning that there will be a statement of the final say on the standpoint regarding the initial hypothesis. Based on the findings, there will be recommendations on what is believed to be the best course of action for the parties involved. Depending on the evolution of the process, there will be an explanation of the limitations and endorse further research on expanding on certain aspects of the topic.

• Chapter 2: Blockchain; State of the Art in the Tourism Industry:

2.1 What blockchain is

Blockchain technology is known to be a trustworthy and digital public ledger. Blockchain gathers data sets which are chained together into blocks, where every block represents multiple transactions. This chain grows bigger and bigger with every new block added and that is why it is seen as a public ledger, since it publicly stores all of these transaction records. It is important to emphasize that no private information has to be given to establish a transaction with blockchain (Korpela, 2017). Depending on the size of each block and transaction, there is only a maximum number of exchanges that each block can potentially hold (Zheng, 2018). With the use of cryptography methods, each block can be validated therefore guaranteeing 100% security. This is due to the digital signature of the user and the hash value that each block contains, which is a fixed and unique number used to identify data. Therefore, any tampering with the block would change that unique value and fraud would easily and quickly be detectable.

Due to the many innovations this new technology provides, blockchain technology is rapidly becoming one of the most promising advancements for the up and coming age of internet interaction frameworks. Its most notorious application being the crypto-currency Bitcoin, having reached 10 billion dollars in the capital market only seven years after it was introduced into the market (Zheng, 2018). Overall, industries in every sector have been spending in blockchain solutions globally, more especially, $2.1 billion euros were invested in 2018 (Anon, 2020).

Amongst the key characteristics of this new technology, the most important ones include persistency, anonymity, auditability and decentralisation (Zheng, 2018).

As mentioned earlier, fraud and falsification can easily be noticed when using blockchain since each transaction has to be confirmed, checked and validated given a hash number when recorded into the blocks within this network. Therefore, the persistency of this framework allows blockchain technology to be considered trustworthy (Zheng, 2018).

When it comes to anonymity, the way users can interact with the blockchain is by using a generated address given by this network that identifies them. However, since there is no party used to preserve this private information, the users can generate more than one address to conserve a certain level of privacy on their blockchain exchanges (Zheng, 2018).

When talking about auditability, blockchain users can easily trace previous transactions within the network, as every exchange is validated and recorded with a unique and fixed hash number, making it possible for users to verify the data stored. This shows how traceable and transparent the information stored in each block is (Zheng, 2018).

Moreover, an important application of blockchain is the digital asset registries which allow users to record, transfer and verify asset ownership, like titles for automobiles, mortgages, insurance, homes and land. This application is being introduced in various countries like Ukraine and Sweden where the government has predicted that this particular use of blockchain could save taxpayers an amount of approximately $106 million USD each year through the elimination of extensive paperwork, reducing timely transitions and by lowering the probabilities of fraud (Swan, 2017). In relation to this application, blockchain can also be

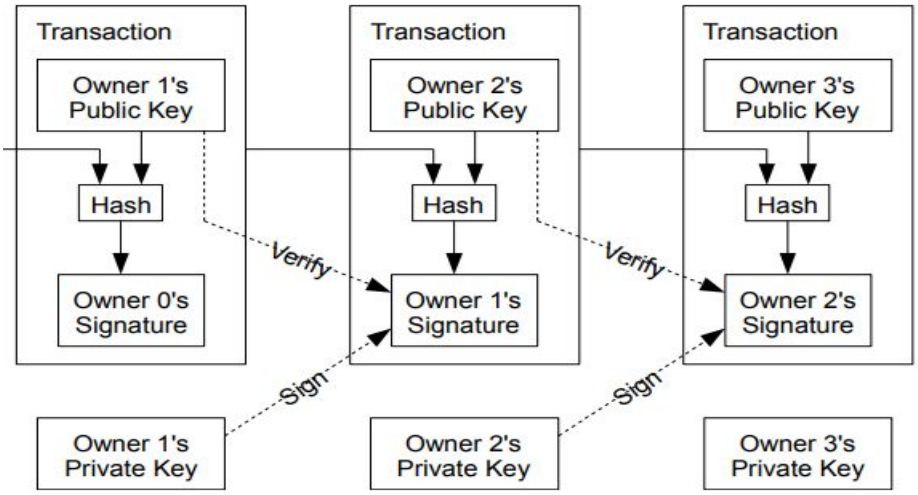
used to store private documentation such as death and birth certificates, work contracts, medical records, passports, visas and more.

2.1.1 Cryptocurrency's role

Satoshi Nakamoto, was the anonymous individual who made a paper where he built up a convention for computerized money that utilized a fundamental digital currency called Bitcoin. This digital currency empowered individuals to build up trust and conduct exchanges without the need for a third party. Bitcoin can be defined as an asset, although it is valued as a currency, it's a different concept than the one currently assigned to money. Most importantly, it's cryptographic money, which means it is not constrained by a nation-state. (Tapscott, 2016)

A way an electronic coin can be characterized is by defining it as a succession of digital signatures. By carefully marking a hash of the past exchange and the public key of the following owner, every proprietor moves one coin to the next, by adding these to the furthest limit of the coin. The marks to check the chain of proprietorship can then be confirmed by a payee (Nakamoto, 2008).

Figure 2: Cryptocurrency Transactions' Process



(Nakamoto, 2008)

The success of blockchain's technology's most unmistakable application to date is the cryptocurrency Bitcoin, which has set off a great deal of media consideration lately and made a colossal measure of enthusiasm across different enterprises; what's more, the

European Courtroom has acknowledged Bitcoin as a legitimate form of currency and exempted it from sales taxes (Titcomb, 2015).

Major companies within the tourism industry are also starting to integrate it, with tremendous cash flow being put into up-and-coming start-ups (Aitken, 2016) and significant organizations such as the TUI group incorporating blockchain innovation in its booking, reservation and installment frameworks (Sixtin, 2017). CheapAir, Expedia, One Shot Hotels, and Webjet are different models in the travel industry that likewise acknowledge bitcoins as payment (Chokun, 2016). Nevertheless it is important to mention that the use of bitcoins for travel purchases is still in its early stages and consumers in general lack knowledge. (Leung, 2017)

In the appearance of Bitcoin, platforms such as Ethereum have developed; through the implementation of smart contracts which are accredited regardless of whether or not the parties know each other, the blockchain technology is expanded. The combination of computerized monetary standards and the mentioned smart contracts, could potentially disrupt many sectors, including the tourism industry (Giancaspro, 2017).

2.2 How blockchain could facilitate and boost innovation

Numerous specialists concur that data innovation has significantly changed promotion strategies, and these progressions are additionally obvious in the travel industry. The travel industry changed altogether from the second the World Wide Web conceded tourists the ability to search for and coordinate their travels without the need of a travel agency. Currently, the tourism industry is portrayed by constantly improving their quality by staying up to date with an assortment of administrations, which are all an outcome of the inescapability of media and promptly accessible new technologies. Colombo and Baggio (2017) expressed that the travel industry area needs to join innovation, data information, and a good cash flow to build creative and new stages to fulfill the client/tourist needs.

The travel industry will change soon by methods for digitalization, which will be set off by moving requests and necessities of tourists. The worldwide-scale changes, enhanced rivalry and computerized disruption that worldwide known tourism brands will be pushed by other organizations to embrace these technological developments to maintain their competitive edge. Furthermore, the hospitality industry is being impacted by thin net revenues, changed

financing costs, and varying degrees of income, which are essentially influencing peoples' access to traveling.

Considering it an innovation in technology, blockchain is impacting changes in all areas, including the travel industry. Iansiti and Lakhani (2017) expressed that blockchain innovation speaks to a computerized record that permits separate organizations to work together in a straightforward and trusting manner without the need of the focal hub of control. This is another method of organizing, recording, and preparing data in blocks which are provable, solid and long-lasting.

Blockchain will impact the travel industry by building trust with the accompanying segments: straightforwardness, control, impact and plan of action. Another effect of blockchain innovation can be found in the improved identity management and a productive correspondence with tourists that can be utilized inside the entire scope of the travel industry area. The utilization of blockchain innovation in the travel industry can result in cost decrease associated with money trade rates and it has enormous potential for streamlining regular tourists loyalty programs. Analysts and experts are searching for approaches to change these adjustments in the travel industry area, remembering that the tourist experience is crucial to sell. (Rejeb et al., 2019)

Because of how blockchain technology works, individuals wherever can confide in one another and execute safe transactions amongst strangers. What's more, trust is set up, not by some large establishment, but rather by joint effort, by cryptography and by some smart code (Tapscott, 2016).

According to Don Stapcott there are five main ways that blockchain will lead to our society’s prosperity:

First of all, the poor stance on current economic mobility is our foremost issue according to Hernando de Soto, the great Latin American economist. The fact alone that 70% of the world who has land to their name is in fact holding insubstantial ownership means their title is invalid; therefore they can't acquire against it, nor get ready for future plans. So currently, organizations are working with governments to put land titles on the blockchain, making the data permanent, unhackable, leading to conditions for success for possibly billions of individuals (Tapscott, 2016).

In second place, a great deal of scholars talk about organizations playing their part in a shared economy. The thing is though, that what these organizations are doing is not actually sharing. Truth be told, it is in fact the not sharing that leads to their being fruitful; what they're actually doing is aggregating services, and then selling them. A scenario must be imagined in which, as opposed to a big corporation being worth billions for offering an intermediate service, there was a circulated application on a blockchain, that is fundamentally owned by the entirety of the individuals who have the actual service to offer. Then, when somebody needs that service, they go onto the blockchain information base and filter through the options until they come up with the one they like; afterward the blockchain assists with the contracting, and handles the payment transactions simply through computerized installments as they're incorporated within the framework. Along these lines, the large sharing-economy disruptors in Silicon Valley could be discombobulated, most likely leading to success and prosperity (Tapscott, 2016).

Thirdly, the greatest progression of assets from the developed world to the developing is remittances. This is the worldwide exodus; individuals have left their native countries, and they're sending cash back to their families at home. This is a flow of 600 billion dollars per year, and it's increasing while these individuals are being defrauded (Tapscott, D, 2016). There are currently applications in the making that allow for these kinds of monetary transactions to be conducted without the need for an intermediary: they simply use an interface that commissions a very small percentage of that money. This gets rid of the time investment, as well as the need to pay large amounts of money to the companies acting as intermediaries. What's more, these remittances are received instantly, therefore granting welfare to the receiving party.

Number four is based on data being the most remarkable resource of the digital age. This asset that data represents is created by all of us, constantly. Whether there's awareness of it or not, there is this path of computerized marks being left behind through every individual's life. What's more, these scraps are gathered into a perfect representation of 'you': this is what is considered to be the 'virtual you'. The key factor here is, that this virtual you isn't actually claimed by you; this is the serious issue (Tapscott, 2016).

What companies are attempting to create now, is a series of black boxes per individual which essentially contain our identities in concealed manners. This black box moves around

with you wherever you go and most importantly is extremely parsimonious. The way it works is that for every transaction you conduct, only the relevant information for that transaction will be revealed: this means not having to disclose your entire identity, while still being able to verify your end of the deal. What's more, is that this virtual you empowers you: information is power. It allows you to adapt your data to the given situation. As a result a free society can be established, as securing our personal information is a given (Tapscott, 2016).

Last but not least, there is number five: as Tapscott, 2016 says "the system for intellectual property is broken". This makes a point out of creators of content not having access to their rightful remuneration. Because of how the system is built, nowadays there are a wide range of individuals who create hit content, and yet don't get the money this content generates (Tapscott, 2016).

Because blockchain technology allows for companies to create smart contracts and payment systems, all of this money flow is able to go back to the actual owners of the intellectual property; as they are able to control their rights and have binding agreements, consequently the big intermediaries don't benefit from others' content, and have no control over it either. (Tapscott, 2016).

This day in age, there is a complete dependence on large intermediaries to build up trust in the economy. Furthermore, these intermediaries play out all the business and exchange rationale of each sort of trade, from confirmation, ID of individuals to clearing, settling and data storing. What's more, is that generally speaking, they do a very great job. Be that as it may, as we've seen, there are developing issues (Tapscott, 2016).

The most concerning issue is that in general, they've appropriated the largesse of the computerized age lopsidedly as riches creation is faced, and yet we're developing a social imbalance (Tapscott, 2016).

However, this disruptive advancement does not only have the potential to change the way economic transactions are executed in the real world, but also has the potential to change other aspects of our daily lives. For example, the way tourists and hospitality industries use intermediaries.

2.3 How blockchain solutions for tourism can change the intermediaries' role

Nowadays, most interactions over the internet are made through centralized platforms which are controlled only by just a few powerful and large companies, such as Google or Facebook. This way they can keep track of all these activities made through the Internet and can intervene if a user does not follow the platforms' rules (De Filippi, 2016). All of the recurrent users are willing to give each time more and more of their personal information to receive a more accurate personalized service, aligned with their needs and wants, since they trust operators with this kind of private data. This data that these companies store and use is not disclosed with any other company, as having more data means that they have more of a competitive advantage against other operators when it comes to financial concerns (De Filippi, 2016). This is because these centralized platforms use this information to promote ads or articles for their own monetary interests without the users being aware, since most of the time users do not know what kind of data they are legally giving away to these online operators.

One of the most important benefits of blockchain technology is how it allows transactions to be easily done without the need of an intermediary. Normally, an everyday transaction would need to be verified and validated through a trusted third party, as explained before, which is a time consuming task resulting in higher costs, in risks if an intermediary does not do its job correctly, and also in security leaks since third parties need to collect personal information which can be hacked. This new innovation that blockchain offers can potentially be a great advantage for many parties, like firms or suppliers, as it will enable more data to be processed more precisely and more often, as there will be no need for manual entries of information and therefore decreasing the possibilities of human errors (Korpela, 2017).

More specifically for companies in the hotel industry, it will create a competitive advantage to those who enable blockchain onto their systems. One of the main reasons is because clients of tourism related companies value a fast and excellent service. Therefore, being able to incorporate faster financial transactions with a reduced probability of human mistakes will lead to better service provided to customers and thus, standing out from the competition (Korpela, 2017). They will also reduce costs, as they will not need to establish relations with

third parties and will not have to pay the high commissions these ones charge per reservation.

Moreover, using blockchain technology will make the role of intermediaries obsolete which will ultimately lead to an increase in user's security of their private data. This is because it allows users to have more control over their own personal information; what data they want to share and with whom. This way, your data will not be disclosed with third parties like large online operators that will use this personal information to bombard you with customized ads (De Filippi, 2016).

On the other hand, blockchain technology does need a degree of transparency, as it is considered a public ledger, as peers need to verify and validate your online transactions in order to be recorded into the network to prevent people from tampering with them. Therefore, your exchange history can be seen by the public, however they do not know who the person behind these transactions is (De Filippi, 2016).

Another way blockchain has made easy to minimize the need for intermediaries is through smart contracts, which are computerised transaction protocols that execute a contract. This enables both parties to execute the terms of the contract without the need of a lawyer, a bank or another third party, in a way that is efficient, secure and transparent. Therefore, leading to lower transactions costs on what was before essential to enforce a contract. An example of how this can be beneficial in our everyday lives, is when society pays for goods and services with our credit card (Nofer, 2017). This payment can be deferred for a few days or even weeks and sometimes the money may be returned if there is any problem. Moreover, you also have to pay a high commission for this money transaction, especially if it needs to be transferred into a different currency and also if it has to be transferred to a bank that is not the one you are using (Swan, 2017). However, using blockchain this payment would be done instantly, without having to wait days, therefore saving us time, money and stress.

2.3.1 How a decentralized online travel platform bears the potential to provide equal market power to all operators

According to Colombo & Baggio (2017), an issue that came with OTAs was the popularity they gained in the early 2000s; granting market power to consumers instead of suppliers and

changing the market structure. Therefore, the increasing level of disintermediation would be the biggest impact of blockchain on the travel industry. (Colombo, et al., 2017)

The current tourism supply chain is syndicated by OTAs and Global Distribution Systems (GDS); blockchain technology has the capacity to expunge these relatively new intermediaries. Because power-dependent connections tend to be the basis for tourism value networks, the more powerful members are more prone to getting a bigger profit from the partnership (Ford, et al., 2012). To better understand what this means take the example of small-scale tour operators or hotels: in order to be taken seriously and have a competitive advantage, they need to be party to a GDS. This means complying with specified principles and taking on the imposed expenses, leading to what is essentially an imbalanced situation. If they weren't subjected to accepting these stipulations, they would gain better control on their actual positioning and shift the market power right into their hands.

Distinguishing an element to indicate or consider answerable for any level of market force (which is implied by the decentralized nature of blockchain technology) is unattainable, therefore the price positioning is harder to set (Catalini, et al., 2018). Therefore, although the technology leads to equal market power by allowing the operators to set their prices as they wish, it correspondingly has its drawbacks.

Due to its total decentralization and dispensation from any third-party to carry out its tasks, a permissionless blockchain-based stage has value. Therefore, while the market is at its early stages and at present no digital money or blockchain venture has arrived at any significant market power, at scale a portion of the undertakings will have enough allocation of the overall industry to impact costs and customer welfare. On the off chance that the assets' providers utilize their authority over key contributions to shape rivalry on a decentralized market to their advantage, it will be complex to mediate, difficult to recognize and geologically scattered. (Catalini, et al., 2018)

2.4 Consider the opportunities that blockchain and intermediaries provide in the tourism industry

What blockchain promotes in the hotel industry is the direct communication with the clients due to the diminishing need of an intermediary (Anon., 2020). Therefore, commissions hotels and airline companies have to pay to OTAs, which are around 15% for each reservation

made through them, will disappear and lead to those companies having more disposable income to spend on improving the client's stay (Van Rijmenam, 2019). In Figure 2, it can be seen the impact

Some of the most important changes blockchain can introduce into the hotel and airline industries to upgrade the experience of travellers are improved loyalty platforms, safer passenger identification and baggage tracking.

When talking about loyalty schemes, through the tokenizing reward programmes that blockchain would enable, it would encompass a range of products and services from different operators such as hotel stays and air miles. This way consumers will be able to exchange these secure rewards for an enhanced travelling experience (Van Rijmenam, 2019).

Moreover, most travelers would agree that going through airport security or crossing national borders can be stressful and a repetitive process. However, blockchain technology would allow individual travellers to be tracked during their trip, so they do not have to go through security every time they cross a border or every time they get on an airplane or bus (Van Rijmenam, 2019). Apart from this, blockchain would also allow the verification of documents such as passports and visas without sharing personal information with all the service providers that they have to go through. This would allow for a more seamless and non stressful journey for all travellers.

Not only can blockchain track the individual's journey, but the owner can also track their luggage with a decentralized database. The different parties that handle the baggage items, such as the airport and security staff could compare the journey of the luggage with the journey of the traveller; should an item be misplaced, the databases could be reconciled to find where the luggage is (Van Rijmenam, 2019). This is ideal for all travelers as if they get to the destination and they find out that the luggage got lost, the individual and the airport staff can easily find out where it got derailed and bring it to their owner. In addition, if you arrive at your destination and security checks your luggage to find illegal items, such as drugs or guns, with this database, security will be able to check if your luggage was clean when you embarked. Therefore, they would also be able to see in which airport your luggage got tampered with. Moreover, any damage to the bags could be easily noticed and any type

of reimbursement would be done using smart contracts, so travelers would not have to wait days or weeks for the reimbursement to arrive.

Another reason why the hotel industry would benefit from implementing blockchain technology is because of Global Distribution Systems (GDSs) (Anon., 2020). These systems store a lot of relevant information, however they are expensive and inaccessible, especially if you are a small hotel that just started operating. On the other hand, blockchain technology is cheaper and is accessible for everybody to use. Therefore, if a small hotel is having trouble competing with larger hotel corporations, implementing blockchain can help them earn more profits and have a competitive advantage over other hotels. Moreover, they would not need OTAs to execute bookings with their potential clients, thus lowering costs for the hotel, as OTAs charge a high commission per reservation. However, OTAs bring other advantages to the table, like more visibility and thus more reservations to a lot of hotels, which means the money saved from not using OTAs might be used for marketing purposes if the hotel decides not to use intermediaries (Quinby, 2018).

On the other hand, large hotel brands will also benefit from using blockchain technology as it is increasingly common for hotels to realize that sometimes OTAs will sell their room for a lower price than they are selling in their own website. This can be because travel agents buy rooms from a wholesaler, who has previously bought it from hotels, and then choose to sell those rooms individually for a lower rate (Galun, 2019). Thus, hotels can not see who broke the terms of the agreement. This can be infuriating for hotels because it is really important for them to establish direct connections with clients by assuring them that they will not find better rates for their rooms in any other place. Blockchain could tackle that, as it is a transparent and traceable registry, so hotels would be able to see to whom they sell the inventory and at what price (Galun, 2019).

Some big companies that are already introducing this kind of technology are for example, Singapore Airlines. They launched in the year 2018 a digital wallet, called KrisPay, that allows for clients to turn their air miles, through the company's loyalty program, into digital currency which they can spend on different products and services, other than flights, of the company's 18 partners (Van Rijmenam, 2019).

Additionally, another important business within the tourism industry that has implemented blockchain is the previously mentioned, TUI. This company owns their individual agencies,

airlines, hotels and more. Thus, to synchronize all their operations efficiently across all of these departments they are using blockchain. This company has publicly addressed their enthusiasm towards this new technology and has stated that it is looking forward to implementing it on other aspects of their business as well (Van Rijmenam, 2019).

Due to blockchain, the positions of many intermediaries are jeopardized, as this technology allows transactions and the executions of contracts to be done without the need of a third party, that being a bank, a credit card or an OTA. However, this does not mean that buyers and sellers can not agree to hire one to supervise the execution of this transaction (Korpela, 2017).

However, there are still reasons why potential travelers would prefer to still go to OTAs to secure their booking. Online OTAs, such as Booking and Expedia, are easy to use and convey a beautiful user experience where they can compare the prices of their desired product in a fast and efficient way (Quinby, 2018). In person, OTA workers also convey trust and a human connection that no technology could ever offer. Moreover, these intermediaries are aware of the potential competition, so they invest yearly an approximate of $10 billion USD in marketing and advertising in order to promote their services and make sure customers come to them first if they want a more personalized trip (Galun, 2019). Therefore, due to the fierce competition of intermediaries, blockchain might not always be the first option for travelers when planning their trip, especially for the ones that are already used to working with intermediaries. Thus, their jobs might not be completely eliminated due to blockchain, however they will have to innovate and find other ways to attract the market share that blockchain technology is threatening to take away.

Another reason why blockchain will not eliminate the intermediaries' employment position as much as might be expected, is because especially OTAs, have a lot of market power as they control a big portion of the leisure segment, having in their inventory around 750,000 hotels for travelers to choose from (Galun, 2019). For blockchain, this would take years to accomplish, establishing a high barrier to entry in this sector. Also, one way to have access to all of these databases from hotels and airline companies, is through a GDS, which is expensive and also a competitor that is most likely not willing to cooperate (Galun, 2019).

2.4.1 The shift in social inequality

Furthermore, the social imbalance that our system currently faces should be taken into consideration. How could blockchain technology change that at an employment level? Let us speak about what leads to the inequality:

According to Tapscott, when the era of the internet started, it increased the access to obtaining capital; nevertheless this did not generate a shared wealth, on the contrary, because social inequality is constantly expanding. (Tapscott, 2016)

First of all, let us analyze how blockchain technology could support public services, catering to more than just the wealthy. Public institutions tend to use data that is regularly clandestine to the average citizen, company and watchdog. These records could be made and checked with a more noteworthy degree of speed, safety and transparency by implementing blockchain technology. Public administrations are starting to integrate this innovation in record keeping. An open record is relied upon to convey benefits for all clients through the blend of time-stepping with computerized marks on, empowering them to lead exchanges and generate records with less reliance on legal advisors, public accountants, government authorities and other outsiders. (Boucher, et al., 2017)

There are a few countries that have started to use blockchain to oversee land ownerships, such as Ghana, Kenya and Nigeria. Their goal is to make a reliable record of possession, because of issues with enlistment, defilement and inadequate means of approach to records. Additionally, Sweden is testing executing land exchanges on blockchain to permit the banks, government, intermediaries, purchasers and merchants to follow the advancement of the exchange bargain in the entirety of its stages and to ensure the credibility and straightforwardness of the cycle while saving time and cost investment funds. (Boucher, et al., 2017) This would then lead to a fair access to records, non-dependent on the citizens' net-worth.

Secondly, let us talk about the social inequality led by the inability to vote because of the time commitment, or for those who do vote, the fact that their votes can later be tampered with.

Generally, votes are recorded, overseen, tallied and checked by a centralized power. A way to engage electors to manage these responsibilities themselves by permitting them to hold a duplicate of their vote, would be by using Blockchain-enabled e-voting (BEV). Voters would be able to access their data, and check it remains the same, therefore guaranteeing their record is untampered with. Because this technology would allow tracking the votes to a valid elector, illicit votes cannot be added; in the case that they were, it would be easily recognized as fraud. Through BEV centralized organizations would lose their power, as this one would shift and encourage the advancement of tech empowered network agreement. Countries like Denmark and Estonia have already implemented BEV for internal elections of political parties and investor votes. Taking the idea a stride further, BEV could be joined with blockchain's smart contracts, to consequently make a move under certain concurred conditions. Here, for instance, political race results could trigger the programmed usage of proclamation guarantees, venture decisions or other hierarchical choices. As Boucher points out, a more participatory and bottom up social structure could be conveyed by BEV offering a generally modest and safe e-voting framework. (Boucher, et al., 2017)

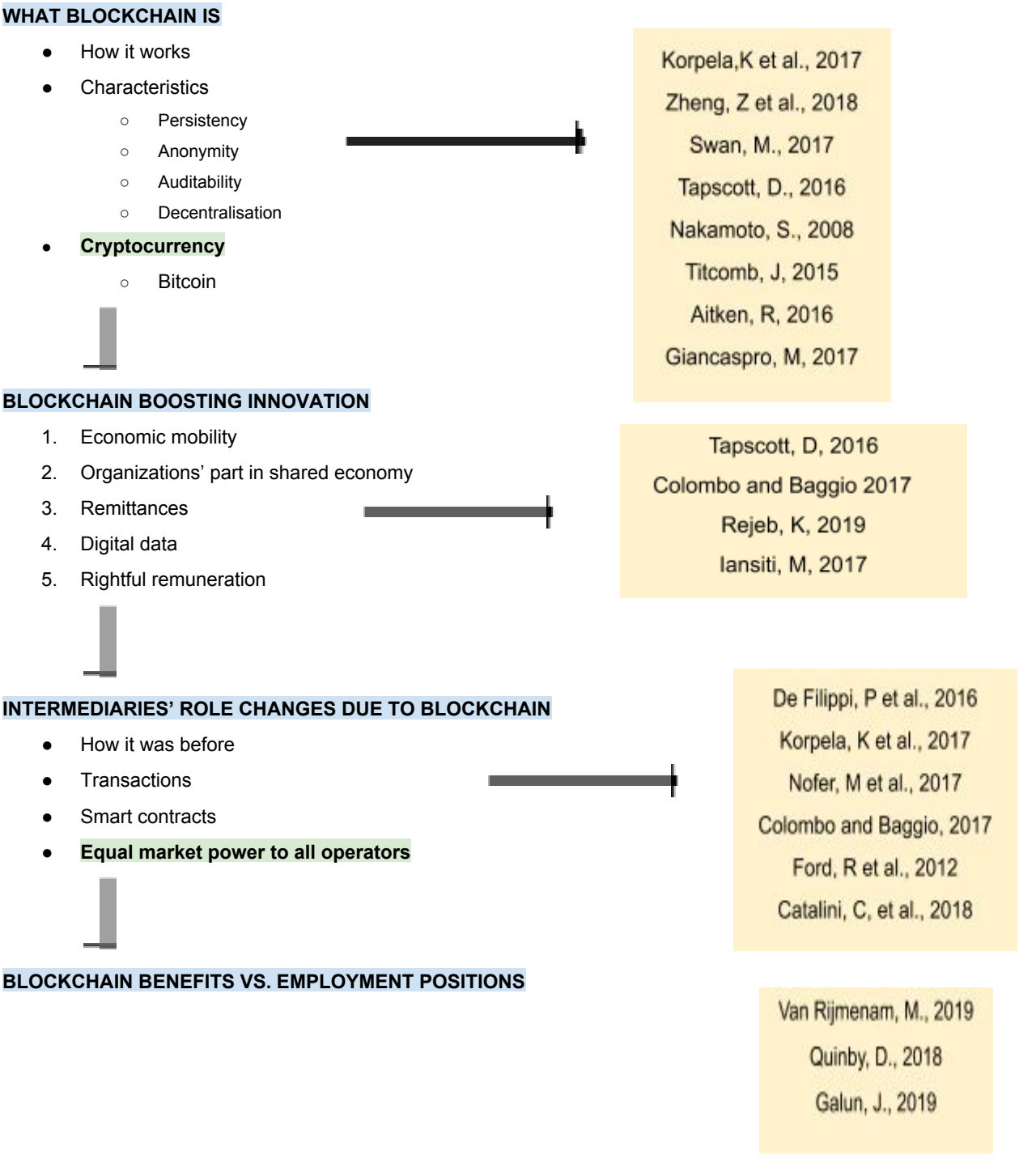
Last but not least, it is to be mentioned that because of the decentralized nature of blockchain, people have access to contracting and securing jobs from a completely different location; keeping in mind that smart contracts and payments can be executed safely. Because of the virtual you (which was previously mentioned) companies will only have access to the information that is actually relevant to the job position. This means that anyone who is qualified or fills the needed requirements is awarded the same chance regardless of their social standing, race, ethnicity, gender or sexual orientation. By the discrimination barrier being nullified, the same opportunity is granted to all, and "the rich become richer, while the poor become poorer" discontinues to perpuate (at some level).

Nevertheless it is important to say that blockchain technology isn't going to put a full stop to social inequality, although it has the potential to significantly balance it. Those who can't utilize internet providers will not have power over their information and exchanges and will not have access to the leverage these advancements have the capacity to provide.The exact execution of the convention regarding its structure and its UI is relevant to political and social principles advocated by the framework (Boucher, et al., 2017). These issues are at the core of the entirety of the aggravation, fanaticism, intolerance, xenophobia, etc. that are currently spreading in our society (Tapscott, 2016).

2.5 Literature map:

In this Literature Map, the relationship between the main aspects of this thesis can be seen, as well as the main authors that were used to back up and expand our knowledge. The relationship of the main objectives that were researched in order to answer our main hypothesis are connected through a series of arrows, to show the order in which we reached our conclusions. Subheadings were added to include more vital information needed to move from one object to another.

Literature Map for the Degree Thesis on how Blockchain technology can lead to an increased disintermediation in the tourism industry, Andrea Horcasitas and Ana Soto (2020)

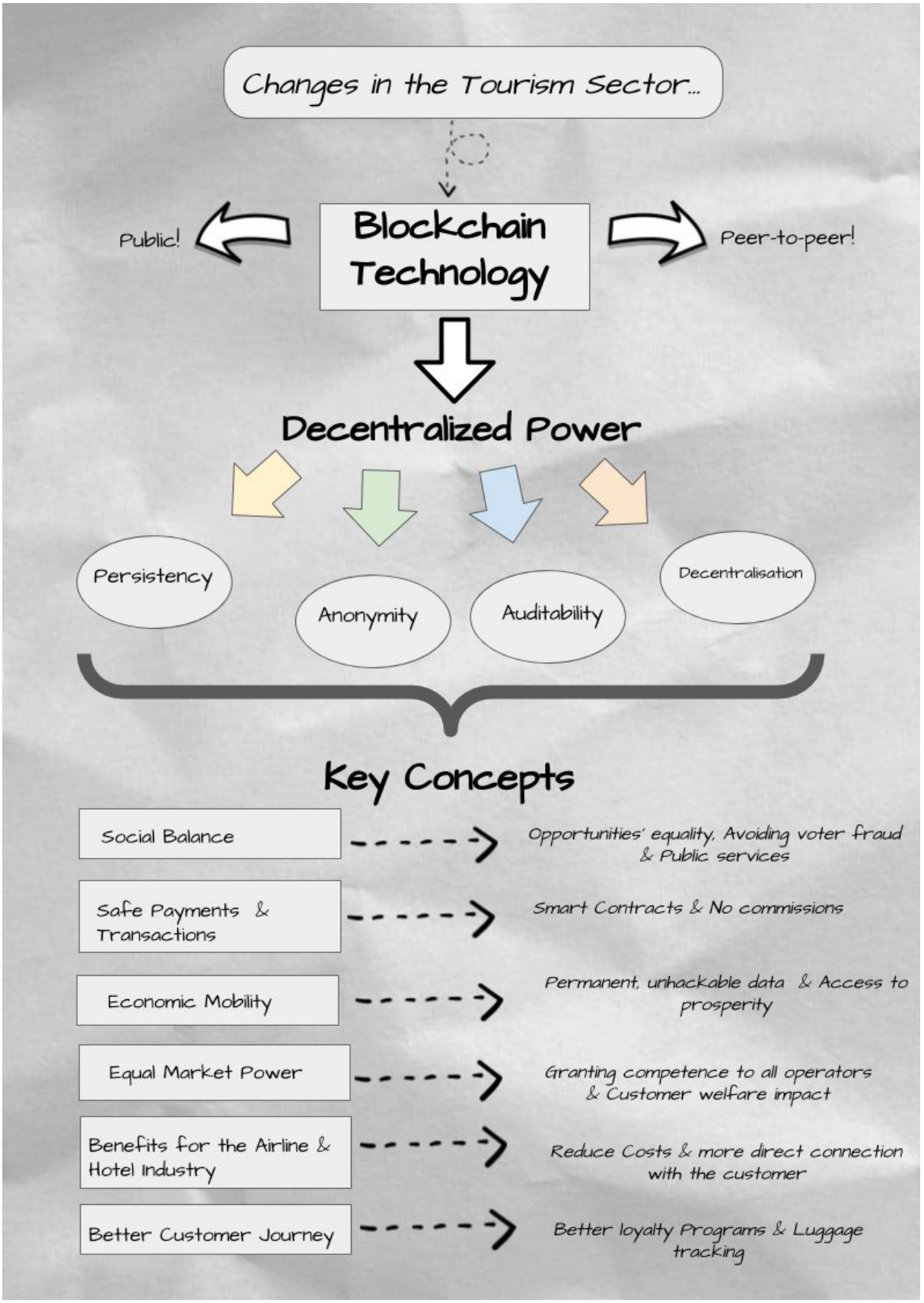


- Benefits for the hotel and airline industry with blockchain
- Opportunities for the intermediary industry
- Drawbacks for blockchain to eliminate intermediaries
- **Shift in social inequality**

2.6 Conceptual framework:

In this Conceptual Framework the main features of the thesis and its relationship are presented, portraying how blockchain technology is a decentralized power, due to its four main characteristics, which leads to key areas of innovation within the tourism industry. All of the features presented are vital to answer the research question and to get a better understanding of the extension that blockchain has.

Conceptual Framework for the Degree Thesis on how Blockchain technology can lead to an increased disintermediation in the tourism industry, Andrea Horcasitas and Ana Soto (2020)


Changes in the Tourism Sector...
Public!
Blockchain Technology
Peer-to-peer!
Decentralized Power
Persistency
Anonymity
Auditability
Decentralisation
Key Concepts
Social Balance
Opportunities' equality, Avoiding voter fraud & Public services
Safe Payments & Transactions
Smart Contracts & No commissions
Economic Mobility
Permanent, unhackable data & Access to prosperity
Equal Market Power
Granting competence to all operators & Customer welfare impact
Benefits for the Airline & Hotel Industry
Reduce Costs & more direct connection with the customer
Better Customer Journey
Better loyalty Programs & Luggage tracking

• Chapter 3: Data Assortment Mechanisms:

• Overall research design:

The approach used is the combination of both primary and secondary data recollection; for it is essential to include an in-depth analysis of published content on the matter, as well as adding the input gathered from reaching out to third parties.

• Data collection techniques and research instruments:

To gather the primary data, it was decided to conduct interviews with blockchain and tourism industry professionals, as well as intermediaries who have applied blockchain technology. This way qualitative information can be gathered about their perspectives on how blockchain will lead to decentralization and what the new role of intermediaries will be.

As for the conceptual research, it was decided to not limit to a specific type of articles, papers or readings; as this topic combines blockchain technology with the tourism industry, the best considered approach would be to read up on all of the subjects that factor in to answer the initial hypothesis. Therefore, different kinds of secondary data were included, such as: TED talks, academic readings, books and articles posted online.

• Research context and participants:

It was decided that the research population would be the respective industries' professionals. This includes those who specialize in Blockchain, those who are well-acquainted with the ins and outs of the tourism industry and finally, professionals familiar with the works of intermediary tourism platforms. An approximate goal, has shifted accordingly, is to interview 10 professionals (about 30 minutes each), with the objective being to gain as many perspectives as possible.

The technique that was used to get this sample is based on filtering the people reached out to; experts who have relevant points of views (i.e they have 3 or more years of experience either in the blockchain or tourism industry). Moreover, businesses that were used as examples in scientific papers read during the extensive research for the Literature Review were contacted.

In order to reach out to said professionals, the LinkedIn media platform was used in order to conduct specified searches with the key words: “blockchain”, “tourism” and “online travel agencies”. Out of the profiles that came up, the ones considered relevant to this research were chosen and contacted.

• Data analysis:

As mentioned above, in order to answer the main hypothesis, qualitative data will be collected.

The audio of the interviews were consensually recorded, so as to be able to accurately transcribe the data. Whenever the interview was conducted in a language other than English (e.g. Spanish), the transcription was later translated.

The way the data from all the interviews was analyzed, was by firstly writing down the transcripts which were recorded during the interview with the permission of the interviewee. Once all the transcripts were written down in the Appendix, it was decided that different colored highlighters were going to be used for each objective, in order to see clearly which objectives needed more attention and which ones had enough information to reach a conclusion. This process also helped to adjust the interview questions that were being asked to the industry’s professionals, in order to make sure we had enough data to analyse for all of the objectives.

Given the sectors this research is based on, and the globalization it is associated with, any and all relevant information is in English, which means the data collection has been compiled without the need for any translations (this includes the language the interviews were conducted in).

The way the interviews were structured was taken from the relational table (Figure 1: Scope of the objectives’ research) as the main goal was to have those answered, so we constructed the questions in a way that those objectives were addressed. What came first was introducing the topic by asking broad questions about blockchain and its benefits, followed by more specific questions that could hopefully help answer the hypothesis and its objectives. Although maintaining a standard protocol of questions, every interview was catered to the person speaking; many provide additional information as the conversation goes, without specifically being asked for it.

Below, you can find some questions that are meant to guide the interview. The first three questions are quite broad and are meant to give an overall idea of what is to be discussed in the interview. Moreover, there are some additional questions written down that are going to be asked depending on the type of interviewee (e.g. blockchain professional).

Interview Sample

1. How familiar are you with blockchain?
2. Do you know the effect blockchain can have on the role of intermediaries?
3. Do you think the tourism industry will use it/ and what do you think will happen if the tourism industry starts implementing blockchain technology?

Additional Questions (according to each specific situation)

- Do you believe that even if blockchain could nullify the need for intermediaries in the industry, these intermediaries would still exist?
- Do you believe that blockchain knowledge should/will be part of hospitality universities' syllabus?
- Would you continue to encourage students to intern at intermediaries, knowing how blockchain could disrupt the sector?
- Regardless of whether or not blockchain technology affects the tourism industry, considering our current situation, do you believe that the role of intermediaries will continue to be relevant?
- Would you consider implementing blockchain in your company?
- Do you know the effect blockchain can have on the role of intermediaries?
- If you believe that blockchain will affect the intermediaries in the tourism industry, how do you think the employment will shift?
- Knowing the benefit of blockchain do you think it could lead to less social inequality? (opportunities' access)

• Ethical considerations:

First of all, it's important to mention how relatively new blockchain technology is, especially when it comes to applying it to the tourism industry. Which is why it's hard to pinpoint the relevance and validity of the information provided by the different sources.

All of the answers provided by the participants of the interviews were substantiated by both their personal experience or research on the topic. In light of the matter at hand, primary research was crucial to undertake in order to provide an effective and justified answer to our initial question.

Nevertheless, because of the possible bias the hypothesis of this research presents, it may be that some of the participants base their answers (somewhat) on what they want or expect the future to look like. This however poses the dilemma that the professionals who are familiar with how blockchain really works, and can provide significant insights for this research, are also people who have invested the time because they realize in what direction it can/will take us. Moreover, those willing to participate tend to be those in touch with the industry; this means that it's hard to get input from professionals who don't understand how it works. Therefore, the idea was to get as many perspectives as possible, to get an objective answer.

In terms of anonymity, all of the participants were happy to share their insights along with their name. Taking into account that their input was based on their personal take on the topic, the information provided isn't considered right or wrong, rather factual and contemplative. They all signed their respective consent forms and allowed for voice recordings to be done in order to keep track of all their helpful insights.

• Chapter 4. Findings and discussion:

The main objective of the chapter of Findings and Discussions is to showcase all the information presented in the Literature Review, with the contribution of the new data collected through interviews, alongside the goals of answering the objectives previously stated in Chapter 1.

Essentially, the travel industry characterizes two sorts of partners: those who appreciate the advantages of traveling, and those who work in the tourism industry in order to gain monetary movement to produce turnover. In this paper, it has been featured how blockchain works, contemplated past exploration on the matter, and perceived instances of blockchain solutions for the travel industry. To assess expected advantages of the applications within tourism, there is a requirement for a wide analysis and methodical examination of the usage and integration of this innovation.

In order to organize the findings, see the following table in which the different sources used have allowed for the main questions to be answered:

Figure 3: The categorized findings according to their source

Sources	Objectives
Blockchain Professional #1	• Investigate how blockchain could facilitate and boost innovation. • The role that cryptocurrency plays. • How blockchain solutions for tourism can change the intermediaries' role. • Opportunities that blockchain and intermediaries provide for the tourism industry companies. • Shift in social inequality.
Industry Professional #1	• What blockchain technology is. • How blockchain solutions for tourism can change the intermediaries' role. • How a decentralized online travel platform bears the potential to provide equal market power to all operators. • Opportunities that blockchain and intermediaries provide for the tourism industry companies.
Blockchain Professional #2	• What blockchain technology is. • The role that cryptocurrency plays. • How blockchain could facilitate and boost innovation. • How blockchain solutions for tourism can change the intermediaries' role. • Whether a decentralized online travel platform bears the potential to provide equal market power to all operators. • Opportunities that blockchain and intermediaries provide for the tourism industry companies.
Industry Professional #2	• How blockchain could facilitate and boost innovation. • How blockchain solutions for tourism can change the intermediaries' role. • Whether a decentralized online travel platform bears the potential to provide equal market power to all operators.

	• Opportunities that blockchain and intermediaries provide for the tourism industry companies.
Blockchain Professional #3	• Research how blockchain solutions for tourism can change the intermediaries' role. • Research how a decentralized online travel platform bears the potential to provide equal market power to all operators. • The shift in social inequality.
Blockchain Professional #4	• Investigate how blockchain could facilitate and boost innovation. • Research how blockchain solutions for tourism can change the intermediaries' role. • Consider the opportunities that blockchain and intermediaries provide for the tourism industry companies.

1. Investigate what blockchain technology is

Thanks to the interviews conducted with blockchain professionals and with the information gathered previously for the Literature Review, the definition of blockchain has been expanded due to this new knowledge.

As Blockchain Professionals #1 and #2 mentioned, the extension of blockchain technology is grasped by just a few professionals, most of them have to continuously read and learn about its new applications in order not to fall behind. That is why neither are comfortable calling themselves experts on the subject. Moreover, Blockchain Professional #1 explain how transactions are done very inefficiently and do not obey the privacy code that the users deserve. Therefore, the decentralization that blockchain technology offers would eliminate the need for intermediaries which would lead to more efficiency in this process and the cost of transactions to decrease.

Moreover, Industry Professional #1 also added some comments on the applicability of blockchain both in the judicial and banking system as it allows for more efficient and secure transactions and contracts, essentially not needing attorneys or notaries anymore. This industry professional has not been directly involved with blockchain and therefore his knowledge on it is limited, however, he has stated that it is crucial for the tourism industry to keep up to date with the new advancements in technology. This is why he stated that

tourism and hospitality universities should implement blockchain as part of their syllabus, in order to better train young professionals that are going into a labour market that is constantly changing and where digitalization is a highly demanded skill.

Furthermore, Industry Professional #2 also explained that due to the applicabilities of blockchain technology, the spa he works for has applied blockchain to guarantee a successful contract between the supplier and the customer in order to have a more direct relationship with the client.

Blockchain Professional #2 highlighted the importance of trust when it comes to a key component within blockchain technology, This is because when it removed this component which was essential for traditional technology it caused disruption in different sectors like banking. He also stated the fact that blockchain can create assets that are not controlled by the government or other major and powerful companies, as well as assets that can not be tampered with. Therefore, many companies and individuals started entering this market in order to create products and services which were decentralized from the government, which as Blockchain Professional #2 said, it started a big revolution.

1.1 Research the role that cryptocurrency plays

Combining the research within the literature review, with the in-depth interviews cryptocurrencies can be defined. Cryptocurrencies, such as Bitcoin or Etherum, are non-state-endorsed digital forms of money that are made utilizing blockchains. Simply put, computers form algorithms, when these are calculated and put together, Bitcoins are procured. Since the advancement is consistent and there is no known strategy of producing the remarkable cryptographic money it is exceptionally secure and they frequently use distributed organizations for installment preparation. The professionals interviewed explained how this leads to Bitcoins not being able to be fraudulently produced and are unmistakably more hard to embezzle because of the significant level of encryption utilized in their creation.

<u>Now what is its role in blockchain?</u>

Monetization. Looking at it equitably; money has a monetized worth only because individuals concur its value. Physical cash has characteristically no worth; the ink and the paper are frequently worth a couple of pennies in material, but because of the globalization of the economy, it can be given a substantial worth. The equivalent is valid for Bitcoins. Blockchain

Professional #2 explained how as albeit at first, Bitcoins were generally worth next to nothing, more individuals started to comprehend what this could speak to and its security, and thus more started to get on board with the Bitcoin trend. As more individuals acknowledge it as a valid currency, it continues to be more grounded and all the more notable. Blockchain Professionals #1 and #2 believe digital currencies could undoubtedly turn into a globalized vehicle of trade despite the fact that they are not supported by anything aside from mechanized science.

How is it applied to the tourism industry?

With the approach of this new form of payment, corporate travel could utilize it alongside travel services for valid payment methods in tourism. Tourism businesses are progressively validating Bitcoins as a type of payment, as they allot the worth to the currency.

Blockchain Professional #2's input was that this acknowledgment has gotten simpler since there are currently a few banks which will even trade Bitcoins and different digital currencies into actual physical forms of currency. Because of the approach in which the transactions of Bitcoins are executed, there is quite a significant level of security included which makes fraudulent interference almost inconceivable. Therefore, it simply makes sense that tourism companies utilizing and integrating Bitcoin as a suitable mechanism of trade.

2. How blockchain could facilitate and boost innovation

Throughout this research there is plenty of evidence stating how blockchain technology has led to innovative solutions in many sectors. Blockchain Professional #1 stated how the two most basic ways in which it is revolutionary are the following: financially, because of the decreased cost in moving money and transparency given the efficiency that comes with not having the need to go through a number of intermediaries. This is just the root of the matter.

Essentially, according to Blockchain Professional #2, there are three general categories of blockchain generations or waves, per say, in which innovation has been succeedingly boosted:

Figure 4: Blockchain Technology Waves

1st Wave B. Tech	Integration of cryptocurrencies: the transactions, settlements, and digitized payment methods.

2nd Wave B. Tech	Decentralization of the government - Smart contracts; the kept record of the market and monetary applications.
3rd Wave B. Tech	Integration past business and currency sectors; particularly in b2b model companies, health and scientific industries.

According to the research conducted, the innovative changes in tourism can be placed in the third generation of blockchain technology implementation; showing how new it really is. Along these lines, Industry Professional #1 stated that although blockchain technology has clear benefits, people still do not have general knowledge on how it works; therefore it is hard to integrate blockchain solutions into your companies' apps, especially when it is hard to come by developers that are well acquainted with it.

Blockchain Professional #2 provided a contrasting view of how if you ask anybody that has worked in the travel space they will tell you that the biggest challenge is access to inventory. This is why an open market space is so necessary, where there's no controlling middleman. Blockchain does not only solve distribution issues, but is monopoly resistant and tamper proof. Even if people don't understand it yet, it doesn't mean they won't. This was corroborated by Industry Professional #2, who highlighted how people didn't understand the Internet at first, and yet now people can't live without it.

Furthermore, Blockchain Professional #2 talked about how crucial the trust factor is. By guaranteeing secure transactions that warrant no fraudulent activity will take place, there's a prevention from anyone from taking your money. That by itself revolutionizes the modernization of payment methods: necessary to companies in all sectors. This is also corroborated by Blockchain Professional #4, as he talks about the importance of the traceability of all the steps the product or service you sell, goes through. As we've previously seen, blockchain technology acts as a digital notary, therefore guaranteeing no scams or money loss in a set deal.

3. How blockchain solutions for tourism can change the intermediaries' role

The most important blockchain solution that will impact intermediaries is security and transparency, which is why blockchain has become such an important disruptor as it allows to eliminate the inefficiencies in the market. Therefore, as Blockchain Professional #1 explained, anything that involves trust and money will change due to blockchain, as it has

been progressively seen in the justice and banking space with the implementation of defy tools (decentralized finance). This kind of technology that blockchain offers, has the potential of replacing services with smart contracts and other decentralized technologies.

However, it is important to highlight the fact that all of our interviewees have mentioned that even though blockchain has the potential to eliminate the need for intermediaries, that there is always a way to reinvest themselves by offering different service or by implementing blockchain into their business models. Intermediaries have a lot of power and spend a significant amount of money into marketing and advertising in order to allure clients, although they are not as efficient as the industry would hope.

Blockchain Professional #2 talked about the need for the tourism industry to innovate, especially taking into account the new Covid scene, and also made a connection between intermediaries and telephone operators. He explained that during the 90s and 80s, the telephone industry was fighting the Internet, as due to their existence, people would not be needing them anymore (if people use email, they would not be making long distance calls). However, once they saw that they could not compete with this disruptive technology, they decided to adapt and reinvent themselves in order to survive. Therefore, those phone companies that were fighting the invention of the Internet, became Internet providers, meaning that something similar could happen with intermediaries. They will not cease to exist but they might have to adapt to continue having market share.

On the other hand, a more radical view on this topic was provided by the Industry Professional #2 where he states that he does not think that blockchain solutions will have an impact on the intermediaries' role. He mentioned that, based on the information he has on the tourism industry and blockchain, the internet should have already eliminated the need for intermediaries, as nowadays you can directly contact a hotel or an airline through their own website and also gather all the information required to book a trip.

Moreover, Blockchain Professional #3, also commented on the threat that the internet posed on travel related intermediaries and how due to that, they changed completely their way of doing business. Blockchain Professional #3 assures that intermediaries will not disappear if they are able to adapt, as they have done throughout these years. This is because when a new technology enters the market, businesses entirely change their way of delivering their

products and services as new opportunities arise to raise customer satisfaction or to increase market share.

Furthermore, Blockchain Professional #4, when asked how blockchain technology could affect the role of intermediaries, he answered that mostly just on paperwork, which will eventually save money and time for both parties in the transaction. Since blockchain creates an environment of trust, companies can save up on costs by not having to use a notary. On the other hand, Blockchain Professional #4 argued that blockchain technology will not eliminate the need for intermediaries, due to the importance of the human factor. Moreover, it is important to mention that this professional was the only one who emphasised on the idea of intermediaries adopting blockchain into their way of working, as it would lead to a more efficient way of doing things. It is mentioned again the issue that many intermediary jobs will be removed, however it is assured that this happens with most job positions when new technologies arrive into the market, which is why it is so important to constantly readapt to changes.

3. 1 How a decentralized online travel platform bears the potential to provide equal market power to all operators

According to Blockchain Professional #2, the reason behind intermediaries having so much power in the market currently, is because they can control your success rate within the marketplace. However, a decentralized platform devalues the worth of these middlemen by guaranteeing a high level of trust in comparison, that they simply cannot, by allowing all the verification stages blockchain offers. Agreed with by Blockchain Professional #3, blockchain provides opportunities to small businesses because of the concept “traceability of origin”; the value of your product increases due to the reliable verification of blockchains’ registers.

However, Industry Professional #2 offered an opposing view, as a company that uses intermediaries and is interested in blockchain. The problem with the usage of this technology, comes with the entry barrier that is the initial investment. Depending on the revenue your company is generating, and considering the current situation, taking a risk and investing in developing this technology may not seem like a viable option. This would disprove the results gained from the Literature Review, as the findings highlighted how one of blockchain’s benefits versus using an intermediary for your transactions, eliminates the

financial aspect of gaining market power (it must be noted, this is a personal perspective from a non-blockchain professional).

However, this professional has indeed integrated blockchain in their services; given that they do not see it as a 'fleeting' trend, as people are increasingly using it, and by sheer statistical probability, will lead to a must-have tool. Moreover, Industry Professional #2 voiced his opinion on how the more name brands, and bigger companies use it, the more the rest of the operators will as well; this still considers a hierarchy and does not grant equal market power to all.

4. The opportunities that blockchain and intermediaries provide for the tourism industry companies

An important aspect that Industry Professional #1 and Blockchain Professional #2 touched and agreed on, was how the travel industry, in contrast with other service industries, is the slowest sector in adapting new technologies which is why the travel space is so behind in terms of significant and disruptive innovation. Blockchain Professional #2 mentioned how his co-founder had previously been working on improving the inefficiency of the sector. His goal was to solve the problem that airlines had when a flight was delayed or cancelled, because the airline workers had to manually call hotels one per one because of the hotels' faulty booking systems which wasted key resources like money and time. Moreover, the airlines would constantly be losing the loyalty and good reviews of their customers and as it would take them hours to be able to allocate all their clients into hotels.

This is why Blockchain Professional #2 went on to create his non-profit company, Winding Tree. His idea was to create an open space market where hotels and airlines could publish their inventory without a third party controlling this interaction. This would help hospitality operators because this way they would have a trusted and accessible platform to release their inventory to, since with blockchain technology once it is put out there, it can not be tampered with (if it needs to be changed it can be done, but it has to be done as a community). Therefore, these companies, that do not pay any sort of commission to the platform, can be certain that the owner of Winding Tree will not wake up one day and start charging 20% or 30% commission fees, as that inventory can no longer be manipulated.

Moreover, hospitality operators that use the Winding Tree platform, will also benefit from the trust and security that blockchain offers as one of the main setbacks when introducing a new technology is hackers and/or spammers. Blockchain Professional #2 stated that this is one of the main reasons why intermediaries have the amount of power that they currently have because they can guarantee a safe money transaction. However, he also mentioned that due to that power, intermediaries also get to decide who gets to be successful and who does not in the travel industry. Therefore, with the several stages of verification that Winding Tree requires to all of its users, they can guarantee a safe transaction of inventory and money.

On the other hand, as it was previously mentioned, the tourism industry is not the fastest developing sector, which is why it will take money and time for blockchain platforms, like Winding Tree, to be used by most hospitality operators. Additionally, Blockchain Professional #2 explained that a significant challenge for any new and disruptive technology that wants to enter the tourism industry, is access to inventory. Nowadays, important intermediary companies such as Booking, Expedia or Amadeos control almost all the inventory in this industry, so any company that wants access to that information needs to ask them for permission as accessing it directly is impossible. Industry Professional #1 also mentioned that it is easier for users looking to book hotels or airlines for their vacation to go to just one page where they can find all the information they need, instead of searching individual websites for the best deals, which would take a significant amount of time. Therefore, intermediaries have a competitive advantage as they aggregate lots of inventory from different tourism companies in one page to display to the potential customer.

Blockchain Professional #4 posed a solution for many intermediaries being threatened by this technology, posing an example of how Booking.com, one of the most famous online travel agencies, could use blockchain to their advantage. When one writes a comment on those travel platforms, nobody can make sure what the comment says is true or not. However, this professional explained that when using blockchain, since it is tamper proof, it is easier for hotels to sue people lying on the internet as nobody can manipulate that data that has been posted, therefore creating a sense of responsibility. Therefore, blockchain technology could be a beneficial implementation for both the tourism and intermediary industries.

4. 1.The shift in social inequality

As provided by the different sources, a main question when a new technology enters the market, is how jobs will shift. According to Blockchain Professional #1, what is clear is that in general, when jobs are inefficient, they become unnecessary. Nevertheless it doesn't mean there will be less positions, it means there will be different ones. In this case, blockchain can create new and diverse types of business models, which brings and leads to new opportunities within the job market.

Concurring with the findings in the literature review, the sources talked about this virtual persona that only discloses the needed information in every given case. The matter of the fact is, blockchain can provide privacy for individuals in a new and revolutionary way. Blockchain Professional #1 talks about how this can potentially lead to a more balanced social equality, unless censored by a government. For example, the Chinese government is popularly known for wanting to control everything their people do. In their case, if they start to implement blockchain technology, they will do so in a way that you can not have that privacy. Basically, blockchain does indeed have the opportunity to give more power to the individual, but eventually whether that is granted or not will depend on the government.

Furthermore, according to Blockchain Professional #3, this technology definitely has the power to shift the current social imbalance. By having a protected and manageable digital identity, networks and relationships can be easily created that can have a substantial impact on your professional career, providing broad opportunities to all. The downfall to this system however, is that access to the internet is required to channel these opportunities and unfortunately not everyone has access to it.

Discussing the overall results

The data collection method used was qualitative, therefore the findings are a combination of previous research and professionals providing their insight. However, biases must be taken into account when it comes to properly analyzing the results. Mentioned above, there are opposing views on the different aspects revolving around the need for intermediaries, when provided with blockchain solutions.

On one side, the Blockchain Professionals are evidently leaning towards popularizing this technology; it must be noted that they have studied and taken the time to understand how it works along with its benefits, given that their professional careers revolve around it. On the other side, the Industry Professionals provide the important perspective that can lead to assessing whether professionals who have limited knowledge on blockchain (within the tourism industry in this case) would use it.

Nevertheless, it is this limited knowledge that poses a possible bias; because they aren't familiar with the benefits of this technology they are less prone to using it. Furthermore, there are also the long-lasting relationships endured with the essential intermediaries in the market right now. Therefore, being a pioneer (as Industry Professional #2 aforementioned) is a risk many are not willing to take, generating another possible bias.

The conceptual framework developed from the literature review, was mostly corroborated by all sources, with the exception of whether blockchain technology leads to social balance and provides equal market power. These matters remain at question, as a broader sample would be necessary to answer them. Furthermore, because of how relatively new blockchain solutions are, there is a lack of data, deeming the one at hand insufficient to properly assess not only what it could potentially lead to, but what it has led to up until now.

• Chapter 5. Conclusions, limitations, and recommendations:

5.1 Conclusions:

For the final chapter of the thesis, a reflection of all the information gathered will be presented. There are in-depth articulations that summarize the inputs of knowledge of this research. The goal is to provide a collection of existing data, put together in order to reflect whether the initial hypothesis is correct or not. On account of all the information assortment, a few proposals will be contemplated, which could potentially give the chance to continue the investigation of this matter; considering the near future will have plenty of new data to analyze.

The overall aim of this research is to prove whether or not blockchain technology will lead to an increased desintermediation in the tourism industry. The objectives were set to collect all relevant data to answer the matter at question, observe below how each one has provided information either proving or disproving it:

Figure 5: Table showing how the objectives proves or disproves the main hypothesis.

OBJECTIVE	PROVES / DISPROVES HYPOTHESIS
What blockchain technology is	Researching what blockchain is, has proven that it can lead to a desintermediation because of its decentralized power and its ability to act as a public ledger while also guaranteeing tamper proof and cost effective transactions. Therefore, in theory blockchain technology can lead to an increased desintermediation in the tourism industry.
The role that cryptocurrency plays	Findings have proven Bitcoin secures travel transactions and helps maintain financial security meaning that as they globalize their reach, airlines and further tourism companies will increasingly accept this form of payment, entering the blockchain world.
How blockchain could facilitate and boost innovation	All sources and research conducted points to the main pillars of blockchain: persistency, anonymity, auditability and decentralisation. All of these concepts lead to the possibility of replacing the needs intermediaries fill, while nullifying the cons.
How blockchain solutions for tourism can change the intermediaries' role	Due to the benefits of blockchain technology, such as security, transparency and anonymity, the need for intermediaries, especially in the banking and law space is decreasing. However, as it has been mentioned in the interviews, intermediaries are well-known for adapting to new technologies. Although their role will change due to blockchain solutions, this does not mean that they will disappear.
How a decentralized online travel platform bears the potential to provide equal market power to all operators	The literature review findings prove how many entry barriers, which come with using intermediaries, are eliminated when using blockchain. According to previous research on the matter, blockchain leads to the shift of market power from the consumer to the supplier; this means companies gain more control and are therefore able to better position themselves.
	On the other hand, investing in blockchain is also currently perceived as a risk, because it is costly and there is limited knowledge on how to properly develop it. Therefore there would

	still be an entry barrier, not providing equal market power to all operators. This would prove the hypothesis wrong.
The opportunities that blockchain and intermediaries provide for the tourism industry companies	In theory blockchain has the potential to eliminate the need for intermediaries, in practise however, intermediaries hold a significant amount of power and inventory in the tourism industry which is why it is so difficult to compete against them. Moreover, they spend thousands of dollars each year on marketing purposes. Therefore, although the amount of opportunities blockchain provides for tourism companies are many, it would still not be enough to decrease the need for intermediaries.
The shift in social inequality	Although it hasn't led to it, blockchain technology has proven to have the potential to create a more balanced social equality. Desintermediation would be one of the many reasons to get there.

Considering the entirety of the data gathered, as well as what each objective leads to, the general takeaway of this research proves the initial hypothesis mainly **correct**.

The need for intermediaries could potentially diminish because of blockchain technology; therefore this could absolutely lead to disintermediation in the tourism industry. However, if the matter at hand is discussing whether intermediaries will disappear, the answer is no.

Sounds confusing, right? The thing is, companies have proven time and time again, their ability to adapt to circumstances; especially when their present model is threatened by new technology. Therefore, although the need for intermediaries as currently known to function, could easily disappear because of blockchain solutions, it must be assumed that they will evolve in a way that guarantees continuous demand.

5.2 Recommendations:

Because of the limitations that are further discussed below, and the extensive research this topic calls for, in order to get a more accurate idea of how blockchain technology can affect the tourism industry, there are two main concepts to be factored in: time and sample size.

One can synthesize the following recommendations to those who might want to conduct research on potential disintermediation in the tourism industry due to blockchain:

1. As gathered from the findings, because of how innovative this technology is, some time has to pass before companies start understanding how it works and actually start implementing it. The more people use it in other sectors, such as banking and finance, the more likely other sectors will more massively integrate it as well. Therefore a longer period of time to research would provide a more accurate depiction of how blockchain could potentially affect the tourism industry.

2. Moreover, gaining a significantly bigger sample size would supply a more precise understanding of the titans of the respective industries' standpoints. Therefore it should be advised that a vast in-depth analysis of a more substantial sample size be used in a research on this topic.

Furthermore, it would be interesting to conduct a specific research on the repercussions on social inequality because of blockchain technology. An intriguing recommendation would be to continue to further add to the findings of this thesis on how blockchain solutions could potentially lead to a better social balance; and an analysis of why it hasn't been applied (if possible).

Finally, an alternative, similar research proposal would be to further understand the validity of accepting Bitcoin, or other forms of blockchain currency, as a valid payment within the tourism industry. Will these be increasingly acknowledged? Will this lead to the elimination of currency exchange for tourists? How could this affect the destinations?

5.3 Limitations and further research:

Every research has some form of limitation, and this one is no exception. This degree thesis is based on a topic that is relatively new, specially on the industry that it is being focused on. This fact itself is a limitation because there is no extensive data on examples of the applicability and level of success that blockchain has had in the tourism industry, as this information will only be available years from now. One of the reasons for this, apart from the fact that blockchain was launched only nine years ago, is that the tourism industry is particularly slow at implementing new soaring technologies, as it is quite a traditional sector. This has been emphasized even more with the appearance of Covid-19, which has led to

mostly all travel companies being forced to stop all their advancements and innovations in the digital and technological sector.

Moreover, Covid-19 troubled the development of this degree thesis once again, in the process of selecting the interviewees. It was crucial for this research to contact professionals in the tourism sector to ask them about their involvement with blockchain technology and the threat that this poses to intermediaries. However, the process of contacting all these professionals was obstaculized by the fact that most of them were not working anymore because of the current status of the travel industry worldwide, or they were incredibly busy trying to keep their companies afloat. Thankfully, some of the desired candidates answered, but it would have been a much more complete thesis if a more wider and knowledgeable (about blockchain) audience was reached.

Furthermore, the fact that this thesis is written by two young adults still undertaking their university degree, it means that the lack of money or none thereof, has been a limitation in the finalization of this paper. The availability of money would have helped implement tools such as Findthatlead that would have allowed access to specific information that is not attainable for free. The data provided by these kinds of tools would have assisted in the research for relevant and significant interviewees, as the contact details would have been available for use when filtering professionals into categories such as “blockchain” and “tourism industry”. A problem often encountered was not being able to find an email address of a specific professional, as the one from their company would usually not answer. Therefore, if these technologies were available for this thesis, many more compatible candidates would have been interviewed, as it would have been much easier to reach them directly.

Additionally, time was a constraint as this paper had to be written within a few months in order to submit it on time. What took the most time was the whole process of getting to interview professionals. This included deciding which candidates to interview, obtaining their contact details, contacting them, getting an answer and setting up a time for an interview. Therefore, if more time was provided for the finalization of this paper, there would have been more time to research and contact compatible candidates which would have led to a more elaborate and extensive conclusion. Similarly, the instructions provided by the HTSI university restricted the development of this degree thesis as we had to abide by certain guidelines, like a restricted amount of objectives and number of pages.

• References:

Aitken, R. (2016). *Blockchain startup TamTam eyes trillion Dollar travel industry offering 'Crypto'.* Forbes. Available online: https://www.forbes.com/sites/rogeraitken/2016/11/01/blockchain-startup-tamtam-eyes-trillion-dollar-travel-industry-offering-crypto/#1f3012782b76 [Accessed October 24, 2020]

Anon, 2020. Blockchain adds huge new opportunities for hotels. *Pebble Design - Trusted Leaders in Hotel Web Design*. Available at: https://pebbledesign.com/insights/blockchain-adds-huge-new-opportunities-for-hotels [Accessed October 23, 2020].

Boucher, P. , Nascimento, S. & Kritikos, M. (2017) European Parliamentary Research Service. *How blockchain technology could change our lives* Available online: https://www.europarl.europa.eu/RegData/etudes/IDAN/2017/581948/EPRS_IDA(2017)581948_EN.pdf [Accessed October 24, 2020]

Catalini, C. & Tucker, C. (2018) *Antitrust and Costless Verification: An Optimistic and a Pessimistic View of the Implications of Blockchain Technology* Available online: http://ide.mit.edu/sites/default/files/publications/SSRN-id3199453.pdf [Accessed October 24, 2020]

Chokun, J.. *Who accepts bitcoins as payments?* (2016). https://99bitcoins.com/who-accepts-bitcoins-payment-companies-stores-take-bitcoins/ [Accessed October 24, 2020]

Colombo, E., & Baggio, R. (2017). *Tourism distribution channels: Knowledge requirements*. In N. Scott, M. De Martino, & M. Van Niekerk (Eds.). Knowledge transfer to and within tourism: Academic, industry and government bridges (pp. 289–301). Bingley, UK: Emerald. [Accessed October 24, 2020]

Dalrymple, M. et al., 2020. Make it better, not just safer: The opportunity to reinvent travel. McKinsey & Company. Available at: https://www.mckinsey.com/industries/travel-logistics-and-transport-infrastructure/our-insights/make-it-better-not-just-safer-the-opportunity-to-reinvent-travel [Accessed October 23, 2020].

De Filippi, P., 2016. The interplay between decentralization and privacy: the case of blockchain technologies. *Journal of Peer Production, Issue*, (7).

Ford, R. C., Wang, Y., & Vestal, A. (2012). *Power asymmetries in tourism distribution networks. Annals of Tourism Research*, 39(2), 755–779. [Accessed October 24, 2020]

Galun, J., 2019. Blockchain: A Revolutionary Technology That Won't Change Hotel Distribution. *Excella*. Available at: https://www.excella.com/insights/blockchain-a-revolutionary-technology-that-wont-change-hotel-distribution [Accessed October 23, 2020].

Giancaspro, M. (2017). *Is a 'smart contract' really a smart idea? Insights from a legal perspective. Computer Law and Security Review*. Available online: http://www.sciencedirect.com/science/article/pii/S026736491730167X [Accessed October 24, 2020]

Iansiti, M.; Lakhani, K.R. The Truth About Blockchain. Harv. Bus. Rev. 2017, 95, 118–127 [Accessed November 13, 2020]

Korpela, K., Hallikas, J. and Dahlberg, T., 2017, January. *Digital supply chain transformation toward blockchain integration. In proceedings of the 50th Hawaii international conference on system sciences.*

Kwok, A.O.J.; Koh, S.G.M. Is blockchain technology a watershed for tourism development? Curr. Issues Tour. 2018, 1–6, doi:10.1080/13683500.2018.1513460.

Leung, D., & Dickinger, A. (2017). *Use of Bitcoin in online travel product shopping: The European perspective*. In R. Shegg, & B. Stangl (Eds.). Information and communication technologies in tourism 2017 (pp. 741–754). [Accessed October 24, 2020]

Nakamoto, S. (2008). *Bitcoin: A peer-to-peer electronic cash system.* Available online: https://bitcoin.org/bitcoin.pdf [Accessed October 24, 2020]

Nofer, M., Gomber, P., Hinz, O. and Schiereck, D., 2017. *Blockchain. Business & Information Systems Engineering*, 59(3), pp.183-187.

P, R., 2020. *La crisis de Covid-19, una 'oportunidad única' para la agencia tradicional*: Noticias de Agencias de viajes: Revista de turismo Preferente.com. *Preferente.com*. Available at: https://www.preferente.com/noticias-de-agencias-de-viajes/la-crisis-de-covid-19-una-oportunidad-unica-para-la-agencia-tradicional-299504.html [Accessed October 23, 2020].

Quinby, D., 2018. Only One Thing Will Disrupt OTAs (and It Ain't Blockchain). *Phocuswright*. Available at:

https://www.phocuswright.com/Travel-Research/Research-Updates/2018/Only-One-Thing-Will-Disrupt-OTAs-and-It-Aint-Blockchain [Accessed October 23, 2020].

Rejeb, K.; Rejeb, A. Blockchain Technology in Tourism: Applications and Possibilities. World Sci. News 2019, 137, 119–144 [Accessed November 13, 2020]

Sixtin, E.. *TUI tourism group will adopt Ethereum blockchain technology.* (2017). https://btcmanager.com/tui-tourism-group-to-adopt-ethereums-blockchain/ [Accessed October 24, 2020]

Swan, M., 2017. Anticipating the economic benefits of blockchain. *Technology innovation management review, 7(10), pp.6-13.*

Tapscott, D., 2016. TED talk. *How the blockchain is changing money and business.* Available at: https://www.ted.com/talks/don_tapscott_how_the_blockchain_is_changing_money_and_business [Accessed October 18, 2020]

Titcomb, J.. *Bitcoin is tax-free, European court rules*. (2015). http://www.telegraph.co.uk/technology/news/11948222/Bitcoin-is-tax-free-European-court-rules.html [Accessed October 24, 2020]

Van Rijmenam, M., 2019. How Blockchain Will Change the Travel Industry. *AI, Blockchain & Big Data Speaker on the Future of Work*. Available at: https://vanrijmenam.nl/how-blockchain-changes-travel-industry/ [Accessed October 23, 2020].

Warburg, B., 2016. TED talk. *How the blockchain will radically transform the economy* Available at: https://www.ted.com/talks/bettina_warburg_how_the_blockchain_will_radically_transform_the_economy [Accessed October 15, 2020]

Zheng, Z., Xie, S., Dai, H.N., Chen, X. and Wang, H., 2018. Blockchain challenges and opportunities: A survey. *International Journal of Web and Grid Services*, *14*(4), pp.352-375.