

# Application Possibilities of Blockchain Technology in Tourism

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Master's Thesis submitted in fulfilment of the Degree

Master of Science

in International Tourism Management

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Vienna, 24.06.2020



## **AFFIDAVIT**

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## **ABSTRACT**

Since the creation of Bitcoin in 2008, buzzwords such as ‘blockchain’ have led to an impending technological transformation among multiple industries around the world. Therefore, the tourism and hospitality industry is not only confronted by these technological advancements, but also affected by the ever-changing behaviour of tourists and travellers.

Existing data suggests that blockchain technology has been successfully integrated into sectors such as banking or finance. Nonetheless, research on the applicability of blockchain technology within the tourism and hospitality industry is limited. Consequently, this master’s thesis aims to fill this knowledge gap and examines the current integration status of blockchain technology in the tourism and hospitality industry in Vienna, Austria.

A mixed-methods research design laid the foundation for the data collection process. Local industry experts were interviewed in order to provide qualitative data. The interviews were then analysed and structured according to identified patterns hereby, a quantitative approach was utilised. Subsequently, commonalities between discussion themes were observed via a text mining strategy, including the use of VOSviewer software in order to generate deeper insights on the expert’s opinions.

Key findings imply that blockchain-based solutions within the local tourism and hospitality industry are scarce, totalling 15 businesses. These businesses showcased an overall satisfaction and consequently demonstrated interest in further expanding the use of blockchain technology. The data suggests that the potential benefits of implementing blockchain technology clearly outweigh its shortcomings, as blockchain-based solutions act as a customer-centric instrument.

Nevertheless, the development of blockchain technology in the tourism and hospitality industry will be dependent on the willingness of service providers to further develop this technology and tailor it to the requirements of the industry.



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## 1 INTRODUCTION

Today's business environment and economy is constantly changing, especially with the fast-paced of technological development and evolution. Every industry experiences these impacts on their day-to-day operations. There are many industries which are considered fast adopters to technological advancements, for instance, the sectors of banking and finance. The tourism industry, however, is generally considered a late adopter, often misjudging trends (Filimonau & Naumova, 2019). Especially in contemporary times, the global travel industry is confronted with perpetual change associated with the development of technology and how this influences the behaviour of travellers (World Tourism Organization, 2018). Of all the technological advancements of the past decade, blockchain technology has been the one most intensively discussed as being among the future-dominating trends. In any case, blockchain technology is a buzzword and has made its way onto the list of revolutionary innovations since the creation of Bitcoin in 2008. Since then, blockchain, which is the underlying technology of Bitcoin, has steadily grown in its global importance (Nam et al., 2019). Many industries, such as banking or finance started early to adopt the newly developed blockchain technology and believed in its potential. However, the tourism industry is not considered to be an early adopter of the application of blockchain to technological advancements (Filimonau & Naumova, 2019). This is supported by Nam et al. (2019), who claim that there is a shortage of literature when it comes to blockchain technology related to the tourism industry, including application possibilities, challenges and future guidance.

Therefore, the purpose of this study is not only to examine the current integration status of blockchain technology into the tourism and hospitality industry in Vienna, but also reasons for and against the integration and its advantages and disadvantages which blockchain technology is able to provide to the industry. Moreover, this thesis investigates the present application possibilities of this technology and accordingly, the status quo of the utilisation process. Furthermore, the potentials and the limitations of blockchain technology are explored in terms of the application and integration of this

technology in the tourism and hospitality sector in Vienna. Last, this thesis addresses the potential of blockchain technology to influence and change the entire industry and its processes in the upcoming years. Finally, it attempts to contribute towards padding the current dearth of literature concerning the relation between blockchain technology and tourism, specifically investigating the current status in Vienna, Austria.

## **1.1 Background**

The aim of this master's thesis is to generate a deeper insight on the application possibilities of blockchain technology within the tourism and hospitality industry. A foundational understanding of the underlying technique is provided, as well as current utilisations and trends within the hospitality industry. Moreover, this thesis provides insights into systems and processes, which are the fundament of blockchain technology and which need to be set up in order to be able to apply this technology. There is high interest in the application possibilities of blockchain technology specifically for meeting various needs within the tourism industry.

Nonetheless, blockchain technology and its potential has unfortunately not been recognised by tourism-related companies so far, especially in Vienna, Austria, although the technology offers various advantages to its applicants (Filimonau & Naumova, 2019). The topic of blockchain technology is frequently discussed in the given literature; most often, blockchain technology is pointed out as the future, and already accepted across numerous industries. However, there is hardly any literature on blockchain technology linked to the tourism industry (Nam et al., 2019), and it is even harder to find examples of real-life applications in Vienna.

## **1.2 Research question**

Blockchain technology seems to be the current cutting-edge trend when it comes to technologising industries. The technology is described as more efficient, effective, safe and transparent than conventional solutions which are in place at the moment (Bhardwaj & Kaushik, 2018). Nevertheless, hardly any literature on blockchain technology and possible applications within the hospitality industry can be found. Especially the tourism and hospitality industry in Austria is facing hard times because it

is under increasing pressure by big global players, who dominate the market. For this dilemma, guidance is offered in terms of technological revolutions with the new and innovative blockchain technology. Blockchain has successfully generated an exceptional amount of media attention with its most prominent representative, the cryptocurrency Bitcoin, which is based on blockchain technology (Önder & Treiblmaier, 2018). The media emphasise the potential applications of blockchain technology for the tourism industry, as this brand-new technology is associated with many outstanding advantages for the hospitality industry (medium, 2017). However, although blockchain is predicted to be a heavy influencer in various industries, such as the banking sector, it is still not clear how much blockchain will disrupt the travel and hospitality industry (Langford & Weissenberg, 2018).

Defined research questions:

*RQ 1: How can blockchain technology enforce brand loyalty?*

*RQ2: Which impact does blockchain technology have on the transactions taking place within businesses?*

*RQ 3: How can blockchain technology be utilised to increase customer centricity within the tourism and hospitality industry?*

*RQ4: Which influence will the cryptocurrency Bitcoin have on the future operations of tourism and hospitality entities?*

*RQ5: Which impact do transaction fees have on the willingness of guests to proceed with the transaction?*

## 2 LITERATURE REVIEW

Industries and business environments are changing, and this change is shaped by the development of new and advanced technologies at an increasingly fast pace. Consequently, technological changes and advancements like blockchain technology are predicted to revolutionise industries and change economic sectors, which leads to a global transformation, decisively influenced by digital technologies (Iansiti & Lakhani, 2017). Accordingly, various technological advancements are taking place and are gaining significantly in importance. Among the most prominent representatives of the technological revolution are the Internet of Things, artificial intelligence (AI), the 5G mobile network, and blockchain technology (Filimonau & Naumova, 2019). Industries and fields of business have been disrupted and influenced by the technological change (Filimonau & Naumova, 2019). However, there are industries which are particularly fast in adopting changes, such as the finance and banking industry, whereas other industries, such as tourism, are considered late adopters (Nam et al., 2019). According to Manski (2017), a need for faster adaptation has been identified to be able to work with this technology for future operations. Especially since it is commonly agreed that technological advancements, specifically blockchain technology, are capable of delivering new possibilities to the industry which have not been discovered so far (Sachchidanand & Nirmala, 2016). Among the industries which have already attempted to adopt and work with blockchain technology, finance can be seen as the industry which has the farthest-reaching adaptations within the field of blockchain applications (Filimonau & Naumova, 2019).

However, not only the finance industry has specific characteristics which were the basis for deciding to implement blockchain technology. In order to adopt to this technology, there is the need for a pre-existing technological foundation within the company or industry. Moreover, other industries, such as manufacturing, are in possession of such technological frameworks and successfully work with them (Nam et al., 2019). Particularly in the service industry, a pattern of increasing digitalisation has been observed over the past decade. The tourism and hospitality industry, as an industry segment shaped by services, has been transformed by the technological

revolution, and the entire industry had to change and adapt to technological advancements (Buhalis & O'Connor, 2005). Therefore, technology and its application have become crucial to everyday operations within the tourism industry, on both the supply side and the demand side. Consumers are used to technologies, such as booking tables at restaurants or hotel rooms online, checking-in and out via smartphones or tablets, and the possibilities which are provided. Especially the convenience and the speed of interactions can be pointed out. On the other side, technology is especially crucial for back-office operations of the industry, where technological applications simplify and accelerate interactions (Stankov et al., 2019). Consequently, the importance of technology generally, and for the tourism industry specifically, increased significantly, especially as an intermediary between the customer and the tourism enterprises. Therefore, it is essential to understand the role of technology and recognise its importance (Gretzel et al., 2015).

For the tourism industry, two distinct approaches are recognised by experts. First, there is smart hospitality, which refers to a smart and interconnected hospitality industry. In this concept, technology simplifies the exchange of data, which allows internal systems as well as business partner systems to interconnect and accelerate their exchange operations. This model exists in various expansion stages, beginning with low technological implementations and interactions and ending with the full integration of applications while using big data and AI to support and strengthen hospitality decisions and increase the competitiveness and accuracy of individual hospitality enterprises (Buhalis & Leung, 2018). In contrast, the concept of smart tourism has also generated considerable attention throughout the past years. According to Gretzel et al. (2015), the phenomenon of smart tourism is a concept which has developed over the past years and describes the increasing trust of tourism regions and destinations in new and developing forms of information technologies. This trust enables tourism regions to collect information and data to be stored and utilised. As this trend has only started recently, and the increasing development of new technologies such as big data, sensor technology or positioning technology needs to be adopted within the tourism regions to be utilised properly. Only when regions are able

to successfully work with new technologies and constantly adapt to trends, can competitiveness and continuity be guaranteed (Gretzel et al., 2015).

Despite the global increase in the application of different technologies to simplify day-to-day activities, the tourism and hospitality industry was not willing to adopt the newest developments. However, the tourism and hospitality industry would be an area predicted to benefit from recent technological developments (Filimonau & Naumova, 2019). There are various sectors within the tourism and hospitality industry which are considered potential areas in which blockchain technology could especially be utilised as an advantage for the industry. For instance, areas such as digital currencies, redefined trade models or tailored product distribution are commonly seen as areas where the utilisation of blockchain technology could be of use for the industry (Treiblmaier, 2019).

So far, the potential of blockchain specifically in the context of the tourism and hospitality industry has not been fully explored (Filimonau & Naumova, 2019). This thesis attempts to analyse the potential which blockchain technology could have in relation to the tourism industry in Vienna. It outlines the status quo and what industry experts believe about future application scenarios and potentials of blockchain technology within the tourism and hospitality industry in Vienna. Before the deep dive into the topic, a common understanding of blockchain technology and its potential will be established. It must be understood how this technology functions and consequently, where it could be utilised within the tourism industry. Furthermore, the risks and fears associated with this new technology and its potential downsides are examined to generate an understanding of why this technology is rarely deployed in the tourism and hospitality industry, especially in Vienna, Austria.



## 2.1 Fundamentals of blockchain technology

Although blockchain technology only recently emerged as a buzzword with respect to technological advancements, the introduction of the technology is not as new as it may seem. The first attempt to introduce blockchain technology dates back to 2008, when Nakamoto (2008) developed the idea of peer-to-peer networks to transfer value. This system was created to introduce a peer-to-peer cryptographic system which can be utilised in various ways and implemented in distinct fields of business (Nakamoto, 2008). The technology became especially well known through the introduction of the cryptocurrency Bitcoin, which still is the most prominent representative of blockchain technology (Kwok & Koh, 2019). Two major advantages of blockchain technology include trust and security, which can be highlighted. These attributes are considered the most distinct advantages of blockchain technology (Filimonau & Naumova, 2019). Trust and security have also contributed significantly to the success of blockchain technology, as they enable peers to interact with one another without the need for an intermediary. However, to foster trust, all transactions within a network need to be verified to be correct and valid beyond doubt. The trust that the transactions are legitimate is the foundation on which the success of blockchain technology is built (Kwok & Koh, 2019).

Fundamentally, blockchain technology is set up as a peer-to-peer cryptographic network which is dependent on distributed ledgers. This refers to a process where all transactions and the respective information is stored and distributed across different data storages and participants within the network (Kwok & Koh, 2019; Polukhina et al., 2019). This system is based on different networks combined in one mutual chain, where the aim is to store data which enables the authorisation of transactions (Filimonau & Naumova, 2019). Any additional information added to this chain represents one block, which can only be added after all nodes within this network have verified the new information (Goldman & Sachs, 2017; Stevens, 2018). In a simplified way, blockchain technology can be defined as a digital platform where all transactions are confirmed and saved among all users of the network. Therefore, it functions as a

dispensed database based on cryptographic mechanisms so as to store the data and information which, once it is saved, cannot be changed anymore (Varelas et al., 2019).

In public blockchains, everyone is allowed and able to add additional data and create information within the blockchain; however, a block will only be created and attached to the chain when the information is verified by other users within the network. Consequently, unity within the network is essential to legitimise any transaction (Varelas et al., 2019). “This is unique, as the consensus protocol obviates the need for having a trusted central party, such as a bank, government or a business intermediary, whose purpose is to authorise, validate and, therefore, control each transaction made within the network” (Filimonau & Naumova, 2019, p. 2). Therefore, blockchain technology is able to work without an intermediary who verifies transactions, since the power to validate transactions and information is distributed among peers within the network (Efanov & Roschin, 2018). In this context, “peer to peer” refers to the equality among participating nodes within the network; each and every node has the same responsibilities, obligations and rights, which means that there is no need for a single party to function as the “middleman” in order to guarantee that the information is legitimate. The information about everything taking place within the network is recorded through the blockchain and publicly available, resulting in the validation through the network. Through the transparency and the legitimation provided by the network, there is no need for a middleman who must be trusted to legitimate the transactions; the network occupies this part (Varelas et al., 2019). This is also one of the characteristics that differentiates blockchain technology from any conventional systems, in which the need for the verifying middleman determines daily routines. This distribution of power and the verifying mechanism through the users further increases the overall security and trustworthiness of blockchain technology (Kasireddy , 2018). This decentralisation strengthens the trustworthiness of blockchain technology, since the system is more transparent and accountable (Filimonau & Naumova, 2019).

Once the information is included in the chain with a newly generated and verified block, there is no possibility to make alterations to the block or to entirely remove it. (Varelas et al., 2019). However, according to Varelas et al. (2019, p. 886), there is one way to rectify a mistaken transaction “by returning it to the payee to re-execute it

correctly". The irreversibility of information and data once it is verified and added to the chain in form of a block is another key feature which differentiates blockchain technology (Varelas et al., 2019).

Every single information concerning transactions and data is saved within one block after the verification process. The block itself is then cryptographically joined with the preceding block. Single blocks attached to each other constitute the chain (Varelas et al., 2019).

Correspondingly, blockchain technology can be defined as

*"a distributed database of records, or as a public ledger of all transactions that have been executed and shared among the participants. Each transaction in the public ledger is verified by consensus of a majority of the participants within the system. Once entered, information can never be erased"* (Crosby et al., 2016, p. 7).

The distributed database, or ledger, can be seen as the foundation of blockchain technology, since it authorises each participant within the system to possess one exact replica of the data on their individual device via peer-to-peer connection (Filimonau & Naumova, 2019).

The technical functionality of blockchain is based on an algorithm which is able to assemble, sort and systematise data. Through the power of cryptography, this sorted data is subsequently arranged in blocks and chained together (Goldman & Sachs, 2017). Each block is uniquely identified with a header, where information concerning time stamp, ID, hash code and a version of the client is recorded. Once any transaction is time-stamped and hashed, it is recorded in a new block, which is then validated (Filimonau & Naumova, 2019). When the block is added to the chain, all users of this blockchain are able to look at the entire list of transactions, which are recorded in every single block (Dhillon et al., 2017). Each block can only be added to the chain through the process of "mining", where miners have the responsibility to link, preserve, and manage the network. The miners are compensated for their work with applicable cryptocurrencies (Dhillon et al., 2017).

The unique cryptographic hash and the timestamp in each block are among the main reasons for the secureness of blockchain technology. To increase security within blockchain technology and its applications, two different keys are used—one to encrypt the transaction and the other to decrypt it (Fisher, 2019 ; Lord, 2019). The systematic usage of cryptography increases trustworthiness by promoting the irreversibility of transaction and information entries, whereas this trustworthiness is among the key characteristics of blockchain technology. Consequently, cryptography enables trustworthiness by applying two-way encryption to render access to information, making it impossible for unauthorised users to access content. Therefore, to infiltrate blockchain technology, at least 50 percent of the computers within the network must be hacked to gain access (Kshetri, 2017). By complicating it to imitate transactions which have already been recorded within the network, the possibility of double spending is eliminated (Kshetri, 2017).

Consequently, blockchain technology can also be referred to as a distributed ledger technology; it allows for the distribution of data and information, since the database on which blockchain technology is based is not stored at a single point, such as a website or local server, but rather on every participating node within the network (Varelas et al., 2019). This feature can best be described as decentralisation, implying that the blockchain network is allocated among every node of the respective network. The information which is put on the network is simultaneously stored on every node of the network. Therefore, the system is so far considered “unhackable”, since a hacker would have to change or rewrite the stored data simultaneously on all devices utilised within the network (Varelas et al., 2019). This is considered the most significant difference of blockchain technology as compared to conventional technologies with respect to security.

### **2.1.1 Blockchain 2.0**

#### **2.1.1.1 Smart contracts**

Smart contracts are a vital element of blockchain technology (Shermin, 2017). This invention was integrated only recently into blockchain technology, many years after the invention of blockchain technology, on the Ethereum platform (Varelas et al.,

2019). Through smart contracts in a peer-to-peer network, parties are enabled to create and execute their individual agreements without an external authority permitting agreements. Through the automation of executing the agreements, the management of often complex transactions becomes accelerative and more convenient (Prybila et al., 2017).

In other words, smart contracts can be described as agreements which have been transformed into digital code in order to be executed fully automatically. Consequently, they have the potential to automatically enforce and justify all regulatory conditions of a contract. In this case, the terms of the contracts are entered in the form of digital commands and performed through blockchain technology. When all terms of the agreed contract are realised, the contract is enforced automatically, without the need for intermediaries. However, the execution of such smart contracts needs an open-source platform which enables these processes, such as the Ethereum platform (Varelas et al., 2019).

Smart contracts are based on and carried out through blockchain technology. Therefore, once the information is on the blockchain, it cannot be manipulated or changed. Additionally, every contract is recorded and stored on the distributed database. Smart contracts are entirely deterministic, which minimises the risk of controversy once the contract is executed. However, since the terms of the contract can be agreed on beforehand, there are various possibilities to incorporate mechanisms and terms for a resolution (Varelas et al., 2019).

The future development of the blockchain is predicted to be shaped by the evolution of smart contracts. This technology could become significantly important due to its ease of use, consequently influencing and shaping countless economic sectors on a global scale (Efanov & Roschin, 2018). Additionally, the importance and the fields of application of smart contracts are predicted to further expand. For instance, in utilising smart contracts for automated payroll of employees or to automate problematic securitisations, all without the need of a middle party to verify the processes and transactions. Furthermore, smart contracts have the capability to take the place of banks when it comes to escrows within asset transfer contracts (Varelas et al., 2019).

### **2.1.1.2 The Ethereum platform**

The Ethereum platform was first designed and established in 2014 as an open-source platform based on blockchain technology. It was created as a platform which enables the execution of decentralised applications (Varelas et al., 2019). Consequently, the Ethereum platform was fundamentally created as a decentralised trading platform for cryptocurrencies, but also to trade value (de Caria, 2017). This platform is the enabler for smart contracts and is also closely linked to them technologically, since the Ethereum platform also works with smart contracts. This offers an immense advantage compared to the Bitcoin system traditional blockchain technology, since applications are enabled to function and work precisely as programmed without the possibility of any interference. Consequently, fraud, editorial control or third-party interference can be eliminated (de Caria, 2017). Fundamentally, this platform enables people to automatically set up and execute contracts and affairs, once the predefined terms have been fulfilled (Wright & De Filippi, 2015). At its core, the Ethereum platform functions through blockchain technology. Therefore, blocks are created, but the system is enhanced by the function to register and schedule commands to the blocks. This is vital for the functionality of smart contracts (Varelas et al., 2019). Additionally, the Ethereum platform has established a separate cryptocurrency, named Ether, which is widely accepted in fields of financial services, crowdfunding or governance (Varelas et al., 2019).

### **2.1.2 Five key characteristics**

To summarise, blockchain technology can be characterised by five key attributes. First is the distributed database, which enables the transparency of the blockchain. Everyone is able to gain access to the entire database of the blockchain, including the total history. There is no single participant or group that has control over the network or information. Furthermore, every entry will be verified directly through the participating parties, without an intermediary (Iansiti & Lakhani, 2017).

Second, transmission occurs peer to peer whereby all communications and information interactions are handled directly between the participating groups, instead of a central entity. Here, every node functions as an entity which is responsible

for, transferring information among the network as well as saving and storing it (Iansiti & Lakhani, 2017).

Third, transparency is one key factor of blockchain technology while still taking into account the anonymity of the participants within the network. Hence, each transaction and its specific value is transparent and visible to every participant within the system. However, the nodes within the blockchain can only be identified by their individual identification, which is a unique alphanumeric address. Within the system, the transactions are processed among the blockchain addresses, where users are able to decide to maintain their anonymity or give proof of their real identity (Iansiti & Lakhani, 2017)

Fourth, to guarantee the irreversibility of records, several algorithms and security mechanisms are established to ensure that the records which have been put on the blockchain database are permanent, sequentially ordered and available to the entire network once the information is stored there. Once the information is recorded on the blockchain system and the database is updated, the information cannot be modified anymore. Due to up-chaining within the blockchain network, new and additional information is linked to every previous data entry (Iansiti & Lakhani, 2017).

Last, the computational logic refers to the entire data history of the ledger, which implies that the transactions are programmed and depended on a computational logic. Consequently, users are able to create algorithms and guidelines which automatically cause transactions among nodes (Iansiti & Lakhani, 2017).

To conclude, blockchain technology has the potential to revolutionise various industries on a global scale, especially by guaranteeing safer and more transparent exchanges of information and transactions. Further, the technology can eliminate the need for trusted third parties or middlemen, who are in control of information flows and enable transactions. The reduction of interference of third parties will consequently reduce the complexity of systems and mitigate costs accordingly (Filimonau & Naumova, 2019).

## **2.2 Overview of blockchain applications**

As discussed earlier, blockchain technology was originally created to enable peer-to-peer payments, especially web-based micropayments. However, since the invention of blockchain technology in 2008, the scope of the application has expanded drastically (Heilman et al., 2016). The main reason for the enlargement of the fields of application of blockchain technology is the fact that the technology enables its users to exchange not only the rights of digital money but basically the possession rights of anything where existence can be verified can also be exchanged. The only necessity is that the possession rights can be converted into a digital medium (Filimonau & Naumova, 2019). This underlying technological setup facilitates the usability of blockchain technology in various fields of application (Nam et al., 2019).

### **2.2.1 Smart home and building**

Due to the current pressure to develop a more sustainable economy, blockchain technology is already being utilised to approach these concerns. For instance, the development of smart homes and smart building concepts based on blockchain technology, are able to reduce energy consumption. Consequently, reducing the energy used is both beneficial for the environment and reduces costs for landlords, which ultimately enhances socio-economic and environmental sustainability. This transition towards a more cautious processing of resources can improve the overall competitiveness and eco-friendliness of the entire construction industry (Park et al., 2018). Further, blockchain technology is able to foster economic growth and development while considering the ecological movement and sustainable development. This could lead to an overall improvement of land use, water consumption and pollution of soil and air. Thus mitigating the continuous development of climate change (Bergendahl et al., 2018).

Furthermore, blockchain can be used to enhance the deployment of non-human actors, based on AI, to automatically manage ecosystems. This can lead to more detailed, accurate and objective assessments of ecosystem services, because a self-interested or influenceable third party can be displaced by technology (Seidler et al.,



2016). Finally, blockchain technology can be utilised to precisely and independently track and record carbon emissions. An objective recording of emissions for distinct industries and countries could lead to an increased understanding of carbon emissions, which could foster the development of mechanisms to manage and reduce emissions substantially on a global scale in long term (Walker, 2017).

### **2.2.2 Financial markets**

In recent years, the finance and investment markets have been disrupted in their conventional operations and were forced to digitalise and change in order to remain competitive (Nam et al., 2019). Blockchain technology seems to be mainly associated with cryptocurrencies, and their exchange, with respect to financial services. However, the technology is not limited to the financial sector (Cocco et al., 2017). Blockchain technology can be especially useful when it comes to safety and security because of its technological setup, as characterised earlier. Therefore, within the financial and banking industry, the application and utilisation of blockchain technology to increase internal security and resistance against cyberattacks is widely accepted and predicted to further accelerate (Voshmgir, 2019). Furthermore, applications based on blockchain technology can be found which track and validate transactions and payments. This helps banks to reduce the number of international payments which are turned down due to errors and complications, as opposed to traditional methods where transactions can be rejected after days due to wrong addresses, multiple account numbers or typographical errors. With newly integrated blockchain applications, transactions are instantly verified when account details are correct and valid (Simms, 2019).

### **2.2.3 Government applications**

Among the fields of application, for governmental purposes seem to be most promising. It seems that the blockchain can be helpful when it comes to elections or official votes (Marsal-Llacuna, 2018); due to its ease of use, participation in official events can be accelerated. Credibility as well as authenticity of official elections and votes can be strengthened through the transparency and secureness of blockchain technology (Filimonau & Naumova, 2019). In addition, blockchain technology is not

only able to increase the privacy of online users but also the verify validity regarding the identity of the users, which could be specifically relevant for the development of national electronic voting systems (Kshetri & Voas, 2018). Furthermore, the technology can be applied to eliminate breaches in regulations and the interference of institutional parties, which can be especially helpful in prohibiting fraud and corruption in developing countries (Kshetri & Voas, 2018). The general quality of public services could be significantly enhanced through the application of blockchain technology, such as possible integrations within nationwide health care systems. Additionally, integration into governmental service centres fosters digitalisation and atomises routinised processes. Further it can simplify interactions of individuals with the government and public services and increase the secureness when it comes to the verification of identifying documents, such as passports, or driving licences (Hoy, 2017 ; Ølnes et al., 2017). Blockchain technology can foster steadfastness when it comes to cybersecurity mechanisms within the governmental and public sector; especially systems which are vital to the strategic importance and national security of countries and their infrastructure are popular targets for cyberattacks (Kshetri, 2017).

#### **2.2.4 Marketing and advertising**

Blockchain technology is already used within the marketing and advertising environment in various forms. For instance, through the verification mechanism, marketers can be certain that a real person has seen an ad within the contractually bound timeframe, or they can verify the ad's performance (Berkowitz, 2017). Likewise, blockchain can prevent click fraud, in which automated systems simulate users' clicks on online advertisement. This phenomenon harms the credibility of the marketing industry. The employment of blockchain-based solutions can mitigate the impact of click fraud through the creation of a more transparent and trustworthy environment (Rejeb et al., 2020). Furthermore, the use of blockchain provides customers with transparent insight into how personal data is treated and how it is utilised within the advertising environment (Berkowitz, 2017).

Blockchain can also positively impact marketing in terms of automation. When marketing is integrated with technology, it is also known as "Mar-tech", it can improve

the way that firms communicate and engage with their customers through the utilisation of technology, and in this case, blockchain (Rejeb et al., 2020). Similar to other industries, the utilisation of blockchain in eliminating or reducing the influence of centralised third parties can also be a relevant application of the technology in marketing. For example, in controlling transactions, such as bookings or monetary transactions, there is a use case for blockchain. Marketing executives must recognize and understand the capabilities of blockchain technology (Rejeb et al., 2020). Rejeb et al. (2020) categorize the capabilities of blockchain into distinct target fields.

Blockchain has great potential to disrupt the marketing industry via enhancing the relationship between customers and companies through the utilisation of data and information transparency, which ultimately improves security and privacy. The technology also supports transparency, security, and privacy through the creation of “immutable and shared data records, blockchain technology can also help to improve quality and facilitate data access” (Rejeb et al., 2020, p. 4). Therefore, using blockchain could change the entire industry and its working model.

The second use of blockchain is focused on fostering disintermediation. This sector concentrates on the possibilities of blockchain technology in reducing dependency on intermediaries within the industry. Blockchain has the capabilities to connect customers and businesses directly, thus, reducing the influence of intermediaries. These intermediaries also influence the marketing industry where brands are not able to make their individual dissemination decisions, which blocks innovation and limits the ability to acquire new projects and offers. Blockchain could enable brands to connect directly with their customers and foster a strong relationship while bypassing intermediaries (Rejeb, et al., 2020).

The final use case for blockchain is the reinforcement of trust and transparency, which can be viewed as a major advantage of the implementation of blockchain technology in different segments or industries. In this context, through the application of blockchain-based solutions, customers, as well as brands, are enabled to operate in more transparent and secure environments. Blockchain technology enables transparency, consistency of information and consequently assists in re-establishing

trust in the system itself. Given this background, “blockchain-enabled trust is both an antecedent and an outcome of consumer-centric transparency, especially when consumers share their personal information and interests” (Reje, et al., 2020, p. 7). Ultimately through the utilisation of blockchain within the context of trust and transparency, customers should have better visibility and the chance to verify claims and promises made by brands (Rejeb, et al., 2020). Blockchain would not only strengthen trust and transparency but also improve security within digital marketing. The introduction of online marketing information security concerns represents barriers to the progress of the marketing industry. Through the application of blockchain, customers and brand would be able to ensure a certain level of security. Through the distributed and decentralised storage of data, blockchain is a tool that is resistant to security breaches. Moreover, blockchain enables the efficient synchronisation of information to allow for better integration of marketing-related information across members within the same network (Rejeb, et al., 2020).

### **2.2.5 Supply chain**

Another major application field can be seen in the utilisation of blockchain technology within the supply chain. Here, blockchain technology can restore trust in the supply chain by guaranteeing transparency right from the start—from the point when the primary products are grown and harvested to the final product at the end of the supply chain (Kshetri, 2017). In this context, blockchain technology is used to create transparency and trust, which leads to the elimination of the middleman who regularly verifies the steps within the supply chain. Ultimately, this can lead to the empowerment of stakeholders within the supply chain, such as local farmers or the end consumer (Lucas, 2018). This is a great asset, since with the newly developed application possibilities of blockchain technology, trust in the supply chain can be re-established, and the origins and history of products cannot be questioned anymore. This fosters transparency and the products’ authenticity, which becomes significantly more important when products depend on certain certificates. Hence, blockchain technology can be utilised to comprehend the products from place of origin to place of consumption. Consequently, this verifies certificates automatically and entirely objectively (Lucas, 2018).

For these reasons, the premier capability of blockchain technology within the supply chain can be examined in the process of tracking and comprehending assets and products from the place of origin and its production facility to the end-user and the place of sale (Galvez et al., 2018). Within this process, when it comes to the supply chain, typically countless intermediaries are involved, overcomplicating the process which results in increased time and monetary costs, directly influencing both the consumer and the producer (Goldman & Sachs, 2017). Due to the increasing requirements set by the customer, the supply chain comes under pressure which creates the need for higher efficiency, adaptability and effectiveness. As currently these attributes; efficiency, adaptability and effectiveness; are characterised not to be fulfilled within supply chains due to the well-established and overcomplicated system with various intermediaries. Consequently, supply chains are dependent on future-oriented systems like blockchain technology, which are able to increase the transparency and adaptability of the supply chain and ultimately eliminate the middleman (Alicke et al., 2016). This would consequently lead to a faster, more agile and more transparent supply chain, which is more cost-effective and competitive for consumers as well as producers (Korpela et al., 2017). Additionally, the simplified supply chain becomes more accurate and efficient with respect to forecasting supply and demand, which can lead to a more reliable management of inventories and predictions of needed products and raw materials. This increases cost efficiency and amounts of money bound to inventory and resources (Kamble et al., 2019). Ultimately, the utilisation of blockchain technology within the supply chain management could foster more sustainable control over the supply chain and, consequently, supply and demand on a global scale (Filimonau & Naumova, 2019).

## 2.3 Application possibilities within the tourism field

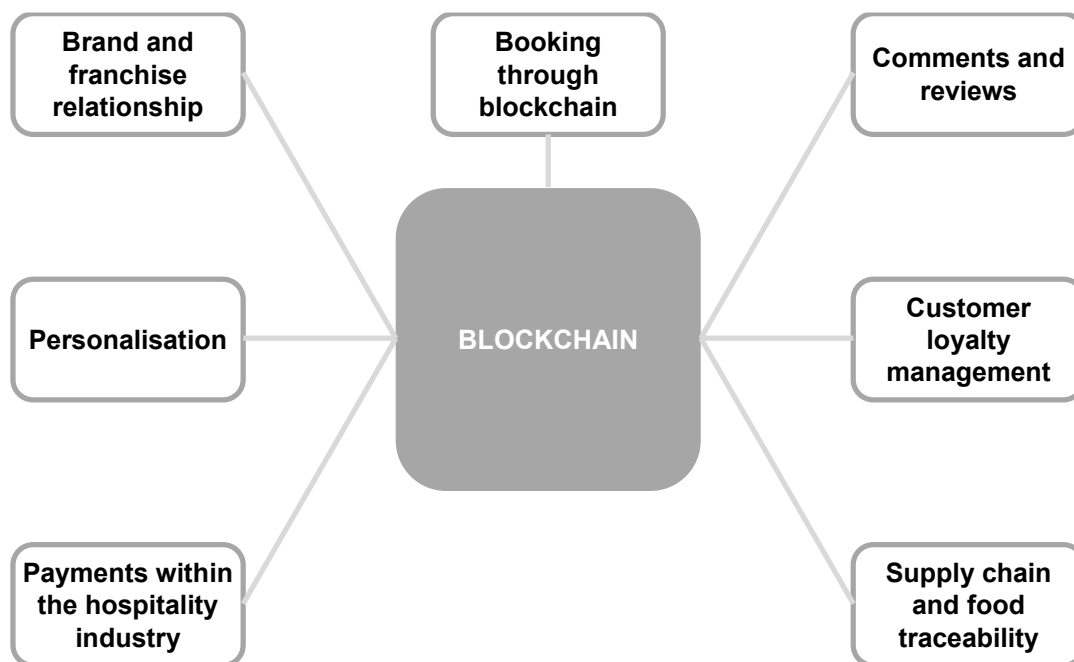


FIGURE 1 SUMMARY OF KEY BLOCKCHAIN APPLICATIONS TO ENHANCE TOURISM

In Figure 1, an overview of the upcoming seven fields of applications is visualised. Here the focus lies on the potential which applications related to the blockchain technology have. In contrast, Figure 2 focuses on the demonstration of the hospitality industry without a middleman. Figure 1 provides an overview of the seven fields of blockchain based applications, which have the potential to reshape the tourism industry substantially.

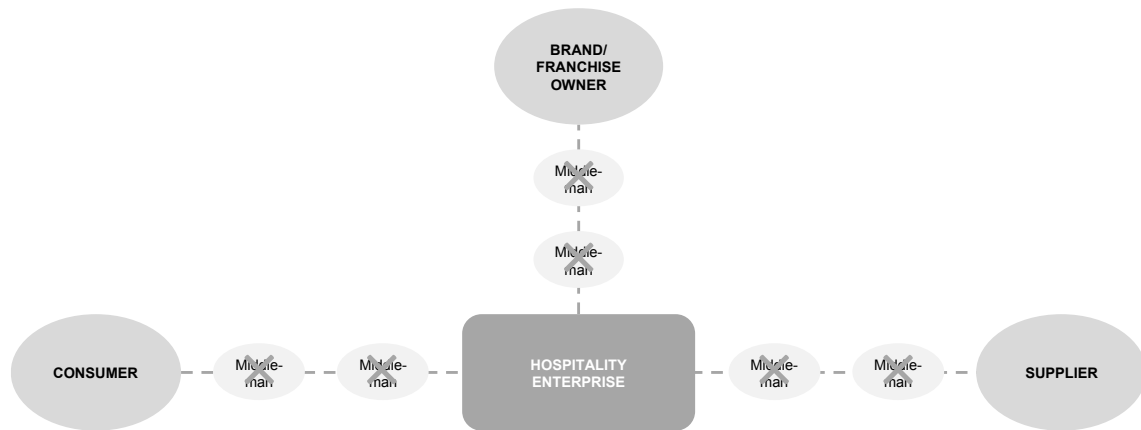


FIGURE 2 EXTRACT FROM: THE SCOPE FOR THE BCT APPLICATION IN HOSPITALITY OPERATIONS (FILIMONAU & NAUMOVA, 2019, P. 5)

Moreover, in Figure 2, three major application fields of blockchain technology within the tourism industry can be identified. In this matrix, three different target segments are analysed in which blockchain technology could either be utilised within the tourism industry or has already been partially established. As a first impression, one important field can be examined, which is the crossing out of any interferences by the middleman. This can apply to the consumer as well as supplier side within the tourism and hospitality industry (Filimonau & Naumova, 2019). Consequently, this topic is addressed in the current study, with a focus on the possibilities to book and search via blockchain technology. Furthermore, possibilities for brands and franchises through the utilisation of blockchain technology are addressed and closely observed.

### **2.3.1 Booking through blockchain**

There are various well-established possibilities to utilise blockchain technology within other industries, such as finance or banking, of which several have been identified that could potentially be applied within the tourism sector. Most prominent in this regard is the potential commonly seen in the disruption by blockchain technology to the travel industry and the booking behaviour of individuals (Calvaresi et al., 2019). Within the tourism industry, especially the booking and travelling field is under increasing pressure exerted by online travel agencies (OTAs), which serve within the booking process as the middlemen being responsible for the verification and proceeding of the bookings. On a global scale, OTAs account for approximately 70 percent of bookings processed online (Bhuller, 2018). The danger associated with OTAs can be characterised by their dominance in the booking market and consequently their increasingly monopolistic market position (Keane, 2018). OTAs are consequently in a privileged situation, as most travellers book through such channels. Therefore, OTAs are in the position to control and dominate the market, which leads to a significant increase in commissions charged to hotels for successfully procured bookings. These commissions can amount to 20 percent of room prices, which exerts increasing pressure on hotels (Blenkinsop, 2018). This situation not only harms the hospitality industry but also directly influences the customers, as hotels have to compensate their losses and fees and by increasing room prices (Poulter, 2015).

Blockchain technology has the potential to change the way bookings proceed and travellers behave. Where research places trust in the fact that the technology would be able to reduce costs for the middlemen and put OTAs under pressure. This scenario would create an environment where the power is returned to customers and hotels (Braun, 2018). Blockchain technology can solve the middleman issue by creating a decentralised system enabled by digital signatures, distributed consensus and integrated cryptographic hashes (Pilkington et al., 2018). Each transfer or booking contains details about the transaction, verification, key signing and data mining. Therefore, a middleman who verifies and processes bookings and transactions becomes redundant, since the entire blockchain network authorises and verifies the transaction (Pilkington et al., 2018). For these reasons, blockchain can represent a



technology within the tourism and hospitality industry, where information about transactions and bookings is constantly recorded and stored by each user within the network (Olson & Wessel, 2016 ; Braun, 2018). The underlying potential of blockchain technology for the travel industry can be summarized by the establishment of trust, enabling direct, more secure and cashless monetary transactions, in cutting costs and facilitating transparency, which would eliminate the need for any middleman (Poorigali, 2018). This leads to a more transparent and trustworthy environment, creating equality of power among providers and consumers of products and services (Calvaresi et al., 2019).

Ultimately, the tourism industry should be able to decrease the power of third parties such as OTAs and directly reconnect their business with the customers again through the utilisation of blockchain technology (Braun, 2018). The direct connection between the customer and the service provider, such as hotels, could be re-established and strengthened; currently, this connection is overcomplicated through the interference of OTAs (Mubeena & Jamsheer, 2018). Therefore, blockchain technology is associated with the capability of decreasing the market dominance of OTAs and to foster direct bookings thus connecting customers and hotels/service providers (pebbledesign, 2020). Ultimately, blockchain technology could change the way people behave during the booking process and how they search and pay for their next vacation. The overall goal for the implementation of blockchain technology within the travel industry can be seen as the reduction of the influence of third-party organisations and, consequently, a decrease in the commissions payable, which should strengthen the direct relationship of hotels/service providers to their customers (Braun, 2018). Although, it currently seems unimaginable that blockchain technology could put OTAs out of business, but OTAs may be forced to adapt and change their established way of doing business (Langford & Weissenberg, 2018).

Within this development, major booking sites would process all their actions through blockchain technology established within the booking environment. In the following, the most prominent four initiatives are examined and described in detail. First, the platform GOeureka aims to transfer the market power back to the customer and the

hotel. Consequently, hotels should be able to gain back their influence and power over the market (Bhuller, 2018).

Second, the platform Trippki is technologically based on the Ethereum platform, where a reward system for users is in place (Trippki, 2018). When booking through this site, customers receive tokens as a reward; because there is a strong belief that customers and hotels should enter into a relationship that is rewarded in a points system (pebbledesign, 2020 ; Trippki, 2018).

The third example is Travala, which can be considered more recent than GOeureka or Trippki. Travala also aims to create a platform which could challenge well-established booking platforms and enhance the competition in the market (Blenkinsop, 2018). Additionally, Travala intends to diversify the booking market, which is currently shaped by OTAs, through the creation of its peer-to-peer platform set up on blockchain technology (Keane, 2018).

Fourth, the platform LockTrip is a decentralised open-source booking system which enables the customer to process the entire booking process for hotel rooms as well as private accommodations. The platform serves as a connector, through which property owners and customers are enabled to directly interact with one another and process the transaction (LockTrip, 2020). In contrast to traditional OTAs, LockTrip does not charge any commissions or fees for booking through this platform, neither for the hotel nor for the customer. This can be seen as a unique characteristic contrasting OTAs, which charge significant fees (Tozzi, 2018). Similarly to its competitors, the platform aims to reduce the influence and power of OTAs. However, to reach this target, LockTrip not only utilises the peer-to-peer connection, set up on blockchain technology, but also executes smart contracts and advanced technology, which sets them apart from other platforms. Moreover, LockTrip can be characterised as established in the “booking-through-blockchain market”. The platform was invented in early 2017 and thus belongs to the early innovations within this field (LockTrip, 2020).

The abovementioned blockchain-based initiatives commonly focus on the establishment of booking platforms meant to reduce the dependency of hotels and the entire tourism industry on OTAs. The transfer of the booking process to blockchain

technology should challenge the intermediary (i.e., the OTA) and ultimately take away business from it (Filimonau & Naumova, 2019). However, these solutions represent, to some extent, intermediaries, only in a modernised approach set up on blockchain and priced via cryptocurrencies. Therefore, for the success and trustworthiness of such platforms, supporting and fostering transparency and commercial independence are vital (Filimonau & Naumova, 2019).

The concept of processing bookings through blockchain technology has become especially important for small island destinations, which are highly dependent on tourism. These islands are investing in the development of blockchain-based platforms which have the capability to directly link tourists with local tourism enterprises, such as hotels and restaurants, consequently both eliminating the threat of sharing economic value with other parties and fostering local economic benefits (Kwok & Koh, 2019). For instance, the small Caribbean island of Aruba develops a sustainable blockchain-based booking environment. This should help the destination to connect local hotels and restaurants directly with potential tourists, thus decreasing the economic value and revenue occupied by traditional online booking platforms and consequently supporting local tourism enterprises by eliminating or at least reducing the fees they are obliged to pay to third-party service providers. This blockchain-based solution is seen as an additional instrument to book and search, as the tourism authority is certain that they will not be able to eliminate OTAs entirely (Parsons, 2017).

Furthermore, not just the entire booking process can be shifted towards blockchain technology; as a start, parts and segments of the conventional process could be replaced by blockchain technology. However, the current process of booking hotels or flights is relatively untransparent, and customers have to spend hours searching for and comparing deals to find the best offer. Therefore, blockchain technology can be utilised to increase the transparency of this process (Varelas et al., 2019). Here, the technology can create single-market platforms that offer the best rate available, due to the integration of all major travel mediums.

At the same time, blockchain technology guarantees the avoidance of double bookings through the utilisation of smart contracts, which is of highest interest especially for

hotels. Once a room is booked in one hotel, there is no possibility of booking another room for the same period by the same person. This eliminates the problem of increasing short-term cancellation rates, as many customers currently book in different hotels for the same dates and cancel on short notice (Varelas et al., 2019). Additionally, the customer will be more transparently informed about current rates for hotel rooms. When price changes happen, customers have the opportunity to easily adapt to the current available rate. The price difference will be retransferred to the customer (Varelas et al., 2019).

Another advantage of blockchain technology within the booking process is the real-time confirmation of bookings. This represents an advantage both for customers and service providers such as hotels, since it not only reduces the time resources needed to deal with inquiries but also the complexity of the conversations needed to check and verify availabilities and prices. For customers, this simplifies the interaction with hotels, since once the preferred booking option is identified, the direct booking and confirmation is possible and customers have a guarantee that this room is booked at the best available rate (Varelas et al., 2019).

### **2.3.2 Comments and reviews**

The second field of possible applications for blockchain technology within the tourism industry is the detection of fake and unfair comments and reviews posted by consumers. Especially in today's highly technologised environment, customers increasingly tend to write reviews and post their experiences. This trend has a significant impact on the hospitality and tourism industry, as service providers are put under ever-increasing pressure (Sigala, 2017). Among these reviews, the number of fake and unfair consumer comments is increasing, an issue which is often not detected by potential new customers and therefore poses a threat to the industry. This issue becomes even more critical given the ever-increasing competitiveness within the industry. Whereas nowadays single entities are dependent on reviews fake and unfair reviews pose a real threat to the industry because they can have market-distorting effects (Calvaresi et al., 2019). Here, blockchain technology could represent a sustainable solution to the issue of fake and unfair consumer reviews. Blockchain

technology is able to protect hospitality businesses from unfair online reviews by utilising its infallible management of credentials and proof of individuals' real identity. Through the analysis of the reality and authenticity of individuals who write reviews, hospitality and tourism entities are able to separate real from fake reviews and react accordingly (Colombo & Baggio, 2017).

### **2.3.3 Customer loyalty management**

The third field within the tourism and hospitality industry where blockchain technology can potentially be utilised and challenge traditional operations is customer loyalty management (Kwok & Koh, 2019). Loyalty management has become increasingly important within the luxury travel segment (amadeus, 2017), and blockchain technology represents a mechanism that is able to align various loyalty management systems. This strengthens the possibility of transferring loyalty rewards not only within the tourism and hospitality sector, but also the entire industry and economic sectors (Filimonau & Naumova, 2019). According to Rejeb and Rejeb (2019), a company willing to transfer its loyalty systems to blockchain technology and consequently work with it "would certainly create a competitive edge over other competitors and increase the quality of its services and its ability to reach new potential customer segments" (Rejeb & Rejeb, 2019, p. 129). Therefore, hotels or airlines could create loyalty systems based on blockchain technology, where tokens are issued as rewards to the customers. Operating loyalty systems on blockchain technology increases authenticity, transparency, convertibility, identification and traceability within the industry (Rejeb & Rejeb, 2019). Among the first innovators within this field is Singapore Airlines, which has set up a blockchain-based loyalty system. Through this system, customers can collect miles via the booking of flights and transfer them instantly to utilise their points at programme partners such as retail or accommodation providers (Rejeb & Rejeb, 2019). As another example, the platform Loyyal operates through blockchain technology and enhances the interoperability of airlines' loyalty programmes by simplifying the transfer of reward points among airlines as well as partner hotels and rental companies (amadeus, 2017).

There are additional possibilities to utilise blockchain technology within the loyalty systems of companies. For instance, the firm Deskbell Chain is based on blockchain technology and fosters the familiarisation of clients with the surroundings of the hotel. Rewards are based on the co-creation process and on customers' willingness to be involved in the exchange and allocation of services and events. This idea is moved one step ahead by the travel blogging platform Triptalk, where customers receive loyalty points for contributing to the platform. However, these reward points are not bound to the platform. Customers are enabled to convert their loyalty points into cryptocurrencies or fiat money or to exchange, sell and buy the points within the network and its members (Rejeb & Rejeb, 2019).

Blockchain technology has the capability to reshape the entire system of how loyalty management is currently employed. It can change the way customers perceive loyalty systems, how they access their personal information and ultimately how they use their rewards. When blockchain technology is appropriately implemented within the environment of loyalty schemes, customers are able to strive for more privacy, transparency, autonomy and a higher degree of personalisation. From a business perspective, blockchain technology can inaugurate a more cost-efficient loyalty system which has the capability to foster data collection. This ultimately leads to more data being available, increasing the analytical effectiveness of individual travel businesses and thus the entire industry. The higher amount of data available increases efficiency and precision, which enables enterprises to customise more precise and tailor-made loyalty offers to their clients (Rejeb & Rejeb, 2019).

In essence, blockchain technology has the capability to entirely change current loyalty systems, which could enhance the attractiveness of brands and service providers. This ultimately increases the trustworthiness and fosters the bond between travellers and their destination (Rejeb & Rejeb, 2019).

#### **2.3.4 Supply chain and food traceability**

Another blockchain application field for the tourism industry is supply chain management and logistics management, specifically regarding the traceability of food. In a globalising environment in which food and basic ingredients for hotels and

restaurants are shipped from all over the world, transparency and traceability become increasingly important. Hence, this can be an application field for blockchain technology, since there is a need for a more transparent declaration of the supply chain and food traceability, which blockchain technology is capable of providing (Kshetri, 2017). At present, especially in developed countries, the origin of products and the guarantee of their quality by labels has become increasingly important to customers. This can be seen both from an environmental point of view, as individuals critically examine the trustworthiness of supply chains, and in terms of being able to guarantee certain standards with regard to health and allergen requirements. People increasingly scrutinise the ingredients of dishes, and hotel and restaurant entities need to prove the origin and trustworthiness of the products they employ (Filimonau & Naumova, 2019). When it comes to business procurement strategies the tourism and hospitality industry needs to adopt a more transparent, sustainable and traceable approach. This is especially important when it comes to food (Poorigali, 2018). In Western countries, food traceability and the verification of origin is important because of the changing mindset of individuals. In emerging hospitality countries and markets, verification is vital so as to avoid fraud. Here, the verification of food and its origin is crucial to eliminating both food fraud and crime based on pretended food origin and the manipulation of certificates. Hence, the implementation of blockchain technology within this market might at least reduce food fraud and guarantee the origin and authenticity of the food supply chain (Galvez et al., 2018). From a religious point of view, the authenticity and validity of ingredients needs to be verified so that individuals, that are only allowed to consume halal food can trust the products they are consuming. To be able to successfully target this specific food market, the tourism and hospitality industry needs to be able to provide a guarantee for the trustworthiness of the products (Battour & Ismail, 2016).

### **2.3.5 Payments within the hospitality industry**

Another important application field of blockchain technology which can also benefit the tourism industry is the utilisation of payment systems based on blockchain technology. Throughout other industries, this is the application most frequently in place; however, not in the hospitality and tourism industry (Heilman et al., 2016).

Blockchain technology can foster more transparency, safety and security with respect to payments within the tourism and hospitality industry. The technology has the capability to promote both monetary transactions in the hospitality industry and enable more secure cashless payments and transactions, which can be utilised for interactions with customers as well as with suppliers and intermediaries (amadeus, 2017). This is often referred to as processing transactions and payments through digital currencies. Nowadays, roughly 90 percent of all transactions are processed using digital money. Hence, digital money can be seen as the hypernym for all transactions processed through internet banking, mobile applications, online payments with credit card or giro transfers (Turkay et al., 2019).

Although transactions processed through blockchain, with cryptocurrencies, can also be allocated to digital currencies and represent a share within this category, cryptocurrencies are distinctively different from digital currencies: They are organised and controlled by enterprises, organisations and networks, whereas other currencies are controlled by states or countries (Turkay et al., 2019). Hence, no centralised institution and/or value-determining institution is behind cryptocurrencies and controlling its value (Heilman et al., 2016). Accordingly, the control mechanisms are decentralised, and there is no single entity that is able to take full control over the currencies (Turkay et al., 2019). Consequently, the value and price of cryptocurrencies is mainly determined by their demand (Heilman et al., 2016).

Accordingly, cryptocurrencies are based on blockchain technology and cryptography in their structure, whereas the payments need to be verified by the nodes within the network. Among the thousands of cryptocurrencies which have emerged over time, Bitcoin is still the most prominent representative of cryptocurrencies, and it is also among the few currencies which are actually in place for payments within the tourism and hospitality industry (Turkay et al., 2019). Even so, it is hard to find literature focusing on this topic. Consequently, the conclusion can be drawn that payment via cryptocurrencies is a field not yet widely established in the tourism industry. This conclusion is also supported by Leung and Dickinger (2017), who claim that it will take time for consumers to become familiar with and to frequently apply matters of crypto currencies. Especially in the tourism and hospitality industry, it is predicted to take



longer for both consumers and suppliers to develop a feeling of safety, security, transparency and adequate familiarity to utilise cryptocurrencies in a frequent manner (Leung & Dickinger, 2017).

### **2.3.6 Personalisation**

Through the utilisation of the data collected via processing operations such as booking or payments via blockchain technology, offers and packages can be better tailored to individual customers. This has become increasingly important to the tourism industry as a means of differentiation, since customers are seeking individual and personalised services and experiences (Kwok & Koh, 2019). Consequently, through the utilisation of blockchain technology, tourism and hospitality entities would be able to target their customers more specifically and offer individual experiences and packages. This is possible through access to the unique digital identity of every customer, which is stored on the distributed ledger system and enhanced through each and every transaction made by the customer. Consequently, through the utilisation of blockchain technology, tourism and hospitality enterprises are able to access this information and process it to create personalised and individual packages and experiences (Kwok & Koh, 2019).

### **2.3.7 Brand and franchise relationships**

Blockchain technology is also able to foster the relationship of hospitality businesses/enterprises with franchise or brand owners. First, blockchain technology can provide more accurate real-time data and information on business performance, in matters of operational data as well as customer satisfaction and the management of the entities' surroundings. This data is exchanged between the owner and the entities in a safer as well as faster and more transparent manner, which increases overall efficiency. The acceleration within the process leads to an enhancement of the decision-making process of the franchise owners as well as their respective entities, since the available data is trustworthy and can be processed and analysed faster due to the real-time transfer of data (Hospitality Technology , 2017). The speed of digital payments and transfers can also be accelerated; the accuracy in settlements and their safety and security against fraud can be increased (Filimonau & Naumova, 2019).

Moreover, through the implementation of blockchain technology, leakages of sensitive data can be prevented, and the protection against fraud can be increased. This has become increasingly important in modern times, in which the amount of continuously exchanged data is ever growing. The accuracy and trustworthiness of this data is vital for business decisions and performance. Consequently, the security of data transfers and the exchange of expert knowledge is vital for a successful continuance of the relationship between entities and franchise owners (Winder, 2019). This is essential to the tourism and hospitality industry, since, comparable to manufacturing industries, services and unique selling propositions are easy to copy or replicate (Filimonau & Naumova, 2019). Consequently, the security of data and information in the exchange process and thus the prevention of fraud is vital to the success and continuity of the brand as well as the single entity (Winder, 2019).

#### **2.4 Key concerns within the tourism and hospitality industry**

As discussed and examined previously, especially for the tourism industry, the adoption of blockchain technology seems to be difficult even though this technology potentially offers and promises numerous benefits as compared to conventional technologies. Only a few entities already work with blockchain technology within the tourism and hospitality industry (Nam et al., 2019). There are many reasons for this, specifically relating to characteristics of the tourism and hospitality industry. This industry is often characterised as a late adopter and as being conservative, risk adverse and often resistant to innovations and the application of such. Overall, the tourism and hospitality industry and the undertakings within this industry tend not to utilise innovative technologies before they are tested and well established in other industries. Consequently, the newness of this technology hinders its utilisation and represents the utmost threat to the commercial application of the blockchain on a broad scale within the tourism and hospitality industry (Wyers, 2019).

Especially, in the fast-changing environment currently shaped by development within the technological industry, entities within the tourism and hospitality industry need to adapt quickly. Otherwise, this can impact business operations, leading to worst-case scenarios such as the extinction of certain segments of the tourism and hospitality

market, which would be replaced by more developed solutions. For instance, the sharing economy and its applications pose a tremendous threat to the operations of the tourism and hospitality industry. The development of this technology has put pressure on the traditional tourism industry and forces the development of solutions and adoptions (Guttentag, 2015). However, it is predicted that the tourism and hospitality industry will face hard times in adopting blockchain technology, because both consumers and suppliers will need time to become familiar and work with the new system (Leung & Dickinger, 2017).

Consequently, in order to stay competitive and continue successful operations, companies must adapt fast to technological advancements (Buhalis & Leung, 2018). Executives within the tourism and hospitality industry need to see and understand the potential which comes along with blockchain technology. It is the responsibility of destination managers and policymakers to create an understanding and a common information foundation, investing in workshops and seminars to inform executives about the current developments and trends surrounding blockchain technology. By optimising this procedure, interested individuals will develop a better understanding and a higher information level; knowledge-sharing will be facilitated, which enhances business development and fosters innovation within the sector (Buhalis & Leung, 2018).

Although blockchain technology offers numerous benefits for the tourism and hospitality industry, there are still hurdles to be overcome before a wide-ranging application is feasible. Among the most frequently mentioned obstacles are regulatory implications which shape the further development of blockchain technology not only in the tourism sector but in every potential utilisation industry (Hackius & Petersen, 2017).

Furthermore, the infrastructure at hotels and restaurants poses an issue to the smooth implementation of blockchain technology. The technological unripeness of the supporting infrastructure, such as poor internet connection and speed, negatively influences the quality and possibilities of potential blockchain applications (Wyers, 2019). Moreover, the current technological infrastructure, such as booking software or

bookkeeping software, is operated and maintained by partners and suppliers unfamiliar with new and innovative technologies such as the blockchain. This hinders tourism and hospitality entities from changing anything in their current technological setup. As one change triggers a chain changes, leading to many currently in place systems which would be needed to be replaced due their incompatibility with the new blockchain technology. Consequently, high costs are associated with any changes to the system, and tourism and hospitality enterprises are often not willing or able to invest (Saber et al., 2019).

Another challenge for the wide-ranging adoption of blockchain technology within the tourism industry is its actual costs of operation and integration (Stein, 2018). Currently, operating blockchain-based applications such as Bitcoin is considered to be time consuming, to obtain the confirmation of validation. This is especially uncondusive in the tourism and hospitality industry because customers consume the service, and they typically want to process payments quickly and end the transaction. This is often not possible with cryptocurrencies because the transaction must be verified by the community. This is the safety and security mechanism of blockchain technology; the community is typically spread across the globe, and interactions take time (Stein, 2018). The delay creates costs for operators and consumers. Furthermore, transaction costs fluctuate and add up, often to a significant share of the amount payable. Consequently, the utilisation of cryptocurrencies is currently characterised as unprofitable, specifically for small and medium-sized businesses. This is especially applicable to the tourism and hospitality industry, since the majority of businesses are considered to be small or medium sized (Tuwiner , 2019).

Table 1 summarises the key issues which need to be overcome, including their drivers. This table represents an overview of the most challenging topics associated with blockchain technology within the tourism and hospitality industry. In this table issues are presented and drivers are examined.

TABLE 1 – OVERVIEW OF THE KEY ISSUES COMPILED FROM: (NAM ET AL., 2019 ; WYERS, 2019 ; GUTTENTAG, 2015 ; LEUNG & DICKINGER, 2017 ; BUHALIS & LEUNG, 2018 ; HACKIUS & PETERSEN, 2017 ; SABERI ET AL., 2019 ; STEIN, 2018 ; TUWINER, 2019)

| No | Issue   | Driver  |
|----|---|---|
| 1  | Characteristics of the tourism and hospitality industry | Late adopter and as being conservative, risk adverse and often resistant to innovations and the applications of such. Tourism and hospitality industry and the undertakings within this industry tend not to utilise innovative technologies before they are tested and well established in other industries. |
| 2  | Novelty of the blockchain technology                    | Hinders the utilisation and represents the utmost threat to the commercial application of the blockchain on a broad scale within the tourism and hospitality industry   |
| 3  | Fast-changing environment                               | The tourism and hospitality industry needs to adapt quickly, otherwise, this can impact business operations, leading to worst-case scenarios such as the extinction of certain segments   |
| 4  | Adoption issues   | Consumers and suppliers will need time to become familiar and work with the new system of the blockchain technology   |
| 5  | Understanding and information foundation                | There is the need to see and understand the potential which comes along with blockchain technology  |
| 6  | Regulatory implications                                 | Among the most frequently mentioned obstacles, not only in the tourism sector but in every potential utilisation industry   |
| 7  | Infrastructure at hotels and restaurants                | Technological unripeness of supporting infrastructure, such as poor internet connection and speed, booking software or bookkeeping software, negatively influences the quality and possibilities of potential blockchain applications   |
| 8  | High implementation costs                               | Systems, that are currently in place, would need to be replaced due their incompatibility with the new blockchain technology  |
| 9  | Costs of operation                                      | Operating blockchain-based applications such as Bitcoin is considered to be time consuming, to obtain the confirmation of validation<br><br>Furthermore, transaction costs fluctuate and add up, often to a significant share of the amount payable   |

### 3 METHODOLOGY

The following section outlines the methodological procedures used to examine the research question. Through the methodology section, the specific structure of the approach and techniques are clarified. Furthermore, the required information is identified and interpreted. According to Kallet (2004), the methodology section of a paper should serve as the basis to understand the data collection procedure and the subsequent analysis of the accumulated data.

For this master's thesis, a mixed-method approach seems most appropriate as the research design strategy for this topic. The main reason for this decision is that there is limited information available concerning blockchain and its impact on tourism in Vienna. Therefore, this is a relatively new topic to the industry and society in Vienna, Austria. Consequently, it is necessary to create as much information as possible by utilising different methods with different approaches. In this context, a sequential method is intended to utilise the information generated through the first strategy, identifying information patterns to cluster the second round.

In the sequential application of the mixed method, expert interviews are conducted at first. The focus lies on conducting interviews with individuals who already have experience with the application of blockchain technology in the tourism industry and are willing to share their experience. The term "experts" in this context refers to individuals who work with blockchain technology in the tourism and hospitality industry in Vienna on a daily basis. Alternatively, their firm's infrastructure may have incorporated the technology. The target group for this field of study seems to be limited, since there are only a fifteen tourism-related companies in Vienna, which already work with blockchain technology. Therefore, this segment of the population also represents the target population of this investigation. For the expert interviews, an interview guideline with 17 open-ended questions was designed (See Appendix 1). Open-ended questions were applied to avoid biases and so as not to influence the interviewees or direct them in any specific direction. The questions were designed to help the participants be as free with their answers as possible in order to generate the

greatest variety of information. Afterwards, this information was analysed based on patterns generated from the transcripts.

As the second part of the current study's research strategy, a text mining approach was chosen to accompany the qualitative analysis of the expert interviews: Patterns within the transcripts of the expert interviews were examined and analysed accordingly. This technique is utilised to uncover patterns hidden in the data set. Through this process, accompanying the pattern analysis, deeper insights into the expert statements but also knowledge about the connection among the observed items and its strength are generated. Furthermore, the most common keywords are examined and the connections among them highlighted. In utilising this technique, the most important terms within the data set are pointed out and their connections and thematic clusters are visualised.

The result is increased knowledge about how blockchain can serve the tourism industry in the identified problem areas. The purpose of utilising different approaches is to examine the topic from two different viewpoints. The combination of two research methods seems to be most suitable to generate a valuable outcome with sufficient insights into the utilisation possibilities of blockchain technology in the tourism industry. To understand the strategy applied in the current study, its different parts are elaborated upon in the upcoming section.

### **3.1 In-depth interviews**

The in-depth expert interviews are the foundation upon which the research and the analysis are built. Consequently, it is necessary to first elaborate on the interview method in order to understand their influence on the overall concept. Interviews are commonly defined as interactions, most often on a verbal basis, where one party aims to gather information from another party by asking questions. In this context, the two different parties refer to the interviewer as the first party and the interviewee as the second party (Longhurst, 2009).

According to Anozie (2018), interviews can be clustered into three distinct categories according to their structure, namely structured, semi-structured and unstructured

(Anozie, 2018). Structured interviews are planned beforehand; the interviewer controls the interview by utilising brief questions as well as control answers in terms of its length. Such structured interviews in qualitative in-depth interview sessions are considered to be highly intense, for both the interviewer and the interviewee, in terms of concentration and structuring procedures. On the opposite side, there are unstructured interviews. Although no interview can really be unstructured, the name is given due to the incoherence of the interview settings. According to Anozie (2018), unstructured interviews can be defined as open conversations between two parties, which are directed by the researcher and conducted in the interests of the researcher (Anozie, 2018). In terms of the framework and the interview guidelines, semi-structured interviews fall between structured and unstructured interviews. Semi-structured interviews are similar to structured interviews with regards to the setting, that is, a predefined framework is set in terms of questions; nonetheless, the interview framework is flexible, as the interviewer is able to allow the interview to be directed by the development of the interview and is not strictly bound to the present framework (Creswell, 2014).

According to Creswell (2014), interviews can be further distinguished according to the type of interview setting. Qualitative interviews can be clustered into four categories based on the interaction of interviewee and interviewer. First, there are face-to-face, one-on-one or in-person interviews, which are based on the direct interaction between the two interviewing parties. Second, there are telephone interviews, which are still based on the direct conversation between the interviewee and interviewer, but there is no direct interaction. Third are focus group interviews, in which the researcher interacts with a group of six to eight people and conducts interviews within this group of observed people. Finally, there is the option of disregarding direct interaction entirely by conducting interviews via email. Here, a predefined set of questions is transmitted to the interviewee, who fills out the interview questions. In this setting, no direct personal interaction is possible (Creswell, 2014).

For the current study, it was decided to conduct in-depth interviews primarily in a face-to-face setting. However, due to appointment conflicts on the interviewee's side, telephone interviews were also considered as a second option, since a direct



interaction between interviewee and interviewer was still possible. In-depth interviews as a method of data collection were chosen since the utilisation of in-depth interviews is described as the most common and valid method within qualitative research (Lewis & Richie, 2003). In the interviewing process of in-depth interviews, the researcher decided on a set of questions beforehand, which were given to the interview participants. Even though the set of questions were identical for every interview conducted, each interview followed its own direction, shaped by the participant (Brounéus, 2011; Guion et al., 2001; Creswell, 2014). Throughout the face-to-face interview process, the researcher was able to observe the respondent's behaviours and sense his or her thoughts and feelings concerning certain topics or questions. This is one main differentiator of a face-to-face setting, since only with this method is the researcher able to observe the interviewee while the interview is taking place. Consequently, the researcher is advised to take notes about the additional information which can be retrieved during the interview process (Boyce & Neale, 2006; Creswell, 2014).

Certain advantages and disadvantages are associated with in-depth interviews. An advantage is that the interviewer has the possibility of retrieving detailed information by asking directly for specific details. Furthermore, in-depth interviews are characterised as being more relaxing for participants than, for example, filling out a survey. Participants may provide more detailed information on certain topics because they feel comfortable, safe and it is more enjoyable to speak directly to a person instead of filling out surveys online (Boyce & Neale, 2006; Creswell, 2014). However, there are also negative aspects associated with the successful execution of in-depth interviews. Prior the interview, the researcher needs to be trained in order to successfully conduct in-depth interviews. It is necessary to apply tailored interview techniques to provide a framework in which the respondent feels comfortable and is consequently enabled to provide valuable information. Second, the researcher may not express any personal opinions or body language which could possibly influence the respondent. In-depth interviews are time-consuming to prepare, conduct, transcribe, analyse and report the results. Especially the pre- and post-processing is time-

consuming and needs to be executed precisely in order to retrieve valuable output (Creswell, 2014).

In-depth interviews are structured along a predefined set of open-ended questions. This implies that the questions should not result in a simple “yes” or “no” format, but rather in a comprehensive fashion. In order to obtain high-quality and extensive results, the questions should be designed through “why” or “how” approaches. Therefore, the interviewees should always be able to decide on the length and detail of their answers. If necessary, the interviewer may utilise follow-up questions as an instrument to increase the granularity of the content provided. Although the researcher should remain an active listener and not influence the interview progress, he or she controls the overall interview and decides accordingly when it is time to continue with the next question (Guion et al., 2001; Brounéus, 2011; Creswell, 2014).

When conducting in-depth interviews, the preparation beforehand plays a major role in determining the quality of the retrieved data. Guion et al. (2001) suggest seven steps in conducting in-depth interviews. First, there is thematising, whereby it is necessary to formulate the intention for conducting the interview. Furthermore, the researcher needs to decide on the information he or she aims to retrieve through the conducted in-depth interviews. The second step is referred to the designing phase, in which the researcher develops an interview guideline, which should enable access to the targeted information. This guideline should be framed around the key terms and issues, which are identified in the literature review. This structured framework allows the researcher to better control the interview and consequently have a guarantee of the achievement of the targeted information. Third, the real interview takes place; in this step, the information is sought through questions and retrieved from the interviewees. Here, the researcher is advised to first introduce the topic, providing the interviewee with the necessary foundation to better understand the targeted topic and its boundaries. However, once the interviewee understands the topic and the target, the researcher’s role is restricted to listening, observing and taking notes. The researcher is advised to audio record the interview so as to be able to analyse the provided data more precisely. Permission to record the interview needs to be obtained beforehand (Guion et al., 2001).

Upon conclusion of the interview, the fourth step can be initiated: transcribing the interviews. Here, the audio recording is transferred into a text document to enable the analysis of the collected data. In this step, the researcher should not only write down the audio transcript but also add the taken notes and observations. When the fourth step has been completed, step five can be initiated, in which the data is analysed, and themes and patterns are clustered. In the sixth step, the data is verified for its credibility. Finally, the retrieved information is reported; however, the data should not only be considered according to the results but also in terms of how these results influence the forthcoming work (Guion et al., 2001).

### **3.2 Data collection process**

The goal of this master thesis and thus the qualitative research is to generate an overview of the currently employed blockchain-based solutions within the tourism and hospitality industry in Vienna. Furthermore, to create an understanding of the utilised solutions, especially of why certain solutions are employed and others are not. Moreover, the identification of future perspectives on the possible applications of blockchain technology within the tourism and hospitality industry in Vienna. In-depth expert interviews seem to be the most appropriate in order to retrieve the targeted information. In the context of this master thesis, the term “experts” refers to individuals who work with blockchain technology in the tourism and hospitality industry in Vienna on a daily basis. As blockchain is a relatively new topic in the tourism and hospitality industry, especially in Austria, the scarcity of literature in both the media and trade magazines made access to the target population difficult. Thus, the target in Vienna was limited.

To identify hotels, restaurants or bars working with blockchain technology in Vienna, the website “coinmap.org” was utilised, on which businesses working with blockchain technology are listed and registered (coinmap, 2020). According to this website, 15 businesses related to the Viennese tourism and hospitality industry officially work with blockchain technology and consequently represent the target population of the current study. All 15 businesses were approached directly via e-mail to invite representatives for an in-depth expert interview. None of the businesses replied on

the first approach. Given the small target population, it was essential to get in touch with all of the businesses, since there was no possibility to replace any of them. It took four attempts via mail and three telephone calls to contact the six representatives of the ultimately interviewed businesses. These six experts were selected to be questioned in in-depth expert interview sessions. They represent one hotel, one bar and four restaurants located in Vienna, working with blockchain technology, as required. All experts are commonly responsible for the development and maintenance of blockchain technology and the utilised application in their respective businesses.

The interviews were conducted between May and June 2019, based on a predefined questionnaire that included 17 open-ended questions (See Appendix 1). The goal was to conduct the interviews in a face-to-face setting, to observe the experts properly and to generate detailed insights. This was applicable in four interviews; the remaining two in-depth interviews were conducted in a telephone setting due to appointment conflicts on the experts' side. Although the participants were commonly responsible for the development and handling of the blockchain technology within their respective businesses, their main responsibilities varied distinctly. The participants included experts in management positions such as three restaurant managers, one public relation executive. In two entities, the owner was responsible for the blockchain application. Demographics varied between participants, among the six questioned experts five were male and one was female. Furthermore, the age of the experts ranged between 35 and 50. The six questioned experts have in common that they are responsible for the development and handling of the blockchain technology within their respective businesses for more than three years.

All six interviews were conducted in English and audio recordings were made, which had been approved by the experts beforehand. The experts agreed to remain anonymous, meaning that their name or properties would not be mentioned, in order to safeguard their knowledge and prevent competitors from gaining any insight into a particular business. The interviews were transcribed word by word, including additional content noted while the interview was taking place. These transcripts were only corrected for spelling or grammar mistakes; no changes to content or wording were made, keeping the data as original as possible.

### 3.3 Analysis

For the analysis of the data, two distinct methods were applied in order to generate a deep understanding and to examine the collected data in as much detail as possible. First, all transcripts were analysed and structured according to identified patterns, as well as to the experts' opinions and overlaps in discussion themes. This analysis was processed manually, and patterns were clustered according to their individual connections and overlaps in content (See Appendix 2). The information was arranged according to a structure appropriate for the presentation of the data, but there is no interference or direction influenced by the researcher. The information is clustered and presented objectively, without any intervention (Annesley, 2010).

Second, the software VOSviewer was utilised to apply a text mining approach so as to retrieve more details and visualise connections within the data set (Eck & Waltman, 2020). The goal of a text mining approach is to highlight hidden patterns within the data set and to visualise the connections among the patterns—how they are linked and consequently what can be retrieved (Hotho et al., 2005). As a basis for this approach, the in-depth interviews and the transcripts were utilised. However, the data had to be prepared beforehand to properly fit this type of analysis. Therefore, the data was cleaned from any unnecessary layout adjustments and converted into a plain Unicode text file. Next, it was analysed with VOSviewer. With this software, hidden patterns within the data set were examined and clustered in sections according to their content. Within these blocks, the most frequent and most important themes were ranked and visualised through the magnitude of the theme bubble and its connection to other objects. Connections among the sections were examined and connectors emphasised. Through the utilisation of this text mining software, further topics could be examined and their relevance and the connections among them visualised and ranked according to their respective importance.

## 4 FINDINGS

### 4.1 Pattern analysis

In this section, the information retrieved from expert interviews is discussed and analysed according to the identified patterns. The information is arranged and presented coherently without any subjective interpretation by the author (Annesley, 2010). The information is clustered according to main patterns and overlaps in information that emerged. The transcripts were analysed and overlaps within the content highlighted. Afterwards, these overlaps were taken and clustered accordingly, in order to retrieve meaningful categories with sufficient insights and content. Several main categories are introduced, and the content is analysed accordingly. Ultimately, 12 clusters were set up.

TABLE 2 – OVERVIEW CLUSTERS COMPOSED FROM PATTERN ANALYSIS

| Number | Cluster                                      | Number | Cluster                               |
|--------|--|--------|---------------------------------------|
| 1      | Reasons for integrating blockchain solutions | 7      | Technology and its functionality      |
| 2      | Predefined goals                             | 8      | Government and regulations            |
| 3      | Implemented technologies                     | 9      | Expert responsibilities and positions |
| 4      | Transactions                                 | 10     | Positive aspects                      |
| 5      | Software and infrastructure provider         | 11     | Negative aspects                      |
| 6      | Customer centricity                          | 12     | Future guidelines                     |

#### **4.1.1 Reasons for integrating blockchain solutions**

Based on the interviews and the analysis of the most frequently used terms in the transcripts, publicity and marketing were most often referred to as reasons why the experts decided to deploy blockchain-related applications. The experts use blockchain and its applications predominantly to increase marketing and foster attention. For example, a board who decided to invest in blockchain-related solutions in order to increase awareness of both blockchain technology and their individual businesses among the targeted people interested in blockchain. The experts agreed that they can foster recognition and awareness within the blockchain community of their respective properties by advertising with blockchain logos and signs that they work with blockchain or accept a variety of cryptocurrencies. This becomes especially relevant when the properties can be found on websites on which individuals are able to search and find locations where they are able to pay with cryptocurrencies. The experts agreed that thus far, the utilisation as a marketing instrument was the predominant focus of any incorporation of blockchain technology within their respective businesses. As these individuals are typically characterised as rather young and technically versed, they could potentially be interesting for hotels and restaurants for years to come.

Furthermore, the experts expressed an interest not only in the awareness boost of their respective properties within the blockchain community but also in raising awareness of blockchain on a broad scale, especially in Vienna and the rest of Austria. The experts aim to be pioneers within this segment and make people aware of this technology specifically within the tourism and hospitality industry. They want to demonstrate that this technology exists and that they believe in the future and further application possibilities of this technology. The utilisation of this technology should create awareness among the regular patrons of each business, such that customers may become attracted to this technology and its possibilities.

The main reason hotels and restaurants decide to apply blockchain technology and its applications is to increase sales and boost revenue while reducing costs. Accordingly, the experts described one pattern which became important to them when considering the future of blockchain technology within their hotels and restaurants: This

technology is able to attract people who possess cryptocurrencies and want to pay with them. In Vienna, there are only 15 businesses within the tourism and hospitality industry which actually accept cryptocurrencies. Consequently, individuals who own cryptocurrencies and are curious about how to use them and how to pay are confronted by a small number of businesses that accept them. Accordingly, the experts observed a common pattern among these new guests. First, they came to the businesses solely because they wanted to test how the payment is processed and to experience the new payment method first-hand. They made a reservation at one of the properties to consume food or drinks. Subsequently, the customers paid their bill with their cryptocurrencies in order to experience how the process functions, which, according to the interviewed experts, was often for the first time.

All the experts agreed that many of these customers did not visit their businesses only once but actually became regular customers. Furthermore, these guests did not visit the restaurant solely due to the possibility of paying via cryptocurrencies but because they enjoyed the food, drinks or atmosphere. This customer behaviour results in the diversification of the customer segment and thus both an increase in business operations and the sustainable enlargement of the customer base. Consequently, individual businesses are able to create brand loyalty which started with the introduction of blockchain technology and customers' curiosity, subsequently, focusing on customers and providing a tailored solution for their specific needs.

The experts are certain that brand loyalty among customers is enhanced not only by offering the possibility of paying via blockchain technology but also by fostering transparency and traceability. They agreed on the importance of blockchain technology with regard to the increased traceability and transparency of products, especially of primary products within the preparation process of food. In today's globalised environment, customers look carefully on the origin of primary products and their verification. This topic has increased in importance not only in supermarkets, but also within the tourism and hospitality industry. People want to know where the products originate, and they need proof of authenticity. This has become increasingly important for organic and highly priced products. The experts agreed that within the process of verification and providing traceability and transparency, blockchain could be



of tremendous help and, once recognised and utilised, foster customer loyalty. Through this technology and its verification process, customers are assured that products can be trusted. Accordingly, customers' trust in the business and its operations can be strengthened, which leads to increased loyalty.

Another reason for implementing blockchain solutions is to invest in cost-reducing technologies and measurements for not only internal and operational costs but also on transaction fees which arise for the customer. These fees accompany every transaction, similarly to transaction fees for credit cards. The difference is that fees for cryptocurrency transactions are typically significantly lower, but they are subject to greater fluctuations. Although the experts were certain that, when utilised appropriately, blockchain technology is capable of reducing costs for back-office activities within single properties or entire brands, so far there are no back-office systems appropriate for tourism and hospitality purposes. However, they agreed that, once single aspects of the business are processed using the blockchain technology, the full shift towards this technology will be easier.

A final common argument why the experts decided to invest in blockchain solutions and utilise them within their respective organisations was curiosity, personal interest and ambitions to follow or set trends. The experts agreed that they simply wanted to find out how the utilisation of this technology would influence their target market and affect day-to-day operations. Furthermore, they wished to invest in future-shaping technologies with the capacity to change the entire industry. The interviewed experts agreed that they aim to set new standards within the industry in Austria and be pioneers, trendsetters and innovators.

#### **4.1.2 Predefined goals**

Before considering which blockchain-based technology to implement, the experts needed to think about why they should implement any blockchain-based technology at all. Accordingly, they thought about goals for investing in this technology, as, from an economic viewpoint, it is essential to define targets in order to determine which additional services could potentially contribute to the success of the business. Furthermore, targets needed to be defined in order to understand which blockchain-

based technology would be capable of meeting the predefined needs. Therefore, approximately half of the interviewed experts defined goals in a manner that enabled them to measure the success or failure of the project. The most prominent goal specified was an increase in revenue and sales through the application of blockchain-based solutions. However, another frequently mentioned goal was the diversification of the respective businesses' current client portfolio.

The experts also defined more general targets, such as increasing the awareness of blockchain technology by enabling customers to pay with bitcoins and advertising this technology on the websites of their hotels, restaurants and bars via the display of the Bitcoin logo. Generally speaking, the goal was to increase the online traffic on their respective webpages through the utilisation of blockchain technology as a marketing instrument, which would lead to higher awareness of both the technology and the businesses themselves.

On the other hand, many of the experts claimed they did not set any predefined goals or targets to be accomplished through the implementation of blockchain technology. The experts explained that because no specific goals were set, no defined reasons for the implementation were predefined. Many of the experts mentioned that the implementation of the blockchain-based solution occurred as an attempt to follow trends and often, out of curiosity. They also claimed that the initial investment costs are relatively low if the solution is not bought from third parties but placed at their disposal. There was agreement on the attempt to follow trends, especially within the technological segment. Consequently, these experts' expectations were relatively low, which increased their satisfaction with the blockchain-based solution once the first customers already entered the restaurant, bar or hotel due to the possibility of paying with cryptocurrencies.

Although these experts have no way to measure the success or failure of the investment or the implemented solution, they claimed that the investment was worth it and that they were astounded by the development of the technology and its impact on the business. However, responses were different from the expert segment who defined targets beforehand. When asked about the failure or success of the

implementation of the blockchain-based solution, their response was identical. The questioned experts claimed that it is too early to evaluate the success or failure of their respective implemented applications. Nevertheless, each expert was highly satisfied with his or her current application and its contribution to the success of the business. Furthermore, most of the experts were already considering expanding their current offered portfolio and investing in further blockchain-based applications.

#### **4.1.3 Implemented technologies**

Blockchain-based solutions which enable payments were particularly popular among applications that are currently in place within the businesses where representatives were interviewed. The experts focused solely on those solutions which enable cryptocurrency payments, specifically, the acceptance of Bitcoin. The experts explained that despite the general unawareness of blockchain technology in society, most people are familiar with the term Bitcoin and thus associate something or some information with Bitcoin rather than with blockchain technology. Often times people heard about Bitcoin and its existence but not of blockchain technology or the relationship between the two. Therefore, the experts decided to first implement Bitcoin technology and advertise its application, solely because of its popularity among the general public. The experts commonly agreed that Bitcoin is the most popular solution specifically within the field of cryptocurrencies and consequently the only imaginable way to attract customers for now, because it is considered crucial to first attract people by utilising a technology or solution which is to some extent familiar within the broader society. Once, this application is established and frequently requested by customers, further applications can be examined and potentially integrated.

Currently, customers are offered two distinct blockchain possibilities in order to pay their bill in the observed restaurants, hotels and bars. In most of the properties, a so-called Bitcoin ATM is in place where people can both pay their bills and change euros into cryptocurrencies and vice versa. This ATM also functions as a real ATM for the exchange and the withdrawal of money, where the properties claim transaction commissions. A few of the businesses possess a portable device which looks like a

credit card reader and is brought to guests to process their payment. This works similarly to a real credit card reader, into which the billing amount is entered; however, the guests need to access their cryptocurrency wallet and release the amount payable. Afterwards, the transaction is verified by the nodes within the community and confirmed. When this has been done, the transaction is processed and completed.

Specifically, within the tourism and hospitality industry, blockchain technology is at the moment mainly used to process payments. By offering the possibility to pay via cryptocurrencies, the experts aim to popularise the technology within society at large. Therefore, they claimed that the application of the most prominent representative of blockchain technology, Bitcoin, is crucial to generating publicity throughout various customer segments and channels. Furthermore, integrating a new payment system into the infrastructure of tourism and hospitality entities is simpler and faster than making far-reaching changes to the back-office infrastructure or supply chain. Consequently, the integration of cryptocurrencies, especially Bitcoin, is commonly seen as the first step towards an information technology infrastructure which will be shaped by blockchain technology, once it is widely accepted.

Moreover, the experts commonly agreed that once payments via the cryptocurrency Bitcoin are well established and customers frequently pay this way, there are more blockchain-based solutions they are aiming to integrate. As a first step, the experts see the potential in expanding the variety of cryptocurrencies accepted. At the moment, most of the properties, as indicated previously, solely accept Bitcoin. However, once this cryptocurrency is publicly established and well known, the experts agreed that businesses would benefit from accepting a greater variety of cryptocurrencies. Accordingly, the experts have examined the high potential for cryptocurrencies such as Ether, Litecoin or Dash within the Austrian market. Introducing these cryptocurrencies is among the initiatives which will soon be seen more often within the Austrian tourism and hospitality sector. The first step in this direction is to enable customers to pay via a greater variety of payment methods.

Furthermore, blockchain technology has huge potential within the internal systems of tourism and hospitality entities, especially when it comes to back-office applications. Many of the experts claimed that the real future of blockchain technology within the tourism and hospitality industry lies here. The purpose of this technology was often described by the experts as simplifying, accelerating, refining and increasing transparency and security within back-office proceedings. While this does not increase the businesses' revenue, the experts indicated that it could lead to significant cost reductions because back-office procedures, such as bookkeeping or paperwork, are time-consuming and often require a large workforce. This workforce could be utilised more effectively, beneficially and profitably elsewhere. Consequently, many of the experts are currently aiming to transfer such processes to blockchain technology so as to cut costs and increase the efficiency of their businesses. Once the entire back-office system is processed through blockchain technology, many manual activities can be automated, and the workforce can be utilised in different areas to increase revenue. However, the experts claimed that there is currently no solution which is capable of automating back-office procedures, on the market. Consequently, it is difficult to further extend the scope of their applications, especially because the development of solutions which are integrated into the back-office infrastructure are extremely costly. Therefore, tourism and hospitality entities are not willing, and cannot afford, to invest in the development of such solutions. The experts claimed that there is a need for innovators and inventors of such solutions who are willing to take the risk and invest in future applications based on blockchain. Once such solutions are invented, the experts are certain that many tourism and hospitality businesses will be willing to adopt this technology and shift towards a blockchain-based infrastructure.

Furthermore, one hotel expert was also considering integrating a blockchain-based booking platform which allows customers to process their entire journey through this technology. Starting with the prearrival phase, customers can book the room on the hotel website, check in and finally check out and pay via cryptocurrencies. However, according to the expert, because there is no supplier who offers the needed infrastructure and system to hotels, it is not yet doable. The expert indicated that linking blockchain technology and its infrastructure with the currently employed

property management system, which basically comprises the entire technological infrastructure of the hotel, is highly difficult. This issue occurs mainly because the technological infrastructure implemented in tourism and hospitality entities is obsolete from a technological point of view and therefore incompatible with the novelty of blockchain technology and its infrastructure. To enable progress, the hotel is nevertheless aiming to develop a solution capable of linking their current property management system to blockchain technology. However, the hotel executives are not capable of developing such solutions independently. Consequently, their current software provider for the utilised Bitcoin ATM is developing a tailor-made solution in collaboration with hotel representatives.

#### **4.1.4 Transactions**

In analysing the payment transactions sector, there are various fields which need to be distinguished. The first field within the transactions part concerns the shares of transactions processed through blockchain technology as compared to all other payment procedures available in tourism and hospitality businesses. Here, the experts commonly characterised the share of transactions processed through blockchain technology as relatively small compared to well-established methods. One striking fact is that the experts observed a relationship between the number of payments via blockchain technology and the popularity of Bitcoin. The more popular it is and the more positive the media coverage, the more payments are processed in the experts' respective restaurants via blockchain technology. If there is negative information and the popularity of bitcoins decreases, fewer payments take place via blockchain. The experts also note that at the time the possibility to pay via cryptocurrencies was introduced, the number of payments handled via the blockchain technology was at an all-time high. The experts commonly agreed that the number of payments handled via blockchain technology has stabilised, averaging about two to three transactions per week, and that the share of blockchain-based transactions is rather small.

In terms of current topics influencing the transaction sector of blockchain technology, the experts can be clustered in two categories according to their opinions and arguments: those who feel positively about the current development of transactions

and proceedings which come along with blockchain technology, and those who voiced more critical aspects.

The first group of experts can be characterised as generally optimistic about the development of transactions handled via blockchain technology and its costs to business. This group of experts claimed that through the implementation of blockchain technology, the costs of their business and the costs for their customers could be significantly reduced. This mindset results from the fact that the transaction costs of transactions handled via blockchain technology are significantly lower than commissions paid for credit cards. This contributes to reduced costs for the business, since these transaction costs accrue for the customer and not for the business, whereas with credit card payments, the businesses are obliged to pay the commissions. According to the experts, the transaction time is also much faster compared to payments handled via credit cards. Especially the instant verification of payments was highlighted. Once the payment is verified and approved, the money is instantly transferred to their wallet and can be used immediately. This is an advantage over traditional payments handled via credit cards—the experts claimed that it often takes up to seven days for a payment to be transferred to their bank accounts.

In contrast, the second group of experts are more critical and agreed that transaction fees and commissions are sometimes lower but not always. The experts noted that the current problems are the fluctuating commissions and transaction fees. These fees are often lower than the commissions which accrue for credit cards. However, these costs can also rise up to 10 percent. The handling of this volatility was described as particularly difficult because customers most often do not know how the technology functions and assume that the restaurant retains these fees. The price volatility in general was characterised as a threat to the existing business system, because hotels, restaurants and bars are not able to set prices correctly due to the price fluctuations of cryptocurrencies. Often today's values differ drastically from tomorrow's, and revenue which is kept in a wallet differs significantly in its value over time. Additionally, time can be seen as another constraint due to the fluctuating amount of time required for the verification process. Experts claimed that often, this verification process takes up to ten minutes, which especially in the tourism and hospitality industry should be

avoided: Once customers request the bill, they are aiming to leave as soon as possible. Especially those customers who possess cryptocurrencies but are uninformed about the technology behind it and its functionality are difficult to deal with and often blame the respective hotel, restaurant or bar for the difficulties.

However, the experts argued that there are remedies for these problems. One possibility is to cluster the transactions processed through blockchain technology and to process the payments with a bundle transaction. This provides the benefit that customers pay and leave, and the expert processes the payments once bundled. Consequently, both the transaction time and commissions only occur once. The drawback is that the instant verification of the payment, which is typically approved during the customer's payment process, is no longer guaranteed, which can lead to an increase in incorrect payments.

#### **4.1.5 Software and infrastructure provider**

As already mentioned, the tourism and hospitality experts indicated they were not capable of maintaining and developing an infrastructure and providing the maintenance needed for blockchain applications. A third party in charge of these operations is needed. This means that every interviewed expert was in collaboration with a third party that was responsible for maintaining their respective blockchain-based solutions, mostly the Bitcoin ATM or the credit card reader capable of processing cryptocurrency payments. These third parties most often provide both the physical and technological infrastructure and continuously develop and maintain the solutions.

Fundamentally, two principles of possession can be distinguished regarding blockchain solutions employed in the businesses. First, there is classical ownership: The solution belongs to the business in question and is utilised there, while maintenance is carried out by a third party, most often the one which installed the solution. Second, the third-party provider installs the blockchain solution in the respective tourism and hospitality properties and operates, maintains and updates the solution. The solution does not belong to the property; rather, for each transaction processed through the ATM, such as the changing of euros to bitcoins, the owner of the property claims commissions



paid by the third-party provider. This model is common because the hotels, restaurants or bars can offer a service to their guest but are not obliged to make an initial investment or pay maintenance fees. However, the revenue generated in this way is considerably lower than by owning the blockchain-based solution.

Since the market for blockchain-based solutions is limited in Austria, so is the variety of third-party providers. There are only a few big players on the Austrian market, who dominate this business field. Among the experts who were interviewed for this thesis, most were supplied by the same third-party provider. All the experts claimed to be highly satisfied with their current provider. However, the dependence on a single entity can be troublesome, especially when there are no other competitors on the market. This is illustrated by the fact that the development of new and customised solutions has been slow, since new solutions such as hotel back-office systems are only required by a minority of the software provider's clients. Not much effort is put into the development of new applications, as one expert indicated, because the software provider is aware of its privileged situation. Accordingly, the experts need to work closely with the solution provider and also yield advantages for the software developer, otherwise there will be no further development in this area.

#### **4.1.6 Customer centricity**

Throughout the interview sessions, all experts commonly mentioned one topic of highest importance when it comes to deciding on the blockchain application utilised. When implementing the solution, the buzzword "customer centricity" was mentioned frequently as the main focus. The experts claimed to always concentrate their focus on their respective customers. Consequently, when considering a blockchain-based application, the benefit for the customer was always at the forefront. Many experts claimed that the implementation of blockchain-based services, such as the expansion of methods to pay with cryptocurrencies, could be seen as an investment for their guests rather than for their respective business. The experts described the option to pay with bitcoins as another service offered to guests, and the experts are delighted when customers make frequent use of this option. While the additional service benefits current and regular customers, the aim of experts was also to target different

customer segments, thus enlarging their audience. Offering blockchain-based services was a move characterised by the experts as targeting a different customer segment than their current regulars. Through the utilisation of blockchain technology, the experts aimed to target younger and tech-versed customers. As the number of tourism and hospitality entities accepting or working with blockchain technology is limited, especially in Austria, the customers in possession of cryptocurrencies and willing to pay through this technology do not have many places to go. This was characterised as a tremendous advantage for the experts.

However, they also noted that through the proper utilisation of blockchain technology, trust in the tourism and hospitality industry can be re-established and fostered. Especially through the unique characteristics of blockchain technology, transparency and trustworthiness as well as safety and security are increased. Experts expressed faith in blockchain technology to re-establish trust, since, especially in Austria, the tourism and hospitality industry is often perceived by the public as an industry shaped by single businesses that attempt not to pay taxes on their entire earnings. The interviewed experts believe in blockchain as an instrument to rebuild trust through the deployment of a transparent and trustworthy technology. The experts hope that once customers see that there are many entities that work with blockchain technology, customers will start to reconsider, and their faith should increase accordingly.

Here, the experts raised an interesting issue. As mentioned, most customers currently do not know anything about blockchain technology or its functionality. A few customers are familiar with the term Bitcoin, but only due to its popularity in media. Consequently, many customers questioned the staff of the respective business entities about the newly installed Bitcoin ATM. This revealed that neither the staff nor their regular customers were informed about this new invention and its technology, resulting in the decision to set up staff information evenings to educate them about the technology and its capabilities, such that they could answer basic customer questions. As a second step, the experts decided to set up information evenings for guests. These evenings were offered as a package which included food and drinks with the blockchain information sessions. The restaurants were thus able to focus on their core business, and they invited an expert to talk about blockchain technology and

answer any questions raised. The hospitality experts noted a high interest in the topic of blockchain among their clients—all information evenings sold out quickly, and the feedback from their customers was highly positive. Consequently, experts are already planning more of such events in the near future.

#### **4.1.7 Technology and its functionality**

In this section, explanations and comments about the technology behind blockchain and its functionality are examined and presented. In this regard, the experts frequently mentioned the complete record of all transactions. Consequently, they focused on safety and security as well as transparency which comes along with the integration of blockchain technology. They also highlighted the fact that, for instance, once a coffee is sold and recorded on the blockchain, the generated revenue is instantly stored, as are the costs and earnings associated with the sale of this coffee and how much in taxes needs to be transferred. In this context, a decentralised system is characterised as a major advantage of a system in which all the data is not only recorded and stored among the participants within the network but also individualised through the utilisation of hashes. This results in a data set which is comprehensive and unchangeable and thus creates inability to make any changes to verified and stored data. Consequently, the trustworthiness of the entire industry could be increased significantly as, for instance, taxes cannot be evaded anymore.

Furthermore, the experts claimed that businesses' efficiency could also be increased through the establishment of blockchain-based infrastructures, especially in the back office. Referring to the example of the coffee sale, once the record is on the blockchain, there is no need for human interference, since it is clear how much revenue is produced, which costs are associated with it, which taxes need to be transferred and how much earnings are left. There is no need for a human accountant, traditionally in charge of these proceedings. The experts had confidence in the capabilities and trustworthiness of blockchain technology especially in operations traditionally involving many parties. The experts felt that once blockchain technology was utilised to a greater degree throughout many industries, the hospitality sector would also be able to fully trace back their products. Developing the example further,

through the traceability and transparency supplied by blockchain technology, the experts would be able to trace back their coffee beans and would be certain of everything associated with this product. The experts expressed trust in both the quality of the products and the conditions during the production process. Furthermore, once the products have arrived, the experts could retrieve information on how much they need to sell based on the quantity of products. Consequently, the transparency and trustworthiness of the system would enable the experts to fully track all proceedings within their businesses, and would empower them to detect threats. Therefore, the experts valued blockchain's security and trustworthiness the most, as these characteristics provide the most substantial value added for future operations.

The experts also referred to issues regarding the current development of blockchain-based technology and systems. One criticism raised by the interviewed experts is the increase in different systems and in the number of people who are involved with this technology. According to the experts, this creates confusion and uncertainty among customers. The experts claimed that the entire system is developing towards an overcomplicated infrastructure with too many different providers, which would lead to a situation in which not even the experts would have an overview over the current evolution. According to the interviewed experts, this development contrasts with the initial idea behind blockchain, which was to establish a system that is not controlled by a single party and can be utilised in the same manner all over the world. Currently, blockchain technology is developing towards a system where many different rudiments are evolving within this framework; accordingly, there are too many options to choose from. According to the interviewed experts, this poses the biggest threat to the system, which will only succeed on a global scale if there is one system which functions everywhere.

#### **4.1.8 Government and regulations**

Especially when utilising blockchain infrastructure for business purposes, one must pay attention to both governmental and legal regulations in order to stay and work within the defined framework. According to the interviewed experts, there are only a few regulations which need to be complied with. To legally work with cryptocurrencies, the

experts need to set up a company wallet for every respective cryptocurrency, in which all transactions are collected. Additionally, there needs to be an option within the cash register where the bills can be closed via “cryptocurrencies”, similar to options already in place, such as “cash” or “credit card”. This is crucial for legal representatives to track how many customers have paid via which payment option and how much was paid. In this case, the officials need to know how many customers have paid via cryptocurrencies and which amount in the respective currencies is outstanding. The experts noted that governmental regulations were convenient to comply with and no different from regulations already in place for other payment systems.

Furthermore, the experts highlighted the possibility of collecting all payments handled via cryptocurrencies in their company wallet in the respective cryptocurrencies. Under governmental regulations it is possible to forgo conversion of cryptocurrency revenues into Euros. However, there is a necessity to disclose this separately in the profit and loss statement. Cryptocurrencies need to be treated similarly to stocks, as they are not defined as “real money” under Austrian law. On the other hand, there is also the possibility of instantly converting payments handled via cryptocurrencies to Euros, for people who have no faith that the worth of cryptocurrencies will increase. In this case, although the opportunity is provided to directly exchange the value of the cryptocurrency to Euros, the revenue generated through cryptocurrencies needs to be shown separately on the profit and loss statement.

The experts also mentioned that if blockchain technology develops further, there is the need for governmental involvement in terms of research and development. The experts claimed that governments or major business players would need to invest in this technology because these are parties in possession of the necessary resources to properly advance it on a broad scale. The experts believe the involvement of governments or major players to be vital for the further development of this technology, as smaller individual businesses are not capable of providing either the necessary infrastructure or monetary background to bring blockchain technology to the next level.

However, the experts also claimed that the involvement of such powerful parties is contradictory to the initial ideals of the technology. Originally, the technology was created to avoid the necessity of a single powerful party and instead create trust in a decentralised system with many involved parties so as to distribute power equally. Currently, the system is designed to work without interference, trusting in the community and its judgement. This is a major point of critique regarding governmental involvement, since governments and regulators are not able to entirely control the system and consequently it cannot be assured that all transactions comply with the regulations in place. Consequently, the involvement of a single powerful party was frequently debated among the interviewed experts, as it is within the community.

#### **4.1.9 Expert responsibilities and positions**

To understand which importance the utilisation and development of blockchain technology holds in the respective entities, it is necessary to examine the respective positions of the interviewed experts and the responsibilities associated with these positions. Most of the interviewed experts are either the owners of their business or high executives, such as restaurant managers or department heads. Most of them are in charge of the blockchain solution, which indicates the importance within their business. The majority of the interviewed experts claimed to be privately in possession of cryptocurrencies and consequently demonstrates the interested in this topic. Most of the interviewed experts indicated that they started to think about an integration of blockchain technology as a payment instrument out of curiosity, personal interest and to remain ahead of their competition. Because the interviewed experts cannot be responsible for business operations as well as the development of a blockchain-based service within the firm, most often a team is in charge of system support. In most cases, this team had remained unchanged since the introduction of the blockchain-based application. The decision to implement the application was also made among these participants.

However, the experts also commonly agreed that a successful implementation and utilisation of a blockchain application within the infrastructure of any business is only possible when this decision is supported by high executives or the owners of the

business. The experts found that it takes plenty of resources, of both time and money, for the blockchain-based solution to not only be integrated and functioning, but also recognised and utilised by guests. Consequently, the experts agreed that the commitment of high executives or the owner is crucial; otherwise, the project may not deliver results early enough and be discontinued.

#### **4.1.10 Positive aspects**

According to the interviewed experts, there are various aspects which need to be considered when integrating blockchain-based applications. The experts examined both, the positive and the negative aspects of the most prominent examples. The subsequent section elaborates the positive aspects, followed by the negative ones.

First, the experts highlighted the popularity which can be created through the utilisation of blockchain technology. The experts were certain that they would not be able to create as much popularity and recognition of their respective businesses without the integration of blockchain-based applications. The experts commonly agreed on the tremendous effect of blockchain technology in increasing the reach of publicity for their respective businesses, especially within the new target segment. This can be related to another positive aspect of the integration of the blockchain technology: It addresses a different audience; typically young, tech-savvy and of an above-average income, since this segment is able to afford investments in cryptocurrencies. The experts were in agreement that they would not be able to address this target group without an implemented blockchain-based application. Another positive aspect which comes along with this new target segment is that it is significantly younger in terms of average age. Consequently, once individuals are attracted to a business, they are predicted to remain customers for a long time.

The experts also claimed that the integration of a blockchain-based application is not only beneficial in terms of boosting online popularity but also in creating something which people can relate to and talk about, thus generating offline popularity and spreading information about the respective hotel, restaurant or bar. The experts who had installed cryptocurrency ATMs mentioned that people often ask about the “new thing over there” and that, once it had been explained, fascination sparked among

customers. It was claimed that these customers spread news about a “new invention” and that other customers visit the location and consume at least one drink. Consequently, the experts agreed on the increased popularity of their properties created through the application of the blockchain technology.

Furthermore, the experts named the system behind the technology as another advantage over traditionally established technologies. Speed, transparency and traceability were highlighted as the characteristics of blockchain most valued among industry executives. This technology is characterised as not only unhackable but also trustworthy, which in times of increased hacking attacks and online thefts is of the highest importance to all industries and consequently also to the tourism and hospitality industry. Furthermore, through the unique setup of the system and its adaptability the experts found that blockchain technology also has beneficial implications for the costs of business. For instance, through the technology’s traceability, one can be certain that products are really what they claim to be; theft within the supply chain can be eliminated, as every movement and step is recorded and stored on the blockchain and, once verified, cannot be changed anymore. Furthermore, the experts agreed on the effects which the blockchain can have on the labour costs of businesses, as many administrative duties can be eliminated or at least reduced once an applicable blockchain application is on the market. Currently, extensive human resources are consumed by repetitive back-office tasks, such as, verifying and scanning bills or payments. Furthermore, the experts were certain that once an entire blockchain-based supply chain is established, these duties will be omitted due to blockchain-based automatisation. Consequently, the previously occupied workforce could be utilised differently, and costs could be decreased.

The experts see another possibility for cost reductions associated with blockchain technology in transaction fees and commissions payable. For the businesses, the commissions which need to be paid are significantly lower in comparison to traditional credit card firms, since the commissions are charged to the customers paying with cryptocurrencies, and not to the business. At a time when the number of payments and the amounts paid via cards is increasing, reducing these costs can save large amounts of money. Even if the charges are in the single-digit percentages, this can add



up to a significant share of the revenue over time. Along with these commissions, the experts also highlighted the speed of transactions and the instant verification once the payment is accepted. This increases trustworthiness, and the business can be certain that the payment is valid because the network would otherwise not have accepted the transaction. The experts also noted that once the payment is accepted, the amount is instantly transferred to the wallet of the hotel, restaurant or bar. This is much faster than the traditional path, which often takes up to seven days for the payment to be transferred to the bank account of the business.

#### **4.1.11 Negative aspects**

As with other technologies, there are also negative aspects associated with the development of the blockchain. First, the experts noted more general drawbacks in regard to the efficiency of blockchain technology. Due to the network which is needed, especially the Bitcoin and its underlying technology was critiqued for its high energy consumption and the associated impact on the environment. Many of the experts demanded higher efficiency and environmental friendliness together with a reduction of the energy consumed. Furthermore, the experts emphasised the dependency of both cryptocurrencies and the development of blockchain technology on the public opinion and the current reporting, which can be either beneficial or harmful. According to the experts, especially the “hype” around Bitcoin significantly influenced the general opinion about this technology and thus its popularity. If the bitcoin has a high value and the reporting is positive, people more often tend to avail themselves of the payment possibility via blockchain technology and spread positive impressions of it. Conversely, if the reporting is negative, the share of people who pay via cryptocurrencies decreases, and the word of mouth is negative. This has an extensive impact on the development of the technology, and the experts claimed that this influenced the day-to-day operations with blockchain technology.

Correspondingly, the volatility and the uncertainty about the current value of the respective cryptocurrencies is also an issue which needs to be considered when implementing a blockchain-based application, especially as a payment solution. The experts claimed that the volatility is a global problem resulting from the fact that

cryptocurrencies are still used as an objective of speculation and not as real currencies. The experts claimed that consequently, any regular operation is difficult to operate with cryptocurrencies, since their exchange rates change frequently. For instance, simple tasks such as setting up new menus and the corresponding price lists is simply impossible to specify in cryptocurrencies due to the volatility of their value. The experts claimed that only once the price has stabilised, setting up a price list in cryptocurrencies would make sense.

Another drawback when utilising a blockchain-based payment system is, according to the experts, not really associated with the technology but with its customers. The interviewed experts claimed that the customers' lack of knowledge about blockchain technology and its functionality caused problems and negative word of mouth. The experts indicated that especially the transaction process often creates disputes with customers, due to their unknowingness. Customers most often buy Bitcoins out of curiosity and have no knowledge of their functionality and the payment process. Once the customer is in the hotel, restaurant or bar and wants to pay, he or she blames the respective business for any transactional issues. Customers often wonder about both the fluctuation in commissions payed and the verification time. Accordingly, the customers blame the respective business for any high commissions or long waiting times needed for a confirmation. This results in unsatisfied customers who blame the business, even though it is not responsible for the payment procedure. The experts indicated that no matter what or how much they explained about how the transaction process functions and which fees are claimed by whom, most guests are still unsatisfied and blame the restaurant, hotel or bar. This causes negative word of mouth which may have originated through lack of knowledge on the part of the customer. Nevertheless, negativity about the respective hotel, restaurant or bar will spread on the fact that the guest's ignorance was neglected.

As another drawback, the experts also elaborated on the incompatibility of the highly advanced blockchain technology with the established and integrated systems which are currently employed in the tourism and hospitality industry. The experts indicated that the applications of blockchain technology are often not compatible with the systems which are in place. Consequently, it was described as rather difficult to

implement far-reaching blockchain-based applications. The experts underlined the technological advancements as the main reason for the incompatibility. This is a constraint, especially considering future implementations which should support the current technological infrastructure of the businesses.

Nonetheless, the experts emphasised that research and development is already in progress. However, high costs are associated with the further development of the system. This situation is challenging because the market in Austria for specific solutions for the tourism and hospitality industry are limited, and the costs associated with development and research are high. Moreover, there are only a few third-party providers which focus on blockchain technology for the tourism and hospitality industry. As a result, not only the potential market in need of these prospective solutions but also the number of developers is limited. This leads to a situation in which costs are extremely high relative to the few companies which would need to invest in the development. The experts characterised this situation as another drawback which is especially applicable within the Austrian market. The situation can be clustered in two negative aspects, which are linked: First, the high costs associated with the further development and individualisation of blockchain applications, and second, the limited number of providers who work with blockchain technology specifically designed for the tourism industry. Because this creates a market dominance of the few entities providing the service, hospitality and tourism entities must comply with the terms set by one of the third-party providers.

Last, the interviewed experts focused on the current development of the blockchain technology towards a system in which too many global players are introducing their respective individual systems. The experts noted that originally blockchain technology was introduced to create one decentralised system which can be utilised in the same manner all over the globe. The current development is different, since many people have become involved and introduced their own systems. This leads to confusion among the participants; even experts claim that they are not able to stay on top of current developments. For instance, the interviewed experts observed that even though they are working with blockchain and would describe themselves as well

informed, they would not know which cryptocurrency they should add to the list of accepted ones. This is solely because there are currently too many to choose from.

#### **4.1.12 Future guidelines**

Regarding future scenarios, the experts examined, according to their expertise, different objectives which might be achieved. First, the experts focused on the further development of blockchain technology within the payments sector, since this is also the only blockchain-based solution already in place in the respective businesses. Accordingly, the experts examined further developing the importance and potential for transactions and payments handled via blockchain technology. The experts had faith in the revolution of the payment market shaped through blockchain technology. In this scenario, the experts described a situation in which travellers from all over the world would not have any local currency available to pay with. The experts claimed that global travellers of the future might only possess different globally accepted cryptocurrencies, such as Bitcoin or Ether, and would not need to change money into local currencies. The experts felt that from the point of view of a restaurant, hotel or bar, there is a need to accept such cryptocurrencies; otherwise, it is predicted that travellers would not frequent their businesses, as they would have no way to pay. The experts characterised this situation as similar to the current development in the sector of payments via credit cards. Presently, the share of payments processed through credit cards is steadily increasing and represents the majority of all processed transactions within the experts' businesses. As a result, the experts claimed that they are obliged to accept credit cards, otherwise customers would not book at their properties.

This potential, observed in the development of transactions based on blockchain technology, was also the reason why the experts decided to employ a blockchain-based payment system. Here, the experts agreed on the growing importance of this segment. Consequently, the interviewed experts said they believe in its future and are aiming to enlarge the number of accepted cryptocurrencies in the future. The experts claimed that once Bitcoins, which are currently utilised most, are publicly more

accepted and customers pay more frequently with cryptocurrencies, they will be willing to enlarge their portfolio of accepted cryptocurrencies.

However, the interviewed experts also declared that in order to create public awareness about blockchain technology and thus public acceptance, major enterprises or governments would need to further develop the systems. The experts claimed that any further development of the technology, especially the research and development of specialised solutions, is costly. As a result, there is a need for major players to invest in this technology so as to enable a wide-scale utilisation. The interviewed experts have faith in blockchain technology in both, its increasing importance and its beneficial contribution to society. That said, the advancement of the technology is especially needed in certain sectors. For instance, the energy consumption needed to properly pursue the system is extremely high, and the efficiency of the blockchain technology is characterised to be low. Consequently, further technological development is needed in this field. According to the interviewed experts, this is going to happen, especially since the overall system is under pressure due to this inefficiency.

Nonetheless, once barriers are overcome, the experts commonly agreed on the tremendous application possibilities of blockchain technology within the tourism and hospitality sector. The interviewed experts stated that one solution is currently employed in order to keep up with the fast-changing times and stay ahead of the competition. However, the experts laid out endless utilisation possibilities for this technology within the tourism and hospitality sector, especially in measures which increase the efficiency of day-to-day operations and therefore reduce costs and automate repetitive tasks.

The experts agreed that blockchain technology will begin to develop further within the tourism and hospitality sector, once the technology is more accepted throughout the population and more tourism and hospitality experts are able to examine the potential linked to the utilisation of blockchain technology.

## 4.2 Text mining

Through the analysis with VOSviewer, five distinct clusters (Table 3) were composed, with 20 items in total which had been observed. The most relevant items within the data set were highlighted. As a basis, the items needed to occur at least 10 times within the transcripts in order to be relevant for this analysis. Next, the highlighted items were sorted manually in order to exclude elements which were relevant in the questions but did not appear in expert statements. Furthermore, the default choice was selected to the 60% most relevant terms. In order to display the association, the method “Association Strength” was selected, which normalises the strength of the relationship among the items in order to guarantee all items to be treated identically, regardless of the number of interviews where these items are referred to (Eck & Waltman, 2020).

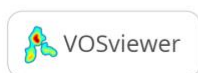


FIGURE 3 VOSVIEWER NETWORK VISUALISATION

Consequently, Table 3 was created, in which 20 items are clustered into five distinct categories.

TABLE 3 – TEXT MINING CLUSTERS

| Cluster 1                | Cluster 2              | Cluster 3              | Cluster 4                  | Cluster 5       |
|--------------------------|------------------------|------------------------|----------------------------|-----------------|
| Brand Loyalty            | Transaction<br>Impacts | Customer<br>Centricity | Significance of<br>Bitcoin | Fees for Guests |
| blockchain<br>solution   | blockchain             | customer               | bitcoin                    | guest           |
| blockchain<br>technology | cost                   | goal                   | future                     | transaction fee |
| brand loyalty            | positive impact        | new thing              | marketing                  |                 |
| negative aspect          | potential              | owner                  | room                       |                 |
| positive aspect          | transaction            |                        |                            |                 |

Overall, it can be stated, and observed through the visualisation in Figure 3, that the most frequently mentioned item within this data set is “blockchain” (39 occurrences). The second most frequently used item is “bitcoin”, with 38 occurrences. The third most frequent item is “customer”, with roughly 30 occurrences, which demonstrates in total numbers how often the experts refer to blockchain and Bitcoin. Accordingly, the importance as well as the relation of the latter two items can be highlighted. In observing Table 3, it can be stated that each of the three most frequently mentioned items is located in different clusters, which implies that the items are separated from one another and clustered with more similar items yet linked together through the link strength. This link is visualised in Figure 3 through the lines connecting the items; the distance among the items refers to the relatedness among the items and clusters. Where the closer the items are located to one-another the stronger the relatedness among the items is. Furthermore, the strongest co-creation links between items are

visualised through the connecting lines, where the thicker the connection line is, the stronger the link between the items is (Eck & Waltman, 2020).

It can be observed that blockchain technology is located in the middle of the VOSviewer output. This indicates its importance and symbolises the centre of all observations, which is in line with the focus of this master's thesis. On the far-right, Cluster 1, with the items "blockchain solution" and "brand loyalty", is located with a strong relation to the core "blockchain technology", since it is clustered in the same category (Cluster 1).

In Figure 3, proceeding from the core towards the left part of the output, the strongest correlation to Cluster 1 can be seen with Cluster 4 and accordingly the importance of Bitcoin and its linkage with blockchain technology. This is followed by Cluster 3 and the focus on both, the customer's and the owner's perspective, which indicates a close and strong relationship with the topic of blockchain technology. However, in the illustration not every single item out of the 20 is visible due to the fact that the circle's size relates to their individual importance within the entire dataset. This means that items such as "positive aspects" and "negative aspects" are quoted in Table 3, however not visible in the illustrations, since in relation to other items, their respective importance is too weak. However, within the entire data set, items such as "positive aspects" or "negative aspects" are relevant and complement the analysis.



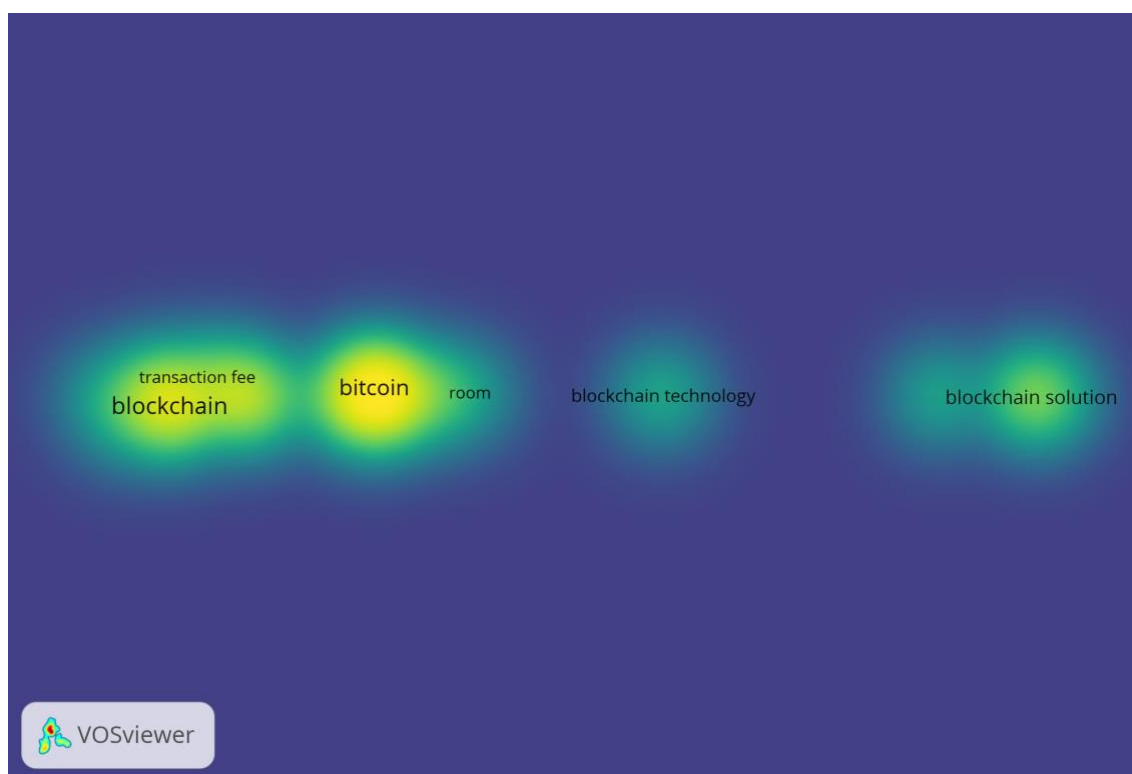


FIGURE 4 DENSITY ANALYSIS

In terms of the density among the items, in Figure 4 one can observe that the item “blockchain technology”, which is in the core of this analysis, decreased in importance, as it stands alone and is not surrounded by items which support it and its overall importance. However, items such as “bitcoin” stand out in this analysis. This density analysis demonstrates that the items “bitcoin” as well as “blockchain” and their related clusters are closely related and connected to their neighbouring items, which supports their importance within the entire analysis—the more intense the colour yellow, the more important the item in respect of the cluster (Eck & Waltman, 2020).

Thus far, a broad overview of the results and their connections among one another has been presented. In the upcoming section, more details for each cluster and their corresponding items are given.

### 4.2.1 Cluster 1: Brand Loyalty



FIGURE 5 CLUSTER 1 – BRAND LOYALTY

This cluster can best be characterised by its two sub-sections, which are rather far apart from each other. On one side is the cluster congregated around the most important and strongest item within this section, “blockchain solution”, and its direct relation to the cluster items “brand loyalty”, “positive aspects” as well as “negative aspects”. Most frequently mentioned in the expert interviews was both, the impact on awareness among society when utilising blockchain technology and the positive aspects in terms of marketing and advertising for the respective businesses. However, the most negative aspect according to the interviewed experts is blockchain technology’s volatility and consequently, the inability to predict future operations if one focuses solely on this technology. However, due to the fact that the circle’s size relates to their individual importance within the entire dataset, items such as “positive aspects” and “negative aspects” are not visible within the illustrations since in relation to other items their respective importance is too weak. However, within the entire data set and analyses the items are relevant and complement the analysis. Furthermore, the interviewed experts believed in the blockchain solution and its direct impact on brand loyalty, especially when re-establishing trust and transparency for customers.

Given the fact that the experts emphasised the importance of not only the blockchain solution and its general positive aspects, but also the loyalty of the customers, the first proposition is formulated for the first cluster:

*P1: Blockchain technology has an impact on brand loyalty.*

This proposition can be strengthened, as the interviewed experts claimed that blockchain technology can have an impact on customers' brand loyalty. However, thus far they had not been able to measure this impact. Therefore, the experts could not indicate which direction, positive or negative, this impact could have. There was a general belief that blockchain technology has a positive impact on customer loyalty and that blockchain technology strengthens the relationship with customers.

The collected data provides insights into the procedure of how blockchain technology could potentially enforce brand loyalty. Although the experts claimed that blockchain technology is not directly able to impact brand loyalty, it can positively impact brand loyalty through transparency and the reestablishment of trust. The experts were certain that by utilising blockchain technology, restaurants, hotels and bars would be able to provide transparency. Once this is established, customers are assured that service providers' claims are true and can be trusted. As a result, the experts were certain that brand loyalty would increase and customers would have an increased amount of trust in businesses.

Research Question 1 can be formulated, which pertains to the brand loyalty of customers.

*RQ 1: How can blockchain technology enforce brand loyalty?*

#### 4.2.2 Cluster 2: Transaction Impacts



FIGURE 6 CLUSTER 2 – TRANSACTION IMPACTS

The strongest characteristic within this cluster is the item “blockchain”, which is with 39 occurrences, the most frequently referred item within the entire data set. Second is the item “transactions”, which is strongly related to both “blockchain” and the item “bitcoin”, as seen in Figure 6. The two items “blockchain” and “transaction” are among the most frequently mentioned topics in all in-depth expert interview sessions, since currently the main application field of blockchain technology within the interviewed businesses is concerned with transactions and payments. Consequently, it is not surprising that within this analysis, these two items can be described as rather strong in terms of importance as well as connection strength.

The second cluster is formed by the items “transaction”, “blockchain”, “cost” as well as “positive impact” and “potential”. Referring back to the expert interviews, it can thus be stated that the items within this cluster are strongly connected to one another which also explains the strong connection visualised in the density analysis (Figure 4). The reason for this connection can be explained as payments and the costs of operations, handled through the blockchain technology, are currently the main utilisation field of the blockchain. Experts highlighted the importance of blockchain technology in regards to the payment process and the positive impact concerning transactions and the reduction of transaction fees.

Therefore, Proposition 2 can be stated as follows:

*P2: Blockchain has an impact on transactions and their costs.*

This proposition is strengthened by the insights provided by the experts, in which it is clearly stated that the application of blockchain technology within the payment sector of the respective businesses is beneficial to them. First, there is an additional payment option, and a variety of options was said to always be beneficial to customers. Furthermore, the integration of blockchain technology within the payment sector of hotels, restaurants and bars had a beneficial impact on the costs of the respective businesses' transactions.

The reason for this beneficial impact on costs was commonly seen in the fact that the transaction fees created through payments and handled via blockchain technology are lower in comparison to, for instance, credit cards. Furthermore, when transactions take place via blockchain technology, customers are obliged to pay the transaction fees, whereas with regular credit card transactions, the respective businesses pay the fees. Experts claimed that though the utilisation of blockchain technology, the transaction costs for businesses could be reduced substantially. Consequently, through the utilisation of blockchain technology, costs can be reduced and invested differently. The experts thus value the positive impacts of the blockchain technology on the costs of transactions taking place.

As a result, Research Question 2 can be stated as follows:

*RQ2: Which impact does blockchain technology have on the transactions taking place within businesses?*

### 4.2.3 Cluster 3: Customer Centricity



FIGURE 7 CLUSTER 3 – CUSTOMER CENTRICITY

The third cluster is formed by a more personal or human perspective when it comes to blockchain technology. Within this cluster, the item “customer” is the centre of attention; the entire Cluster 3 is composed of the additional item’s “goal”, “new thing”, and “owner”. However, according to VOSviewer statistics, the most important items in this cluster in terms of meaningfulness and connection strength are “customer” and “goal”.

These two items correlate with the experts’ elaborations, in which a focus was placed on the importance of customer centricity in the decision to incorporate a blockchain-based solution. The interviewed experts commonly agreed that the decision to offer a blockchain-based solution was made predominantly to provide the customer with another option to choose from. The experts claimed that they wanted to not only benefit their current customers, but also attract new ones as well as new customer segments. Consequently, through the utilisation of blockchain technology, the experts wanted to benefit their current customers as well as target new ones as the defined goal of the project. Applications based on blockchain technology were incorporated into the infrastructure of the businesses in order to benefit the customers. Primarily, to provide current customers with new options to choose from, such as paying through the blockchain technology. Second, to attract new customers as well as different customer segments to the hotels, restaurants and bars. Therefore, the experts stated

that customers, and the benefits to customers, have always been the motivator to make the decision. The foremost goal has always been to provide the customers with benefits.

Therefore, Proposition 3 and Research Question 3 can be stated as follows:

*P3: Blockchain technology is a customer-centricity instrument.*

*RQ 3: How can blockchain technology be utilised to increase customer centricity within the tourism and hospitality industry?*

#### 4.2.4 Cluster 4: Significance of Bitcoin

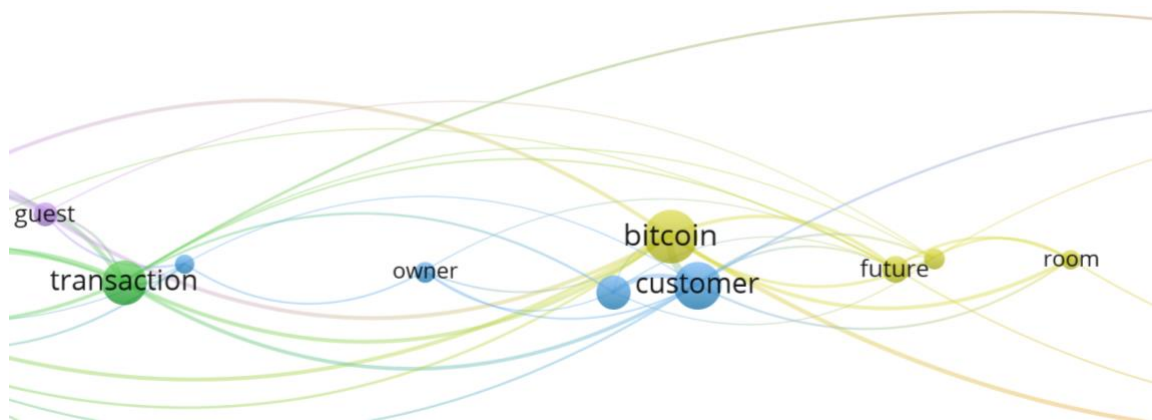


FIGURE 8 CLUSTER 4 – SIGNIFICANCE OF BITCOIN

Cluster 4 is built around the second most frequent item within the entire data set, “bitcoin”, with a total of 38 occurrences and the strongest total link strength. As a result, this cluster is shaped through this item and its influence on the interviewed businesses. Within Cluster 4, the item “future” is strongly connected to the item “bitcoin”. This matches the details provided by the interviewed experts, who claimed that people are more familiar with the term Bitcoin than with the underlying blockchain technology, and that Bitcoin will have a significant impact on future transactions within the tourism and hospitality industry. Besides the two more frequently mentioned items, there are also items such as “marketing” and “room”

located within this cluster. This implies that the stronger items within this cluster, “bitcoin” and “future”, directly influence the weaker items, “marketing” and “room”.

This is also in line with the expert statements, where it was argued that especially Bitcoin was utilised for marketing purposes, since customers are most often unfamiliar with blockchain technology but at least have a rough idea of what Bitcoin represents. For this reason, the interviewed experts noted that the Bitcoin logo is often placed on their respective websites in order to create popularity and increase awareness; in other words, to utilise the item “bitcoin” for marketing purposes. However, the connection among the items “bitcoin” and “rooms” reflects the experts’ ongoing attempts to incorporate a blockchain-based system within the hotel property management system in order to enable room payments processed through cryptocurrencies such as Bitcoin. Consequently, there is a connection among the items “bitcoin” and “rooms”, although the connection strength is shown to be rather weak in comparison to the connection between “bitcoin” and “future”. The interviewed experts claimed that the broader society does not know what blockchain technology is, neither how it functions nor its capabilities. However, society is much more familiar with the cryptocurrency Bitcoin, since there is much more media attention devoted to this cryptocurrency and its development. Therefore, the experts stated that this also influenced the decision to first give their customers the option to pay via Bitcoin, since this is currently the most well-known cryptocurrency. Once customers are familiar with Bitcoin as a cryptocurrency, they are more willing to adapt to other blockchain-based solutions.

Therefore, Proposition 4 and Research Question 4 can be stated as follows:

*P4: The cryptocurrency Bitcoin is an instrument which has an impact on the future operations of the tourism and hospitality industry.*

*RQ4: Which influence will the cryptocurrency Bitcoin have on the future operations of tourism and hospitality entities?*



#### 4.2.5 Cluster 5: Fees for Guests

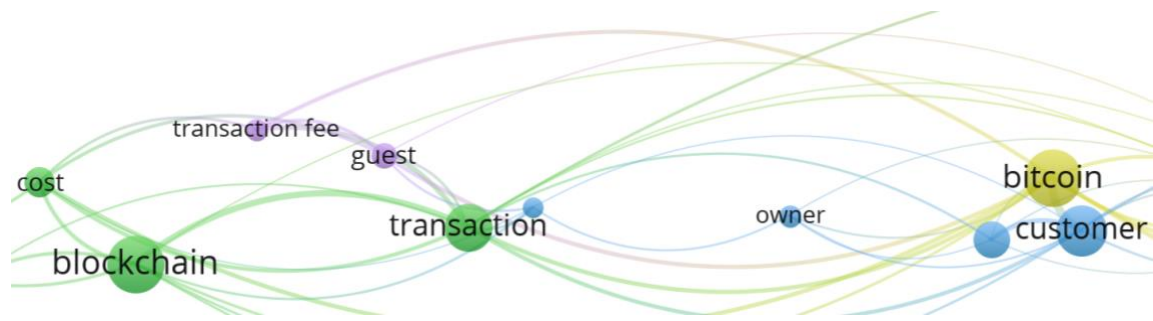


FIGURE 9 CLUSTER 5 – FEES FOR GUESTS

The experts saw in Bitcoin the first step towards a more blockchain-based future. This could ultimately lead to an environment in which cryptocurrencies are as omnipresent as credit cards are right now. The experts believed in the possibility of global travellers being in possession of certain cryptocurrencies, primarily Bitcoin at the moment, and only participating hotels, restaurants and bars which accept their cryptocurrencies. This belief exists mainly for the reason that in this future scenario, there is no need for currency exchanges, and that travellers are enabled to pay with the same currency around the world.

The last cluster, Cluster 5, is the cluster with the fewest items in it. Within this cluster, there are two items, that are equally strong when it comes to both, total occurrences and connection strength, namely “guest” and “transaction fee”, whereby this cluster and the corresponding items are highly connected to the surrounding clusters. As shown in Figure 9, these two items are directly connected with the more frequently referred to items “transaction”, located in Cluster 2, and “bitcoin”, located in Cluster 4.

Referring back to the in-depth expert interviews, this connection becomes more reasonable because Bitcoin is characterised as currently the most important and consequently the most utilised cryptocurrency by guests. This means that most transactions are handled through Bitcoin and that the transaction fees charged to customers are also associated with transactions on a Bitcoin basis. Therefore, these four items, “bitcoin”, “transaction”, “guest” and “transaction fee”, are connected to one another, whereby the items “bitcoin” and “transaction” can function without the

items accumulated in Cluster 5; the items “guest” and “transaction fee” would not exist without the surrounding clusters. Therefore, Cluster 5 can best be described as a supporting cluster for Clusters 2 and 4 in the specific processes of transactions handled via cryptocurrencies.

Therefore, Proposition 5 and Research Question 5 can be stated as follows:

*P5: Cluster 5 is dependent on factors beyond this cluster, as only when transactions take place, items within Cluster 5 become relevant*

*RQ5: Which impact do transaction fees have on the willingness of guests to proceed with the transaction?*

## 5 CONCLUSION

This master's thesis aims to investigate the current integration status of blockchain technology into the tourism and hospitality industry in Vienna. Furthermore, reasons for and against the integration of the technology are investigated, as are advantages and disadvantages of blockchain technology to the industry. Moreover, the current application possibilities are disclosed and thus the status quo of the utilisation process in Vienna. Additionally, both the potentials and limitations of blockchain technology are investigated in terms of the application and the integration of this technology in the tourism and hospitality sector in Vienna. Last, this master thesis addresses the current gap in academic literature concerning the relation between blockchain technology and tourism, specifically within the industry in Vienna, Austria.

### 5.1 Theoretical implications

Especially the fact that, according to the literature, other industries, such as finance or banking, are much more advanced with regard to the application of blockchain technology, seems to be a pressing driver for investigation through the current study (Filimonau & Naumova, 2019 ; Nam et al., 2019). Furthermore, in investigating the functions and characteristics of blockchain technology, there is hardly any literature on real-life examples of business entities that work with blockchain technology within the tourism and hospitality industry. The World Tourism Organization (2008) stated, that the global travel industry is confronted with perpetual change, specifically in terms of the development of technology and how this influences the behaviour of travellers. The blockchain technology could solve this dilemma as it is characterised as being more efficient, effective, safe and transparent than conventional solutions currently in place (Bhardwaj & Kaushik, 2018).

There is still little literature investigating the association of blockchain technology and the tourism and hospitality industry in Austria. This is not surprising, as there are 15 properties associated with the tourism and hospitality industry in Vienna, which is a minor share in relation to the total market. Moreover, the total number of entities related to tourism and hospitality did not change throughout the last year, namely the

period from March 2019 to March 2020 (coinmap, 2020). In light of these findings, it seems that any adoption of blockchain technology within the Austrian tourism and hospitality sector is underdeveloped, otherwise many more businesses would have invested in this technology.

In total numbers, the share of businesses which are related to tourism or hospitality and have incorporated blockchain-based applications can thus be described as minor. However, throughout the in-depth interviews with representative experts, a general positive attitude towards the application of blockchain technology can be observed. Collectively speaking, the interviewed experts highly appreciate their currently employed blockchain-based solutions and are investigating further application possibilities. However, one observation stands out: Despite the tremendous application possibilities for the tourism and hospitality industry as indicated through literature, for instance, booking through blockchain technology (Calvaresi et al., 2019), trustworthiness of comments and reviews (Colombo & Baggio, 2017), or personalisation (Kwok & Koh, 2019), all the experts claimed that currently there is only one blockchain-based solution in place which makes sense for tourism and hospitality. Namely a payment system in which cryptocurrencies are accepted and processed through the utilisation of the blockchain technology. As characterised by Turkay et al. (2019), payment systems based on blockchain technology have numerous advantages, which is corroborated through the expert interviews.

## **5.2 Managerial implications**

The interviewed experts observed that a payment system set up on blockchain technology is one of the applications which can be beneficial for tourism and hospitality to integrate into their respective infrastructures. The interviewed experts highlighted the fact that integrating this payment method is neither too expensive nor too complicated to integrate. The integration of the blockchain-based payment system can be easily processed and the investment costs were described as moderate. Furthermore, the experts claimed that currently the general public and thus most of their customers are unaware of either blockchain technology or its functions and capabilities. Most customers are unfamiliar with blockchain, but despite having heard

about Bitcoin in media. Consequently, all the experts decided that when they entered the blockchain market, the first step would need to be based on a solution recognised on a broad scale.

Therefore, all interviewed experts currently utilise payment applications which are based on blockchain technology. Either a cryptocurrency ATM or a cryptocurrency credit card reader is in place, enabling customers to pay via cryptocurrency, predominantly through Bitcoin. The interviewed experts noted that they are currently highly satisfied with the solutions employed. Once this payment method is publicly more recognised, the experts claimed to be willing to extend their applications by first accepting a greater variety of cryptocurrencies, followed by implementing a greater variety of blockchain-based applications.

The experts stated that the potential of blockchain technology within the tourism and hospitality sector is tremendous, especially regarding back-office applications. In this regard, the great potential of cost savings was examined, as most back-office processes were described as repetitive, time-consuming and non-technically exhausting. In this application field, the experts identified blockchain's potential both in ensuring trust and transparency and applying smart contracts. The experts could imagine a future in which blockchain is deployed so deeply within the infrastructure that the first interaction within the supply chain would be directly recorded in the blockchain. The entire value chain would be shifted to blockchain in order to always keep track of recent developments and stay updated on the current status. Therefore, many processes could be automated and resources saved or deployed elsewhere.

For the interviewed experts, this scenario seems to be imaginable, albeit in the distant future. However, one expert, representing a hotel, was already experimenting with a blockchain-based infrastructure for both room bookings and payments. According to this expert, this development is difficult to foresee because of the incompatibility between the highly developed and technologised blockchain technology and the established hotel property management system. Although the hotel is working closely with its software provider, the development and integration of a blockchain-based

system within a well-established hotel property management system seems to be highly difficult and complex.

Additionally, the experts claimed that they are willing to further apply blockchain-based solutions within their respective properties once it is publicly more recognised. However, a real integration of far-reaching systems within the tourism and hospitality industry currently seems highly unlikely. According to the experts, the currently available solutions are not adaptable for the tourism and hospitality industry and are thus not designed to be integrated into the infrastructure of hotels or restaurants. There are no solutions available which would fulfil the needs and wants of this industry. Furthermore, the experts claimed that the development of such solutions is very expensive and that single tourism or hospitality entities would not be able to invest in such solutions. Moreover, for developers of blockchain-based solutions, the market in the tourism and hospitality industry is too small and specific and consequently not profitable enough to invest in. This situation is even worse in Austria as, according to the interviewed experts, there are only a few suppliers of blockchain applications. Consequently, it is even more unattractive for these few suppliers to invest in any tailor-made solution for specific industries.

Therefore, the experts stated that, before a wide-scale application and utilisation of blockchain is possible, there is a need for tailor-made solutions for the tourism and hospitality industry. The experts also highlighted the need for major players to invest in the further development of blockchain technology so as to make it more attractive and affordable for single entities to utilise and integrate.

### **5.3 Final remarks**

To conclude this master thesis, it can be stated that there is legitimately a scarcity of literature on blockchain technology in terms of its application within the tourism and hospitality industry, specifically in Vienna, Austria. This is because the current market in which blockchain-based solutions are employed is relatively small, with a total of 15 businesses which currently work with this technology. This number did not change throughout the time period of one year (coinmap, 2020). Furthermore, the current

status of the employment of blockchain-based solutions within the Viennese tourism and hospitality industry can best be described as unilateral, as there is predominantly only the option to handle transactions via the blockchain technology employed. However, the interviewed experts claimed to be highly satisfied with their current blockchain-based solutions and are willing to expand once it makes sense from an economic perspective. However, the development of blockchain technology, especially in the tourism and hospitality industry, will be dependent on the willingness to further develop this technology and tailor it to the requirements of the industry.

It can be stated that those businesses in tourism and hospitality which are currently employing blockchain technology are highly satisfied with the current payments handled through this technology. These experts are willing to further adapt their businesses to blockchain and are certain that this technology will shape future operations, regardless of the sector.

#### **5.4 Limitations and future research**

With regard to limitations and future research, a few considerations need to be pointed out. First, as the most pressing limitation, the target group and total number of interviewed experts must be mentioned. The total number of businesses both related to blockchain and considered to be operating within the Viennese tourism and hospitality industry is limited to 15 entities, according to coinmap (2020). In future research, it must be closely observed how this total number develops throughout the upcoming years, as there was no change from March 2019 to March 2020 in total numbers. Therefore, it is advised to attempt to interview representatives from a wider variety of business entities. Once the total number of entities has increased, further research can focus on more specific business fields within the tourism and hospitality industry, such as luxury hotels or restaurants alone. In any case, it is highly advised to further observe the development of blockchain technology within the tourism sector, since it seems to be a promising business field.

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## 7 APPENDICES

### 7.1 Appendix 1: Interview guideline

1. How can blockchain positively impact your business?
2. Which are the core areas in which blockchain can help boost your business?
3. Which aspects of the blockchain do you value the most and can be pivotal for boosting or improving your business?
4. Do you believe blockchain can have a positive impact on the costs of your business?
5. How can a blockchain solution ramp up brand loyalty in your business realm?
6. Which blockchain did implement/or do you plan to implement in your business? If none, jump to question 16.
7. Why did you implement this particular solution?
8. What was your role in the blockchain project?
9. What were the goals of the project?
10. To what extent did you reach your goals?
11. What were positive aspects of the blockchain solution?
12. What were negative aspects of the blockchain solution?
13. Which current blockchain issues do you worry the most?
14. Based on your experience, what potential does blockchain have? What are its limitations?
15. Lessons learned, which experiences do you have when it comes to the blockchain technology?
16. Do you plan to implement any blockchain-related project in your company? Which one? When?
17. Future guidelines.

## 7.2 Appendix 2: Transcripts clustered according to patterns

| 7.2.1 Reasons for integrating blockchain solutions |  |
|--|--|
| Number   | Content  |
| 1  | I am not a crypto expert, but we offer our customers a different platform to pay. Everything is running very smoothly and we are happy.  |
| 2  | People don't know how the system works and just buy Bitcoins and want to pay with them and are frustrated as the costs are so high.  |
| 3  | I think for people who work with these currencies it is a good possibility to come to us and use it, because there are not that many places where you can use it. For us people recognized that we offer this possibility, and therefore they come to us and want to see how it works, and how it is possible. Consequently, we have more guests and more business.  |
| 4  | For us, more people came as they wanted to see how it works and experience the payment method first hand. So, we can win new customers, people who would normally not come to us, they are coming to have a look how it works and then eat something. They try our food at first, and then they want to pay with cryptocurrencies and see how this is working. Most of the people make a video of the payment, as it is all new. There were many Bloggers here to post about the payment process. We also make meetings to talk about the technology behind and how this is working. |
| 5  | I think it is the future, that was also the reason why I thought one and a half years ago to start with this payment method. There were not that many risks or disadvantages associated with the integration of this payment service for our customer.   |
| 6  | ...because of personal interest, curiosity. There was no special reason to implement Bitcoins. It was to try something else to push our business, always try to follow trends. It is a nice marketing trick, but this is all at the moment.  |
| 7  | We have a hotel concept where we try to follow trends. Blockchain started to be an interesting topic, especially for payments in the hotel industry. That's why we decided to try that out for our hotel concept. We always follow our own personal interest, everything we do in the hotel business is first focusing on our own personal interest.   |
| 8  | But for our business it does not really matter in which monetary terms we get our revenue, either Bitcoin or credit card or physical money. Not that much advantages for the implementation, as it does not matter which payment method, for the business it does not change anything as it is changed right at the moment we receive it into Euros. The difference is that with this new technology we can gather publicity.  |
| 9  | I would not say that people come and eat here because they can pay with cryptocurrencies   |
| 10   | The technology heavily impacted my business as it was used as a marketing instrument, as not many places offer the possibility to pay in cryptocurrencies  |
| 11   | Another reason was also, I wanted to put it on our homepage, so that people who visit our homepage know that they are able to pay with Bitcoins and so that I am a bit an ambassador for those type of currencies.   |
| 12   | The only thing where this technology could possibly boost our business is in selling rooms.  |

|    |  |
|----|--|
| 13 | Furthermore, it is also a good tool for publicity in order to make people aware that we offer this possibility to pay your drinks and so different people get to know our hotel.   |
| 14 | Mainly in terms of marketing, as I think it raises awareness and people stop by consume one cocktail and try to pay with their cryptocurrencies.   |
| 15 | Blockchain solutions can maybe ramp up brand loyalty a little bit, but that's not a big thing.   |
| 16 | I think you should see ramping up brand loyalty in perspective of the traceability and transparency. I don't think that people go somewhere because they use the blockchain technology. I think you can say that I go there because they use blockchain technology and therefore I can trust them that their meat is really what they claim it to be and that their vegetable is really organic certified. That will create a brand loyalty, loyalty to this sustainability aspect. People have the possibility to actually trace it back, and that's why I think it can enhance brand loyalty. But as long as it not known among the general public, I think there is a long way to go to use it as a commercial benefit as well. |
| 17 | Mainly the Bitcoin was used as a marketing tool, as the broad society recognized it and came into my bar as they wanted to try to pay with this new payment form. We promoted our new way of payment on Facebook, Instagram and Snapchat, and people started to recognize it. As my main customer segment are young students they were also fascinated by this topic from the beginning onwards.   |
| 18 | The blockchain technology heavily impacted my business as it was used as a marketing instrument, as not many places offer the possibility to pay in cryptocurrencies.  |
| 19 | It is about publicity, which does not have any incentive for us, but it spreads awareness about the technology.  |
| 20 | Mainly in terms of marketing, as I think it raises awareness and people stop by consume one cocktail and try to pay with their cryptocurrencies.   |
| 21 | The goals were basically to show the people that we are believing in this technology and make them aware that it exists.   |
| 22 | Speed, transparency and having something to talk about. Even people who don't know it go to the bathroom to have a look and ask what this is. Than you can elaborate with guests on it. I think the fact that it is present in a bistro like ours, invites people to look into it. It is about publicity, which does not have any incentive for us, but it spreads awareness about the technology.   |
| 23 | At the moment it is rather a tool to gain attention, it is utilized as a marketing instrument.   |

| <b>7.2.2 Predefined goals</b> |  |
|-------------------------------|--|
| Number                        | Content  |
| 1                             | One of the goals focused on marketing to attract more people and more specific customers. Also, right now, people are speculating about price rises. I kept all of my Bitcoin transactions in my company wallet; which is right now around 0.2 Bitcoins; and due to the fluctuations, this is much more worth as it was when customers payed the drinks. So, I made profit with this move. |
| 2                             | Of course, you have to have goals, when you are introducing a new possibility to pay. For example, we want to have more customers but specifically a new segment of customers, which is more interested in this new technology, and willing to come to our restaurant to try everything out how it works. And may return as regular customers, as they enjoyed our food.                   |

|   |  |
|---|--|
| 3 | The overall goal of a business should be to make more business and try to diversify.   |
| 4 | The goals were basically to show the people that we are believing in this technology and make them aware that it exists.   |
| 5 | But I really did not define any goals or had not expectations. Whereas the majority of my transactions happened within the first five to six month.  |
| 6 | No, not really there were no goals defined as I had not the feeling that, that many customers would pay with cryptocurrencies anyways.   |
| 7 | Since we are a quite small business we did not have these traditional goals, and did not set them. It was a decision from our owner to give it a try and it was not a big investment anyways. It was more like let's try it out, if it works it works, if not than not.  |
| 8 | Let's say I can't specifically say if we reached our goals. There is definitely a positive response, that I allow people to pay in Bitcoins, but I can't definitely say that I gained more customers due to cryptocurrencies. However, there are definitely a few regular customers which come and always pay in Bitcoins, I don't know If they would be my customers, when there would not be the possibility to pay in Bitcoins. |
| 9 | Therefore, we also cannot say if we reached those goals or not, as we had non-specified.   |

### 7.2.3 Technologies implemented

| Number | Content  |
|--------|--|
| 1      | Nevertheless, we still have our ATM in the Lobby and people can use it to buy drinks at the bar.   |
| 2      | So we have an app on our hand holds so people can pay in cryptocurrencies and there is an immediate transformation in Euro if we want, but we can decide if we want to have it payed out in Euros or if we want to keep the cryptocurrencies in our valet. |
| 3      | At the moment we are looking into incorporating a system into our back-office but as I said we are not willing to making investments our self therefore we are looking for systems which are ready to implement and directly use.                          |
| 4      | At the moment we are facilitating cryptocurrency payments, this goes via available solutions and apps, we have one Bitcoin ATM where people can pay in cash money and get cryptocurrencies in their valets, and the other way around.                      |
| 5      | ...planning to take Ethereum as well in the future, let's see how the whole market develops and how people react.  |
| 6      | ...such as Dash, but the public society does not know about these.   |
| 7      | We offer the possibility to pay in Bitcoins, Dash, Light Coins but there are many which we accept its around six to seven.   |
| 8      | We only accept Bitcoins at the moment, at our bar where people can pay their drinks with.  |
| 9      | At our ATM we have five different cryptocurrencies to choose from when customers want to buy them, but they can only sell Bitcoins.  |
| 10     | We are focusing on the Bitcoin and it would be possible to pay with Ethereum as well.  |
| 11     | But I think most people only know Bitcoin as it is the most popular one.   |
| 12     | We implemented it (Bitcoin) as it is/was the most popular one. The cryptocurrency with the highest recognition.  |
| 13     | Right now, we are just taking Bitcoins, but I am planning to take Ethereum as well in the future   |
| 14     | Because Bitcoin is a flagship in the cryptocurrency market.  |

|    |  |
|----|--|
| 15 | I think most of the people know Bitcoin but do not know any other cryptocurrencies.                                  |
| 16 | You have to start with the most popular thing like it is Bitcoin right now.  |
| 17 | When you are in the scene there are other big players such as Dash, but the public society does not know about these |
| 18 | Therefore, we are working on finding solutions, that customers can pay also their rooms in Bitcoin in the future     |

#### 7.2.4 Transactions

| Number | Content  |
|--------|--|
| 1      | It is difficult to say. We don't have that much payments at the moment as it is rather new.  |
| 2      | Well in my business, those transactions are only a small percentage of the overall transactions so it doesn't hurt me.   |
| 3      | As I already said, I think there are not that many people who come and pay with cryptocurrencies. It is a new invention, it is at the beginning and things evolve step by step, it is going slowly. But I think there is a lot of potential, let's see how it develops.  |
| 4      | Whereas the majority of my transactions happened within the first five to six month.   |
| 5      | The technology cannot boost the business yet, as the number of transactions, is compared to payment with cash or card relatively low, at this moment in time.  |
| 6      | ...but there were a few customers, all together around five or six.  |
| 7      | ...the transaction fees are quite high at the moment, but there are also solutions for that e.g. you could do cluster transactions where you bundle all the transactions in one cluster and you process the payment once and you only have to pay the fees once. The problem there is that, the instant verification falls away because normally you get your validation in 3-4 sec., and now the system cannot guarantee that the person has the money. |
| 8      | No not really, the only thing is that the volatility is still that it is difficult at the moment to seriously work with cryptocurrencies. A payment today could be 30 percent more or less valued in a month. But it is really difficult to rely on this currency, therefore it is big disadvantage right now.   |
| 9      | Yes, there are people who come here and only have Bitcoin. They come and then you are in the waiting list for the transaction and it takes five to seven minutes, it is annoying for the guests as well as for us. Why does it take that long? It sometimes can last up to 15 minutes.   |
| 10     | Another downside is that guest have to pay the transaction fee. We once had a guest who had a bill of 67 Euros and a transaction fee of seven Euros, which is roughly ten percent of transaction costs. People don't know how the system works and just buy Bitcoins and want to pay with them and are frustrated as the costs are so high.  |
| 11     | And furthermore, the fast transactions are really nice, as by paying with credit cards it takes more than one week until the money is transferred to our bank account. In comparison with cryptocurrencies the amount is transferred immediately.  |
| 12     | I think that depends on the costs of the transaction via e.g. Bitcoin is at the moment relatively low but one year ago the transaction costs were really high. It depends.   |
| 13     | Transaction costs are especially in relation to credit card companies lower with Bitcoins, they also differ as commissions for VISA are for example lower as for AMEX.   |

|    |  |
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| 14 | The transaction fees can be cheaper, and especially transactions are much faster as compared to traditional ways of payment.   |
| 15 | The same things, the transactions fees are cheaper...  |
| 16 | Yes, because when you take credit cards for example, there are transactions fees for every single transaction. Where you have to pay a fixed transaction fee and one to three percent commissions of the whole bill. |
| 17 | Therefore, I think cryptocurrencies and bitcoins have advantages as right now the commissions are very low. Those transaction fees are much lower as compared to credit card providers.                              |
| 18 | For us, more people came as they wanted to see how it works and experience the payment method first hand.  |
| 19 | At the moment we have one to two payments a week.  |
| 20 | We are at the beginning, everything is changing step by step but rather slowly.  |
| 21 | Transactions with cryptocurrencies is developing rather slowly, but it is developing in the gastronomy sector.   |
| 22 | ...amount which is paid in cryptocurrencies is relatively low as there are one to two payments per month each around five Euros.   |
| 23 | ...the biggest right now is that payments via cryptocurrencies through the blockchain is an additional service which we can offer. It is an additional way to pay like credit card or cash.                          |
| 24 | Most of the people make a video of the payment, as it is all new.  |
| 25 | There were many Bloggers here to post about the payment process.   |
| 26 | Blockchain started to be an interesting topic, especially for payments in the hotel industry.  |

### 7.2.5 Software and infrastructure provider

| Number | Content   |
|--------|---|
| 1      | And for accepting payments via cryptocurrencies we are using Bit Pay at the moment.   |
| 2      | This is facilitated by Kurant GmbH, this one of the larger Bitcoin ATM operators in Austria. They own and operate the ATM, and for facilitating that this ATM is in our restaurant we get commissions for each transaction.   |
| 3      | Afterwards we were again looking for a system which we can directly implement, as we did not want to develop one ourselves. Unfortunately, when it comes to ATM providers Austria is quite small so Kurant was one of the prominent ones, and Bit Pay is internationally well known for its services. |
| 4      | After the Bitcoin hype, at the end of 2017 and beginning of 2018, there was especially in Austria this negative spread about this technology and the Bitcoin. Back than we had big issues with our first ATM provider.  |
| 5      | ...than we changed our ATM provider, now everything is fine.  |
| 6      | Furthermore, as mentioned previously one of our biggest issues is that there is no system which is able to connect our property management system with the blockchain so we are not able to offer our customers the possibility to pay their overnights in Bitcoins.                                  |
| 7      | We really enjoy working with it, the system is developing constantly, we are in contact with our suppliers on a weekly basis, which is helpful in constantly developing our system and look for solutions where needed.   |
| 8      | We are also thinking about incorporating a system where you can pay your room with cryptocurrencies, unfortunately our payment provider does not offer this option, but we are working in collaboration with them on the development. This is   |



|    |  |
|----|--|
|    | not that easy as we also need to link our property management system with it.  |
| 9  | Also try to inform the community about current topics, that's why we installed the Bitcoin ATM in our lobby. There you can buy and sell Bitcoins, and people were really interested in this topic especially when the Bitcoins were really high in the last three years.   |
| 10 | But as mentioned previously the system is limited and the option to link rooms is currently not possible as the blockchain technology is at the moment extremely far developed and the old systems in the hospitality industry do not match the new standards. Therefore, we are working on finding solutions, with our partner, that customers can pay also their rooms in Bitcoin in the future. |
| 11 | We have a very good partner who developed our IT framework, we trust one another and therefore I am not worried about the future.  |

| <b>7.2.6 Customer centricity</b> |   |
|----------------------------------|---|
| Number                           | Content   |
| 1                                | People have the possibility to actually trace it back, and that's why I think it can enhance brand loyalty. But as long as it is not known among the general public, I think there is a long way to go to use it as a commercial benefit as well.   |
| 2                                | ...this technology is more for the guest than for us.   |
| 3                                | So, we can win new customers, people who would normally not come to us, they are coming to have a look how it works and then eat something. They try our food at first, and then they want to pay with cryptocurrencies and see how this is working.  |
| 4                                | I think for people who work with these currencies it is a good possibility to come to us and use it, because there are not that many places where you can use it.   |
| 5                                | ...people come to us and want to see how it works, and how it is possible.  |
| 6                                | ...we basically offer our customers a different platform to pay.  |
| 7                                | ...we are happy about the people who have the possibility to pay via cryptocurrencies.  |
| 8                                | I don't know exactly how to really boost the business through this technology, it is another service offered to the customer.   |
| 9                                | We also make meetings to talk about the technology behind and how this is working.  |
| 10                               | After that we decided to make seminars for our guests as well, we had it four times with a dinner included and every time it was sold out. At that time there was a very high interest in this topic as it was also supported by the media.   |
| 11                               | ...but when the Bitcoin boom was like three years ago, we had many questions from guests. But our staff did not really have the knowledge about it to answer the questions. So, we send our staff to seminars so that they know what the technology is and to answer questions asked. After that we decided to make seminars for our guests as well, we had it four times with a dinner included and every time it was sold out. At that time there was a very high interest in this topic as it was also supported by the media. |

| <b>7.2.7 Technology and its functionality</b> |   |
|---|---|
| Number  | Content   |
| 1   | ...far too many people involved and too many different systems which create confusion, as the initial idea was to have one centralized system and not thousands of different ones. Although I am into the topic, I right now do not really know where to invest, how should others know who are not that interested. There are too many |

|    |   |
|----|---|
|    | choices to choose from. This is also the threat to the system as it will only work when everyone goes for one particular solution.  |
| 2  | In contrast, there are internal aspects as, how can the Blockchain technology, improve your business.   |
| 3  | It is a very transparent and straight forward way of keeping your transactions.   |
| 4  | The best thing about the blockchain is the full traceability of goods, e.g. coffee beginning with the farmer towards the sold cup of coffee, if everything is stored on the blockchain you can track everything and fraud will not be possible.   |
| 5  | It will create on long term less costs for businesses, but since it is a relatively new thing and there is no plug in solution yet, somebody has to make first an investment to build up these frameworks.  |
| 6  | I think you should see this in perspective of the traceability and transparency. I don't think that people go somewhere because they use the blockchain technology. I think you can say that I go there because they use blockchain technology and therefore I can trust them that their meat is really what they claim it to be and that their vegetable is really organic certified |
| 7  | ...speed, transparency and having something to talk about.  |
| 8  | You can look at any open platform and trace back transactions. But the speed the transparency and at this point in time transactions fees are the aspects which I value the most  |
| 9  | It is a very transparent and straight forward way of keeping your transactions.   |
| 10 | I think as the Blockchain is a decentralized system this is the most important aspect of this technology.   |
| 11 | The fast transactions are really nice, as by paying with credit cards it takes more than one week until the money is transferred to our bank account  |
| 12 | They are as they are recorded, therefore there is a lot less paperwork.   |
| 13 | Once it is recorded in the Blockchain, it is in that moment stored how much revenue I generated and how much tax I have to pay.   |
| 14 | You get a data set which is comprehensive and cannot be changed.  |
| 15 | Especially in the point of making a business more efficient the blockchain has definitely its advantages.   |
| 16 | ...you have a complete track record of past transactions. For example, everything which happens in the past cannot be changed anymore, so it is stored safely in the system because the hash and all the calculations cannot be entered and changed anymore   |
| 17 | Blockchain is a safe technology as it cannot be changed, as the information is stored on multiple servers which is than secure  |
| 18 | In terms of payments, as we experience with cryptocurrency payments, it is a wave and goes up and down all the time.  |

### 7.2.8 Government and regulations

| Number | Content  |
|--------|--|
| 1      | ...but the government offers the nice possibility for people who do not trust the cryptocurrencies to directly convert them into Euro and avoid the risk of losing money.                            |
| 2      | ... need to reveal, revenues through cryptocurrencies, separately in our P&L statement and we have to treat them like stock as under Austrian rules cryptocurrencies are not accepted as real money. |
| 3      | ... especially on the governmental level, where you look at your tax records transactions are recorded as they are and they cannot be questioned, as you cannot                                      |

|   |  |
|---|--|
|   | change them.   |
| 4 | Therefore, I dropped this payment system, and I created a wallet for the company, to be in line with governmental tax regulations.   |
| 5 | I talked with my tax consultant, and she told me that it can work when I implement it, I basically need an own company wallet and an option in the cash register which enables people to pay with Bitcoins.                      |
| 6 | Major players like Amazon or governments need to develop systems and set the first step as they also have the monetary capacities to do that. After that incentives from smaller companies will come which make the life easier. |
| 7 | ...but one threat is that governments are not able to control the transactions which are taking place.   |

### 7.2.9 Expert responsibilities and positions

| Number | Content  |
|--------|--|
| 1      | ...because of personal interest, curiosity. There was no special reason to implement Bitcoins. It was to try something else to push our business, always try to follow trends. |
| 2      | I started with the topic of Bitcoins one year ago, due to private interests as I am really interested into IT.   |
| 3      | I own a bar, and when the Bitcoin was hyped and everyone was talking about the buzzword Bitcoin  |
| 4      | Well I am responsible for it. I am the owner of the bar.   |
| 5      | As I already mentioned, in my private life I am a fan of it, therefore I implemented it into the company   |
| 6      | I am the owner of the restaurant, and I like cryptocurrencies.   |
| 7      | I think it is the future, that was also the reason why I thought one and a half years ago to start with this payment method.   |
| 8      | I am the restaurant manager, but of course we have an owner and a manager, we together decided that it could be really beneficial for our business.                            |
| 9      | Especially our owner was really passionate about this topic. So, we decided to do this in order to open new doors and do new things.   |
| 10     | We are innovators and try to do new things, to stay ahead of our competitors   |

### 7.2.10 Positive aspects

| Number | Content   |
|--------|---|
| 1      | Speed, transparency and having something to talk about.   |
| 2      | It is about publicity, which does not have any incentive for us, but it spreads awareness about the technology.   |
| 3      | Speed, transparency and it is quite free of possible mistakes as it is a standardized protocol, it is clearly visible which transactions happened.  |
| 4      | The same things, the transactions fees are cheaper, the response of the customers is good and we attract younger customers as with the movement towards cryptocurrencies we stand for innovation.                       |
| 5      | We really enjoy working with it, the system is developing constantly, we are in contact with our suppliers on a weekly basis, which is helpful in constantly developing our system and look for solutions where needed. |
| 6      | ...all this checking could be done in such a framework as blockchain provides it. It is a very transparent and straight forward way of keeping your transactions.   |
| 7      | The best thing about the blockchain is the full traceability of goods, e.g. coffee beginning with the farmer towards the sold cup of coffee, if everything is stored on   |

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|   | the blockchain you can track everything and fraud will not be possible.  |
| 8 | It will create on long term less costs for businesses, but since it is a relatively new thing and there is no plug in solution yet, somebody has to make first an investment to build up these frameworks. |

| <b>7.2.11 Negative aspects</b> |  |
|--------------------------------|--|
| Number                         | Content  |
| 1                              | ...far too many people involved.   |
| 2                              | ...too many different systems which create confusion as the initial idea was to have one centralized system and not thousands of different once.   |
| 3                              | Although I am into the topic, I right now do not really know where to invest, how should others know who are not that interested.  |
| 4                              | There are too many choices to choose from. This is also the threat to the system as it will only work when everyone goes for one particular solution.  |
| 5                              | ...the system could collapse when a majority of the population is using cryptocurrencies as commissions would rise immensely.  |
| 6                              | ...the only thing is that the volatility is still that it is difficult at the moment to seriously work with cryptocurrencies.  |
| 7                              | A payment today could be 30 percent more or less valued in a month. But it is really difficult to rely on this currency, therefore it is big disadvantage right now.   |
| 8                              | ...globally, one major problem is the speculation with such currencies, people are not willing to see them as regular currencies, and the acceptance will further decrease.  |
| 9                              | ... right now, it consuming a lot of energy, which is not that environmentally friendly.   |
| 10                             | When customers wanted to check-out, the function was not functioning at all, there was a countdown of five minutes, which is rather long to get the transaction confirmed.   |
| 11                             | ...quite often the transaction process did not work at all, which is problematic especially for a bar as processes need to be fast.  |
| 12                             | ...sometimes the entire Blockchain is lagging, because of all transactions at the moment.  |
| 13                             | ...extremely far developed and the old systems in the hospitality industry do not match the new standards.   |
| 14                             | We are also thinking about incorporating a system where you can pay your room with cryptocurrencies, unfortunately our payment provider does not offer this option but we are working in collaboration with them on the development currently. This is not that easy as we also need to link our property management system with it. |
| 15                             | People don't know how the system works and just buy Bitcoins and want to pay with them and are frustrated as the costs are so high.  |
| 16                             | Yes, people who come here and only have Bitcoin. There are these few people who come and only have Bitcoins, and they come and then you are in the waiting list for the transaction and it takes five to seven minutes, it is annoying for the guests as well as for us.   |
| 17                             | ...downside is that guest have to pay the transaction fee, we once had a guest who had a bill of 67 Euros and a transaction fee of seven Euros, which is roughly ten percent of transaction costs.   |
| 18                             | People don't know how the system works and just buy Bitcoins and want to pay with them and are frustrated as the costs are so high.  |

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| 19 | After the Bitcoin hype, end of 2017 beginning of 2018, there was especially in Austria this negative spread about this technology and the Bitcoin.   |
| 20 | ... we had big issues with our first ATM provider.   |
| 21 | ...biggest issues is that there is no system which is able to connect our property management system with the blockchain so we are not able to offer our customers the possibility to pay their overnights in Bitcoins |

| <b>7.2.12 Future guidelines</b> |  |
|---------------------------------|--|
| Number                          | Content  |
| 1                               | ...but I am planning to take Ethereum as well in the future, let's see how the whole market develops and how people react  |
| 2                               | For us we want to keep up with the trend, and if it benefits us we are willing to integrate further solutions which are based on the blockchain.   |
| 3                               | ... have something implemented to be prepared for the future, and we'll stick to how it is right now as long as we cannot find a solution for our payment problem.   |
| 4                               | ... if there are changes which result in a decrease of the profitability of our system we have to take decisions   |
| 5                               | The potentials are endless, you can use it in unlimited amount of applications, from medicine to financial transactions, to tax records, basically anything.   |
| 6                               | Anything where there is a transaction where there is a promise made from party A to party B, the whole world can be registered in a blockchain.  |
| 7                               | It is a new invention, it is at the beginning and things evolve step by step, it is going slowly. But I think there is a lot of potential, let's see how it develops.  |
| 8                               | Let's say they will become more efficient. They will be faster, more economical as right now it consuming a lot of energy, which is not that environmentally friendly.   |
| 9                               | If they manage to balance the negative aspects there will be more people who invest in cryptocurrencies and trade them.  |
| 10                              | Major players like Amazon or governments need to develop systems and set the first step as they also have the monetary capacities to do that. After that incentives from smaller companies will come which make the life easier. |
| 11                              | It will create on long term less costs for businesses, but since it is a relatively new thing and there is no plug-in solution yet, somebody has to make first an investment to build up these frameworks.                       |
| 12                              | Also, more major players should start to recognize the technology and cryptocurrencies.  |
| 13                              | It is about the technology, and we still have so much to improve in this whole Blockchain topic, such as efficiency.   |
| 14                              | I hope that it will go better and better and that for the people who know the technology can pay every day with it not only here but in many more places.  |
| 15                              | ...as far as I understood there are much more application possibilities as only the financing sector. I think this technology will shape our future.   |
| 16                              | It might be that in future people come from abroad, and say that they have a wallet with Ethereum or Dash and no local currency and only go to places where they can pay with those.   |
| 17                              | People will not carry a lot of local currency with them anymore, they want to pay with their cryptocurrency wallet.  |
| 18                              | ...I think if you give the technology another 20-30 years it will be the basis for transaction and data storage.   |
| 19                              | ...I think, theoretically speaking it could revolutionize the payment market and how people pay globally.  |