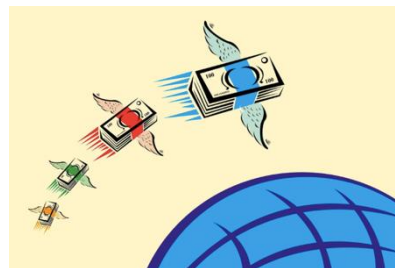THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA

Travelling with Cryptocurrency

A guide for Queensland tourism stakeholders

QUEENSLAND
TOURISM INDUSTRY
COUNCIL

The Voice of Tourism

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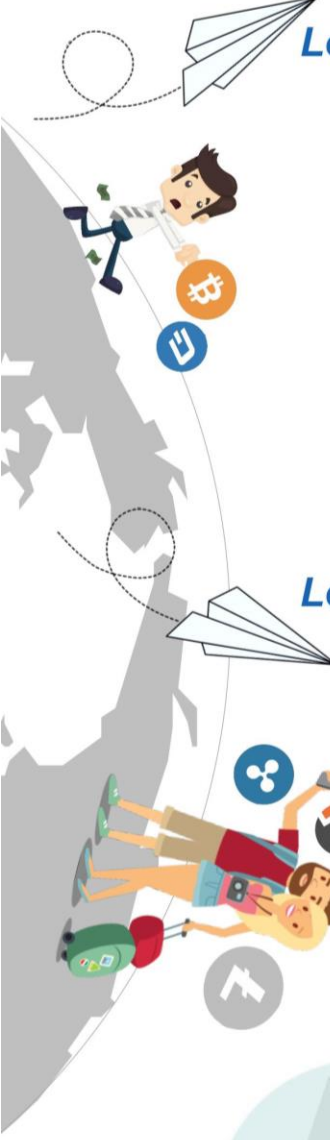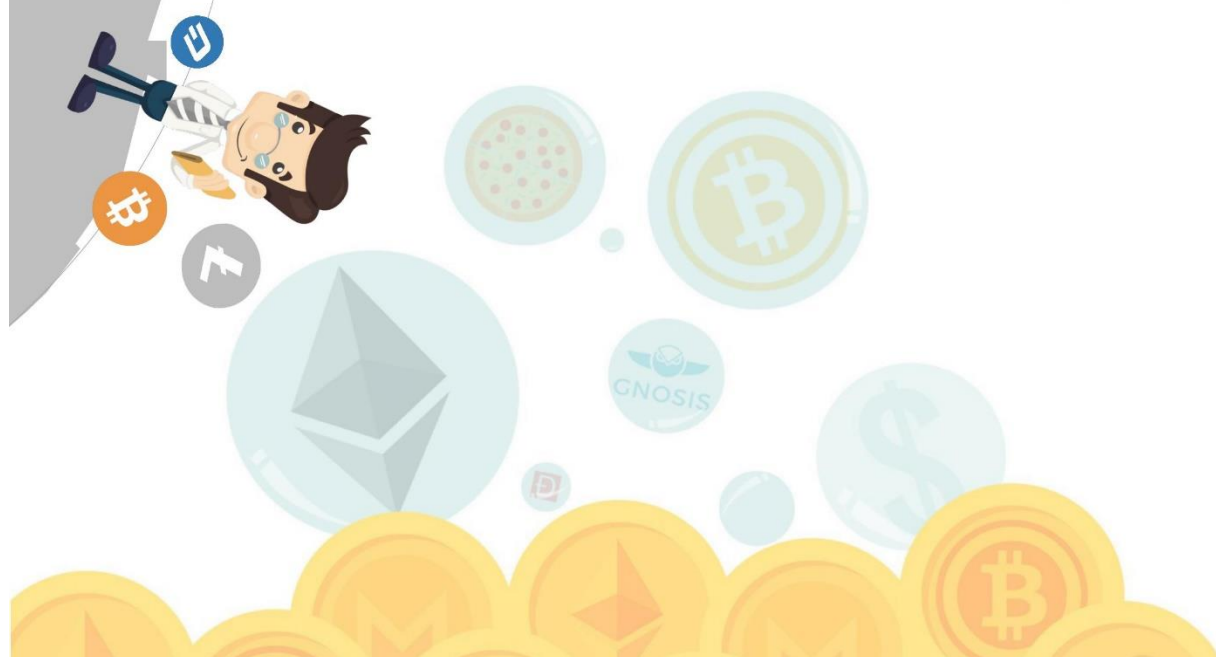## Level 3 Blockchain technology & the tourism industry

Level 1
The basics of cryptocurrency

1.   What is cryptocurrency?

A cryptocurrency is an **electronic currency**, and more specifically, a decentralised distributed currency meaning that it is not controlled by central authority (Baur, Bühler, Bick & Bonorden, 2015). Cryptocurrency is also supported by a **peer-to-peer system** which enables direct payment transaction (Baur et al, 2015). Furthermore, it uses Internet which makes it fast and efficient. It also relies on **cryptography** to make its transactions very secure (Baur et al, 2015).

The graph below shows the significant growth of cryptocurrency since 2013. Even though the value still fluctuates, it is undeniable that cryptocurrency has **exponentially increased** year-over-year. For example, in 2013, 1 Bitcoin was worth AUD$ 15.32 while in 2018, 1 BTC worth AUD$ 12,845. Bitcoin has reached its highest point in 2017 with 1 Bitcoin = 24,540.73. This confirms the growing interest of people in cryptocurrency as well as its increased popularity over the years.
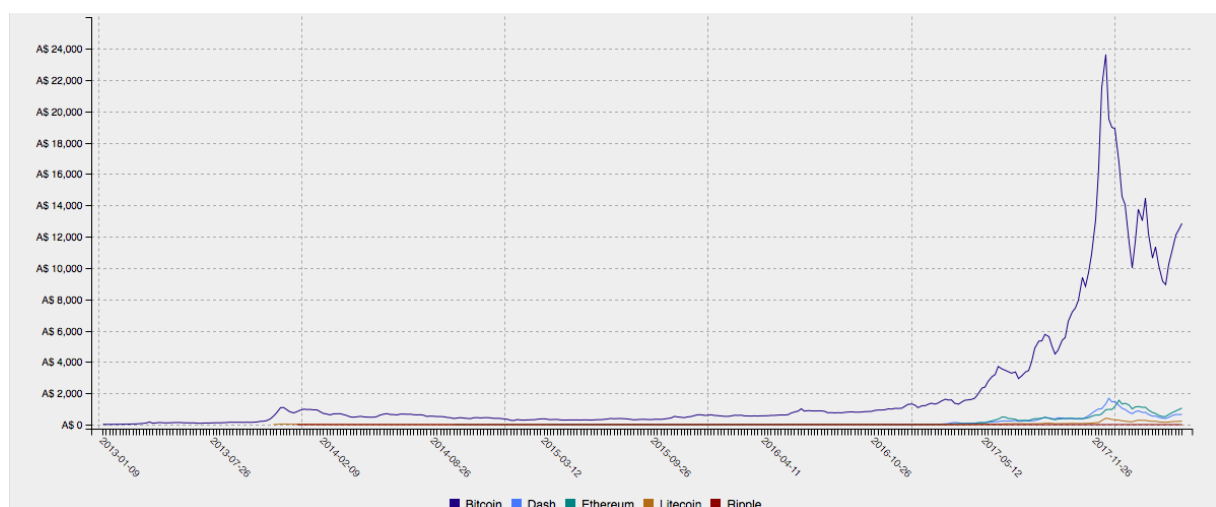
Figure 1. Cryptocurrency growth from 2013 to 2018
Source: Cryptocurrency Chart (n.d.).

2. Cryptocurrency overview

2.1 Where does the idea come from?

1990

Cryptocurrency was the idea of a movement called **"cypherpunk".** This movement gathered a group of people concerned about privacy and personal liberty. However, this concept didn't come alive as no one was really ready for this except for the cypherpunks (Netflix documentary, 2017).

The idea came back due to the **Global Financial Crisis**. Indeed, the Global Financial Crisis has dramatically damaged the world economy therefore, many people lost faith in the way central banks and governments manage the economy (Bradbury, 2018). This event has been an electroshock factor for many people, causing them to look for a more viable alternative, especially for a system that doesn't include the need for a trusted third party.

2007

2008

This situation made several authors wrote about cryptocurrency as many of them felt the need for a **secure and alternative solution** to central authorities (Netflix documentary, 2017). Due to the failure of centralized systems, Satoshi Nakamoto published an article called "A Peer-to-Peer Electronic Cash System" outlining the possible creation of a decentralized digital cash system, suppressing central entity (Rosic, 2017).

The **first Bitcoin** was released by Satoshi Nakamoto called the "Genesis Block" (Rosic, 2017).

2009

2.2 The functions of cryptocurrency

What exactly are the differences between fiat currencies and cryptocurrencies?

Fiat currency has the form of a paper or coin that can be represented electronically whereas cryptocurrency is a decentralised and global digital currency. Fiat currency is controlled by the government and is used to pay taxes while cryptocurrency is not controlled by central authority, it is an algorithm that manages its supply (Cryptocurrency Facts, n.d.).

Fiat currency	Cryptocurrency
Put into circulation by the government	Produced by computers
Unlimited supply as the government can produce more if necessary	Limited supply which means cryptocurrency will reach a maximum number
Form of a paper or coin	Digital form
Centralized system: law and banks control it	Decentralized system: not controlled by institutions such as government or bank
The market determines its value	/

Figure 2. Cryptocurrency vs fiat currency
Source: adapted from Cryptocurrency Facts (n.d.).

What's really remarkable with this technology is that Satoshi found a way to **achieve consensus** without the need of any authority (Rosic, 2017). Indeed, cryptocurrency uses **cryptography** for producing and transferring money.

It is also important to know that the underlying technology of cryptocurrency is **"Blockchain"** as it makes possible the decentralized trade of these digital currencies. Blockchain[1] is a database system in which data is managed by multiple computers all over the world (Rosic, 2017) *(please refer to the level 3 of this handbook for more details)*.

---

[1] With blockchain, third party is replaced by thousands of computers that are responsible for verifying transactions. In order to process a transaction, the computer needs to find the correct mathematical key. Once the computer has solved the algorithm, the transaction is added on a public ledger also called the blockchain. Blockchain keeps a permanent record of every single transaction.

2.3 The characteristics of cryptocurrency

These are the transactional properties of cryptocurrency:

1

IRREVERSIBLE

Once a transaction is confirmed and sent to somebody else, it is impossible to undo it (Cryptocurrency Army, n.d.).

2

PSEUDONYMOUS

Transactions and accounts cannot be traced to real world identities which means people don't know who is spending or sending cryptocurrencies (Cryptocurrency Army, n.d.).

3

FAST & GLOBAL

A transfer is instantaneous and it doesn't take into account the physical location therefore people can send money to someone else on the other side of the world and can see it happens almost immediately (Cryptocurrency Army, n.d.).

4

SECURE

The cryptography system on which cryptocurrency relies only allows the owner of the account to send money therefore nobody else has access to it (Cryptocurrency Army, n.d.).

5

PERMISSIONLESS

Everyone is free to use, buy, exchange and send cryptocurrency (Cryptocurrency Army, n.d.).

The monetary properties are the following:

1

CONTROLLED SUPPLY

Cryptocurrencies have a limited supply, their numbers will reach a maximum unlike physical currency for which it is possible to produce more if necessary (Cryptocurrency Army, n.d.).
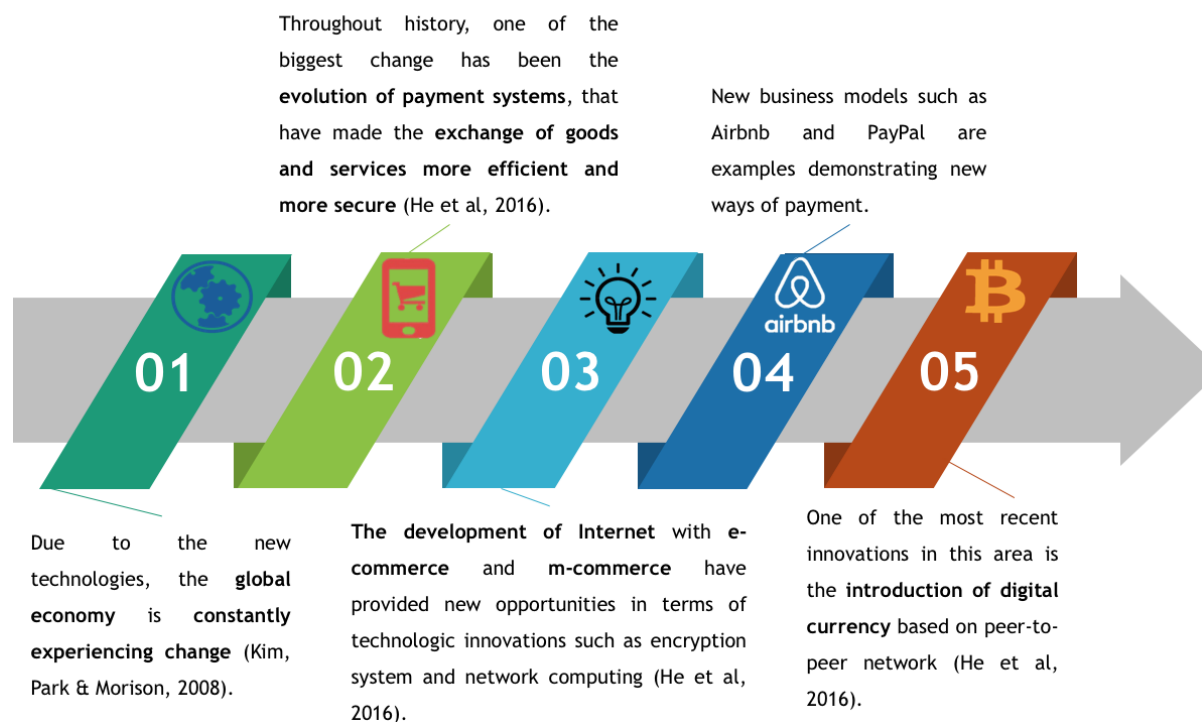
2

NO DEBT

Cryptocurrencies do not represent debt, they just represent themselves and worth exactly the amount belonged while the amount of fiat currency can be redeemed at any time (Cryptocurrency Army, n.d.).

2.4 The global context of cryptocurrency

The chart below states the global environment and advancement in technology in order to understand the factors that have contributed to the emergence of cryptocurrency.

Throughout history, one of the biggest change has been the **evolution of payment systems**, that have made the **exchange of goods and services more efficient and more secure** (He et al, 2016).

New business models such as Airbnb and PayPal are examples demonstrating new ways of payment.

01 **02** **03** **04** **05**

Due to the new technologies, the **global economy** is **constantly experiencing change** (Kim, Park & Morison, 2008).

The development of Internet with **e-commerce** and **m-commerce** have provided new opportunities in terms of technologic innovations such as encryption system and network computing (He et al, 2016).

One of the most recent innovations in this area is the **introduction of digital currency** based on peer-to-peer network (He et al, 2016).

After the release of the first cryptocurrency (Bitcoin) in 2009, the digital currency market has evolved very fast (Farell, 2015).

The graph below shows the market capitalisation of cryptocurrency which represents the amount of demand for digital currency. The market capitalisation increases as soon as more people buy cryptocurrency (Marshall, 2018). On the graph, it is possible to notice that the market capitalisation has increased three times since 2016, reaching almost $800,000M end of 2017 (CoinMarketCap, n.d.). This growth means that the value of cryptocurrency increases and that its popularity is also on the rise (Marshall, 2018).
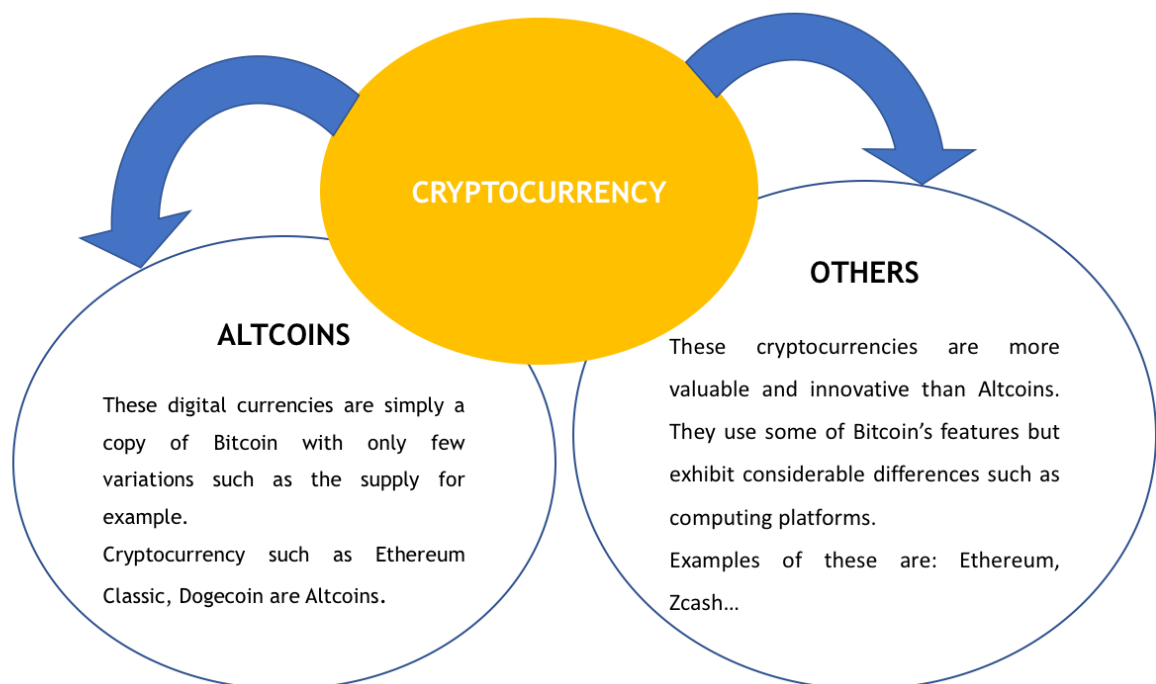
Figure 3. Cryptocurrency total market capitalisation
Source: CoinMarketCap (n.d.).

In total, the cryptocurrency market is composed of more than 1,000 cryptocurrencies (Frankel, 2018).

It is Bitcoin that has inspired the creation of many other ones. Cryptocurrencies can be divided into two categories (Hileman & Rauchs, 2017):

CRYPTOCURRENCY

ALTCOINS

These digital currencies are simply a copy of Bitcoin with only few variations such as the supply for example.
Cryptocurrency such as Ethereum Classic, Dogecoin are Altcoins.

OTHERS

These cryptocurrencies are more valuable and innovative than Altcoins. They use some of Bitcoin's features but exhibit considerable differences such as computing platforms.
Examples of these are: Ethereum, Zcash...

2.5 The main types of cryptocurrencies

Among these thousand cryptocurrencies, which ones are the most popular? Let's look at the main types of cryptocurrency.

The chart below displays the main types of cryptocurrencies in terms of market capitalisation:
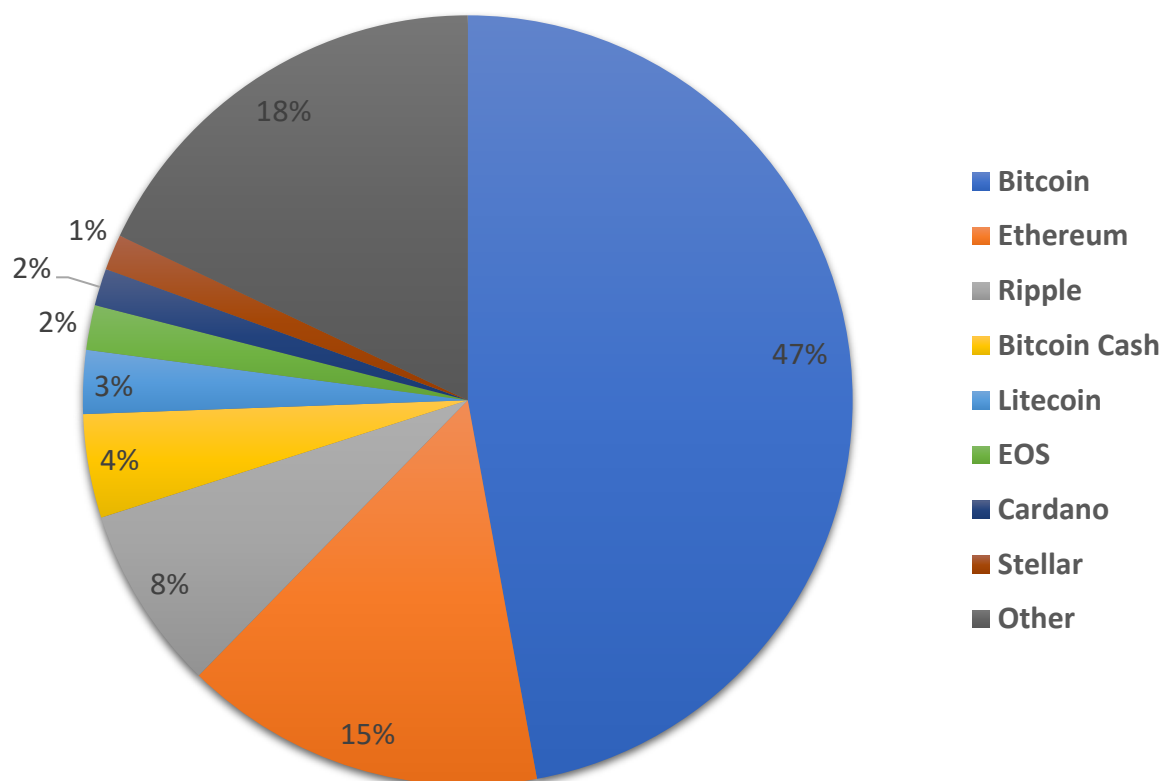

Figure 4. Cryptocurrencies by market capitalisation
Source: Adapted from CoinDance (n.d.).

The table below lists the predominant cryptocurrencies with their main characteristics:

Name	Developer(s)	Release Year	Total Coin Supply	Price (15/05/18)
Bitcoin (BIT)	Satoshi Nakamoto	2009	21 million max	US$ 8,713.58
Ethereum (ETH)	Vitalik Buterin	2015	Do not have a limited number	US$ 729.03
Litecoin (LTC)	Charlie Lee	2011	84 million max	US$ 145.20
Dash (DASH)	Evan Duffield	2014	18 million max	US$ 436.98
Ripple (XPR)	Ryan Fugger	2012	100 billion	US$ 0.742220

Figure 4. The main types of cryptocurrency

- Bitcoin was the **first cryptocurrency** to be produced (Empirica, n.d.). Bitcoin is the most popular and reliable cryptocurrency and takes **over 40% of the cryptocurrency market** (King, 2018);
- Bitcoin is a **peer-to-peer system** allowing online payments;
- Bitcoin is **divisible**: it is possible to break the number down into very small units. A satoshi refers to the smallest unit of bitcoin (1 satoshi = 0.00000001 BTC).

10 minutes
It's the time required to create one Bitcoin

9 to 12 thousand dollars
That's what 1 Bitcoin worth today

21 million coins
Bitcoin will reach this final number by 2140

- Ethereum has a decentralized system allowing people to do online payments with its currency (Ether) (Martindale, 2018);
- Ethereum extends the possibility of the blockchain technology by enabling people to use the platform to **create decentralized applications** *(more details are given in the third level)* allowing businesses to remove intermediaries thus reducing expenses (Coin Telegraph, n.d.).

- **Transaction** and **confirmation** done with Litecoin are much **faster** than the one with Bitcoin as Litecoin was designed to be a better version of Bitcoin (Coindesk, 2014).

84 million coins
That's the maximum of Litecoin

- Dash shares similarities with Bitcoin such as online purchases however, its **speed is faster** (Bitcoin beginner, 2017);
- Dash also has a **decentralized governance** which makes possible for users to implement changes in the network (Bitcoin beginner, 2017);
- The **anonymity** with Dash is **reinforced**: it is impossible to know where someone send money or where it comes from (Bitcoin beginner, 2017).

4 seconds
That's the time Dash confirms transactions

- Ripple displays the most differences with the other digital currencies as it is not a decentralized system (Rutnik, 2018);
- Ripple works with **financial institutions** (banks) to help them increased the speed of transfers and reduce fees for cross-border payments (Rutnik, 2018);
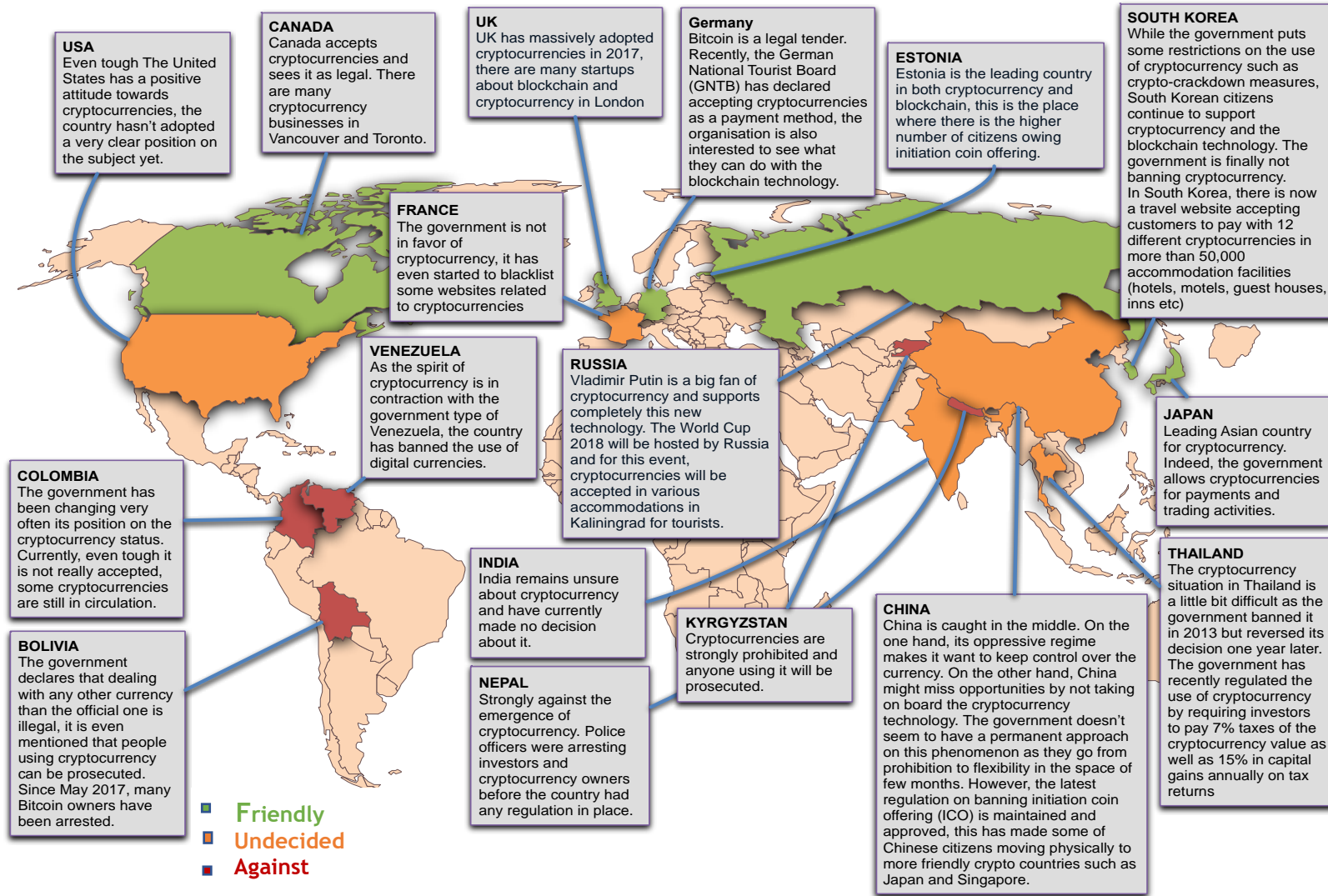- Ripple has been **backed** by many banks (Rutnik, 2018).

After learning about the different types of cryptocurrency, let's see how countries around the world perceive this technology.

3. Cryptocurrencies around the world

USA
Even tough The United States has a positive attitude towards cryptocurrencies, the country hasn't adopted a very clear position on the subject yet.

CANADA
Canada accepts cryptocurrencies and sees it as legal. There are many cryptocurrency businesses in Vancouver and Toronto.

UK
UK has massively adopted cryptocurrencies in 2017, there are many startups about blockchain and cryptocurrency in London

Germany
Bitcoin is a legal tender. Recently, the German National Tourist Board (GNTB) has declared accepting cryptocurrencies as a payment method, the organisation is also interested to see what they can do with the blockchain technology.

ESTONIA
Estonia is the leading country in both cryptocurrency and blockchain, this is the place where there is the higher number of citizens owing initiation coin offering.

SOUTH KOREA
While the government puts some restrictions on the use of cryptocurrency such as crypto-crackdown measures, South Korean citizens continue to support cryptocurrency and the blockchain technology. The government is finally not banning cryptocurrency. In South Korea, there is now a travel website accepting customers to pay with 12 different cryptocurrencies in more than 50,000 accommodation facilities (hotels, motels, guest houses, inns etc)

FRANCE
The government is not in favor of cryptocurrency, it has even started to blacklist some websites related to cryptocurrencies

VENEZUELA
As the spirit of cryptocurrency is in contraction with the government type of Venezuela, the country has banned the use of digital currencies.

RUSSIA
Vladimir Putin is a big fan of cryptocurrency and supports completely this new technology. The World Cup 2018 will be hosted by Russia and for this event, cryptocurrencies will be accepted in various accommodations in Kaliningrad for tourists.

JAPAN
Leading Asian country for cryptocurrency. Indeed, the government allows cryptocurrencies for payments and trading activities.

COLOMBIA
The government has been changing very often its position on the cryptocurrency status. Currently, even tough it is not really accepted, some cryptocurrencies are still in circulation.

INDIA
India remains unsure about cryptocurrency and have currently made no decision about it.

KYRGYZSTAN
Cryptocurrencies are strongly prohibited and anyone using it will be prosecuted.

CHINA
China is caught in the middle. On the one hand, its oppressive regime makes it want to keep control over the currency. On the other hand, China might miss opportunities by not taking on board the cryptocurrency technology. The government doesn't seem to have a permanent approach on this phenomenon as they go from prohibition to flexibility in the space of few months. However, the latest regulation on banning initiation coin offering (ICO) is maintained and approved, this has made some of Chinese citizens moving physically to more friendly crypto countries such as Japan and Singapore.

THAILAND
The cryptocurrency situation in Thailand is a little bit difficult as the government banned it in 2013 but reversed its decision one year later. The government has recently regulated the use of cryptocurrency by requiring investors to pay 7% taxes of the cryptocurrency value as well as 15% in capital gains annually on tax returns

BOLIVIA
The government declares that dealing with any other currency than the official one is illegal, it is even mentioned that people using cryptocurrency can be prosecuted. Since May 2017, many Bitcoin owners have been arrested.

NEPAL
Strongly against the emergence of cryptocurrency. Police officers were arresting investors and cryptocurrency owners before the country had any regulation in place.

Friendly
Undecided
Against

3.1 Australia as a case study

In order to better understand Australia's situation regarding cryptocurrency, it is important to analyze its political and social environment towards the technology.

Politically

Since the **1st July 2017**, Australia is officially treated Bitcoin as money (ATO, 2018). Indeed, the government has removed the double taxation on cryptocurrency which means that sales and purchases with digital currency are no subject to Goods and Services Tax (GST) anymore (ATO, 2018). However, this regulation doesn't apply to businesses that accept cryptocurrency as a payment (ATO, 2018).

Additionally, Australia wants to position itself as a **leading global financial technology country** (Australian Government, 2017). Therefore, the government is facilitating the integration of cryptocurrency as it believes the country should take advantage of the economic opportunities this innovation can drive, thus increasing productivity (Australian Government, 2017).

Socially

From a social perspective, the motivation behind cryptocurrency usage result from technology curiosity and personal beliefs. Indeed, many people use cryptocurrency because they believe it values privacy and personal liberty as there is no central authority controlling it (Yeoh, 2018).

> Australian citizens show significant interests towards cryptocurrencies and several businesses have already adopted them (Hubble, 2018).
>
> Let's look at an example!

THE FIRST LABOUR HIRE COMPANY TO ACCEPT BITCOIN IN AUSTRALIA

HUNTER Labour Hire
hunterlabourhire.com.au

Hunter Labour Hire is the **first Australian recruiting enterprise** for construction companies, to accept cryptocurrency (Hunter Labour hire, n.d.). The company adopts digital currency in order to stay technologically current and also, to provide cryptocurrencies' benefits to its customers such as low fees, rapid payments and high security (Hunter labour hire, n.d.).

Local Australian companies are not many in numbers to accept cryptocurrency however, there is a young start-up, called **TravelbyBit** located in Brisbane that does some very important work regarding cryptocurrency expansion across Australia.

TravelbyBit's goal is to create a **cryptocurrency community travel** in Australia and to support tourism operators that are willing to accept and use cryptocurrency (TravelbyBit, n.d.).

In order to facilitate the use of cryptocurrency in tourism industry, TravelbyBit provides solution to both the demand and supply side.

The way TravelbyBit assists tourism businesses in accepting cryptocurrency payments lie in **removing the price volatility:**
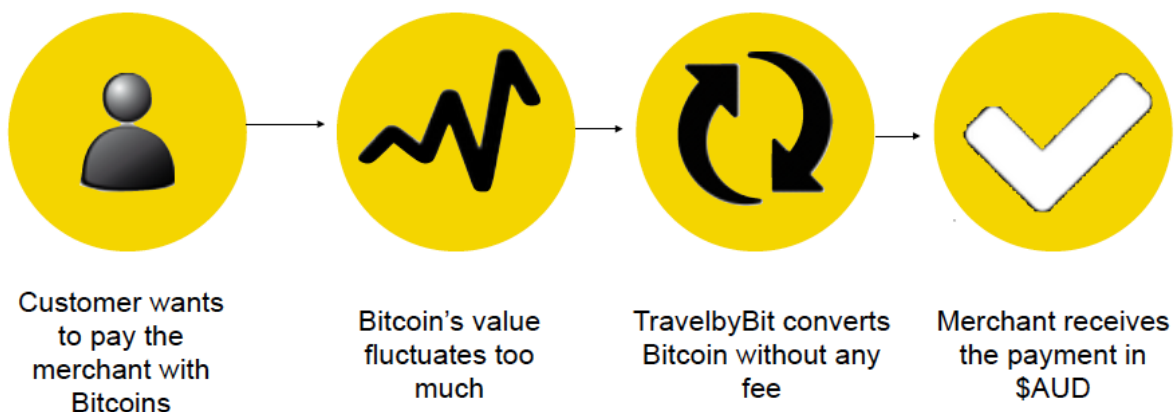
During the transaction process, travelers can pay with their choice of digital currency, and the merchant can either keep the payment in cryptocurrency or convert it into Australia dollars (Yeoh, 2018). As the system is peer-to-peer, it doesn't involve any fee unlike Visa Mastercard that usually charges 2-3% fees (Yeoh, 2018).

TravelbyBit is currently working on different projects:

01 **"Crypto Valley"** which consists of a network gathering more than 20 merchants in Fortitude Valley, accepting cryptocurrency payments. It involves restaurants, coffee shops, bars, hotels, retailers, real estate, car dealership, travel agency, tour provider etc… (TravelbyBit, n.d.).

02 TravelbyBit is also facilitating digital currency payments for the retailers of **Brisbane Airport** (Yeoh, 2018). This makes Brisbane Airport the first cryptocurrency airport in the world and puts Queensland as the leader in terms of digital innovation in Australia (Crozier, 2018).

In the future, TravelbyBit would like to expand its activities widely in Australia and not only in Queensland (Yeoh, 2018).

Currently, TravelbyBit has already some partnerships in:

Melbourne

Barber of Seville

World Computer Centre
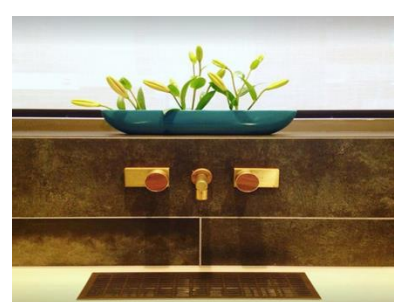
Sensu Spa

The Kraken Squid

Delhi Streets

Sydney

Le Saigon

Fire & Food

Urban Pizza Bar

Darwin

Flight Path Golf & Outdoor Recreation

Thrive

Perth
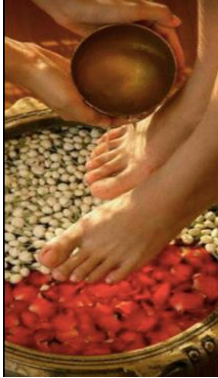
Eco Spa & Wellness

Flicking Road Brewing Co

Adelaide

Talunga Winery, Café & Functions

Tasmania

Maple Café

4. Cryptocurrency on the tourism industry

The graph below shows that travel represents a considerable part in cryptocurrency's spending. Indeed, people use cryptocurrency to pay their travel bills (Coindance, n.d.).
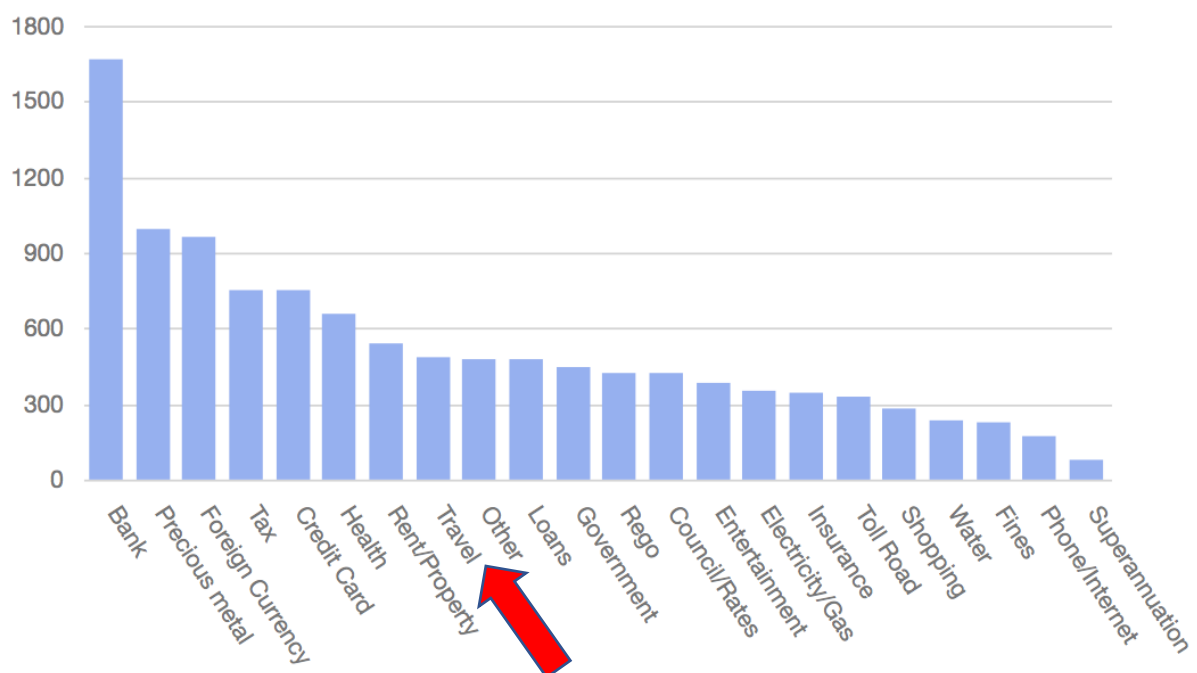
Figure 5. The use of cryptocurrency to pay bills
Source: The living room of Satoshi. (2018).

Furthermore, **international visitors' expenditure rose about 3.6%** in 2017 (Tourism and Events Queensland, 2017). The graph below exhibits the expenditures per international traveler in Queensland which was about $2,000 in 2017 which is twice more than the one of domestic travelers. This growth can potentially open up to a **higher demand of cryptocurrency** as the technology considerably facilitates overseas travels (no need to carry cash, no credit card fraud, no need to change currency, no subjection to high commission etc).

Expenditures per international and domestic tourists in Queensland in 2017
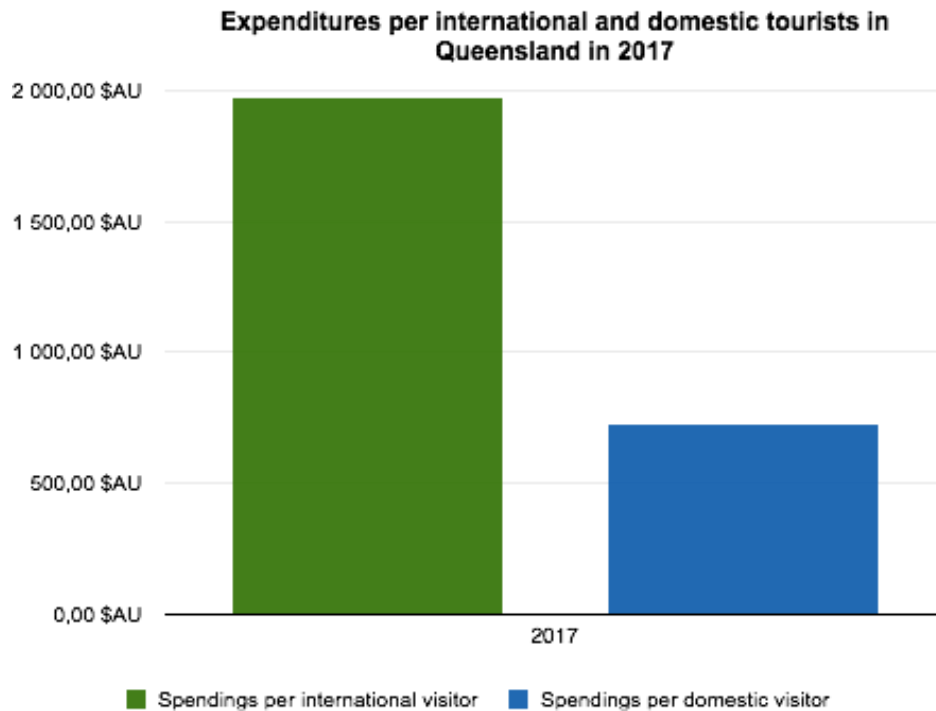
Figure 6. Spendings per visitors in Queensland 2017
Source: Adapted from Tourism and Events Queensland. (2017).

Additionally, the graph below presents the number of international tourists in Queensland. It shows that the number of **international travelers has risen** in the past six years: 2.7 million international visitors was recorded in 2017 with a 4.3% growth rate (Tourism and Events Queensland, 2017).

Figure 7. Growth of international tourists in Queensland
Source: Tourism and Events Queensland. (2017).

Besides, one of cryptocurrency's benefit is that people can use it as a payment method anywhere without the need to worry of the currency exchange rate. Therefore, cryptocurrency and international tourism form a logic connection of compatibility.

From this level, these are the most important elements to remember:

Decentralised

Allows to send money without the need of a third party such as bank.
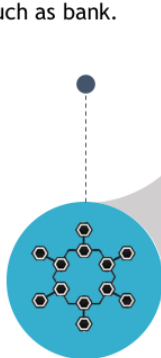
Low fee & fast transfer

Transaction fees are lower than credit card and payment transfers are faster.

Different type

Predominant cryptocurrencies are: Bitcoin, Ethereum, Litecoin, Dash and Ripple.
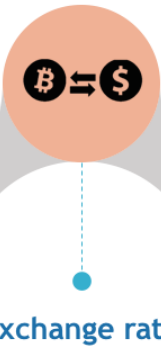
Global

Can be used anywhere in the world.

Exchange rate

There is no currency exchange rate to worry about.

Secure

Uses algorithm for the verification of transactions.

Benefits on the tourism industry

Facilitates tourists' travel: no need to carry cash, to think of the currency conversion, to think of the cost of international transfers and to be afraid of fraud. It is convenient, safe and no bank fee.

To make sure you are ready to move on to the next level, it is time to test your knowledge!

1 Cryptocurrency is....

☐ An electronic currency

☐ A digital currency that is decentralized and distributed

☐ Another form of a fiat currency

2 What elements define cryptocurrency?

☐ Centralised system that is controlled by authority like bank and government and that has a value determined by the market

☐ Decentralised system that is produced by computers and that has a limited supply

3 What are the characteristics of cryptocurrency?

- ☐ Irreversible
- ☐ Pseudonymous
- ☐ Fast & global
- ☐ Secure
- ☐ Permissionless
- ☐ All of the above

4 What are the benefits of cryptocurrency on the tourism industry?

- ☐ Convenient
- ☐ Safe
- ☐ No bank fees
- ☐ No fraud
- ☐ All of the above

Level 2
The implications of cryptocurrencies on the tourism industry
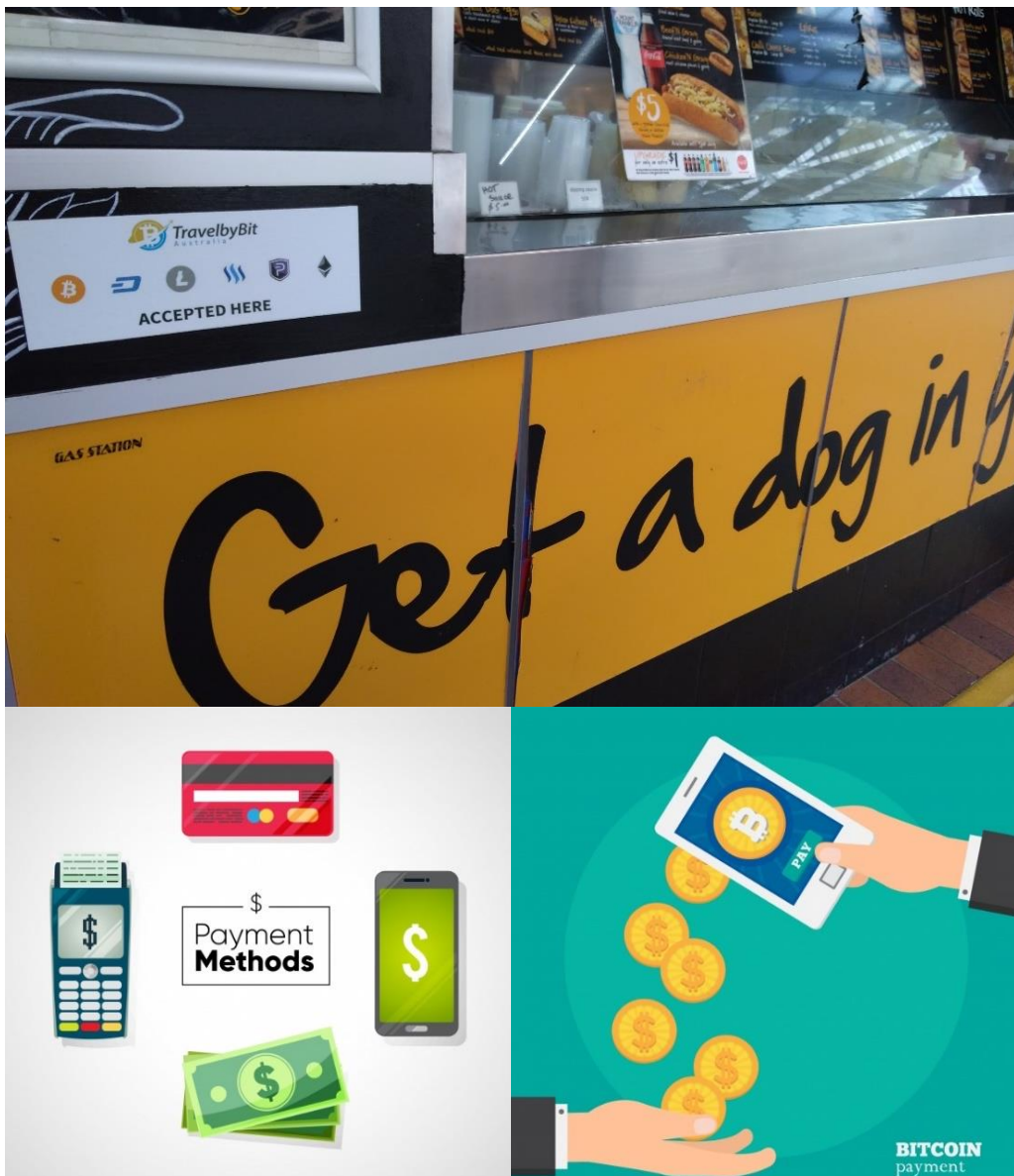
1. Analysis of the largest cryptocurrency in the world: Bitcoin

In the level 1, the main types of cryptocurrencies have been listed and summarized. In this section, the focus will be placed on the most well-known cryptocurrency – **Bitcoin**. Bitcoin is the most used digital currency in the world and occupies the largest share of market capitalisation (King, 2018). Now, let us dive into the world of Bitcoin!

1.1 Bitcoin

In 2009, Bitcoin was released as **the first decentralised digital currency** (Brito & Castillo, 2013). Today, Bitcoin is the most recognized and used cryptocurrency in the world (CBinsights, 2018).

Bitcoins can be sent to **anyone** through **Internet**, can be **used anywhere** and for **any kind of purchase** (CBInsights, 2018).

Bitcoin doesn't take into account the **physical location** of the sender or the receiver and **removes intermediaries** (bank).

Bitcoin's transaction fees are **very low.**

1.2 How Bitcoin works

Bitcoin is generated, traded and circulated online without any trusted third party, such as Government and central bank.

When a system is governed and controlled by central authority, it is called a **Centralized system**.
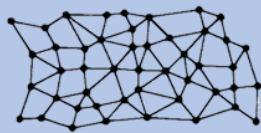
A system where each part connects with another and without any governance mechanism is called a **Decentralized Distributed system**.

Bitcoin is independent as it uses a decentralized distributed system called **Blockchain** that records every single transaction thus ensuring the transaction transparency (Cannucciari, 2016).

Blockchain operation relies on thousands of **computers** *(called Nodes)* (Linus, 2018). The **nodes** role is to verify Bitcoin transactions by solving algorithm (Linus, 2018). The most important process of Blockchain is the recording of transaction which is called **"Mining"** and individuals who perform this task are called *"Miners"* (Judmayer et al, 2017). When people make a transfer to someone else with Bitcoin, the transaction cannot be completed until it is recorded on the blockchain. This process includes a **large amount of calculation** and requires vast amount of processing capacity and electricity (Linus, 2018). This is why Bitcoin system has miners to facilitate this work. In return of processing Bitcoins, the miners get rewarded with Bitcoins (Linus, 2018). The more users join the network, the more difficult it becomes to mine Bitcoins as it requires individuals *(miners)* to be equipped with very expensive and specialised appliances (Linus, 2018).

Once the nodes *(computers)* have authorized the transaction, the miners *(individuals)* can record the transaction and complete it.

What makes this **system trustworthy** is that every computer involved in the network has to find **identical numerical values** and authorize it to be able to complete the transaction (Linus, 2018). As the process of verification involves a large number of nodes, this prevents the risk of **transaction falsification** and keeps the **transaction's authenticity** (Judmayer et al, 2017) *(detailed explanations are given in level 3).*

In summary, this process is all about authorizing Bitcoin transaction:

1 Seller and buyer agree on the condition of transaction, and the buyer sends the Bitcoin to the seller.

2 Transaction information is sent to the all the nodes on the Blockchain network.

3 All nodes approve the transaction.

4 Miner records the approved transaction on the Blockchain.

5 Transaction is completed.

6 The seller receives the money in Bitcoin.
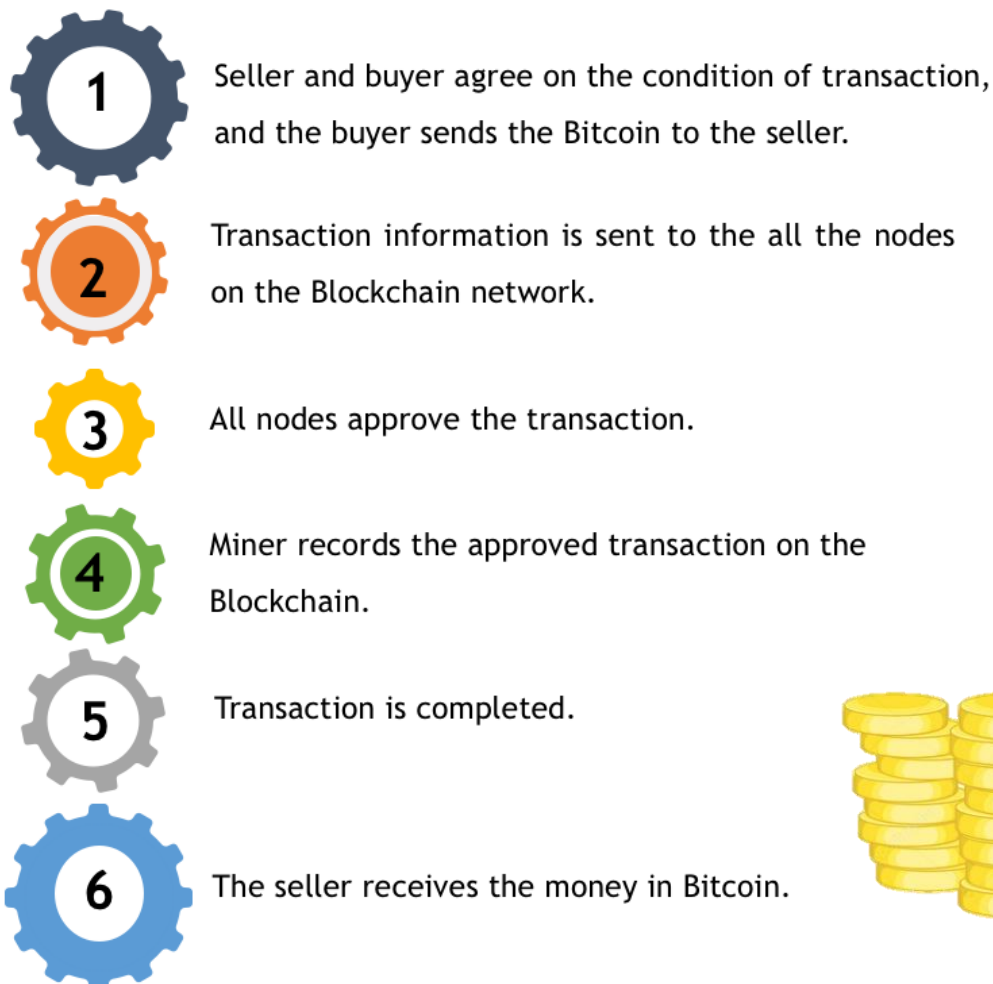
Concretely, Bitcoin's transaction is very simple as Bitcoins can easily be bought and sold from currency exchanges via the use of digital wallets (CBInsights, 2018). These wallets allow people to keep their Bitcoins on their computer or on their smartphones (CBInsights, 2018).

Bitcoin transaction processes are illustrated below:
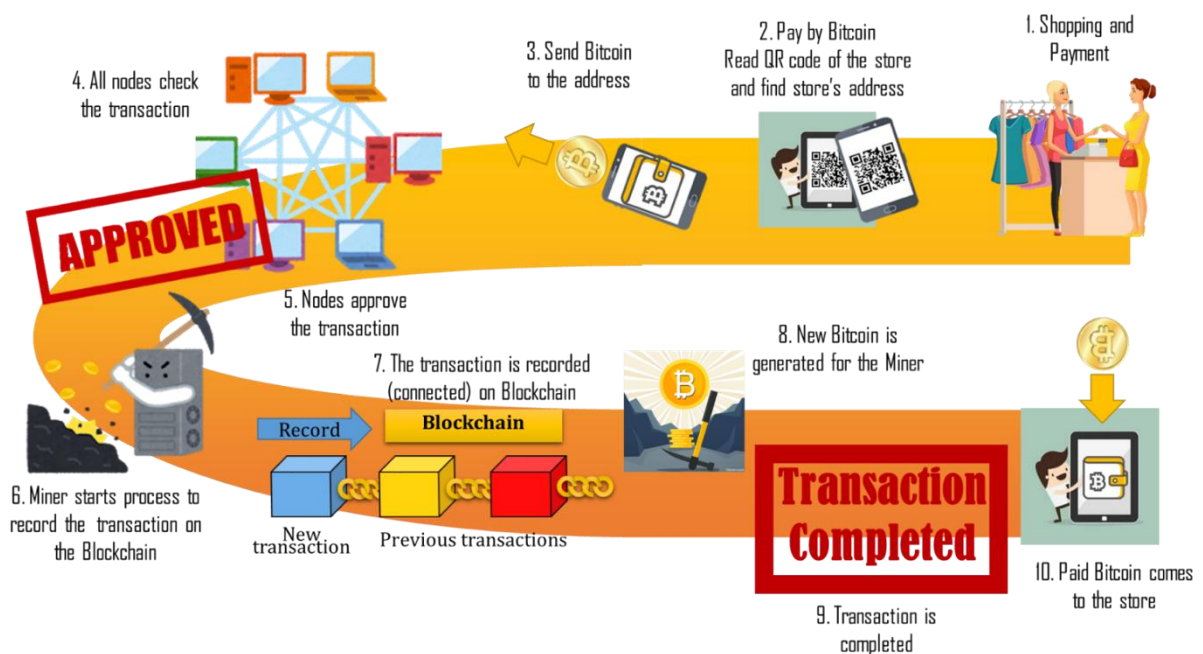
Figure 8. Bitcoin's transaction process

Once a transaction occurs, the blockchain **encrypts people identities** therefore, it is impossible to link real world identities (Cannucciari, 2016). Blockchain only keeps a permanent record of every Bitcoin transaction allowing to know where the money has been and from where it went to (Cannucciari, 2016).

The graph below illustrates the transaction of data with Bitcoin. Each transaction is allocated a unique ID. Payer ID and Payee ID are encoded so that no one can detect the identity of the person involved in the transaction however, the paid and received amount of Bitcoin can be seen.
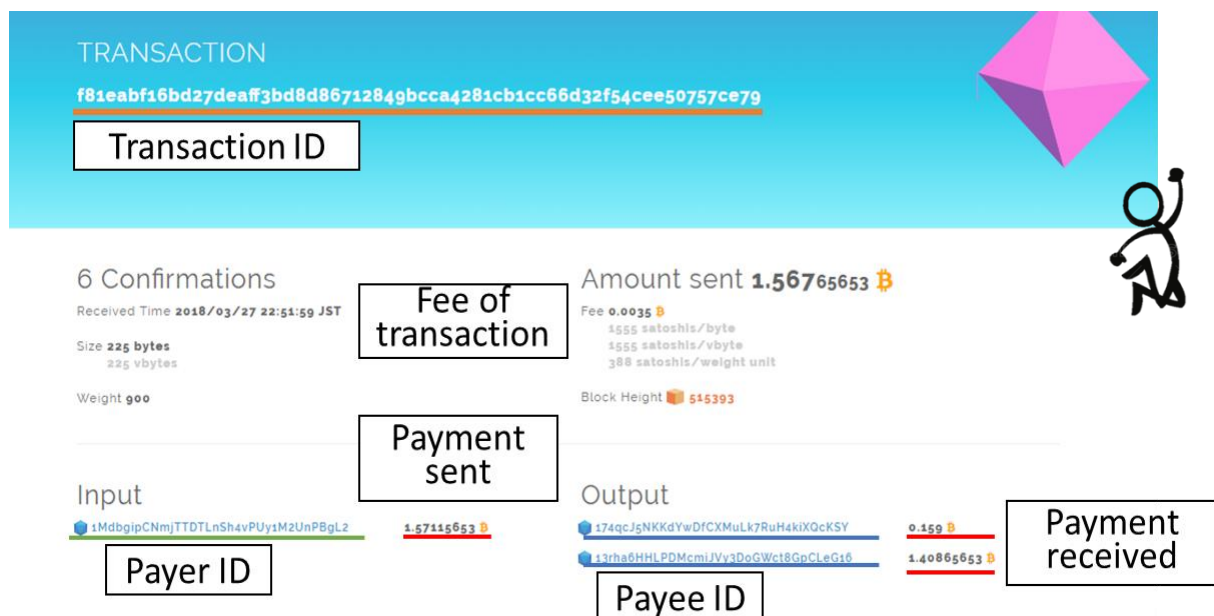
Figure 9. Description of Bitcoin transaction

Fun fact

A couple, Austin & Beccy, decided after their marriage and for a period of 90 days, to only use Bitcoin as a payment method. They even decided to turn the idea in a documentary called "Life on Bitcoin".

WOW !

1.3 Bitcoin from a global perspective

Bitcoin has experienced a very fast evolution throughout the years (Yeoh, 2018). The two timelines below show Bitcoin's history with its most important events and the growth of Bitcoin in terms of price.
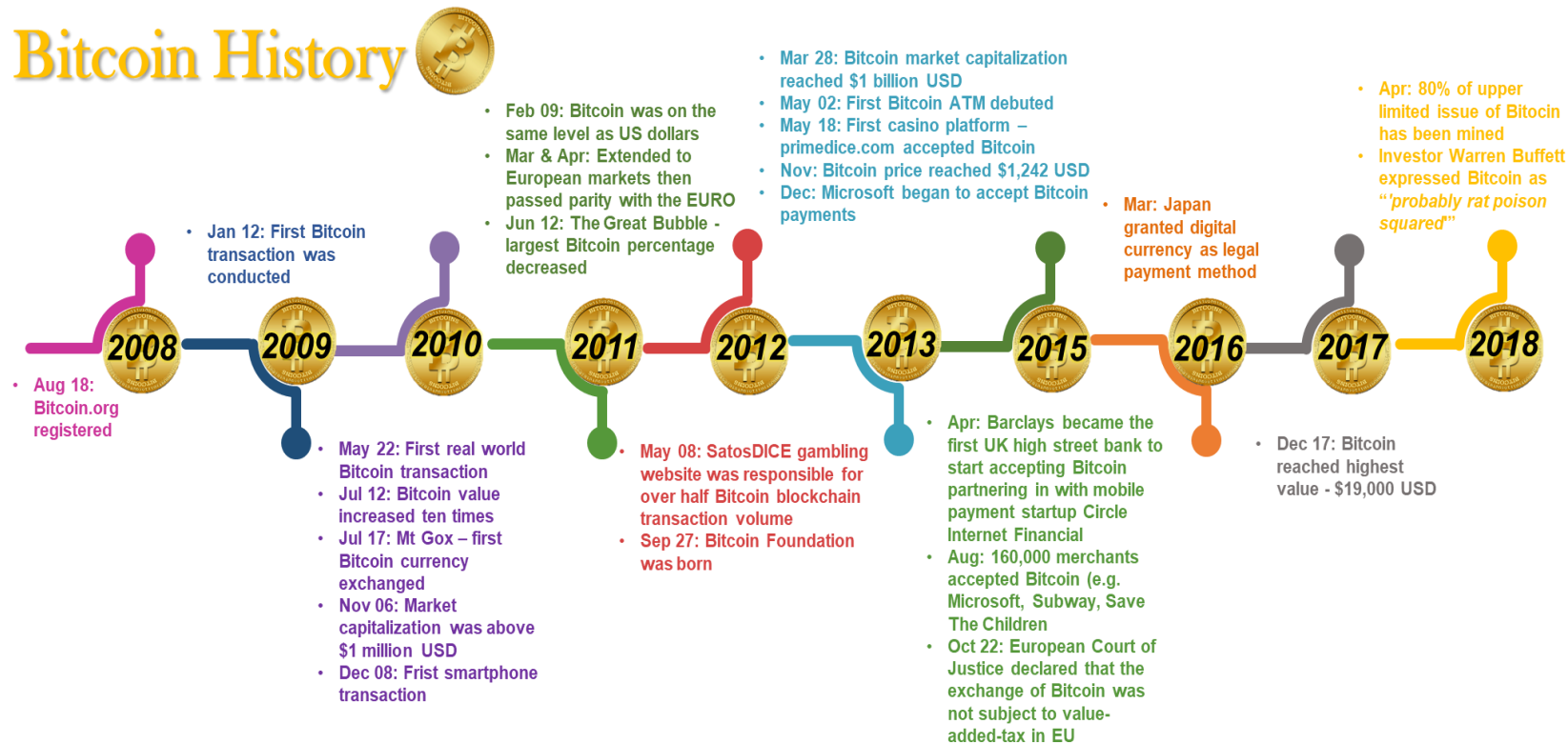
Figure 10. Bitcoin's history
Source: Adapted from Futurism. (n.d).
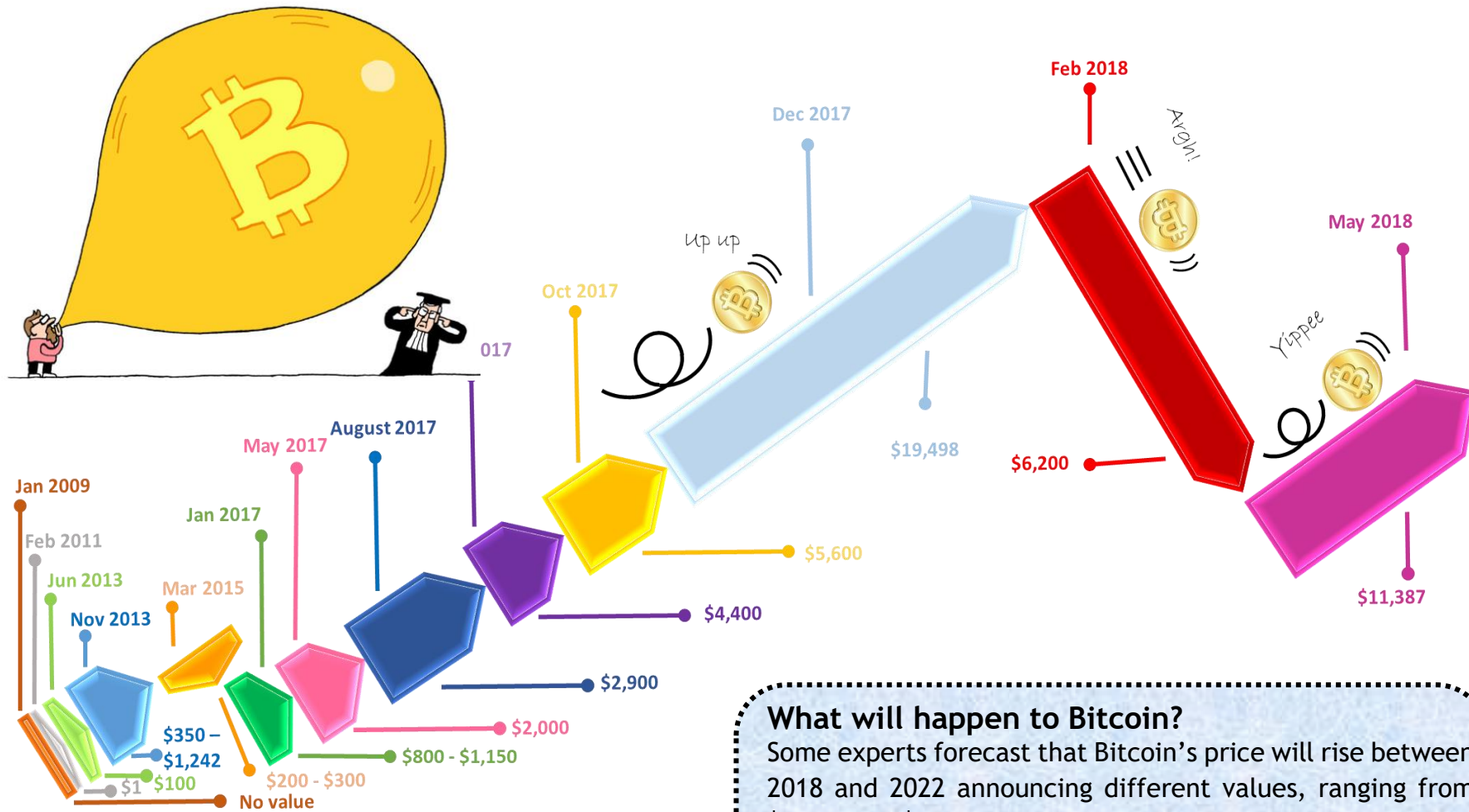
Figure 11. Bitcoin's price evolution
Source: Adapted from Netflix documentary. (2017).

What will happen to Bitcoin?
Some experts forecast that Bitcoin's price will rise between 2018 and 2022 announcing different values, ranging from $20,000 to $1,000,000 (Woo, 2018).
On the other hand, Edward Snowden think that Bitcoin will not last because better version of Bitcoin has been created that has an improved security system (Harry, 2018).

Fun fact

James Howells, an IT worker from Newport mined 7,500 Bitcoins however, as Bitcoin's value was low in 2009, he ended up by throwing away the hard drive on which he stored them.

Few years later, the Bitcoins that he mined were worth $600,000 USD and today, there are worth more than $8 million USD.

WOW !
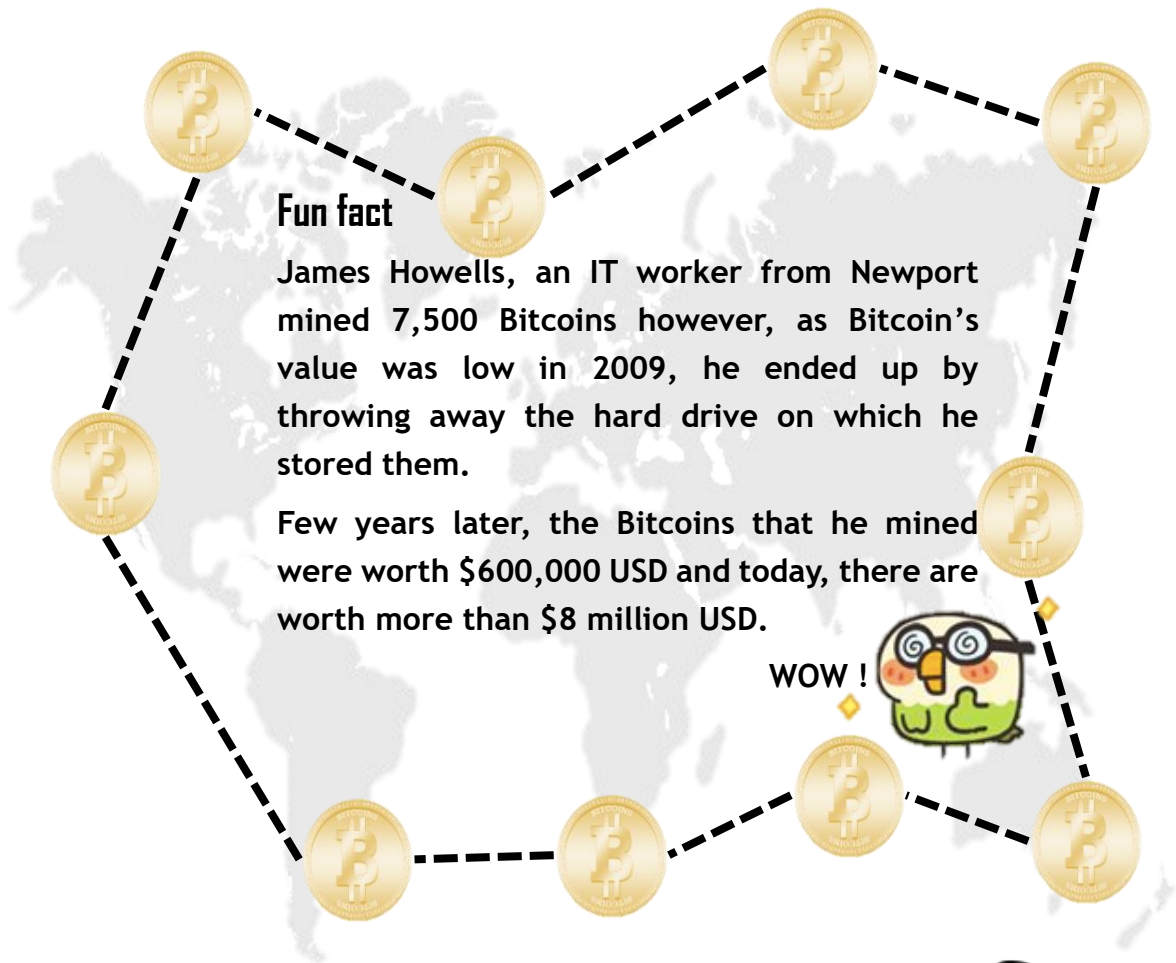
1.4 Applications of Bitcoin

It was necessary to gain a good understanding of Bitcoin and its global context before looking at its application in various industries as well as in the tourism sector.

1.4.1 In various industries

The adoption of cryptocurrency is noticeable in various industries:

PayPal

The giant PayPal accepts Bitcoin using different payment processors like Coinbase, GoCoin etc… In the future, the company will also adopt Ethereum as another form of payment (Sloan, 2018).

Shopify

The e-ecommerce platform has accepted digital currency allowing its consumers to pay with different kinds of cryptocurrency (Terenzi, 2018).

Microsoft

The company accepts cryptocurrency payments too for its products (Sloan, 2018).

Goto Mall

In South Korea, this shopping center has massively accepted Bitcoin payments as it groups 620 stores in total (McIntosh, 2017).

1.4.2 In tourism industry

Information technology has always played an important role in tourism. Throughout the years, we have seen the tourism industry adapting to new technologies.

1970

Travel operators have integrated the Computer Reservations Systems (CRSs) to retrieve information and make bookings (Koo, Gretzel, Hunter & Chung, 2015).

1980   Tourism has adopted the Global Distribution Systems (GDSs)

1990   It was the massive adoption of Internet (Koo, Gretzel, Hunter & Chung, 2015).

2010   Finally, the year 2010 has seen the emergence of smart technologies reshaping the tourism experience (Koo, Gretzel, Hunter & Chung, 2015).

As the tourism industry changes, the travelers' need evolve and the competition increases, it has become crucial for tourism operators to incorporate **new technologies** in their operations thus providing **tailored experiences** and **customized services** (Neuhofer, Buhalis & Ladkin, 2015). To provide more value to their customers and increase competitive advantage, the tourism industry has to be **innovative** (Neuhofer, Buhalis & Ladkin, 2015). Recently, the tourism industry has been marked by the **emergence of cryptocurrency**. This phenomenon already appeals travelers as it involves no bank fees, no currency exchange rate, no fraud and ease of sending and receiving money (Önder & Treiblmaier, 2018). Therefore, it is not surprising that some of the **industry players** have already embraced and adopted this technology (Önder & Treiblmaier, 2018).

Since 2013, the use of cryptocurrency has taken off and numerous tourism companies have adopted the technology around the world.

Let's look at some industry players' examples:

EXPEDIA

2013 Allows its customers to book hotels with Bitcoin and use Coinbase platform to process the transfers (Quackenbush, 2017).

H.I.S

One of the most popular travel agency in Japan, accepts Bitcoin and offers special Bitcoin packages tour (Murison, 2017). Currently, 38 stores of this company takes Bitcoin payments and in the future, more stores will be added to the list (Murison, 2017). **2018**

CHEAPAIR

It is the first American company to accept Bitcoin for airlines, hotels and car rentals. It uses Coinbase platform to process the payments (The points guy, n.d.). **2014**

WEBJET

2015 It is the first Australian online travel agency to adopt Bitcoin in order to offer its customers more flexibility regarding payment options (Perez, 2015).

BRISBANE

2017 Brisbane airport has recently accepted cryptocurrency payments in its retail outlets (Yeoh, 2018).

Fun fact

For his 14th birthday, Eric Finnman received $1000 from his grandmother and at that time, he decided to invest this money in Bitcoins. Only a year and half later, he sold them for $100,000. He also used some of it to create an online tutoring service called Botangle.com.

WOW !

1.5 Bitcoin from a regional perspective

Even though cryptocurrency is a world-wide emerging phenomenon, it is important to consider that its adoption might be different from a region to another within the same state. Indeed, **Queensland** is the **second largest state of Australia** (Queensland government, n.d.) therefore the use of cryptocurrency may be different within the seven regions that formed Queensland.

Brisbane

Brisbane currently accommodates 53 places where cryptocurrency payments are accepted (TravelbyBit, n.d.); Out of these 53 places, 43 of them are the result of a partnership with TravelbyBit while the 10 other ones are independent (BitFinder Plus, n.d.).

Gold Coast

Only 3 places are using digital currency in **Gold Coast** (BitFinder Plus, n.d.).
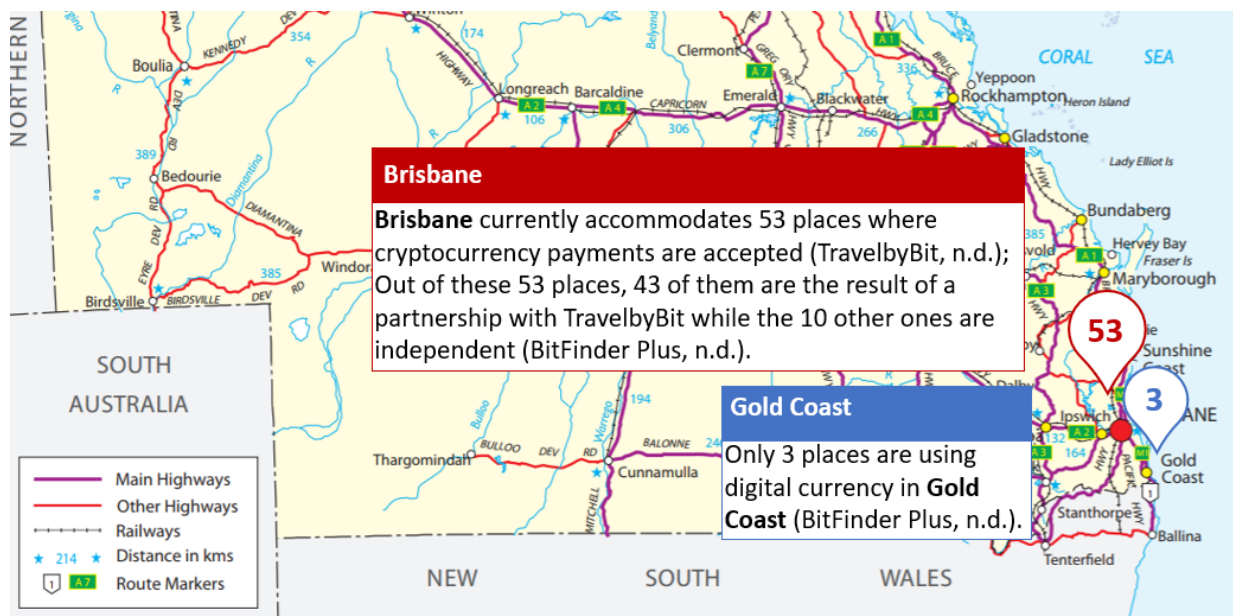
Figure 12. Map showing the adoption of cryptocurrency in Queensland

From the above map, we can notice that **Brisbane** is the **early adopter** of cryptocurrency in Queensland. Indeed, Brisbane currently accommodates **53 places** where cryptocurrency payments are accepted (TravelbyBit, n.d.). Out of these 53 places, 43 of them are the result of a partnership with TravelbyBit while the 10 other ones are independent (BitFinder Plus, n.d.). In total, **36** of these places are tourism-related (hotels, leisure activity, airport's retail shops, restaurants, bars, coffee shops).

However, in Gold Coast, only 3 places are using digital currency (BitFinder Plus, n.d.).

WHY?

This difference can be explained by the fact that TravelbyBit has mainly concentrated its efforts on building a cryptocurrency community and network in Brisbane first (TravelbyBit, n.d.). In the future, the company wants to widely extend the use of digital currency across Australia (TravelbyBit, n.d.).

Due to limited researches on the topic, we primarily pulled out information from TravelbyBit as they are the pioneer in the creation of a cryptocurrency ecosystem in Australia.

TravelbyBit's data have allowed us to create the map below providing a brief description of Queensland regions situation regarding cryptocurrency adoption. The places listed accept Bitcoin payment as well as other types of cryptocurrency such as Litecoin, Ethereum, Dash etc.

Figure 13. Map showing the number of places accepting cryptocurrency in Queensland

🪙 **Far North Queensland (Cairns)**

In Cairns, 4 places have been found to use cryptocurrency whose one of them is a travel agency which also results from a partnership with TravelbyBit (TravelbyBit, n.d.).

THE UNIVERSITY OF QUEENSLAND

Mackay, Isaac, Whitsundays

Same result as North Queensland, no business has adopted cryptocurrency yet in Mackay, Isaac and Whitsundays (BitFinder Plus, n.d.).

Central Queensland

(Agnes Water, Rockhampton, Gladstone, Emerald and Yeppoon)

In Central Queensland, Agnes Water is the only place that has adopted digital currency (TravelbyBit, n.d.). Indeed, 7 companies are using cryptocurrency whose 5 of them are tourism business-related (hostel, travel agency, leisure activity, rental vacation, and restaurant).

Central West Queensland

(from Rockhampton to the Northern Territory border)

There is no business using cryptocurrency in Central West Queensland (BitFinder Plus, n.d.).

Wide Bay Burnett

(Gympie, Bundaberg, and North and South Burnett)

In this region, only Gympie accepts cryptocurrency and it is limited to only one hospitality operator which is a restaurant (TravelbyBit, n.d.).

South West Queensland & Darling Downs (Toowoomba)

In Toowoomba, only one coffee shop accepts cryptocurrency payments (Gettler, 2017).

South East Queensland (Sunshine Coast)

In this region, 4 places have adopted cryptocurrency (BitFinder Plus, n.d.).

Two of them are related to TravelbyBit however, none concerns the tourism industry (TravelbyBit, n.d.).

Based on the above research, it is possible to notice that most of Queensland regions have not adopted cryptocurrency. However, it doesn't mean that these places will not change their mind-set in the future.

These regions' first challenge results from the difficulty of attracting tourists due to their remoteness, lack of infrastructure and the few activity offered (Tilma Group, 2018).
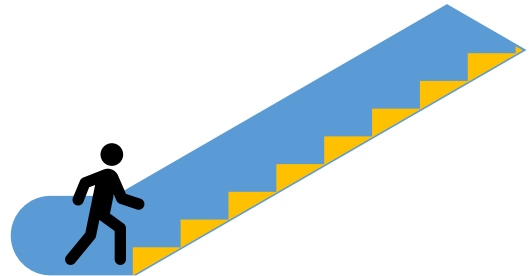
As mentioned in level 1, the number of international tourists in Queensland keeps increasing (Tourism and Events Queensland, 2017) while the adoption of cryptocurrency keeps gaining ground. Therefore, there is an **interrelated relationship** between the two as the more tourists Queensland can attract in its rural regions, the more chances cryptocurrency will have to be adopted by tourism operators.

In addition, during the interview with TravelbyBit, Caleb Yeoh (2018) mentioned that cryptocurrency adoption is very easy. The acceptance of cryptocurrency payment requires only the installation of an application on a tablet device, such as an iPad, and to continuously keep this device online and connected. The cryptocurrency payers read the QR code and send the money to the store's account. Therefore, there is **no barrier of cost** keeping them from introducing this new technology (Yeoh, 2018). For example, even the tourism operators of the small town of seventeen-seventy located in Gladstone region, are coming on board with TravelbyBit's system and are going to adopt cryptocurrency (Yeoh, 2018).
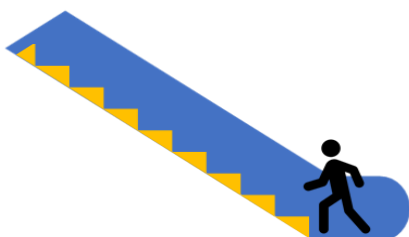
According to Yeoh (2018), the reason why many regions in Queensland have no current adoption of cryptocurrency is because there is a lack of education and awareness from both industry and consumer perspective as well as a lack of branding and advertisement from institution.

2. The implications of cryptocurrency on the tourism industry

A SWOT analysis is necessary to identify the internal and external factors that can affect the adoption of cryptocurrency for tourism businesses in Queensland. This provides considerable insights about the current situation of cryptocurrency in Australia.

2.1 SWOT Analysis

In order to have a better understanding of the implication of cryptocurrency on the tourism industry, a SWOT analysis has been undertaken to determine the strengths, weaknesses, opportunities and threats of adopting cryptocurrency for tourism operators in Queensland.

STRENGTHS

- Ability to send and receive money without bank thus involving very low fee
- Strong security relying on cryptographic algorithm
- Lower risk of fraud
- Increase innovation due to the blockchain technology

WEAKNESSES

- Value fluctuates largely, therefore it is still risky for tourism businesses to hold cryptocurrency
- New and difficult concept to understand

OPPORTUNITIES

- The increase of international tourists opens up a new market for tourism operators to take into account with cryptocurrency

- Favourable future regulations set up by the Government towards the integration of cryptocurrency

THREATS

- Consumers don't see cryptocurrency as a daily payment method but more as a business investment.
- It takes time to change the mind-set of both businesses and consumers. As it is a new way of doing things, this technology needs to be trusted before to be accepted and adopted.
- No real push from industry body such as branding or advertisement to facilitate the use and adoption of cryptocurrency
- Eventual unstable political and economic situation in the future could prevent cryptocurrency adoption.

2.2 Implications of cryptocurrency on the tourism industry from a supplier perspective

From a supplier perspective, the emerging phenomenon of cryptocurrency represents both **opportunities** and **challenges** on the tourism industry.

Firstly, cryptocurrency removes the need of a third party. Thus, tourism operators can transfer money without the help of a bank (Murison, 2017). Although cryptocurrency transactions are not free, the **fee** is still **lower** than the commission charged by payment service providers (Murison, 2017). Additionally, the **security is higher** due to fact that they are encrypted in cryptographic algorithm thus avoiding counterfeit and fraud (Murison, 2017).

Secondly, cryptocurrency can lower the risk of fraud. This is particularly interesting for tourism operators in developing countries where credit card fraud is high such as Thailand and Indonesia (Murison, 2017). In fact, this can **reassure people** to travel in these countries as cryptocurrency provides them with an alternative and **secure form of payment** (Yeoh, 2018).

Thirdly, it is beneficial for tourists to use cryptocurrency comparing to the use of fiat currency as there is **low transaction fee, no currency exchange rate** and **not bound by borders**. Thus, it could facilitate their journey, especially when it comes to international travel (Yeoh, 2018). Therefore, as the number of international tourists increase in Queensland (Tourism and Events Queensland, 2017) and the adoption of cryptocurrency becomes more popular, it seems important for tourism

operators to take into account this trend in order to be able to **meet travelers' new demand.**

Furthermore, tourism businesses will gain a competitive advantage against their competitors by becoming early adopters of cryptocurrency because tourists will have flexible and better payment options benefiting them with low transaction fee and no currency exchange rate. It is expected that tourists who want to pay by cryptocurrency will prefer the operators that accept digital currency compared to those who don't due to the advantages of this payment method (Lipovsky, 2017).

Finally, one would think that future regulations represent a threat on cryptocurrency adoption, however, the Australian government plans to implement regulations in a way that would benefit the integration of digital currency in the country (Pollock, 2018). In September 2017, the Australian government **ceased** its law on the **double taxation of cryptocurrency** (Pollock, 2018). Since then, the government has been taking a more positive look on cryptocurrency as the institution simply wants to avoid the illegal use of digital currency (Pollock, 2018). Indeed, since April 2018, the Australian government obliged businesses using cryptocurrency to register with AUSTRAC (Australian Transaction Reports and Analysis Centre) in order to make sure digital currencies are not used for money laundering and terrorism financing (Pollock, 2018). Furthermore, the ATO (Australian Tax Office) is using data to gain more information on cryptocurrency growth and market (Pollock, 2018). It seems that Australia is **one of the first country** to understand that cryptocurrency phenomenon will not be a temporary phenomenon and that there is the need for a **fair and active legislation** allowing their incorporation in the system (Pollock, 2018).

Regarding the challenges, one of the biggest challenge of cryptocurrency adoption for tourism operators is the price volatility. For instance, Bitcoin's value has fluctuated a lot throughout the years. At the start of 2017, Bitcoin value was less than $1,000, however, by the end of December, Bitcoin was worth more than $16,000 (Agrawal, 2018).

Therefore, the more the value fluctuates, the more reluctant businesses are to accept cryptocurrency as a payment method (Agrawal, 2018). This instability is partly due to the fact that people prefer to invest in cryptocurrency to make more money by reselling them at the highest price (Haran, 2017).
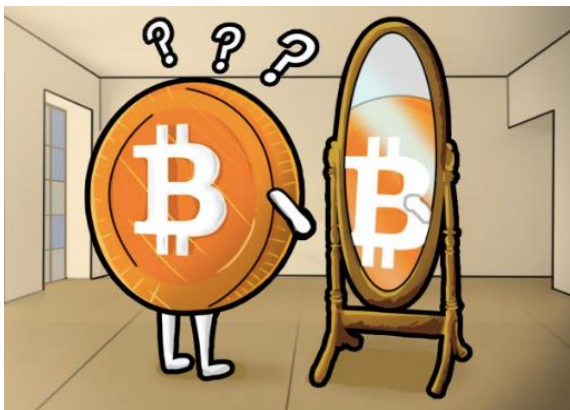
Secondly, the cryptocurrency technology is difficult to understand, especially for the beginners who struggle to figure out how it works and what's the use of digital wallet for sending money (Brownlie, 2018). Furthermore, this is linked to the fact that it takes time for people to change their mind-set when a new technology emerges.

In general, people are wary and afraid to change their habits and this new technology requires willingness to do things differently. Thus, the adoption of cryptocurrency will take time before to be trusted. As a result, tourism businesses may find it **too difficult to integrate** it in their operations thus keeping the same way of doing things (Brownlie, 2018).

These challenges prevent tourism operators from accepting cryptocurrency. However, the reason why businesses find these two aspects challenging is due to the lack of knowledge and awareness. Due to cryptocurrency's novelty, their education on the topic is very limited. Therefore, a better knowledge and awareness on the topic would greatly enhance cryptocurrency adoption (Agrawal, 2018).

If tourism operators can realise the various advantages of the use of cryptocurrency and that its price will become more stable in the future, the adoption of digital currency will spread largely (Brownlie, 2018). In order for tourism operators in Queensland to adopt cryptocurrency, Queensland Government needs to support and help in the creation of a **cryptocurrency ecosystem**. However, there is currently **no real push** from them (Brownlie, 2018).

Level 3

Blockchain Technology & The Tourism Industry

1. Blockchain Technology

1.1 The difference between Bitcoin & Blockchain

Bitcoin & Blockchain Are Two Different Things.

Indeed, **Bitcoin** is a digital currency operating on a **peer-to-peer network** to facilitate transactions without having the government controlling the currency. Bitcoin is not the blockchain however, it is the **blockchain** that allows and **supports bitcoins transactions** (Matt, 2017). Therefore, blockchain is the system supporting cryptocurrency while Bitcoin is one application among many others to run on this system (IBMBlockchain, 2017).

However, regarding **Bitcoin Blockchain**, this one is only designed for **conducting transactions** and operates on an **open system** which means that **anyone can join the network** and view the transactions done (Aantonop, 2018). Bitcoin blockchain is also anonymous as it doesn't let anyone know the identity of the person involved in a transaction (Aantonop, 2018).
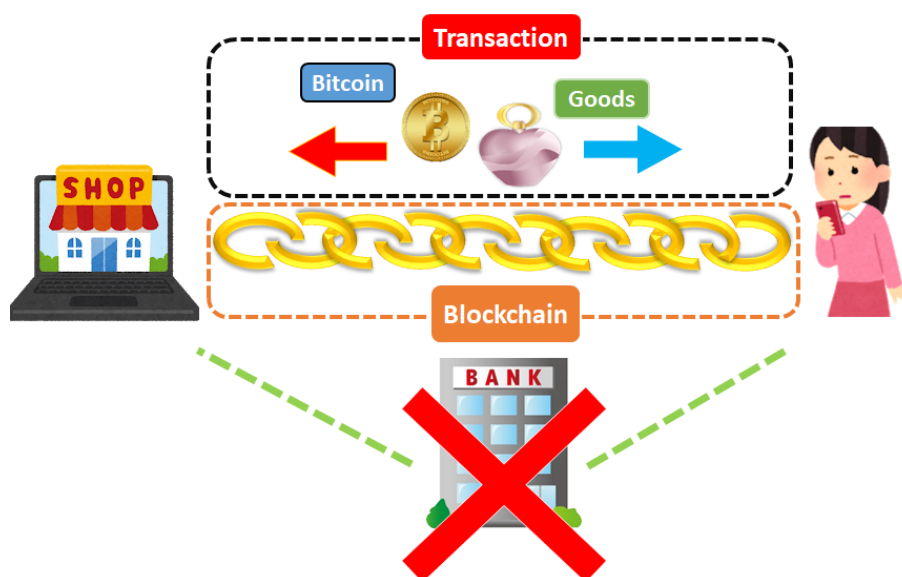
1.2 What exactly is Blockchain technology?

Blockchain is a distributed database composed of multiple computers *(or nodes)* to record transactions that are not controlled by a central point of authority (Winding Tree, 2018).

As mentioned above, there are centralised and decentralised blockchain, both of which need to achieve consensus to be able to trust different parties (Grass, 2017).

A **Decentralised Blockchain** example is the **bitcoin blockchain** as there is no single computer that is in charge of the network. Instead, every computer has the **same level of participation**. Furthermore, the system is fair because if one computer doesn't respect the rules imposed by the network, it will be **permanently excluded** from it (Records Keeper, 2018).
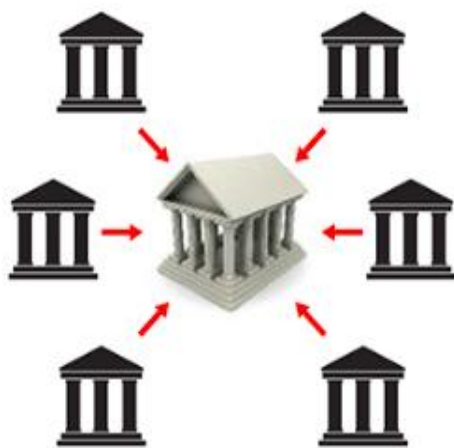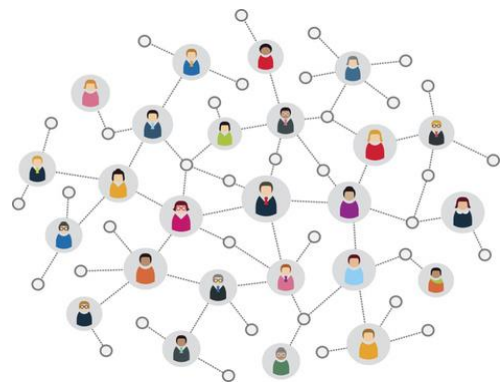
A **Centralised Blockchain** means that the network is only accessible to a **selected group of persons** therefore, it is not a public and open ledger anymore but a **private** one. With this system, because all the parties participating in the network are known, they are all trusted therefore, this centralised system doesn't use the same measures as Bitcoin in terms of security (Records Keeper, 2018).

Today, many businesses are using blockchain technology because it can be used to **decentralize many things**, not just currency but it can also improve the way companies do business (CBInsights, 2018). Indeed, any transactions involving value such as goods, property, work or even votes can use the blockchain technology

(World Economic Forum, 2016). For example, blockchain can be used to **establish ownership** over a variety of assets (house, cars…), **track ownership of products** (where do they come from?) and can **verify identity** on an open ledger that is **not controlled by anybody** (CBInsights, 2018).

1.3 How does Blockchain technology work?

As its name suggests it, a blockchain is a **chain of blocks** and each block contains **information**. Every block is composed of three key elements: data, the hash of the block and the hash of the previous block (Savjee, 2017).
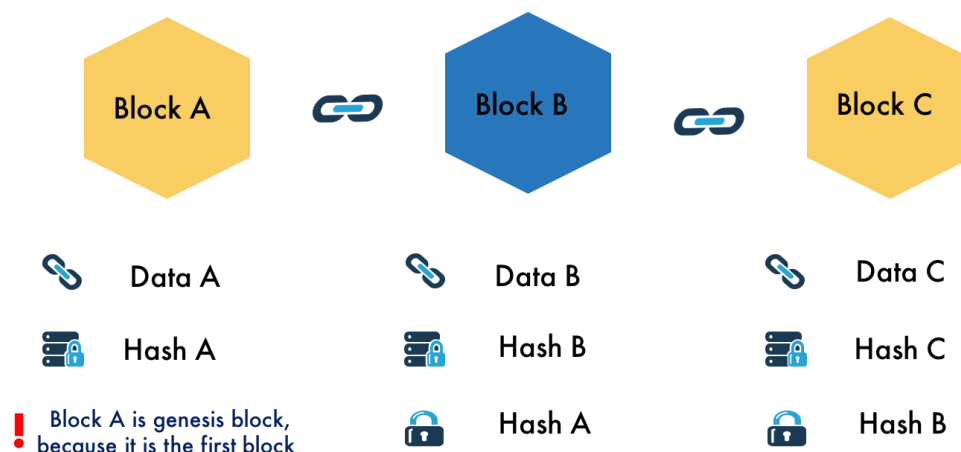
Figure 14. The composition of a block

Regarding the **data aspect**, it is important to understand that depending of the type of blockchain used, the **data of a block can vary** (Savjee, 2017). For instance, the bitcoin blockchain has data about the transaction details including sender, receiver and amount of coins (Savjee, 2017).

Then, there is the **has function** that allows to **turn text into numbers and letters**.
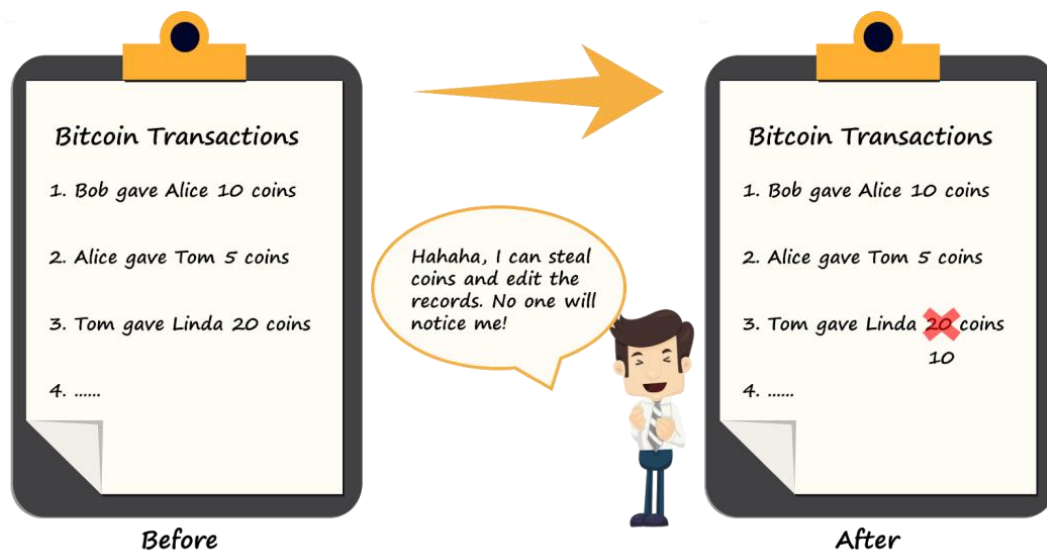
Figure 15. Transaction without the hash
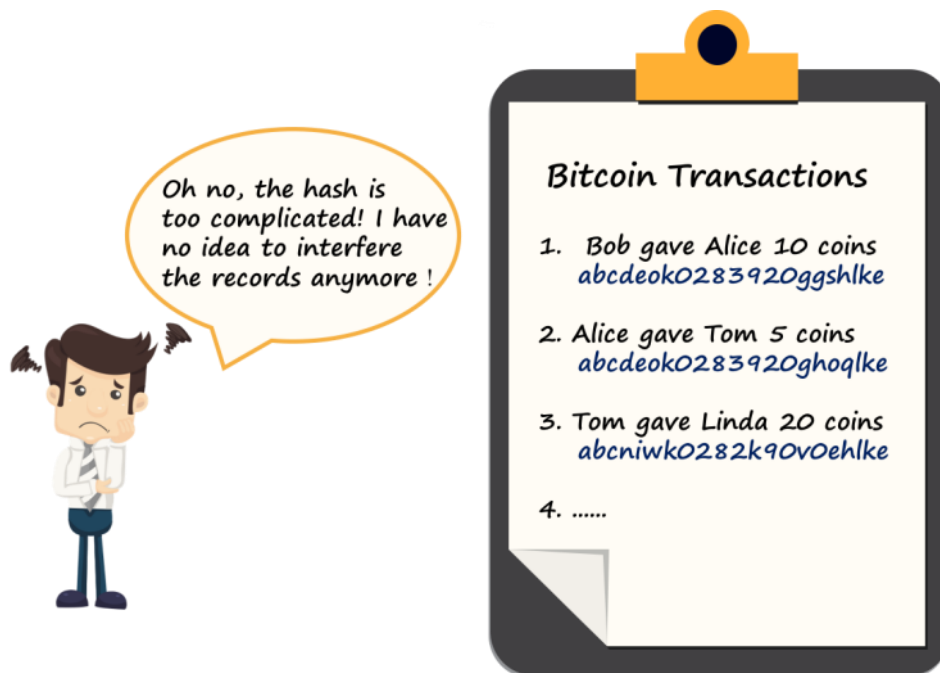
Figure 16. Transaction with the hash function

As you can see on the pictures above, this **mathematical function** *(hash)* makes the **hacking difficult** because the hash *(string of numbers and letters)* is comparable to a fingerprint, it allows the identification of a block with all its content (Savjee, 2017). Therefore, a hash verifies that a file hasn't been tampered with (Rabbani, 2018).

Blockchain even adds a **third element** to make the **security higher** and this is the **hash of the previous block**. This means that every new transaction *(block)* depends on the previous one therefore, if someone wants to modify the record, the hash from all the previous transactions will also have to be changed.
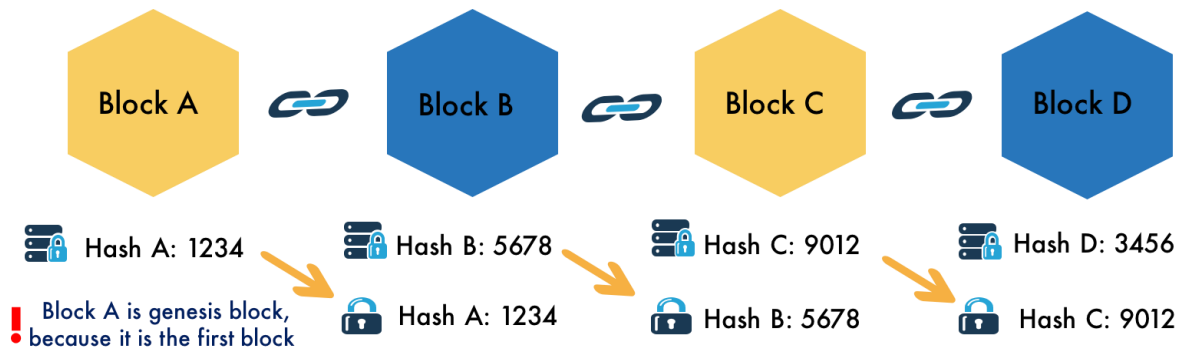
Figure 17. Interrelated relationship between all the blocks

When someone tries to modify the block, what will happen?
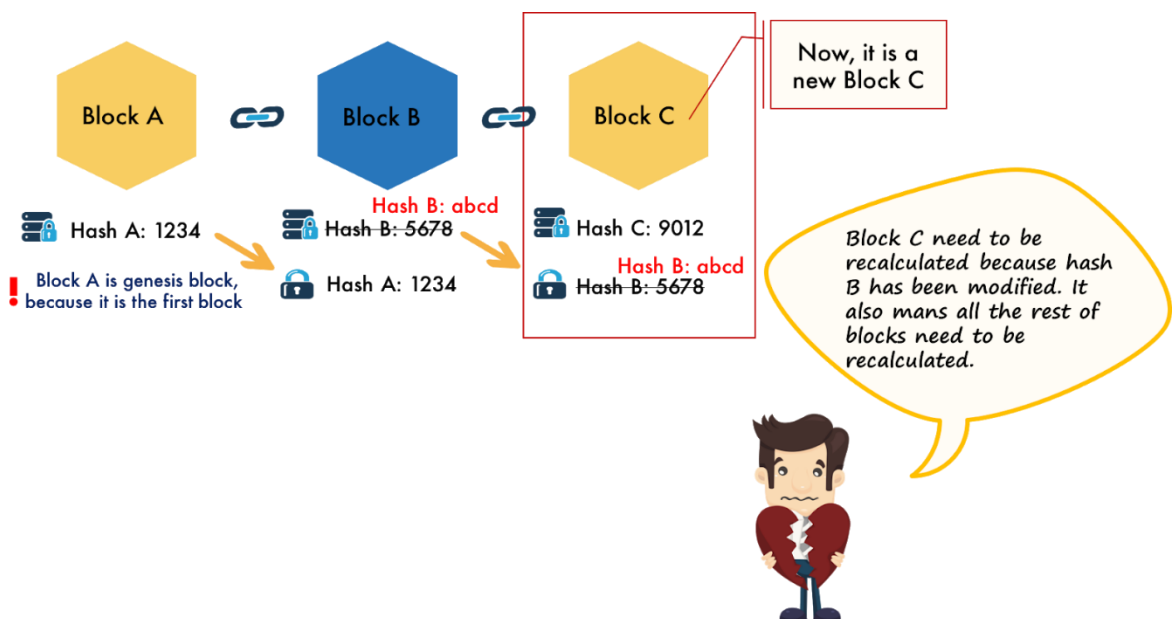
Figure 18. Difficulty of changing a block

The mechanism used by blockchain is called **proof of work** *(computer calculation)* and it is this system that allows the **creation of new blocks** *(transactions)* (Savjee, 2017). For example, it takes 10min for bitcoin to process and add a new transaction to the chain as it needs to calculate the proof of work (Savjee, 2017).
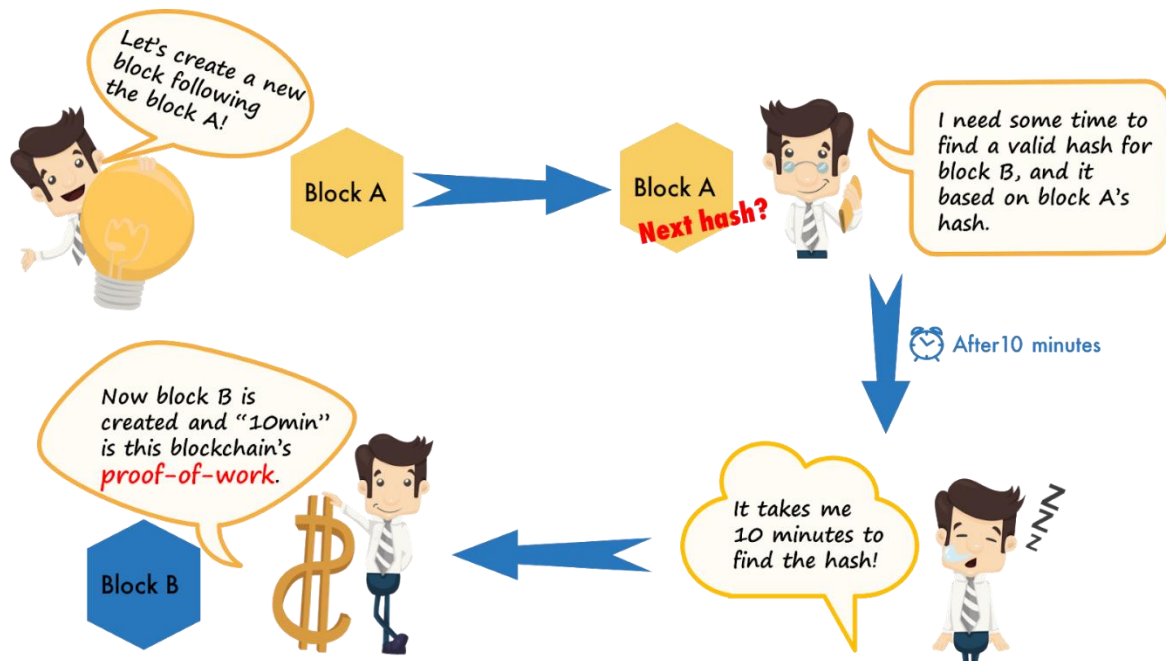
Figure 19. Proof-of-work system

This leads to the following question: when someone creates a new transaction, what happens?

This transaction or block is sent to **every participant nodes** *(computers)* in the blockchain network in order to verify that the transaction is not a fraud (Coin Telegraph, n.d.). The way nodes can confirm the validity of a transaction lies in the fact that these computers all have the **original copy of the blockchain record** therefore, if someone tries to change this, the nodes will not allow it to occur due to their possession of the **original hash** (Coin Telegraph, n.d). Once every computer has validated the new block, it is added on their own blockchain (Savjee, 2017).
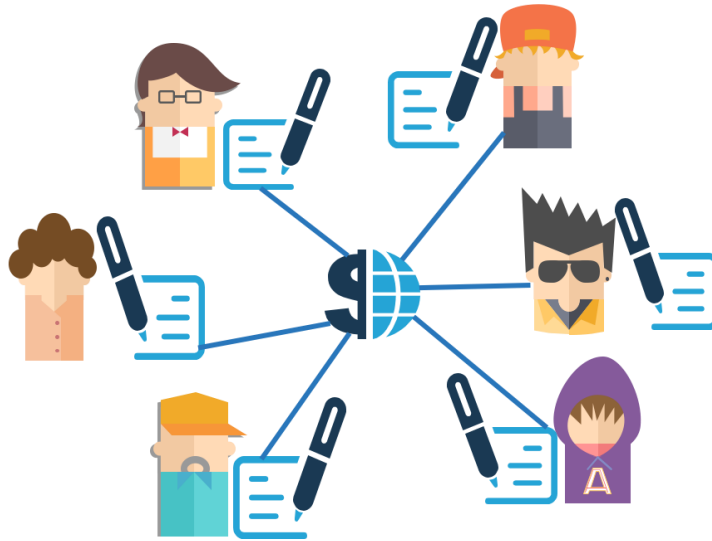
All participants of blockchain have the original copy of the blockchain record in their computers.

Figure 20. Original copy is needed to achieve

2. Blockchain technology on the tourism industry

Blockchain technology is **on the rise** as multiple companies have been invested **$1.8 billion** in total towards blockchain startups in 2017 (Amadeus, 2017). This results from the realisation that blockchain can bring advantages and innovation to certain industries and the **tourism sector is no exception** (Amadeus, 2017). **Indeed, it is argued that blockchain technology can benefit both tourism operators and travelers (Bjorøy, 2017).**

2.1 The unique features of Blockchain

1

Security

The information distributed on blockchain is highly secure due firstly to the cryptographic method and then by the consensus mechanism used like the proof-of-work system of bitcoin blockchain (Murison, 2017). The consensus mechanism authorises the transaction by verifying the encrypted code. This is what allows multiple parties to safely send and exchange sensible information and transaction around the world (Murison, 2017).

2

Transparency

The data that is displayed on the blockchain can be seen by anyone and cannot be altered (Murison, 2017).

3

Data integrity

For a transaction to be accepted, all computers or nodes need to reach consensus about the validity of that transaction (Murison, 2017).

4

Efficiency & cost reduction

A company can become more efficient and reduces its costs if it automates its records through blockchain (Murison, 2017).

2.2 What kind of innovation will Blockchain bring to the tourism industry?

Currently, there is **no real application of blockchain technology in tourism** however, the technology is still in its **early development** therefore, it is possible that tourism businesses will start by applying it in the future (Amadeus, 2017).

In the travel industry, blockchain is mainly used to facilitate reservation systems, data sharing and payment processing (Cross, 2018).

Simplify identification

Blockchain could facilitate the identification of travelers. Indeed, passport and other IDs control punctuates travels and tourists usually find it exhausting and stressful (Murison, 2017). In this area, blockchain could considerably make travelers' journey easier and faster if some of these IDs control points would be reduced (Amadeus, 2017). For instance, a traveler would only need to use his fingerprint to pass every airport security (Amadeus, 2017).

Baggage tracking

One of travelers' greatest fear is to lose their baggage when traveling by plane (Murison, 2017). As Blockchain offers a distributed ledger, this technology could be used here to record a traveler's detail and its luggage (Amadeus, 2017). For example, once a traveler drops off his bagages at the counter, the bag ID as well as the owner ID could be registered on blockchain (Mcmahon, 2018). This would allow every single person that is, at some point, responsible for the transfer of baggage, to have access to these information thus facilitating the tracking of travelers' items (Amadeus, 2017).
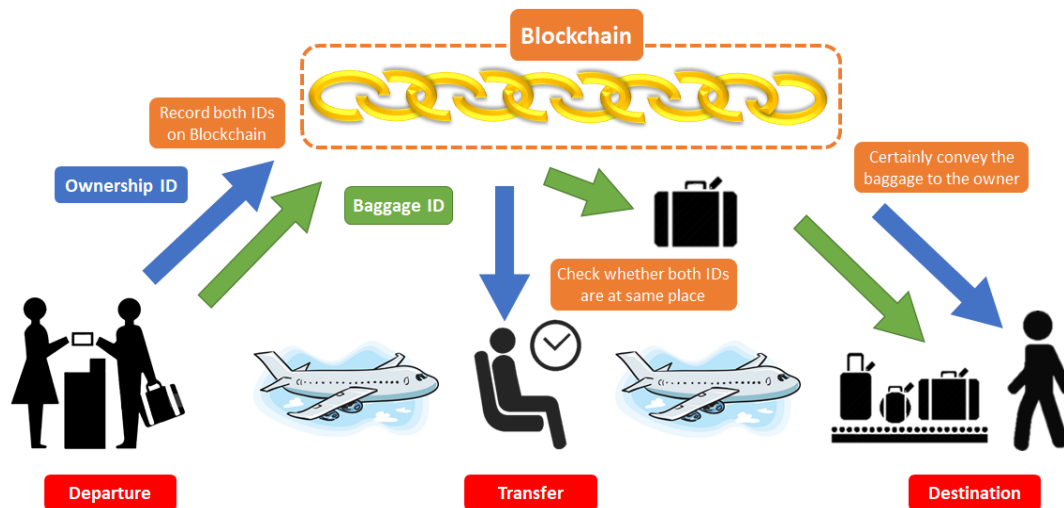
Figure 21. Baggage tracking in airport

Blockchain is **not limited to baggage tracking**, it can also do it for any other kind of products including the hospitality industry. For example, **restaurants** could use blockchain to **track food** which will ensure a **better quality control and food safety of their supply chain** (Dogru, Mody, Leonardi, 2018). Furthermore, it **could enhance the relationship with customers**. In fact, with blockchain tracking goods, guests would be able to check the provenance of the food which could better their experience as more trust would be established (Dogru, Mody, Leonardi, 2018).

What else?

In terms of innovation, blockchain's capability has been expanded with Ethereum. Ethereum is a software that runs on blockchain technology and which offers the possibility for companies to build any kind of decentralised applications (Rosic, 2017). One of Ethereum's decentralised application is smart contract also called blockchain or digital contracts (Rosic, 2017). This **automated working contract** is set with **specific condition** that is recorded on the Blockchain and that **cannot be changed** (El Manawy, 2018). This digital contract is managed by a computer program that gives the permission to directly transfer digital currencies when different conditions between parties are met (El Manawy, n.d.). This means that two enterprises can draw up a contract and decide that it will be operated on blockchain technology thus allowing certain conditions of the contract to be automatically executed (El Manawy, n.d.).

Let's see an example:

> An hotel supplier sets a room at $80, it is then recorded on the platform based on blockchain technology. When an accommodation distributor orders the room at $80, the condition is met, and the transaction is automatically executed without any action of the hotel. Therefore, if smart contract becomes a common practice in tourism industry, the customer will be able to find **cheaper accommodation without travel agent**, and the hotel supplier will be able to sell rooms with **zero or less commission rate to intermediaries**, which means that smart contract can have a significant impact on the **purchasing and negotiation power of each party** (Cross, 2018).
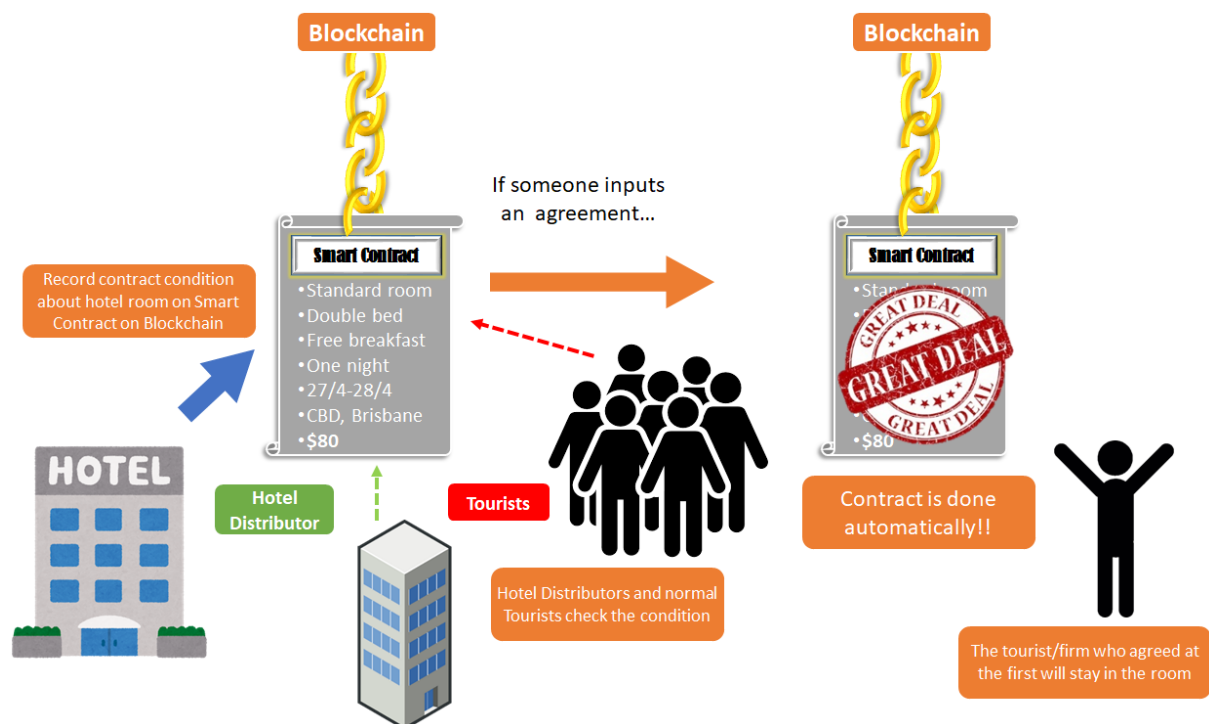
Figure 22. Example of smart contract in the hotel sector

Let's see in what cases smart contract can be used for:

❶ **Loyalty Schemes**

Loyalty programs are a great way to reward travelers however, they often have **restrictions** on the way to redeem points which leads to unspent points and customers' frustration (Amadeus, 2017). **A company called Loyyal in California has already integrated the blockchain and smart contract technology to improve loyalty programs (Murison, 2017).** This company encourages airlines in the same alliance to work together thus allowing travelers to transfer their points easily (Loyyal, n.d.). In this way, travelers would only have **one loyalty card** gathering various travel providers such as airline, hotel, rental car company etc… (Amadeus, 2017). Concretely, it means that **loyalty schemes are built on the blockchain** and that loyalty tokens are given to guests (Dogru, Mody, Leonardi, 2018). Therefore, customers are able to buy and sell these loyalty tokens or to exchange them with others (Dogru, Mody, Leonardi, 2018). This way of using loyalty point gives **more freedom** to customers thus **increasing the service quality** (Dogru, Mody, Leonardi, 2018).

Loyyal is also using **smart contract** in order to **automatically execute payments** and **real-time invoicing** between the partners (Loyyal, n.d.). Besides, the start-up is looking at providing points to travelers instantly which means customers do not need to wait before to get rewarded by points therefore, they will be able to redeem their points straight away if they want (Loyyal, n.d.). Finally, Loyyal can **collect important data** on their customers as the points are recorded on the blockchain. This means that the company can send **customized offers** on which travelers will be more inclined to use their points (Amadeus, 2017).

❷ **Simplify Settlements**

The tourism industry involves many actors such as **operators**, **service providers** and **OTAs** which leads to **complex relationships** (Murison, 2017). For example, when a traveler books an hotel room, he might calls directly the establishment or he might

uses on online travel agent. If this person uses an OTA, the hotel will have to pay a commission therefore, the use of blockchain and smart contract would help in the way that, commissions and payments can be automatically executed (Murison, 2017). This **automated settlement** between tourism operators and intermediaries will **not only reduce costs and increase efficiency but also, develop better working relationships** (Amadeus, 2017).

❸ More power to small companies

Blockchain technology and smart contract can be used to give more power to small companies (The startup, 2017). It is well-known that the tourism industry is mainly **monopolised** by **big intermediaries** thus making it **difficult for smaller businesses to enter the market** (Winding Tree, 2018). **Winding Tree** is a company that uses blockchain to decentralise the travel distribution by allowing anyone to directly access inventory from the suppliers. By doing so, travelers can **book and pay without intermediaries** (Winding Tree, 2018). **This company is revitalising the tourism sector by making it a fairer competitive market (Winding Tree, 2018).**

❹ Give power back to hotels

When hotels pay commission to travel intermediaries, those rates are **not negotiated** and hotels are subjected to it. However, with the smart contract technology, hotels will have the possibility to set the commission as no upfront agreements will need to be signed and commission payments will be automated (El Manawy, n.d.). **This enables hotels to manage the commission rate based on their forecasting** (El Manawy, n.d.). For example, during busy periods, the hotel can set up a lower commission rate while during slower times of the year, the hotel can set up a higher rate in order to get more bookings and increase its occupancy rate (El Manawy, n.d.).

2.3 The hospitality industry as a case study

According to Ron Galloway (2017), blockchain is an innovation that has the potential to disrupt the hotel industry. **The way blockchain will do this is by enabling B2B relationships and by cutting out the middleman, known in the tourism industry, as travel intermediaries (Backer,2017).**

The statement below states the current situation of hotels:

"For a boutique hotel it is extremely hard to distribute their inventory. They have to negotiate a contract to do so, while the intermediaries add their commission fee, usually 10-25%, very often forcing the hotel into a rate-parity agreement. That is why you see major hotel chains heavily advertising direct bookings by providing additional amenities, but not a better price" *(Galloway, 2017).*

The **CEO of TUI**, one of the world largest tourism company, believes blockchain can reshape the travel management as the technology lowers the barrier to entry the market (TUI Group Corporate, 2017). He even adds that **blockchain poses a threat to intermediaries** such as Sabre, Expedia, Airbnb because these businesses do not own any physical products such as an hotel room or an airplane, they only own their technology and brands (Galloway, 2017).

"So how useful would those brands be if a better form of distribution technology came along?" *(Galloway, 2017).*
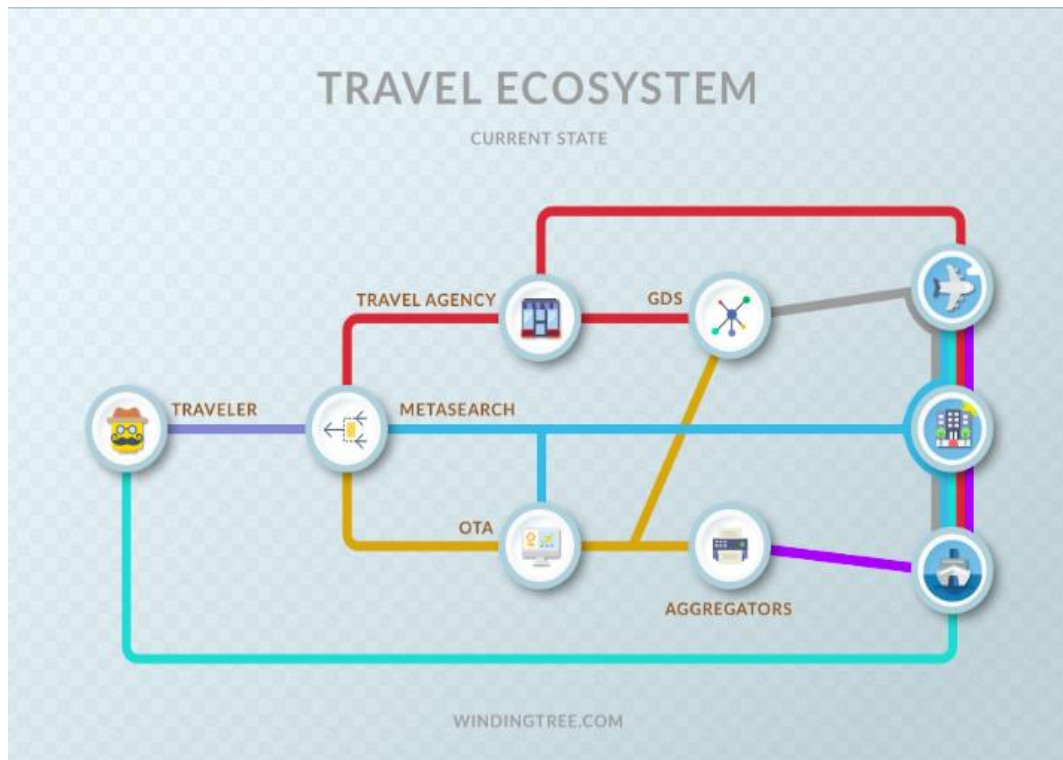
Figure 23. Travel distribution with intermediaries
Reference: Winding Tree. (n.d).

Figure 24. Decentralised travel distribution
Reference: Winding Tree. (n.d).

Besides, blockchain technology is **cheap to implement**, it doesn't require big investment (Galloway, 2017). TUI is currently working on an application called **BedSwap** in order to move its hotel inventory according to the demand between different points of sale thus managing it more efficiently (Revfine, n.d.).

There are other examples of emerging start-up using blockchain in hospitality industry:

Lock Chain

With Lock Chain, the **middleman is removed** therefore, hospitality companies do **not need to pay commission** thus allowing guests to benefit from lower prices (Lock Trip, 2017).

Trippki

Trippki uses blockchain to develop a loyalty system that directly connects guests and hotels. With Trippki, guests are **rewarded with Trip tokens** for staying at a hotel. Those tokens have **no expiry date** as they are recorded on the blockchain thus allowing customers to use them later for **bookings** or to **exchange them for cash** (Trippki, 2017).

ShoCard & SITA

ShoCard and SITA are using blockchain to facilitate the identity of customers when traveling. In the future, they would like to be able to **store customers' ID** on the **blockchain** in order for tourism companies to be able to retrieve and **verify a customer's identity at anytime** (Revfine, n.d.).

3. Will Blockchain revolutionise the travel industry?

In 2009, Bitcoin has drawn a lot of attention however, less focus is given to it today. Indeed, **blockchain** has gained a lot more interest as it has been recognized that the underlying technology of cryptocurrency is the **real innovation** and that it will have the **potential to worldwide impact many industries** (Kaufman, 2018).
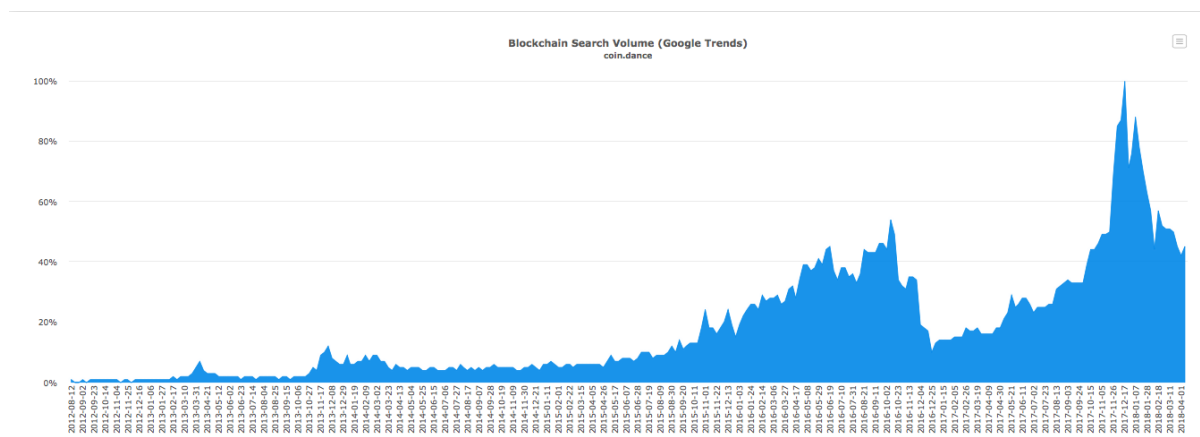

Figure 25. Blockchain Search Volume (Google Trends)
Source: Google trends. (n.d).

In the tourism industry, above examples have demonstrated that blockchain could be used to **enhance the experience delivered** to customers by **improving the quality of touristic products and services** (Medium, 2017). Furthermore, blockchain is also used to **secure financial transactions** as well as **sensitive information shared** between companies (Medium, 2017). Additionally, blockchain can **reshape the travel management by cutting out the middleman** thus **lowering barriers to entry of smaller tourism businesses** making it a **fairer competitive marketplace** (Medium, 2017). Of course, this also allows tourism operators to **save costs** and to deliver a more **customised experience** to their customers (Medium, 2017).

At the moment, even if there is only experimentation and test of blockchain technology, there is a growing number of tourism businesses that show interest and that are willing to use blockchain (Kaufman, 2018).

It is difficult to affirm that blockchain will revolutionise the tourism sector as there is only very **limited researches** on the topic however, blockchain is an innovation and has the **potential to disrupt the travel industry** (Galloway, 2018).

Additionally, **Disney**, one of the biggest hospitality company in the world, has important future projects regarding blockchain (Galloway, 2018).

Indeed, the company has already built its own blockchain called **Dragonchain** (Dragonchain, 2017). Dragonchain has been designed to be more private than the protocols offered by Bitcoin and Ethereum. In addition, Dragonchain is an **hybrid** which means that some of its **data is public** while **others are private** (Dragonchain, 2017). Behind their blockchain, Disney has also for project to build a **commercial business** *(Dragonchain Inc)* in order to help companies that are less technology savvy to use easily blockchain technology (Peterson, 2017).

Due to the fact that large companies such as Disney have already started to integrate blockchain technology in their operation plan, it is important that **tourism businesses gain better knowledge** about it in order to **stay technologically current** (Gallaway, 2018). If tourism operators do not try to understand and learn more about it, there is a risk that they will be behind in terms of innovation and competitiveness (Amadeus, 2017). Tourism businesses need to stay **open-minded** on blockchain by **exploring the possibilities** of the technology, **collaborating** with industry partners and by **experimenting** blockchain (Amadeus, 2017).

Glossary
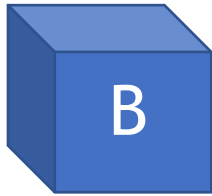
Block: refers to transaction. It carries data on the blockchain network and connects all the transactions together.

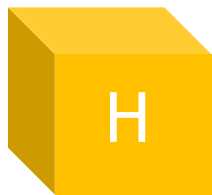**Blockchain:** public database where every transaction is permanently recorded.
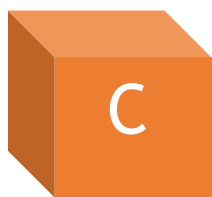
Consensus: achieved when all participants of the network agree on the validity of the transactions.

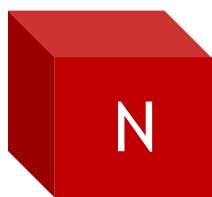**Cryptography:** mathematical and computer algorithms that make transaction secure.

Decentralised: central authority such as bank is removed.
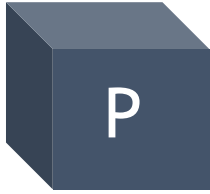
Hash: a string of numbers and letters.

Mining: refers to the use of a hardware to effectuate mathematical calculations in order to verify and confirm transactions.
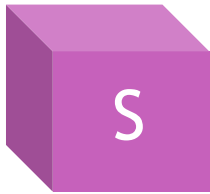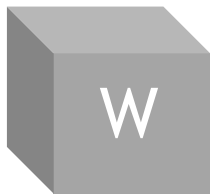
Node: refers to a computer.

Peer-to-peer: refers to the decentralized interactions between two parties or more in a network.

Proof-of-work: computer calculation.

Smart contracts: computer protocols that facilitate or enforce the negotiation of a contract between two parties.

Wallet: refers to a digital wallet where digital currency can be stored and received.

References

Agrawal, V. (2018). *3 major factors affecting mass adoption of cryptocurrencies*. Retrieved from https://www.valuewalk.com/2018/03/mass-adoption-cryptocurrencies/

Amadeus. (2017). *Blockchain: harnessing its potential in travel*. Retrieved from http://marketing.amadeus.com/blockchain-technology-whitepaper

Aantonop. (2018, January 2). Bitcoin Q&A: Bitcoin vs. blockchain. [Video file]. Retrieved from https://www.youtube.com/watch?v=kHbtp7pOftU

Ariffin, E. (2018). *Do cryptocurrencies have a future in Southeast Asia?* Retrieved from https://theaseanpost.com/index.php/article/do-cryptocurrencies-have-future-southeast-asia

Australian Government. (2017). *Australia as the innovation and fintech nation*. Retrieved from https://www.budget.gov.au/2017-18/content/glossies/factsheets/download/FS_Innovation.pdf

Australian Taxation Office. (2018). *Tax treatment of cryptocurrencies*. Retrieved from https://www.ato.gov.au/General/Gen/Tax-treatment-of-crypto-currencies-in-Australia---specifically-bitcoin/

Baker, M. (2017). *Blockchain could reshape travel management*. Retrieved from http://www.businesstravelnews.com/Technology/Blockchain-Could-Reshape-Travel-Management

Baur. W, A., Bühler, J., Bick, M., & Bonorden. S, C. (2015). Cryptocurrencies as a disruption? Empirical findings on user adoption and future potential of bitcoin and co. *Conference on e-Business, e-Services and e-Society*, 63-80. doi: 10.1007/978-3-319-25013-7_6

Bitcoin beginner. (2017). *What is Dash?* Retrieved from https://www.bitcoinbeginner.com/blog/what-is-dash/

BitFinder Plus. (n.d.). *Australian bitcoin directory*. Retrieved from https://bitfinderplus.com.au/directory-builder-search/?listing_address=Sunshine+Coast&listing_search_radius=20

Bitcoin Pro. (n.d.). *The evolution of Bitcoin*. Retrieved from http://www.bitcoincasinopro.com/news/the-evolution-of-bitcoin/

Bradbury, D. (2018). *Bitcoin and financial crisis*. Retrieved from https://www.thebalance.com/is-bitcoin-the-answer-in-a-financial-crisis-391275

Bradley, R. (n.d.). *Blockchain explained… in under 100 words*. Retrieved from https://www2.deloitte.com/ch/en/pages/strategy-operations/articles/blockchain-explained.html

Brito, J., & Castillo, A. (2013). Bitcoin: a primer for policymakers. *Policy, 29*(4), 3-12.

Brownlie, J. (2018). *A real industry example of cryptocurrency adoption* [Interview].

Cannuciari, C. (Director). (2016). Baking on bitcoin [Netflix documentary]. NY.

CBInsights. (2018). *What is blockchain technology?* Retrieved from https://www.cbinsights.com/research/what-is-blockchain-technology/

Coindesk. (2014). *What is the difference between Litecoin and Bitcoin?* Retrieved from https://www.coindesk.com/information/comparing-litecoin-bitcoin/

CoinMarketCap. (n.d.). *Total market capitalisation*. Retrieved from https://coinmarketcap.com/charts/

Coin Telegraph. (n.d.). *How blockchain technology works*. Retrieved from https://cointelegraph.com/bitcoin-for-beginners/how-blockchain-technology-works-guide-for-beginners#hash-function

Coin Telegraph. (n.d.). *What is Ethereum*. Retrieved from https://cointelegraph.com/ethereum-for-beginners/what-is-ethereum#where-to-buy-and-sell-ether

Cross, M. (2018). *Blockchains in the travel industry*. Retrieved from https://www.koddi.com/blockchains-travel-industry/

Crozier, R. (2018). *Brisbane airport retailers to accept crypto coins*. Retrieved from https://www.itnews.com.au/news/brisbane-airport-retailers-to-accept-crypto-coins-481995

Cryptocurrency Army. (n.d.). *Properties of cryptocurrencies*. Retrieved from https://www.cryptocurrencyarmy.com/properties-of-cryptocurrencies/

Cryptocurrency chart. (n.d.). Retrieved from https://www.cryptocurrencychart.com

CryptoCurrency Facts. (n.d.). *The difference between fiat currency and cryptocurrency*. Retrieved from https://cryptocurrencyfacts.com/the-difference-between-fiat-currency-and-cryptocurrency/

Dogru, T., Mody, M., & Leonardi, C. (2018). *Blockchain technology & its implications for the hospitality industry*. Retrieved from http://www.bu.edu/bhr/2018/02/13/blockchain-technology-its-implications-for-the-hospitality-industry/

Dragonchain. (2017). *Dragonchain whitepaper*. Retrieved from https://dragonchain.com/dd6d7a464346349a6659b8c1075e6772.pdf

El Manawy, N. (n.d.). *Smart contracts - the future of commissions and distribution in the hotel industry*. Retrieved from https://blog.arise.travel/smart-

contracts-the-future-of-commissions-and-distribution-in-the-hotel-industry-d460a1ef1c74

Empirica. (n.d.). *Different types of cryptocurrency*. Retrieved from http://empirica.io/blog/different-types-cryptocurrency/

Frankel, M. (2018). *How many cryptocurrencies are there?* Retrieved from https://www.fool.com/investing/2018/03/16/how-many-cryptocurrencies-are-there.aspx

Futurism. (n.d.). *Bitcoin: history and timeline*. Retrieved from https://futurism.com/images/the-entire-history-of-bitcoin-in-a-single-infographic/

Galloway, R. (2017, October 19). The potential of blockchain to disrupt the hotel industry. [Video file]. Retrieved from https://www.youtube.com/watch?time_continue=6&v=tkFDcZF1tKE

Gettler, L. (2017). *Toowoomba coffee van uses cryptocurrency*. Retrieved from http://www.hospitalitydirectory.com.au/industry-news/14189-toowoomba-coffee-van-uses-cryptocurrency/

Gil-Pulgar, J. (2018). *Bitcoin is pervasive in medical tourism*. Retrieved from http://bitcoinist.com/bitcoin-is-pervasive-in-medical-tourism/

Grass, K. (2017). *Blockchain: harnessing its potential in travel*. Retrieved from http://marketing.amadeus.com/blockchain-technology-whitepaper

Haran, N. (2017). *What's keeping cryptocurrencies from mass adoption?* Retrieved from https://techcrunch.com/2017/04/20/whats-keeping-cryptocurrencies-from-mass-adoption/

Harry, D. (2018*). I don't think bitcoin will last forever: NSA whistleblower Edward Snowden*. Retrieved from https://cryptonewsaus.com.au/i-dont-think-bitcoin-will-last-forever-nsa-whistleblower-edward-snowden/

Helms, K. (2017). *Major Japanese travel agency accepts bitcoin and offers bitcoin-exclusive deals*. Retrieved from https://news.bitcoin.com/major-japanese-travel-agency-accepts-bitcoin-and-offers-bitcoin-exclusive-discounts/

Helms, K. (2018). *South Korean travel site with over 50,000 hotels to accept 12 cryptocurrencies*. Retrieved from https://news.bitcoin.com/south-korean-travel-site-hotels-accept-12-cryptocurrencies/

Hilemand, G. & Rauchs, M. (2017). *Global cryptocurrency benchmarking study*. Retrieved from https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2017-04-global-cryptocurrency-benchmarking-study.pdf

Hubble, N. (2018). *Top crypto friendly (and hostile) countries*. Retrieved from https://www.capitalandconflict.com/investing-in-bitcoin/top-crypto-friendly-and-hostile-countries/

Hunter Labour Hire. (2018). *The first labour hire company to accept bitcoin in Australia*. Retrieved from https://www.hunterlabourhire.com.au/labour-hire-company-bitcoin-australia/

Kaufman, A. (2017). *Will blockchain revolutionise the travel industry?* Retrieved from https://medium.com/jtv-insights/willblockchainrevolutionizethetravelindustry-a9cf3076aa8f

IBMBlockchain. (2017, May 8). What is the difference between bitcoin and blockchain? [Video file]. Retrieved from https://www.youtube.com/watch?v=MKwa-BqnJDg

Judmayer, A., Stifter, N., Krombholz, K., Weippl, E., Bertino, E., & Sandhu, R. (2017). *Blocks and Chains : Introduction to Bitcoin, Cryptocurrencies, and*

Their Consensus Mechanisms. San Rafael, UNITED STATES: Morgan & Claypool Publishers.

Kasanmascheff, M. (2018). *Germany: national tourism center adds cryptocurrency payments for services*. Retrieved from https://cointelegraph.com/news/germany-national-tourism-center-adds-cryptocurrency-payments-for-services

Kaspersky. (2017). *Problems and risks for cryptocurrencies*. Retrieved from https://www.kaspersky.com/blog/cryptocurrencies-intended-risks/20034/

King, R. (2018). *Understanding the different types of cryptocurrency*. Retrieved from https://www.bitdegree.org/tutorials/types-of-cryptocurrency/#Bitcoin-2

Knight, W. (2017). *Can bitcoin be the foundation of a fairer financial system?* Retrieved from https://www.technologyreview.com/s/604217/can-bitcoin-be-the-foundation-of-a-fairer-financial-system/

Koo, C., Gretzel, U., Hunter. C, W., & Chung, N. (2015). The role of IT in tourism. *Asia Pacific Journal of Information Systems, 25*(1), 99-104. doi: 10.14329/apjis.2015.25.1.099

Linus, S. (2018, January 30). *How does bitcoin work?* [Video file]. Retrieved from https://www.youtube.com/watch?v=L-Qhv8kLESY

Lipovsky, W. (2017). *Cryptocurrency and your small business: what you need to know*. Retrieved from https://due.com/blog/cryptocurrency-small-business-need-know/

LockTrip. (2017, September 11). Booking Portal With 0% Commissions. [Video file]. Retrieved from https://www.youtube.com/watch?v=tBWpTOhF2Kw

Loyyal. (n.d.). *The internet of loyalty*. Retrieved from https://loyyal.com

Manalo, K. (2018). *Cryptocurrency, casino hub to rise in northern Philippines*. Retrieved from https://cryptovest.com/news/cryptocurrency-casino-hub-to-rise-in-northern-philippines/

Manawy, E. N. (2018, January 23). Smart contracts−The future of commissions and distribution in the hotel industry. *Arise*. Retrieved from https://blog.arise.travel/smart-contracts-the-future-of-commissions-and-distribution-in-the-hotel-industry-d460a1ef1c74

Marshall, A. (2018). *Combined crypto market capitalisation races past $800 bln*. Retrieved from https://cointelegraph.com/news/combined-crypto-market-capitalization-races-past-800-bln

Martindale, J. (2018). *What is Ethereum?* Retrieved from https://www.digitaltrends.com/cool-tech/what-is-ethereum-blockchain-cryptocurrency/

Matt, L. (2017). *The difference between bitcoin and blockchain for business*. Retrieved from https://www.ibm.com/blogs/blockchain/2017/05/the-difference-between-bitcoin-and-blockchain-for-business/

McIntosh, R. (2017). *Now accepting bitcoin: the rise of BTC in retail*. Retrieved from https://www.financemagnates.com/cryptocurrency/news/now-accepting-bitcoin-rise-btc-retail/

Mcmahon, J. (2018). *Stress free global travel thanks to blockchain and biometrics*. Retrieved from https://www.newsbtc.com/2018/02/26/stress-free-global-travel-thanks-blockchain-biometrics/

Medium. (2017). *Tourism - the next sector to benefit big from from blockchain solutions?* Retrieved from https://medium.com/@otncoin/tourism-the-next-sector-to-benefit-big-from-blockchain-solutions-2f3ff633b0f3

Murison, M. (2017). *Bitcoin, cryptocurrencies and the travel industry*. Retrieved from https://travelshift.com/bitcoin-cryptocurrencies-travel-industry/

Murison, M. (2017). *How blockchain could transform the travel industry*. Retrieved from https://travelshift.com/blockchain-transform-travel-industry/

Neuhofer, B., Buhalis, D., & Ladkin, A. (2015). Smart technologies for personalised experiences: a case study in the hospitality domain. *Electron Markets, 25*, 243-254. doi: 10.1007/s12525-015-0182-1

Njui. P, J. (2018). *Big 4 (BTC, ETH, LTC, XRP) 'To kick off' Russia World Cup 2018*. Retrieved from https://www.theindependentrepublic.com/2018/04/03/big-4-btc-eth-ltc-xrp-to-kick-off-russia-world-cup-2018/

Önder, I., & Treiblmaier, H. (2018). Blockchain and tourism: three research propositions. *Annals of Tourism Research*, 1-3. doi: 10.1016/j.annals.2018.03.005

Perrez. B, Y. (2015). *Online travel agency webjet now accepts bitcoin*. Retrieved from https://www.coindesk.com/online-travel-agency-webjet-now-accepts-bitcoin/

Peterson, B. (2017). *Disney built a blockchain, and now its creators are trying to turn it into a commercial platform to compete with Ethereum*. Retrieved from https://www.businessinsider.com.au/disney-blockchain-creators-build-commercial-platform-on-dragonchain-with-ico-2017-9?r=US&IR=T

Pollock, D. (2018). *How Australia is becoming a cryptocurrency continent: markets, regulations and plans*. Retrieved from https://cointelegraph.com/news/how-australia-is-becoming-a-cryptocurrency-continent-markets-regulations-and-plans

Quackenbush, C. (2017). *Booking a holiday? These travel sites let you pay in Bitcoin*. Retrieved from http://fortune.com/2017/12/21/bitcoin-travel-cryptocurrency-bookings/

Queensland government. (n.d.). *Queensland regions*. Retrieved from https://www.business.qld.gov.au/industries/invest/regional-opportunities/queensland-regions

Rabbani, H. (2018). *What is hashing & digital signature in the blockchain?* Retrieved from https://blockgeeks.com/what-is-hashing-digital-signature-in-the-blockchain/

Rapier, G. (2018, May 6). *Warren Buffet: Bitcoin is 'probably rat poison squared'*. Retrieved from https://www.businessinsider.com.au/bitcoin-price-warren-buffett-says-probably-rat-poison-squared-2018-5?r=UK&IR=T

Records Keeper. (2018). *Centralised vs decentralised blockchain*. Retrieved from https://www.recordskeeper.co/blog/centralized-vs-decentralized-blockchain/

Revfine. (n.d.). *Blockchain technology and its uses in the hospitality industry*. Retrieved from https://www.revfine.com/blockchain-technology-hospitality-industry/

Rosic, A. (2017). *What is cryptocurrency: everything you need to know*. Retrieved from https://blockgeeks.com/guides/what-is-cryptocurrency/

Rosic, A. (2017). *What is ethereum? a step-by-step beginners guide*. Retrieved from https://blockgeeks.com/guides/ethereum/

Rutnic, M. (2018). *What is Ripple?* Retrieved from https://www.androidauthority.com/what-is-ripple-819806/

Savjee. (2017, November 13). How does a blockchain work – Simply Explained. [Video file]. Retrieved from https://www.youtube.com/watch?v=SSo_EIwHSd4

Skift. (2018). *Is the crypto-luxury travel market worth the risk?* Retrieved from https://skift.com/2018/03/13/is-the-crypto-luxury-travel-market-worth-the-risk/

Skift. (2014). *Las Vegas' tourists strip just got its first bitcoin ATM*. Retrieved from https://skift.com/2014/07/31/las-vegas-tourist-strip-just-got-its-first-bitcoin-atm/

Sloan, K. (2018). *7 major companies that accept cryptocurrency*. Retrieved from https://due.com/blog/7-companies-accept-cryptocurrency/

Steemit. (2016). *Cryptocurrency explained - the ultimate guide to understanding cryptocurrency*. Retrieved from https://steemit.com/cryptocurrency/@leopold/cryptocurrency-explained-the-ultimate-guide-to-understanding-cryptocurrency

Stephano, R-M. (2018). *What does cryptocurrency mean for medical tourism?* Retrieved from http://www.medicaltourismmag.com/cryptocurrency-medical-tourism/

Taran, E. M., Salmanova, I. P., Dokukina, E. V., Menshikova, M. A., & Skudareva, N. Z. (2015). Features of using the cryptocurrency. *Asian Social Science, 11*(14), 330-336.

Terenzi, C. (2018). *Coinbase integrates with shopify and allows merchants to accept cryptocurrency payments*. Retrieved from https://www.coinstaker.com/coinbase-shopify-integration-cryptocurrency-payments/

Thellmann, P. (2018). *How blockchain is banking the unbanked*. Retrieved from https://cointelegraph.com/news/how-blockchain-is-banking-the-unbanked

The points guy. (n.d.). *Airlines and travel agencies that accept bitcoin for payment.* Retrieved from https://thepointsguy.com/guide/airlines-otas-accepting-bitcoin/

The Startup. (2017). *5 ways blockchain will disrupt the travel industry*. Retrieved from https://medium.com/swlh/5-ways-blockchain-will-disrupt-the-travel-industry-5792c9ecfb4e

Tilma Group. (2018). *How rural communities can increase tourism*. Retrieved from https://www.tilmagroup.com.au/blogtilma/2018/2/26/how-rural-communities-can-increase-tourism

Travelbybit. (n.d.). *TravelbyBit Australia*. Retrieved from https://www.travelbybit.com

TravelbyBit. (n.d.). *TravelbyBit merchants*. Retrieved from https://www.google.com/maps/d/viewer?mid=1ApWWFrtDQf7ckop__SIQaqLcv2-M0c55&ll=-27.5363262526964%2C148.1214604273316&z=8

Trippki. (2017, October 28). Trippki token sale - introduction film.[Video file]. Retrieved from https://www.youtube.com/watch?v=M8hX4nq7d98

TUI Group Corporate. (2017, October 16). What is blockchain? [Video file]. Retrieved from https://www.youtube.com/watch?time_continue=166&v=MtR770GLviU

Vedi, C. (2017). Cryptocurrency NewsBlockchain Technology to Transform Tourism Industry, Says Russian Tourism Official. Retrieved from: https://coinvedi.com/blockchain-technology-to-transform-tourism-industry-says-russian-tourism-official/

Winding Tree. (2018, January 17). Blockchain for travel distribution. [Video file]. Retrieved from https://www.youtube.com/watch?time_continue=48&v=_qer1qd68eQ

Woo, Wilma. (2018). *Top 10 expert bitcoin price predictions for 2018 & beyond*. Retrieved from http://bitcoinist.com/10-bitcoin-price-predictions-2018-beyond/

World Economic Forum. (2016, January 21). What Is Blockchain? [Video file]. Retrieved from https://www.youtube.com/watch?v=6WG7D47tGb0

Yeoh, C. (2018). *Interview with Caleb Yeoh* [Real Media file]. Retrieved from https://drive.google.com/drive/folders/1B4K3uXIimlL9nTESuRhB8Za3Z7ayd UMq

Zhao, W. (2018). *Thailand inches closer to cryptocurrency taxation*. Retrieved from https://www.coindesk.com/thailand-inches-closer-to-cryptocurrency-taxation/