

KARELIA UNIVERSITY OF APPLIED SCIENCES  
Degree Program in International Business

Yuchen Xu

ADOPTION OF CRYPTOCURRENCY IN EUROPE

Thesis  
December 2020



**THESIS**  
**Month 2021**  
**Degree Programme in International Business**

Tikkarinne 9  
FI 80200 JOENSUU  
FINLAND  
Tel. +350 13 260 600 (switchboard)

Author(s)  
Yuchen Xu

Title  
**ADOPTION OF CRYPTOCURRENCY IN EUROPE**  
Commissioned by Savii Digital Marketing Agency, England

**Abstract**

The aim of the study is that to find out how individuals invest with cryptocurrencies and what the functions of crypto technologies are.

Since cryptocurrencies were first adopted in 2008, an emerging industry has arisen. The cryptocurrency industry promotes more international trade, and the technology provides more convenience in different fields. Savii Digital Marketing Agency is a marketing agency that focuses on the worlds of finance, blockchain and cryptocurrency. It is a highly experienced cryptocurrency marketing agency that helps increase awareness of cryptocurrencies. The company has launched a new cryptocurrency project.

This study uses surveys and questionnaires to assist the commissioning company in the new project.

The research results help the company know about the currently cryptocurrency investment trends of European investors. The results also help new investors avoid risks when they first enter the cryptocurrency market.

Language  
English

Pages 35  
Appendices  
Pages of Appendices

Keywords: cryptocurrency, blockchain, Bitcoin, Ethereum, investment

## CONTENTS

Abbreviations .....	5
1 INTRODUCTION .....	5
1.1 Background .....	6
1.2 The aim of the thesis .....	7
1.3 Methodology .....	7
1.4 outline.....	7
2 CRYPTOCURRENCIES AND TECHNOLOGIES.....	8
2.1 Blockchain.....	9
2.2 Wallet for cryptocurrencies transactions.....	10
2.3 Bitcoin .....	11
2.4 Ethereum .....	12
2. 5 Smart contracts.....	12
2.6 XRP .....	13
2.7 Litecoin.....	13
2.8 Definitions related to cryptocurrency.....	8
3 REGULATION OF CRYPTOCURRENCIES IN EUROPE .....	14
3.1 EU Member States .....	14
3.2 Estonia.....	15
3.3 Finland.....	15
3.4 Germany .....	15
3.5 Gibraltar .....	16
3.6 Switzerland.....	16
4 CRYPTOCURRENCIES IN EUROPE .....	16
4.1 Cryptocurrency exchanges in Europe .....	17
4.2 Cryptocurrency trade in Europe .....	19
4.2.1 Bitcoin transactions and prices.....	<b>Error! Bookmark not defined.</b>
4.2.2 Ethereum transactions and prices.....	<b>Error! Bookmark not defined.</b>
4.2.3 XRP transactions and prices.....	<b>Error! Bookmark not defined.</b>
4.2.4 Litecoin transactions and prices .....	25
4.3 Electricity cost of mining Bitcoins in European countries.....	26
4.4 SWOT analysis.....	27
4.4.1 Strengths.....	27

4.4.2 Weakness.....	27
4.4.3 opportunity .....	27
4.4.4 Threats.....	27
5 THE ILLEGAL ACTIVITIES OF USING CRYPTOCURRENCIES.....	28
5.1 Money laundering .....	28
5.2 Drug trafficking.....	30
5.3 Darknet .....	30
6 RESULT .....	31
6.1 Interview and surveys.....	32
7 CONCLUSIONS.....	36
REFERENCE.....	39

## **ABBREVIATIONS**

BTC- Bitcoin

DTL- Distributed Ledger Technology

ETH-Ethereum

FINMA- the Swiss Financial Market Supervisory Authority

ICO - Initial Coin Offering

OTC-Over the Counter

# 1 INTRODUCTION

## 1.1 Background

Cryptocurrencies are digital currencies running on blockchain technology in a decentralized network not issued by central banks. They are not fiat currencies such as dollars and euros, which the central banks control. Various kinds of cryptocurrencies circulate on peer-to-peer networks. Any individual or institution can launch one based on cryptocurrency mining technology. The prices of cryptocurrencies are influenced by supply and demand on the market. Many are still in developmental stages of development. (Öunap, Šorin & Öunap (2018, 18-24.) As a result, in some countries, the laws and regulations related to cryptocurrencies are still not perfect. Therefore, cryptocurrencies are used for illegal activities such as money laundering, drug trafficking, and weapons sales.

Cryptocurrencies have a brief, one-decade history. The first type of decentralized cryptocurrency was created by Satoshi Nakamoto and named Bitcoin in 2008 (Antonopoulos 2014, 3). Since any cryptocurrency is still an emerging technology in most countries, there is a gap in knowledge of what cryptocurrencies are and how they work. Some people still hold negative attitudes towards cryptocurrencies even though they may have given individuals and companies more choices in which to invest and from which to make profits. However, cryptocurrencies also have shown their high volatility of prices. Some people think that investing in cryptocurrencies is like a bubble because of the price fluctuations that come with such investments. After the creation of the first cryptocurrency, hundreds of different kinds of cryptocurrencies were created.

The thesis is an assignment from the author's internship company, the Savii Digital Marketing Agency, a marketing agency that focuses on the worlds of finance, blockchain and cryptocurrency. It is a highly experienced cryptocurrency marketing agency that helps increase awareness on cryptocurrencies. The company has launched a new cryptocurrency project. Readers of this thesis are the potential customers for this marketing agency.

## 1.2 The aim of the thesis

The thesis' main aim is to investigate the adoption of cryptocurrencies in European countries and analyse the circulation of the cryptocurrencies based on blockchain and other similar technologies. The research will find the main European trends in cryptocurrency transactions and look at the electricity consumption when mining one cryptocurrency. Illegal activities with cryptocurrencies are also addressed in this thesis.

The theoretical part of the thesis defines cryptocurrencies and the technologies they are based on. Regulations and laws on cryptocurrencies in different European countries make up one part of the thesis. The practical part analyses the recent transaction data on cryptocurrencies and the energy cost of mining cryptocurrencies, and data gained from cryptocurrency investors. The research scope of this thesis is limited to the cryptocurrency transactions in European countries, including The United Kingdom and excluding Russia.

The research questions are:

- (1) What is a blockchain, and how can it be used in cryptocurrencies and in other fields?
- (2) What are the main European trends in cryptocurrency transactions at the moment?

## 1.3 Methodology

The data for this research was collected by conducting semi-structured qualitative interviews. The secondary data is about cryptocurrencies from reports such as the price of different kinds of cryptocurrencies and the trade volume from cryptocurrency exchanges. Since the transactions on the cryptocurrency exchanges are anonymous, the users cannot be found from the exchange websites so the interviewees were found from cryptocurrency groups online.

The thesis's theoretical part is based on several different cryptocurrency books such as *Crypto and Blockchain for Beginners: The Ultimate Beginner's Guide to Cryptocurrency* and *Blockchain for Beginners*, which the thesis author's employer from the internship company has

written. The two books: *Mastering Bitcoin* and *Mastering Ethereum*, which were written by Andreas M. Antonopoulos, will be used for definitions.

## **1.4 Outline**

This thesis is divided into seven chapters. The first chapter introduces the background of the thesis topic, the aim of the thesis, and the methodology used for the research. Chapter two defines different types of cryptocurrencies and blockchains and other technologies related to cryptocurrencies and introduces the aspects that are relevant to cryptocurrency business investors. Chapter three introduces the regulations and laws on cryptocurrencies in some of the European countries. Chapter four analyzes the transaction data of cryptocurrencies in European countries and the cost of mining Bitcoins. Chapter five discusses the illegal activities of using cryptocurrencies. Chapter six analyses the results. Chapter seven is for conclusions and overall findings.

# **2 CRYPTOCURRENCIES AND TECHNOLOGIES**

## **2.1 Definitions related to cryptocurrency**

A cryptocurrency is a digital currency that is secured by cryptography. It is a decentralized network based on blockchain (Frankenfield 2020). Blockchain is a peer to peer network. Cryptocurrency is a kind of new digital asset. It has allowed users to make a payment without third-party intervention. Tokens are cryptocurrencies built on top of an already existing protocol (Öunap et al 2018 18-24).

A transaction is when an owner of cryptocurrencies authorizes the transfer of some of their cryptocurrencies to another owner. This must be transmitted on a cryptocurrency network. This also proves the ownership of cryptocurrency. (Antonopoulos 2017, xviii.)



Cryptocurrency exchanges are the websites or mobile applications where cryptocurrency users and investors sell and buy different kinds of cryptocurrencies or exchange the cryptocurrencies to EUR or USD.

Miners are the cryptocurrency users who mine the cryptocurrencies and make sure the transactions are accurate and the payments secure. Mining is the way to create new Bitcoins. It is like finding a solution for a puzzle with thousands of different pieces. It takes ten minutes to find one solution. After one solution is found, the system will be reset to find another solution. (Antonopoulos 2017,1.)

A hard fork occurs when the node on a blockchain or the transaction changes, the upgraded node refuses to verify the block generated by the upgraded node, and then everyone continues along the chain that they think is correct, thus dividing the original into two chains. (Frankenfield 2018.)

## **2.2 Blockchain**

Satoshi Nakamoto first created a blockchain for Bitcoin (the World Bank Group 2017, 13). Blockchain is composed of data blocks. The data blocks are linked together in chronological order to form a chain structure, so the technology is named “blockchain”. As the base technology of Bitcoin, it is essentially a decentralized database. Blockchain is an immutable data record managed by a cluster of computers that do not belong to any single entity. It is a series of data blocks associated with cryptographic methods. Each data block contains a batch of Bitcoin network transaction information, used to verify validity and to generate the next block. The data on blockchain is ordered, and a back-linked list of blocks of transactions is formed (Antonopoulos 2017,163-168). Blockchain does not rely on any third party.

Blockchain is a kind of distributed ledger technology. The primary function of a blockchain is a distributed database. The blockchain data can only be added continually with the existing data, which can never be removed. The data on blockchain can be stored permanently. (Houben 2018, 15.)

There are two kinds of blockchains, open, permissionless blockchain, and permissioned blockchain. On an open, permissionless blockchain, users can freely enter or leave the network. There is no entrance permission needed. The only thing needed is the network on a computer. “On a permissioned blockchain, transaction validators have to be pre-selected by a network administrator (who sets the rules for the ledger) to be able to join the network.” It is easy to be verified and identified by network participants. (Houben 2018, 17.)

Blockchain is a smart and straightforward method to transfer information from sender to receiver in a completely automatic and secure way. It requires a lot of electricity for the developers, but the transaction fee is low when the senders transfer the data and cryptocurrency. “One party to the transaction initiates the process by creating blocks.” This block is distributed on the network by thousands of computers. The verified block is added to a chain. This chain is stored in the network, which creates a unique historical record on blockchain. Each of these data blocks is secure and bound to others using encryption principles. Everything on a blockchain is transparent (Rosic 2020).

Decentralization is one of the critical characteristics of blockchain technology. The decentralized network of Bitcoin, which again uses blockchain technology, is based on peer-to-peer technology. Every user on the system can connect with the data created by others. There is no central authority on Blockchain technology.

### **2.3 Wallet for cryptocurrencies transactions**

To start transactions and investments in cryptocurrencies, the users must first create an account on the exchange websites and get their account verified. Then a wallet must be chosen for holding the cryptocurrencies.

There are two kinds of wallets, hot wallets and cold wallets. A hot wallet is connected to the internet and is easy and fast to be accessed. However, the hot wallet is not safe. The cold wallet cannot be connected to the internet, so it is more secure than the hot wallet. A USB stick can serve as the storage of the wallet. (Öunap et al. 2018, 19.)

## **2.4 Bitcoin**

Bitcoin is a kind of cryptocurrency on the digital financial system which is not a physical currency. It is not considered a fiat currency. It was the real first currency on the cryptocurrency system. Bitcoin was invented in 2008. The critical innovation was to use a distributed computation system allowing the decentralized network to record the state of transactions. Satoshi Nakamoto combined several different prior inventions to create a decentralized electronic cash system. The Bitcoin network started in 2009, based on a reference implementation. Bitcoin can be used to store and send the value among the users in the Bitcoin network. The distributed computation has increased exponentially and now exceeds the world's top super-computers' combined processing capacity. (Antonopoulos 2017, 17-20.)

Bitcoins can be exchanged for other kinds of cryptocurrencies and used as payment options at Bitcoin accepting companies and shops. “Bitcoin in a sense is the perfect form of money for the Internet, because it is fast, secure, and borderless” (Antonopoulos 2017, 3). Bitcoin protocol is used for communication between the networks and can run on different kinds of electronic equipment.

The process of Bitcoin problem solving is mining, and anyone with a computer can be a miner. Every ten minutes, a new solution can be found, and then the finder can validate the transaction and get a new Bitcoin reward. This process is called Bitcoin mining. Any participant on the Bitcoin network can be a miner to record the transactions on the network. The Bitcoin protocol includes inbuilt algorithms. The total number of Bitcoins is 21 million. When this has been mined, no more bitcoin mining will be available. The speed of creating new bitcoins halves

every four years. The key in a digital wallet can prove the ownership of Bitcoins. (Öunap et al. 2018, 20-21.)

## **2.5 Ethereum**

Ethereum, which was launched in 2013, is one of the world's top cryptocurrency platforms. (Öunap et al. 2018, 24). It is an open-source, globally decentralized framework for executing smart contracts (Antonopoulos & Wood 2018, 9). A smart contract is a composed part of the decentralized applications (Dapp) of Ethereum (Antonopoulos & Wood 2018, 16). The state transitions of a general-purpose datastore and the ownership of the cryptocurrencies can be tracked on Ethereum (Antonopoulos & Wood 2018,13). Ethereum aims to make the most straightforward transactions. Ethereum is a safe platform to store owners' cryptocurrencies because no one can monitor or steal data from Ethereum. Payments on Ethereum are low-cost and instant. Users can create their private cryptocurrency wallets to make sure their tokens are safe. Contracts can be created by Ethereum users freely on Ethereum to make transactions. (Öunap et al. 2018, 24-25.) A smart contract is a composed part of the decentralized applications (Dapp) of Ethereum (Antonopoulos & Wood 2018, 16).

## **2. 6 Smart contracts**

This concept of smart contract first came out in the 1990s. It was defined by Nick Szabo as “a set of promises” in digital form. The concept has evolved after the invention of blockchain and Bitcoin. (Antonopoulos & Wood 2018, 96.)

“Smart contracts are the contracts that work on blockchain technology (Öunap et al. 2018, 45).” There is no need to have third-party transferring money with a smart contract on blockchain. Smart contract is easily created by every user on blockchain. Instead of a central server such as in a real bank, the contracts can be held and validated on different computers worldwide. “Once a smart contract is put into a block and the block is added to the blockchain, it is there

permanently and unalterably. These blocks are also completely public and transparent, meaning every participant can validate these contracts” (Öunap et al. 2018, 46).

On Ethereum, a smart contract is a fixed computer program running in the Ethereum Virtual Machine as a part of the Ethereum network protocol. “Each contract is identified by an Ethereum address, which is derived from the contract creation transaction as a function of the originating account and nonce” (Antonopoulos & Wood 2018, 97). “A nonce is sequence number, used to prevent message replay” (Antonopoulos & Wood 2018, 76).

## **2.7 XRP**

XRP is a cryptocurrency based on the Ripple system. Ripple is the first enterprise blockchain solution in the world for international payments. It can be used for managerial accounting. The Ripple system can work with banks and companies. All the transactions on Ripple take place directly, moving from senders to recipients’ accounts. Ripple can make transactions cheaper and faster. (Öunap et al. 2018 26-27.)

Ripple can be used to exchange all different kinds of cryptocurrencies on blockchain, and not only for XRP. All kinds of cryptocurrencies can be exchanged into XRP and then sent to every XRP user via the Ripple system.

## **2.7 Litecoin**

Litecoin is an open-source, decentralized, and peer-to-peer cryptocurrency which was launched in 2011. It is based on what is known as the Scrypt PoW algorithm. The value of Litecoin goes up smoothly, so it is less volatile. Litecoin’s limit is 84 million, which is four times the total amount of Bitcoin’s. Litecoin runs on an open, permissionless blockchain. (Houben, 2018).

Creating a block on Litecoin is much faster than it is on Blockchain, so Litecoin can be used for handling higher volume transactions than Bitcoins. The payment on Litecoin can be sent and received immediately, and it runs at low costs. The cost of Bitcoin transactions is four times that of Litecoin. Because of the simple mining algorithm, the mining cost and the entry barriers of Litecoin are lower than other kinds of cryptocurrencies.

### **3 REGULATION OF CRYPTOCURRENCIES IN EUROPE**

In some European countries, a license must be obtained before providing cryptocurrency exchange services. Most governments in Europe do not ban cryptocurrency activities, but there are no specific regulations and laws, and they consider investing in cryptocurrencies high risk. However, there are also some places in Europe where cryptocurrency payments are accepted but cannot be used as a fiat currency. Few areas are cryptocurrency-friendly, especially Gibraltar.

#### **3.1 EU Member States**

In the European Union, cryptocurrencies are accepted as a payment method for making online trade. In 2018, the European Supervisory Authorities for securities and (ESMA), banking (EBA), and insurance and pensions (EIOPA) jointly issued a statement that cryptocurrencies are high-risk unregulated products and are not suitable for investments and savings. (Global Legal Research Center 2018, 35.)

Most European countries have stated that cryptocurrencies are not currencies. In Austria, the Austrian Ministry of Finance (Bundesministerium der Finanzen, BMF) does not consider cryptocurrency as a legal tender or financial instrument. Cryptocurrencies are regarded as intangible commodities. Cryptocurrencies remains unregulated in Belgium. Denmark's Financial Supervisory Authority issued a statement in 2013 rejecting cryptocurrencies as a kind of currency. (Global Legal Research Center 2018, 37-40.) The Czech National Bank would not hinder the development of cryptocurrency, but it also will not help to promote them, and there is no governmental protection for cryptocurrency users (Hampl 2018).

### **3.2 Estonia**

Cryptocurrency as a payment option can be accepted in Estonia, but it is not a legal tender. It can be transferred, preserved, and traded. The anti-money laundering legislation in Estonia regulates that the providers who offer the cryptocurrency exchange services to a fiat currency or other cryptocurrencies must get a licence before providing the services. (Global Legal Research Centre 2018, 42.)

### **3.3 Finland**

Finland does not have any laws to prevent buying and selling cryptocurrencies. It is legal to provide cryptocurrency exchange services. The providers need to be registered with the Financial Supervisory Authority of Finland. (Newsroom 2019.)

When transferring cryptocurrencies to other currencies, the taxation of capital is levied. When cryptocurrency is used as a payment method for goods or services, it is not considered as a traditional payment method. It is a trade. When the value of the cryptocurrencies increases, it is taxable. (Global Legal Research Centre 2018, 42.)

### **3.4 Germany**

The German Federal Financial Supervisory Authority authorizes cryptocurrencies as financial instruments. Companies and individuals who organize the acquisition and trade of cryptocurrencies must get permission from BaFin (Federal Financial Supervisory Authority) in advance. In 2018, BaFin published the regulations of cryptocurrencies and - Initial Coin Offerings: "firms involved in ICOs need to assess on a case-by-case basis whether the ICOs qualify as financial instruments (transferable securities, units in collective investment undertakings, or investments) or as securities and therefore trigger the need to comply with the relevant financial legislations." In February 2018, the German Federal Ministry of Finance published guidance on the value-added-tax of cryptocurrencies: the transactions between cryptocurrencies and fiat currencies are exempt from value-added tax. Bitcoin and other cryptocurrencies can be a payment method as a fiat currency in Germany, and value-added tax is exempt. (Global Legal Research Center 2018, 47.)

The German Bundesbank believes that Bitcoin is a kind of currency because it can be used for payments (Gesley 2018). The German Bundesbank believes that Bitcoin is a kind of currency because it can be used for payments (Gesley 2018).

### **3.5 Gibraltar**

The government of Gibraltar introduced the Financial Services (Distributed Ledger Technology Providers) Regulations in 2017 with a respective and progressive attitude. The companies that execute the cryptocurrency trade must get a license from the Gibraltar Financial Services Commission to become a DLT provider. The license owners need to pay an annual fee for the license. "Under the regulations, the provision of DLT services without a license is an offense, punishable with a fine of up to £10,000 (approximately US \$14,000)." (Global Legal Research Centre 2018, 68.)

### **3.6 Switzerland**

Bitcoin and ETH have been accepted as payment methods for administrative costs by the Commercial Register Office in the Canton of Zug since November 2017. Moreover, cryptocurrencies are accepted as contributions to establishing new companies. Bitcoin has been an acceptable tax payment in the municipality of Chiasso from January 2018." FINMA (the Swiss Financial Market Supervisory Authority) has recognized cryptocurrencies as payment methods and money or value to transfer. (Global Legal Research Center 2018, 83.)

## **4 CRYPTOCURRENCIES IN EUROPE**




































## 4.1 Cryptocurrency exchanges in Europe

Some of the cryptocurrency users in European countries are investors buying and selling cryptocurrencies on the exchange websites. Also, cryptocurrencies can be used for daily payments in some European countries. Blockchain technology can connect hotels and customers without online travel agencies. Take the Blockchain-based hotel booking website Travalva as an example. Most cryptocurrencies can be accepted on Travalva, which offers more bookings in than 2 million hotels.

**Select your payment method** *(Click one option below)*

---

<input type="radio"/> Credit Card	<input checked="" type="radio"/> Crypto	<input type="radio"/> Crypto.Com	<input type="radio"/> Utrust
-----------------------------------	---	----------------------------------	------------------------------

<input type="radio"/>  Travalva (AVA)	<input type="radio"/>  Basic Attention Token (BAT)	<input type="radio"/>  Bitcoin (BTC)	<input type="radio"/>  Ethereum (ETH)
<input type="radio"/>  USDT (Trc20)	<input type="radio"/>  USDT (Erc20)	<input type="radio"/>  XRP (XRP)	<input type="radio"/>  Bitcoin Cash (BCH)
<input type="radio"/>  Cardano (ADA)	<input type="radio"/>  Litecoin (LTC)	<input type="radio"/>  Stellar (XLM)	<input type="radio"/>  Chainlink (LINK)
<input type="radio"/>  BNB (BNB)	<input type="radio"/>  USD Coin (USDC)	<input type="radio"/>  Monero (XMR)	<input type="radio"/>  EOS (EOS)
<input type="radio"/>  TRON (TRX)	<input type="radio"/>  NEM (XEM)	<input type="radio"/>  VeChain (VET)	<input type="radio"/>  DAI (DAI)
<input type="radio"/>  Dash (DASH)	<input type="radio"/>  BUSD (Erc20)	<input type="radio"/>  Waves (WAVES)	<input type="radio"/>  Nano (NANO)
<input type="radio"/>  DigiByte (DGB)	<input type="radio"/>  TrueUSD (TUSD)	<input type="radio"/>  Paxos Standard (PAX)	<input type="radio"/>  Zcoin (XZC)
<input type="radio"/>  Swipe (SXP)	<input type="radio"/>  Komodo (KMD)	<input type="radio"/>  ARK	<input type="radio"/>  GUSD (GUSD)
<input type="radio"/>  Standard Tokenization Protocol (STPT)			

Picture 1. Payment method with cryptocurrencies on Travalva (Source: Travalva.com)

#### **4.1.1 Binance**

Binance is a global cryptocurrency exchange that was founded by Changpeng Zhao and Yi He, both of China, in Malta in 2017. Binance is one of the biggest cryptocurrency exchanges in the world, with more than 100 cryptocurrencies. There are more than 1.4 million transactions per second and 2 billion euros of average daily volume on Binance (Binance 2020). It is famous for its low transaction fees and high mobility compared to other exchanges. Every cryptocurrency can be easily exchanged on Binance.

The average 24-hour volume is \$3,489,448,725 on Binance (Coinmarketcap 2020). According to an evaluation on Coinmarketcap, the average liquidity of Binance is 615. “Liquidity scores a market pair (change one cryptocurrency to another cryptocurrency or a fiat currency such as BTC/USD, BTC/BNB) from 0 to 1000, with 1,000 reflecting the most liquid of markets and 0 for the most illiquid” (Coinmarketcap 2020). A higher score indicates a more liquid market. Binance also launched its own token named BNB, which was created in June 2017. It was designed for reducing the transaction cost on Binance. The total amount of daily volume on Binance is far more than the daily volume on other cryptocurrency exchanges.

#### **4.1.2. Bitvavo**

Bitvavo is a centralized exchange based in Amsterdam and was launched in January 2018 (Bitvavo 2020). Bitvavo is a member of the Dutch Association of Bitcoin Companies, a self-regulating body with the goal of preventing fraud and money laundering (Coinmarketcap 2020).

#### **4.1.3. Bitbay**

Launched in March 2014, BitBay is a centralized exchange based in Estonia. It supports fiat pairs and crypto-crypto pairs. The exchange offers a low trading fee (from 0% for crypto-crypto markets), deposits, and withdrawals in 4 fiat currencies and over 30 cryptocurrencies. Users can use mobile app, PRO mode, and Affiliate Program. For businesses, BitBay provides corporate accounts and OTC services. Over 93% of users exchange Bitcoin to Polish złoty on Bitbay. (Coinmarketcap 2020.)

#### **4.1.4. The Rock Trading**

The Rock Trading is the first cryptocurrency exchange established in Europe in 2011. The headquarters is in Milan, Italy. Over 80% of the daily volume are Bitcoin transactions, and the trade volume is \$457,007. Its Ethereum trade volume is \$69,186 (12.16%). (Coinmarketcap 2020.)

#### **4.1.5. Kuna**

Founded by Michael Chobanian in 2016, Kuna Exchange claims to be the first public cryptocurrency exchange in CIS countries and the Ukraine. The exchange reportedly serves over 150,000 users. Over 30 different trading pairs are available on the platform. The team claims that every account is 100% secured with cash reserves. (Coinmarketcap 2020.)

### **4.2 Cryptocurrency trade in Europe**

Eighty-five percent of all the Eastern European cryptocurrency transactions are more valuable than \$10,000. P2P exchange's trading volumes have grown positively in Eastern Europe. The Ukraine is leading cryptocurrency adoption in Europe. Binance is the most popular exchange in Eastern Europe. Fourteen billion worth cryptocurrencies were sent from Binance to Eastern Europe during 20<sup>th</sup> June to 20<sup>th</sup> July. "The cryptocurrency services sending the highest volume of funds to Eastern European addresses. Most of the top services interacting with Eastern Europe addresses are large exchanges" (Chainalysis 2020,52.)

## 4.2.1 Bitcoin transactions and prices

### Bitcoin Chart



Figure 1. Bitcoin price (Source: CoinMarketMap 2021).

According to Figure 1, the price of Bitcoin went from almost 0 US dollars in 2011 to nearly more than 50,000 US dollars on 18 February 2021. The first surge was in in 2013. The price of Bitcoin first increased to 96 US dollar. Soon afterwards, investors gradually became rational, and the price of Bitcoin began to fall. In the second half of 2013, most European countries rushed to introduce Bitcoin regulations. The price of Bitcoin started to soar. As of December,

the price of Bitcoin was \$1,069. The price exceeded a thousand dollars for the first time at the end of 2013. From 2014 to 2016, the Bitcoin market continued to depress.

In the autumn of 2017, the price of Bitcoin started to increase. “In October of that year, the price broke through \$5,000 and doubled again in November to \$10,000. Then, on 17th December, the price of one Bitcoin reached \$19,783” (Edwards 2020). This was a price bubble for Bitcoin because the price began to go down in 2018. From 2019, the price of Bitcoin continually increased until 2020. Some cryptocurrency individual users and company investors believed that the price of Bitcoin would not exceed \$20,000. However, the current price of Bitcoin (at the time of thesis publishing) is \$23,449.41 (Binance 2020).

Since Bitcoin is the most popular cryptocurrency all around the world, there are on average 20 transactions in one minute. There is no minimum purchase amount regarding Bitcoin. The users and investors determine amounts.

Bitcoin is the most widely supported cryptocurrency among participating exchanges, wallets, and payment companies. The market cap of Bitcoin is \$353,063,878,629, and the 24-hour trade volume is \$68,438,531,094. (Coinmarketcap 2020.) The safety factor of Bitcoin is 6.4 (cointobuy 2020). However, the volume ratio of Bitcoin is low because of the high volatility of the prices in 2020. The price of Bitcoin increased to more than \$30,000 for one Bitcoin rapidly at the end of 2020. Bitcoin. Bitcoin can be traded on eighty-three percent of exchanges currently.

#### **4.2.2 Ethereum transactions and prices**

Ethereum was first launched in 2013. It is the second largest cryptocurrency. It is so called Bitcoin 2.0 and is considered as the next generation of Bitcoin by cryptocurrency users.

## Ethereum Chart



Figure 2. Ethereum price (Source: CoinMarketMap 2021).

In 2015, the price of Ethereum broke through the \$1, and its price has never returned below this. It was equal to 0.589BTC in 2015. The price of Ethereum continually increased during the first two months of 2016. In March 2016, the price of Ethereum was \$11. Ethereum implemented a hard fork in 2017. As a result, the price fluctuated sharply. At the same time, the market value of Ethereum exceeded \$1 billion for the first time. By the end of April of that year, the price of Ethereum fell to \$7.3.

In 2016, “after \$60 million worth of ETH, Ethereum’s native cryptocurrency, was stolen from users from a Dapp known as the DAO, the price of ETH reached the next peak and the highest level in 2016: US \$20.6” (Kim& Hao 2020). About \$50 million in ETH was stolen from the project on June 16; then the price of Ethereum went down to \$11.

In 2017, the price of Ethereum increased sharply. In March 2017, the price of Ethereum went up to \$45. The average daily transaction volume even reached USD 450 million. That month, the price of Ethereum basically remained in the range of US\$53-59. In January 2018, the price of Ethereum reached \$1400. The price of Ethereum fell until April 2018, sinking to \$380. After that, the price fluctuations were smaller in 2019 and 2020. The price was \$648.89 in December 2020.

The market cap of Ethereum was \$74,352,554,145 and the 24-hour trade volume was \$23,901,696,747. The safety factor of Ethereum was 6.9 out of 10. (Coinmarketcap 2020.)

Ethereum can be traded on eighty-one percent of exchanges trade. The volume ratio of Ethereum is 52%. It is traded rather actively in cryptocurrency markets. The prices of Ethereum are stable, around \$988.07, without many changes. It is the safest cryptocurrency (cointobuy 2020).

The emergence of Ethereum provided people with more choices, so that Bitcoin would not be the only option for users and investors.

### 4.2.3 XRP transactions and prices

#### XRP Chart



Figure 3. XRP price (Source: Source: CoinMarketMap 2021)

The price of XRP has consistently been low since its creation. The highest price was \$3.40 on 4 January 2018 (Coinbase 2020). Otherwise, the price is usually lower than 1 US dollar. The market cap of XRP is \$27,733,096,421, and the 24 hours trade volume is \$21,213,765,878 (Coinmarketcap 2020).



#### 4.2.4 Litecoin transactions and prices

### Litecoin Chart



Figure 4. Litecoin price (Source: Coinmarketmap)

The price of Litecoin was \$2.91 29<sup>th</sup> April 2013. The price first increased to \$46 in December 2013. After that, the price was stable until March 2017. The first peak was \$318 in 2017. The price of Litecoin started to drop again in 2018. The price started to increase from 2018 to the middle of 2019. There was another fluctuation from 2019 to 2020. At the end of 2020, the price of Litecoin grew sharply. The value of one Litecoin's value is around 1% of one Bitcoin.

### 4.3 Electricity cost of mining Bitcoins in European countries

Table 1. The cost of mining a single Bitcoin (Source: MarketWatch)

Belarus	\$2,379	Lithuania	\$5,155
Belgium	\$2,177	Luxembourg	\$7,693
Cyprus	\$8,723	Malta	\$6,079
Denmark	\$14,275	Netherlands	\$9,499
Estonia	\$5,551	Norway	\$7,784
Finland	\$7,122	Poland	\$6,931
France	\$7,930	Portugal	\$10,825
Germany	\$14,275	Romania	\$5,698
Gibraltar	\$5,710	Serbia	\$3,133
Greece	\$ 9,120	Slovakia	\$4,746
Hungary	\$5,365	Slovenia	\$7,645
Iceland	\$4,746	Spain	\$11,103
Ireland	\$11,103	Sweden	\$4,746
Italy	\$10,310	Switzerland	\$7,494
Latvia	\$7,122	Ukraine	\$1,852
Liechtenstein	\$8,164	United Kingdom	\$8,402

The cost of mining a single Bitcoin (Source: MarketWatch)

Much energy is consumed for mining one cryptocurrency, amounting to 77.78 TWh of electricity for one year (Digiconomist 2020).

According to Table 1, the price of mining one Bitcoin in Iceland is much lower than that in other countries. It is because of the location and Topography of Iceland. The topography of Iceland provides plentiful and low-cost renewable energy. All the electricity in Iceland comes from renewable energy because the island is full of geothermal and hydroelectric power plants, which reduces the wholesale cost of electricity. It dramatically reduces the cost. Also, because of the climate in Iceland, there is no need to buy air conditioning for cooling the servers. The temperature of server rooms is not so high.

## **4.4 SWOT analysis**

### **4.4.1 Strengths**

Cryptocurrency as a payment method is faster than fiat money transferring, which often lasts three working days between banks and users. This is because cryptocurrencies can be transferred directly from customers to cryptocurrency-accepting companies without any third-party interferences. Every cryptocurrency's total amount is limited, and most of the cryptocurrencies' prices are stable, such as Ethereum and XRP. As a method of payment, it does cause inflation. Transactions are transparent on the exchange website because of decentralization. Everyone can trace the transaction process on the websites. For international trade, there is no need to exchange other currencies. Cryptocurrencies can be paid directly around Europe, and there is no transaction fee.

### **4.4.2 Weakness**

Cryptocurrencies have short histories. There are not enough regulations and laws on the new technology. The data on blockchain and other technologies where cryptocurrencies are based cannot be removed. Only new data can be added. If there is any mistake, it cannot be deleted. The mining cost of one cryptocurrency is high. Enormous amounts of electricity are required when mining Bitcoin. High volatility is another significant weakness of cryptocurrencies. The prices of them change every day, and sometimes these drops or increase rapidly.

### **4.4.3 Opportunities**

With the development of the internet, e-commerce has also developed. More and more customers trade online. Cryptocurrencies can be the method of payment for e-commerce because it is easy and fast to transferred. Blockchain can be used in different fields, such as food safety.

### **4.4.4 Threats**

Since the transactions are anonymous, the users who made transactions cannot be identified. Illegal activities, such as money laundering, happen easily. In some countries, cryptocurrencies

are entirely banned because cryptocurrencies can be used to buy drugs and weapons on the darknet. Ransomware and fake exchange websites can make investors lose their money in seconds. This may lead to social instability.

## 5 THE ILLEGAL ACTIVITIES OF USING CRYPTOCURRENCIES

### 5.1 Money laundering

Criminals use cryptocurrencies to hide their illicit origin of funds because cryptocurrencies can be purchased by a fiat currency. The illicit money would be replaced by cryptocurrencies.

In 2019, “there was \$2.8 billion in Bitcoin that moved from criminal entities to exchanges” (Chainalysis Team 2020).

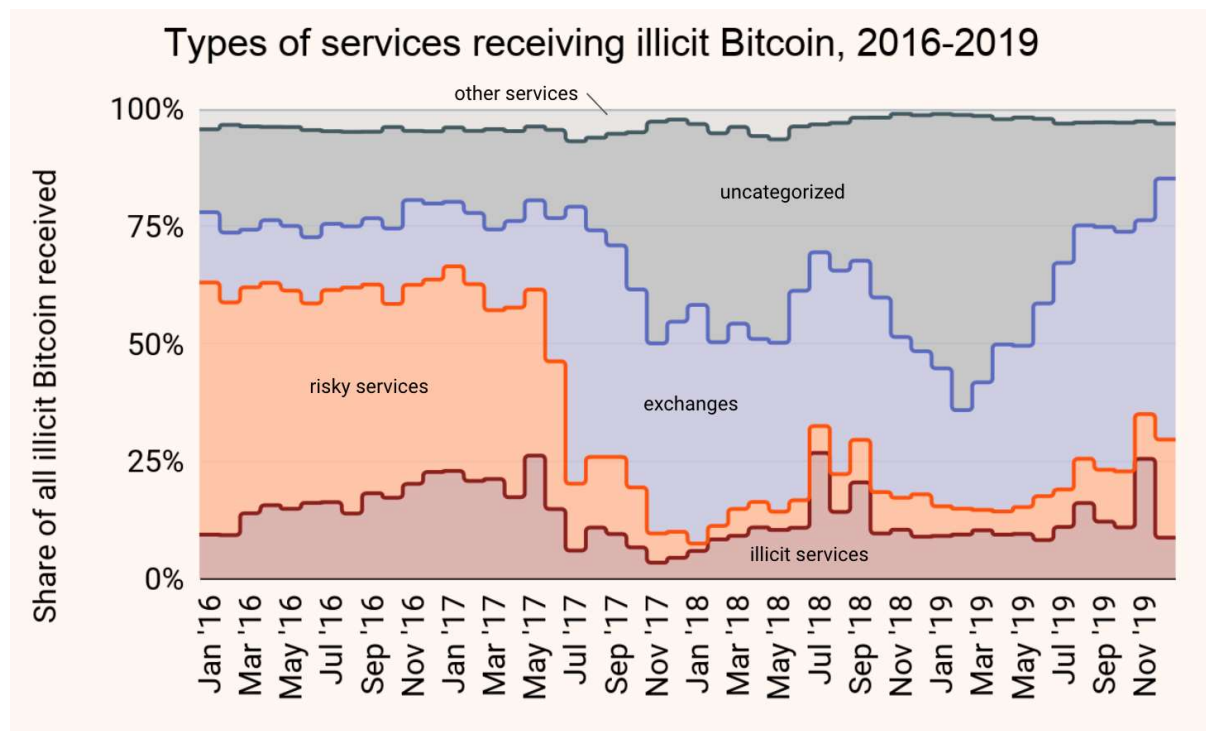


Figure 5. Type of services receiving illicit Bitcoin, 2016-2019 (Source: Chainalysis Team 2020)

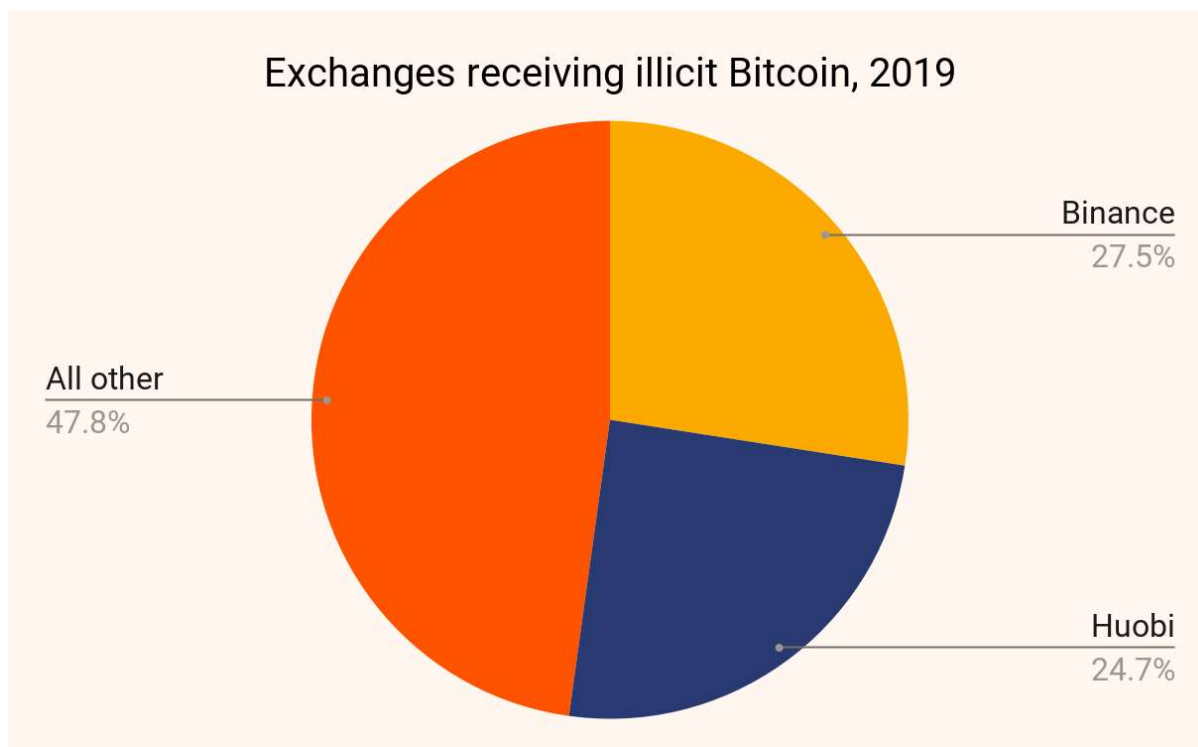


Figure 6. Exchanges receiving illicit Bitcoin 2019 (Source: Chainalysis 2020)

According to figure 16, 27.5% of illicit origin of funds went to Binance, the biggest cryptocurrency exchange, and 24.7% of them went to Huobi, a Chinese cryptocurrency exchange. Most of the criminals were OTC brokers.

OTC brokers facilitated trades between individual buyers and sellers who cannot or do not want to transact on an open exchange. They were typically associated with an exchange but operate independently. Seventy of the OTC brokers in the Rogue 100 (a list of 100 major OTC brokers created by Chainalysis Team) were in the group of Huobi accounts receiving Bitcoin from illicit sources. In total, they received \$194 million in Bitcoin in 2019. (Chainalysis Team, 2020.)

In 2019, the OTC brokers created a fake Houbi website in China in order to attract cryptocurrency investors to help the brokers launder money. They told investors they would get high profits after they invested. However, when the investors put more money in, the OTC brokers told the investors that their money had disappeared. After that, the criminals closed the website and then went to the real Huobi website to exchange their fiat money for Bitcoin and draw a certain percentage of commission to exchange for a fiat currency. (Wu, 2020)

## 5.2 Drug trafficking

In the past, when drug dealers sold drugs, they had to make it in person and meet the buyers. Online drug markets are located on dark webs. The currency can be sent directly to dealers' wallets in cryptocurrencies, and the parties involved in a drug transaction do not need to meet each other (Groysman 2019, 12). The drugs are in turn sent to the buyers by mail despite risks, but the traders' personal information remains completely anonymous on the internet and cryptocurrency exchanges, making this more efficient than offline dealing.

## 5.3 Darknet

A darknet or a dark web is a website that cannot be found by a traditional search engine. It only can be seen through a specific browser such as Tor, "The Onion Router". The best-known cryptocurrency darknet black market was "Silk Road", owned by Ross William Ulbricht. Ulbricht is a Libertarian who believed that drug use was a personal choice. This led him to come up with the idea of the online drug market. The website went online in the middle of January 2011. (Bearman 2015.)

There was explicit instruction on Silk Road for customers to hide drugs. Only a small percentage of packages were intercepted. (Bearman 2015). The trade volume on Silk Road increased very rapidly, and it became a huge market for drugs. Its peak success occurred in 2011-2013. Silk Road made more than one million USD in revenue in these two years. Because there were thousands of drug dealers, any kind of drug could be found on Silk Road. It attracted more than one million customers from all around the world. All the drugs were paid for in Bitcoin. Ulbricht earned 144,000 Bitcoins from Silk Road and other exchanges from 2011 to 2015. (Groysman 2018, 13.)

The most successful cryptocurrency business is the cryptocurrency darknet market Hydra in Eastern Europe. The customers must be originally from Eastern Europe. This market had over \$1.2 billion in cryptocurrency revenue between July 2019 to June 2020. Eastern Europe is the second largest crime region for cryptocurrency, "with 1.4% of its \$41 billion in total transaction volume sent to illicit entities" (Chainalysis 2020).

## 6 RESULTS

Cryptocurrency is a set of digital currencies based on a peer-to-peer network. It can be used for example for hotel booking services in European countries. Cryptocurrencies can be directly invested in or then mined.

Some shops in Europe accept cryptocurrencies as a payment method. The cryptocurrency mobile apps only require users to scan the QR code and make a payment. No password is needed. It is also convenient to make cross-border transactions because no third party is needed. The transactions can be made in seconds with all kinds of cryptocurrencies.

Most European countries believe that cryptocurrencies are high-risk products rather than currencies. There are no specific regulations or legislation, but these European countries do not ban cryptocurrency activities such as buying and selling. Only a few countries accept cryptocurrencies for payments. Germany is the only country that considers cryptocurrencies as proper currencies.

The most significant risk of cryptocurrencies is the high volatility of their prices. The prices of cryptocurrencies depend on supply and demand. When demand exceeds supply, prices rise and vice versa. For example, only 4 million Bitcoins among the total of 21 million have not been mined. The number of unmined coins becomes less and less. This is one of the reasons why the price of Bitcoin has recently been much higher. The second risk involves scams. These use new investors' money to pay short-term returns to old cryptocurrency investors and thereby create the illusion of making money while defrauding more investments. However, if no new investors enter the scam, the capital chain will break. Investors cannot get their money back. Most investors' understanding of blockchain is still superficial, and it is difficult for investors to evaluate the actual value of this abstract virtualized asset accurately. Moreover, at present, the investment risk is tough to predict. There are also technical risks on blockchain and other cryptocurrency technologies such as hard forks and hacker attacks. Hard fork can influence the

price of the cryptocurrencies and it can work on any crypto technology platform such as Blockchain and Ethereum so it can have consequential effect on cryptocurrencies.

## 6.1 Interview and surveys

The data was gathered from semi-structured qualitative interviews. European users and investors were asked about how they conduct their transactions and investments with their cryptocurrencies. Other cryptocurrency surveys from other cryptocurrency research institutions were also included. The interview and survey occurred online from December 2020 to January 2021. The interviewees are currently cryptocurrency users and investors in Lithuania, the United Kingdom, Italy, Malta, Hungary, Poland and Spain. They were found from cryptocurrency groups. The interviews were conducted via telephone calls. Seventeen people answered the questions.

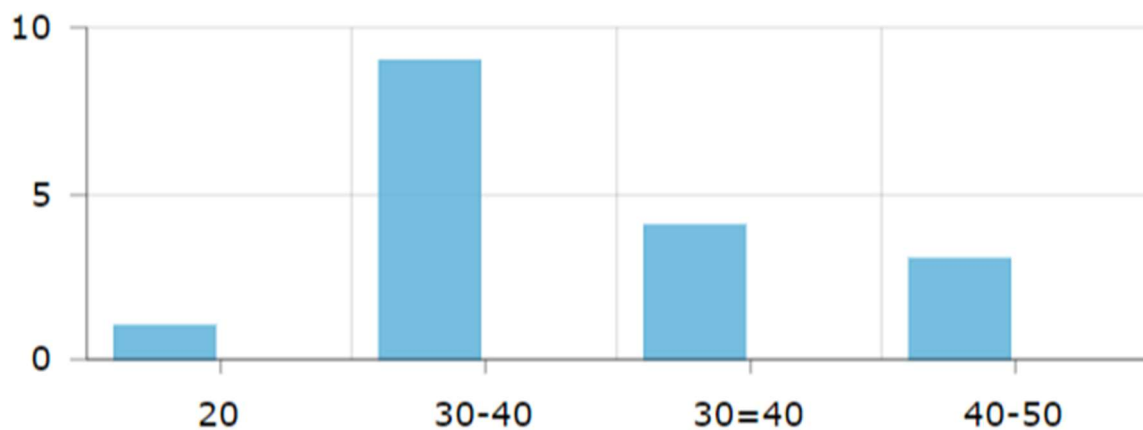


Figure 7. Ages of the interviewees

According to the findings, a lot of cryptocurrency users and investors were men in their 20s to 40s, especially men from 30-40 years of age with higher purchasing power because of their successful careers in IT and finance related jobs. Three men purchased cryptocurrencies for the first time at over 50 years of age. Compared with the position of the men, most female cryptocurrency purchasers in this study were housewives.



Eight of the interviewees used cryptocurrencies for online transactions such as hotel bookings. Three of them had held their cryptocurrencies for a long time (more than one year). Two of them in Eastern Europe used cryptocurrencies as a payment method in their daily life. Eight of the users exchanged all the cryptocurrencies they received to euros directly and spent them. When they felt the prices of the cryptocurrencies had increased enough, they would then exchange them.

Bitcoin was used by all respondents; six of them had Ethereum, and four of them had XRP. The origins of cryptocurrencies were exchange websites and OTC brokers. Prices are more volatile than trading from exchange websites when buying cryptocurrencies from OTC brokers. All the interviewees gained information about cryptocurrencies online. Half of them had been scammed by individual OTC brokers, as stated in Chapter five.

According to the Foley-Cryptocurrency-Survey, ETH was regarded as providing the best opportunities for investors according to 38% of the respondents. Forty-three percent of respondents believed that Bitcoin had the broadest acceptance as a method of payment for products and services. ETH, the second generation of Bitcoin, was chosen by 17% of respondents in the same question. (Foley & Lardner LLP 2018.)

According to RUSI-ACAMS's survey, 86% of respondents believed that cryptocurrencies are used for investments and speculation. Fifty-eight percent of them agreed that cryptocurrencies could be a payment method. Half of the respondents agreed that cryptocurrencies were effective and safe when making financial transactions. However, 69% of the respondents believed that the value of cryptocurrencies was too volatile. (Izenman & McDonell 2020, 11.)

When thinking about the global use of cryptocurrencies, over three-quarters of cryptocurrency industry respondents saw it is an opportunity to make profits with cryptocurrency. However, 55% of respondents thought using cryptocurrencies to be risky. Money laundering (84%) and the dark web (84%) were the most worried about criminal activities. Sixty-five percent of European respondents disagreed that it is easy to use cryptocurrencies. Most respondents believed that in five years cryptocurrencies will become useful financial tools for making payments, but their main function will still be investment related. They also will be used more widely for everyday payments. (Izenman & McDonell 2020, 19-28.)

In the Financial Conduct Authority's research in 2020, 2,132 customers were surveyed. The number of consumers aware of cryptocurrencies has significantly increased. A possible explanation for this increase in awareness may relate to increased posts on social media or websites. Three percent of respondents were cryptocurrency owners. Three-quarters of them held cryptocurrencies under 1,388 USD worth of cryptocurrencies. Most owners were men (79%), and 69% among them were more than 35 years old. Advertising played a role in cryptocurrency purchasing, as 35% of buyers purchased after seeing advertisements. The cryptocurrency users in the United Kingdom preferred non-UK-based exchanges. The cryptocurrency users in the United Kingdom preferred to use the exchange websites launched in other European countries rather than the United Kingdom. Only 5% of domestic users chose British exchanges. "The typical cryptocurrency owner holds small sums of cryptocurrencies." Seventy-eight percent of respondents held Bitcoins. Seventy-seven percent of respondents bought cryptocurrencies through an online exchange. One-third chose hot wallets to store their cryptocurrencies, and almost half stored their cryptocurrencies on the exchange websites. Half of the cryptocurrency users bought goods or services and exchanged to other cryptocurrencies. (English, Tomova & Levene 2020, 9-24.)

The value held by 50% of current cryptocurrency owners is £260 (USD 365.95) or less. Seventy-five percent reported £1,000 (USD 1407.5) or less and 90% reported £4,300 (USD 6062.25) or less. Those who held over £260 (USD 365.95) worth of cryptocurrency tended to declare higher household income in their survey responses – more than 40% reported an income of £50,000 or more. (English et al. 2020, 23.)

### How did you pay for the cryptocurrencies you bought?

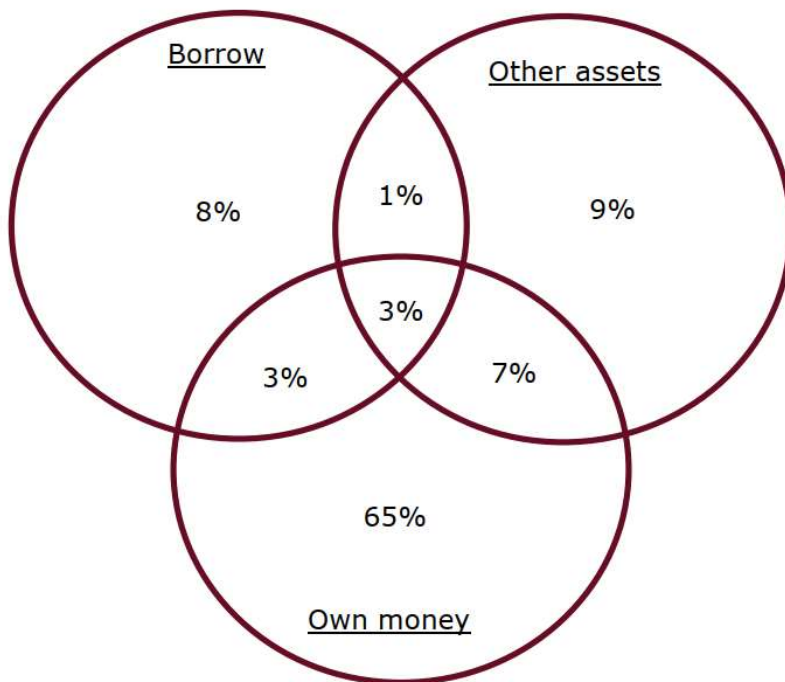


Figure 8. Responses to the question “How did cryptocurrency users pay for the cryptocurrencies?” (Source: English et al. 2020, 18)

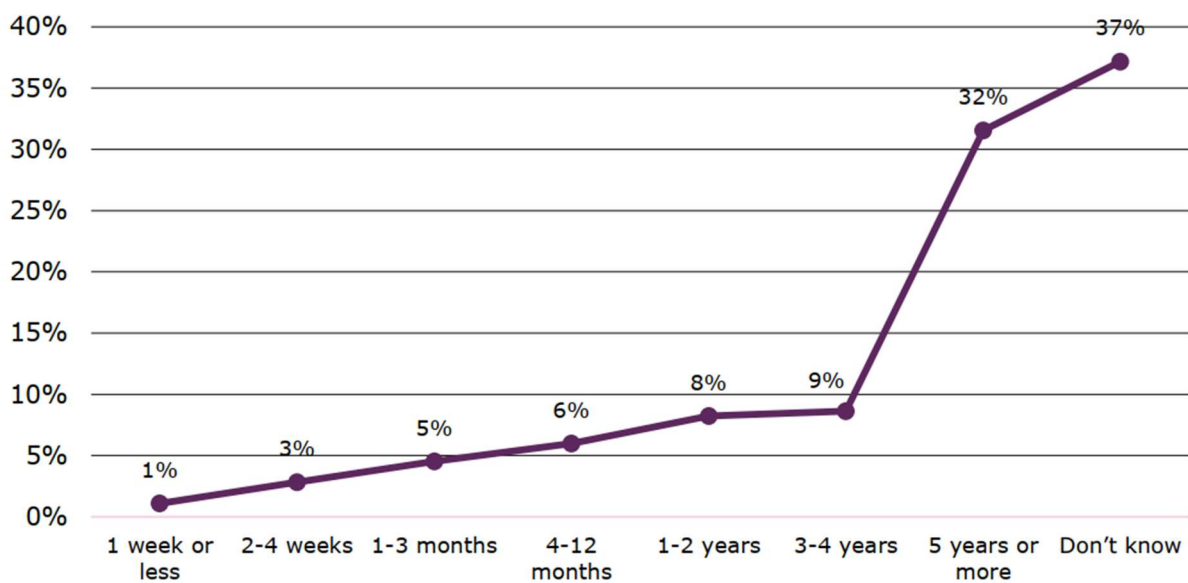


Figure 9. How long users stored their cryptocurrencies (Source: English et al. 2020, 22)

According to these findings, all cryptocurrency users seem to be aware that investing in cryptocurrencies is risky. The interview and the survey both showed that cryptocurrency users in their 30s and 40s had the strongest purchasing power because of their higher income jobs. Some of the cryptocurrency users and investors in Europe were working for finance or IT with

basic knowledge on cryptocurrencies or the technologies. There are also housewives who invest in cryptocurrencies. At the beginning of their investments, not all purchased huge amounts of cryptocurrency because of the awareness of the risks.

## **7 CONCLUSIONS**

The theoretical part of this thesis explains cryptocurrencies and related technologies. Blockchain is used for the cryptocurrency network and some other fields such as food safety. More and more new kinds of cryptocurrencies have been launched with emerging technologies, and they are no longer only based on blockchain.

Blockchain is a kind of distributed ledger technology. The primary function of a blockchain is the distributed database. It is the base technology for Bitcoin and the service of data blocks. The data on blockchain can be stored permanently. Blockchain can be used for food safety tracing, supply chain monitoring, and personal identification. Blockchain can be used for tracing food safety because the data on blockchain is immutable. The transportation of food products can be traced from the origin to the market by blockchain. If there is a food-borne illness, blockchain can find it quickly. For example, Arla Finland uses blockchain technology to show the journey milk makes to consumers. Customers can check the data of the journey by themselves online (Cornall 2018). Walmart uses blockchain to achieve food safety traceability. Blockchain can monitor supply chains. It can improve efficiency. No paper contracts are needed when using blockchain to monitor the supply chain. (Williams 2018.) Blockchain can find the inefficiencies of the supply chain quickly. It also makes the transaction process transparent and simultaneously protects privacy.

Transaction makers and investors are concerned with a peer-to-peer network's safety since anyone can access private keys to move the cryptocurrencies. They are accessible to be stolen. If the cryptocurrency user uses a third-party service, the risk of stealing will increase. Most exchanges involve avoiding regulations and market control in order to achieve higher revenues. Companies may set high prices on transaction fees by themselves and ask the customers for taxation. At the same time, these companies often try to avoid taxation by themselves.

There is no third-party interference with transactions. The fee of the transaction can be meagre on some of the exchanges without any financial institutions. The market is open 24 hours a day and 7 days a week. Transactions can be done anywhere and anytime. The speed is much faster than transferring money from a real bank. Cryptocurrency transactions are made in seconds.

For a beginner to avoid risks, it is crucial to know how blockchain works as well as having theoretical knowledge on different kinds of cryptocurrencies before starting to invest. Education about scams, ransomware, and hacking before investing can help reduce the risks. When choosing the exchanges, investors should try to choose the top ones around the world, such as Binance and Huobi, in order to make sure the transactions will be safe. A small exchange website might be a fake exchange.

Transactions can be made directly on the official website of Binance and Huobi. It is not necessary to find an OTC broker because there could be fake Houbi OTC brokers involved in criminal activities, as mentioned before. Binance's real website provides blockchain and crypto education and reliable brokers to the initial investors. This can help beginners to avoid scams.

After learning about how blockchain works, the next step is creating an account with complicated passwords which must be changed frequently and choose a wallet. Before choosing the wallet, carefully research need to be done. A cold wallet is much safer than a hot wallet because only the owner can assess it. Before making cryptocurrency transactions, learning about the regulations and laws is also essential because cryptocurrency transactions are entirely banned in some countries, even though all the processes are online. For new investors, small investments are more beneficial and less risky. Investing in different cryptocurrencies in different exchanges can avoid risks from hacker attacks on one exchange.

The analysis of the prices shows the volatility of different kinds of cryptocurrencies. The price of Bitcoin fluctuates greatly, but it is still the most popular among all the cryptocurrencies. The price of XRP are more stable compared with Bitcoin, but not so many cryptocurrency investors are interested in investing in XRP.

The research in this thesis considers using and investing in cryptocurrencies in daily life. After nearly a decade of evolution, cryptocurrencies can be used as payment methods for daily life and online transactions. Cryptocurrency investors are mainly people in their thirties and forties

with successful careers. Users think of cryptocurrencies as kinds of trading tools rather than fiat currency.

Eighty-five percent of all Eastern European cryptocurrency transactions are more valuable than \$10,000. P2P exchanges trading volumes have grown positively in Eastern Europe. Ukraine leads the cryptocurrency charge in Europe. Binance is the most popular exchange in Eastern Europe. Fourteen billion USD worth of cryptocurrency was sent from Binance to Eastern Europe. “The cryptocurrency services sending the highest volume of funds to Eastern European addresses, along with the percentages of those services’ total transaction volume that Eastern Europe accounts for. A few things stand out. Unsurprisingly, most of the top services interacting with Eastern Europe addresses are large exchanges.” (Chainalysis 2020.)

The online survey and interviews can answer the research question too, but significant investigation into the subject is needed. Finding enough people to answer the questions can be a challenge, so researchers should be prepared to invest plenty of time.

## REFERENCES

- Antonopoulos, A. 2017. Mastering Bitcoin. Second edition. Canada: O'Reilly Media, Inc.
- Antonopoulos, A. & Dr. Wood, J. 2018, Mastering Ethereum, The United States of America: O'Reilly Media, Inc
- Binance 2020 spot market Bitcoin <https://www.binance.com/en/markets> 17.12.2020
- Bitcoincharts 2020 <https://bitcoincharts.com/charts/bitstampUSD#tgSzm1g10zm2g25zv> 17.12.2020
- Bitcoinwiki [https://en.bitcoinwiki.org/wiki/Bitcoin\\_history#Bitcoin\\_in\\_2011](https://en.bitcoinwiki.org/wiki/Bitcoin_history#Bitcoin_in_2011) 17.12.2020
- Bitvavo 2020 <https://bitvavo.com/en/about> 16.12.2020
- Blockchain 2020 Transactions  
[https://www.blockchain.com/explorer?utm\\_campaign=dcomnav\\_explorer](https://www.blockchain.com/explorer?utm_campaign=dcomnav_explorer) 17.12.2020
- Block 2020 Litecoin <https://blockchair.com/litecoin> 23.01.2021
- Chainalysis 2020 The 2020 Geography of Cryptocurrency Report  
Analysis of Geographic Trends in Cryptocurrency Adoption, Usage, and Regulation
- Chainalysis Team 2020 Money Laundering in Cryptocurrency: How Criminals Moved Billions in 2019  
<https://blog.chainalysis.com/reports/money-laundering-cryptocurrency-2019> 19.12.2020
- Coinbase 2020 XRP Price <https://www.coinbase.com/price/xrp> 17.12.2020
- Coinmarketcap. 2020 <https://coinmarketcap.com/> 02.12.2020
- Coinmarketcap.2020 Bitcoin <https://coinmarketcap.com/currencies/bitcoin/> 17.12.2020
- Coinmarketcap. 2020 Binance. <https://www.binance.com/en/about> 07.12.2020
- Coinmarketcap.2020 Bitbay. <https://coinmarketcap.com/exchanges/bitbay/> 07.12.2020
- Coinmarketcap. 2020 Bitvavo. <https://coinmarketcap.com/exchanges/bitvavo/> 07.12.2020
- Coinmarketcap 2020 Ethereum  
<https://coinmarketcap.com/zh/currencies/ethereum/> 05.01.2021
- Coinmarketcap 2020. Kuna <https://coinmarketcap.com/exchanges/kuna/> 08.12. 2020
- Coinmarketcap.2020 The Rock Trading 2020  
<https://coinmarketcap.com/exchanges/therocktrading/> 08.12.2020
- Coinmarketcap. 2020 Top Cryptocurrency Spot Exchanges.  
<https://coinmarketcap.com/rankings/exchanges/> 07.12.2020
- Cointelegraph 2020 Ripple Price Index  
<https://cointelegraph.com/xrp-price-index> 17.12.2020
- Cornall, J 2018 Arla Finland using blockchain technology to show milk journey to consumers.  
<https://www.dairyreporter.com/Article/2018/11/06/Arla-Finland-using-blockchain-technology-to-show-milk-journey-to-consumers> 01.01.2021
- Digiconomist,2020. Bitcoin Energy Consumption Index  
<https://digiconomist.net/bitcoin-energy-consumption> 01.01.2021

- Euro Area Statistics 2019. Crypto assets: developments and perspectives  
<https://www.euro-area-statistics.org/classic/crypto-assets?lg=en> 17.12.2020
- Etherscan 2020. The Ethereum Blockchain Explorer  
<https://etherscan.io/> 17.12.2020
- Etherscan 2020. Ethereum transaction information  
<https://etherscan.io/txs?p=10000> 17.12.2020
- Foley & Lardner LLP 2018 Cryptocurrency Survey
- Frankenfield, J. 2019. Hard fork <https://www.investopedia.com/terms/h/hard-fork.asp>  
 20.01.2021
- Frankenfield, J. 2020. <https://www.investopedia.com/terms/c/cryptocurrency.asp> 05.12.2020
- Global Legal Research Center. 2018 Regulation of Cryptocurrency Around the World  
<https://www.cnb.cz/en/public/media-service/speeches-conferences-seminars/presentations-and-speeches/A-Digital-Currency-Useful-for-Central-Banks/> 13.12.2020
- The United States of America: The Law Library of Congress
- Greenland, S. Lash, T. & Rothman, K.J. 2012. Modern Epidemiology, 3rd ed. Philadelphia, USA
- Groysman, I. 2018 Revolution in Crime: How Cryptocurrencies Have Changed the Criminal Landscape The United States of America: City University of New York
- John Edwards 2020 Bitcoin's Price History  
<https://www.investopedia.com/articles/forex/121815/bitcoins-price-history.asp>  
 17.12.2020
- Hankin, J 2018 Here's how much it costs to mine a single bitcoin in your country  
<https://www.marketwatch.com/story/heres-how-much-it-costs-to-mine-a-single-bitcoin-in-Hampyour-country-2018-03-06> 31.12.2020
- Hampl, M. 2018 A Digital Currency Useful for Central Banks?  
<https://www.bis.org/review/r180308a.pdf> 16.12.2020
- Houben, R. 2018 Cryptocurrencies and blockchain Belgium: Policy department for Economic, Scientific and Quality of Life Policies
- Izenman, K. & McDonell, R. 2020. Cryptocurrency risk & compliance survey United Kingdom: RUSI-ACAMS
- Kim, C. & Hao, S. 2020. Ethereum history in 5 charts  
<https://www.coindesk.com/ethereum-history-in-5-charts> 17.12.2020
- NEWSROOM, 2019. Upcoming Cryptocurrency Providers Act of Finland  
<https://nordiclaw.fi/upcoming-cryptocurrency-providers-act-of-finland/>  
 26.01.2020
- Õunap, A. Šorin, M. & Õunap, S. 2018. Crypto and Blockchain for Beginners: The Ultimate Beginner's Guide to Cryptocurrency and Blockchain for Beginners. The United Kingdom: Savii Digital
- English, R. Tomova, G & Levene, J 2020 Research Note Cryptoasset consumer research 2020 The United Kingdom: Financial Conduct Authority
- Rosic, A. 2020. What is Blockchain Technology? A Step-by-Step Guide for Beginners.  
<https://blockgeeks.com/guides/what-is-blockchain-technology/> 06.12.2020
- The World Bank Group. 2017. Distributed Ledger Technology (DLT) and Blockchain The United States of America: The World Bank Group.



Williams, S 2018. 20 Real-World Uses for Blockchain Technology

<https://www.fool.com/investing/2018/04/11/20-real-world-uses-for-blockchain-technology.aspx> 01.01.2020

Wu,S 2020 Cryptocurrency OTC money laundering

<https://www.chaindd.com/3313258.html> 19.12.2020

XRP 2020 XRP Ledger Exploer <https://xrpscan.com/> 17.12.2020