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International Economics and Commercial Diplomacy

**THE INFLUENCE OF CRYPTO-CURRENCIS ON  
INTERNATIONAL ECONOMY**

**KRIPTOGRĀFISKO VALŪTU IETEKME UZ  
STARPTAUTISKO EKONOMIKU**

BACHALOR PAPER

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## ANNOTATION

In the modern world there are already about a thousand crypto-currencies, the most popular of which is Bitcoin. The demand for it has grown in record time and still does not fall to the numbers from which Bitcoin started. Crypto-currencies created big hype around themselves and majority tries to understand what is crypto-currencies and how do they work. Nowadays there are many opinions exists related to crypto-currencies: 1. Crypto-currencies would definitely change the world. 2. Crypto-currencies are money which have soap bubble effect and in nearly future it would disappear. 3. Crypto-currencies are just new type of money which gives big advantages for its users. Almost all crypto-currencies working on basis of blockchain technology which ensuring users of crypto-currencies in security and anonymity of crypto-currencies.

The aim of bachelor thesis is to develop topic of crypto-currencies, to investigate changes in worlds economy which occurred after creation of crypto-currencies and what result world getting because of crypto-currencies.

International financial market and banking system plays important role in economy of each country. The author of this bachelor thesis investigating changes which occurred in international financial market because of crypto-currencies and also investigating which advantages banking system getting from blockchain technology. The research shows that in both fields already happened changes which occurred because of crypto-currencies and technology of blockchain.

Bachelor thesis consists of 64 pages and 3 figures.

Key Words: crypto-currencies, technology of blockchain, international financial market, banking system, Bitcoin.

## ANNOTĀCIJA

Mūsdienu pasaulē jau ir aptuveni tūkstotis dažādu kriptogrāfisko valūtu, no kurām populārākā ir bitkoins. Pieprasījums pēc šīs valūtas ir pieaudzis rekordlielā ātrumā un joprojām nav nokritis līdz tādiem skaitļiem, kādi bija pašā bitkoinu sākumā. Kriptogrāfiskās valūtas piesaista lielu uzmanību un lielākā daļa cilvēku mēģina izprast, kā tās darbojas. Pastāv daudzi viedokļi par kriptogrāfiskajām valūtām: 1. Kriptogrāfiskās valūtas noteikti mainīs pasauli. 2. Kriptogrāfiskajai valūtai piemīt burbuļa efekts un tuvākajā nākotnē tā pazudīs. 3. Kriptogrāfiskās valūtas ir jauns naudas veids, kurš sniedz dažādas priekšrocības tās lietotājiem. Gandrīz visas kriptogrāfiskās valūtas darbojas ar blokķēdes tehnoloģijām, kas nodrošina kriptogrāfiskās valūtas lietotājiem drošību un anonimitāti.

Bakalaura darba mērķis ir attīstīt kriptogrāfisko valūtu tēmu, lai izpētītu pārmaiņas pasaules ekonomikā, kuras radās pēc kriptogrāfisko valūtu izveidošanas, un kā kriptogrāfiskās valūtas ietekmē pasauli.

Starptautiskajam finanšu tirgum un banku sistēmai ir svarīga loma katras valsts ekonomikā. Darba autors pētīja izmaiņas, kuras ir radušās starptautiskajā tirgū kriptogrāfijas valūtu dēļ, kā arī kādas priekšrocības banku sistēma iegūst no kriptogrāfisko valūtu blokķēdes tehnoloģijām. Pētījums liecina, ka abās jomās jau ir notikušas izmaiņas, kuras radās kriptogrāfisko valūtu un blokķēdes tehnoloģiju dēļ.

Bakalaura darbs sastāv no 64 lapaspusēm un 3 tabulām.

Atslēgvārdi: kriptogrāfiskās valūtas, blokķēdes tehnoloģija, starptautiskais finanšu tirgus, banku sistēma, bitkoins.

## LIST OF ABBREVIATIONS

IFM – International financial market

EPS – Electronic payment system

PKC – Public Key Cryptography

CPU – Central Processing Unit

GPU – Graphics Processing Unit

ASIC – Application Specific Integrated Circuit

HDD – Hard Disk Drive

ICO – Initial Coin Offering

IPO – Initial Public Offering

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## INTRODUCTION

Crypto-currencies are gaining popularity now however there is small part of society who understand the content of the "crypto-currency" category and are familiar with the mechanism of its functioning. The key issue for a deeper understanding of the role of crypto-currency is the definition of its economic nature. Ultimately, any economic phenomenon is a projection of the system of relations between people regarding the production, exchange, distribution, consumption of various kinds of products and services and their derivatives in conditions of limited resources.

**The aim** of this work is to develop topic of crypto-currencies, investigate changes in world's economy after creation crypto-currencies and what results world getting because of crypto-currencies.

To reach goal which have been set it is necessary to solve following tasks:

1. To study theoretical basis of the international financial markets and how do they work.
2. To deeply study theoretical basis of technology blockchain to understand the reasons of attractiveness of this technology which lies in basis of majority of crypto-currencies.
3. To investigate role which playing crypto-currencies in international financial market.
4. To investigate what changes appeared in banking system because of blockchain technology.
5. To investigate changes which occurred because of crypto-currencies in cyber area.
6. To make interviews with experts in this field to recognize all perspectives of crypto-currencies.

The hypothesis of this work is that crypto-currencies and technology blockchain already influencing on international economy.

The relevance of chosen topic is due the fact of increasing attention which is paying to crypto-currencies. There are many startups in the world which is based on technology

blockchain and making ICOs. Nowadays people willing to invest their money into crypto-currencies or to perspective ICOs. Despite the urgency of the study of the essence of the crypto currency and its increasing role in the economy, it should be noted the weak scientific elaboration of this topic. This is largely due to the novelty theme of crypto-currencies. Experience of countries which is willing to regulate crypto-currencies is quite low. Countries with conservative vision for crypto-currencies neither ignoring them neither banning everything what is somehow related to crypto-currencies.

The relevance of the problem under consideration served as a basis for definition of the topic: “The influence of crypto-currencies on international economy”. And research will be based on current situation in world in connection with crypto-currencies. The objects for the research are crypto-currencies and blockchain technology.

This bachelor thesis will be consist of introduction part, 3 chapters of body text, conclusions and recommendations, literature and sources used, annex and documentary sheet. In introduction formulated aim and relevance of chose theme, subject for research determined and bachelor thesis purpose and tasks formulated. First chapter deals with the entity of international financial market and the entity of blockchain. The second chapter will analyze what changes in world occurred because of crypto-currencies and blockchain technology. Third chapter will be based on interviews with experts in crypto-currency field and will explore all perspectives of crypto-currencies.

# 1. THE ENTITY OF BLOCKCHAIN

## 1.1. INTERNATIONAL FINANCIAL MARKET

Before reviewing influences and impacts of crypto-currencies on world economy it is necessary to understand what is international financial market and how do it work.

All the national and international markets make up the financial market. It incorporates banks, pension/insurance/currency funds and many other economic institutions that help accumulate and redistribute money<sup>1</sup>. The International Financial Market is the place where financial wealth is traded between individuals (and between countries). It can be seen as a wide set of rules and institutions where assets are traded between agents in surplus and agents in deficit and where institutions lay down the rules.<sup>2</sup> The world financial market has its own specific management structure, based on professional market participants. They act as intermediaries between lenders and borrowers, buyers and sellers of different countries. These include: financial companies, stock, currency exchanges, the largest transnational banks and other financial and credit institutions. These financial organizations collect huge amounts of money coming to the world financial market from official institutions: private corporations, pension funds, banks, insurance companies, etc.

Currently, the international financial market includes a number of international financial centers that collect and redistribute huge amounts of capital around the world. In these centers, an overwhelming part of all international currency, deposit, credit, issuing and insurance operations is made.

In general, modern researchers distinguish in the structure of the world financial market - the international market of loan capital and the international currency market. The most complete author is the following division:

- the international currency market,
- the international market of loan capitals,
- international securities market,

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<sup>1</sup>**Liteforex** "The structure of the financial market and its functions." <https://www.liteforex.com/blog/for-professionals/structure/>? April 13 2018y

<sup>2</sup>**Bankpedia** "International Financial Market" <http://www.bankpedia.org/index.php/en/106-english/i/23258-international-financial-market-encyclopedia> April 13 2018y

- the international money market (the interbank settlement market),
- International gold market.<sup>3</sup>

All segments of the international financial market are closely related and it is very difficult to draw a clear line separating one market from another.

Features of the world financial market:

1. The enormous scale of world capital in circulation.
2. Lack of clear spatial and temporal boundaries.
3. Institutional feature. From an institutional point of view, "organizations" ("players" in the world financial market) are a set of world financial institutions, through which capital flows. The formal "institutions" of the world financial market include: international legislation, currency and customs control, international financial and other agreements, etc. Informal "institutions" are: the international code of honor, the national characteristics of the mentality of countries, etc. Together, these institutions and organizations constitute a certain "institutional environment" of the international financial market.
4. Restricting the access of "players" to the world financial market. Unlike market participants from industrialized countries, similar participants from developing countries have limited access to loans in the world financial market. They use foreign direct investment, assistance, loans from international organizations, are forced to pay more to international banks than, for example, similar borrowers from industrialized countries.
5. Usage of convertible currencies of leading countries.
6. Universality of the market. It carries out international currency, credit, settlement and financial, guarantee, insurance operations, operations with securities.
7. Simplicity, standardization of the procedure for making transactions. The market uses the latest computer technology. Transactions are carried out by telephone, telefax with telegraphic confirmation. This feature of the financial market is due to the role of "institutions", which are designed to ensure the effective functioning of the market.<sup>4</sup>

From all what is written above it is clearly seen what the main purpose of the international financial market is. The main purpose of the international financial market is

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<sup>3</sup> Dilip K. Ghosh, Edgar Ortiz "The Global Structure of Financial Markets". P4-19

<sup>4</sup> Dilip K. Ghosh, Edgar Ortiz "The Global Structure of Financial Markets". P4-19

to collect and redistribute temporarily free financial resources on the basis of it, which supports the development of the world economy.

## 1.2. DIGITAL MONEY

Nowadays financial markets closely related with digital money. According to that it is time to deeply explore in the theme of digital money.

Electronic money is a non-cash settlement between sellers and buyers, banks and customers, banks and banks, using a computer network, communication systems using methods of encoding information and its automated processing. In fact, this is money that revolves, not in the form of paper money, but through their introduction into the sphere of computing computer technology and the modern communication system.<sup>5</sup> In more simple words, electronic money is the widest range of payment instruments used on the Internet.

To start a purse in the electronic payment system (EPS), a person is not obliged to give any information about him. A person can open such a purse, and after five minutes, close it permanently. The amounts of money that person can transfer, only person determines, and not the instructions of the Central Bank. What person pays for is only his personal secret, even if person have no reason to make a secret out of it.

Electronic money, being an impersonalized payment product, can have a separate appeal, different from bank circulation of money, but can also apply including in state or bank payment systems. As a rule, the circulation of electronic money occurs through computer networks, the Internet, payment cards, electronic purses and devices that work with payment cards. At the same time, digital money is not an impersonal electron: the one to whom they are intended, precisely determines the source of their receipt. Moreover, digital money allows to avoid cheating on the part of the seller: while the buyer does not receive the goods, the seller cannot use the transferred money (the so-called "deal with

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<sup>5</sup> **Н. В. Коротаева.** Электронные деньги: сущность, функции и роль в экономике. Р137-141 2011у

protection").<sup>6</sup> For electronic money, person can buy almost everything: a house, an apartment, a car, or just a pack of pasta with home delivery. mainly using electronic money buy electronic equipment, cell phones, books, jewelry and cosmetics. many people generally stopped going to ordinary stores. A person simply goes to the site of the shop he needs, looks for the necessary product, compares prices with other stores, and then orders delivery to the house. Convenience is that, first, a person saves his time. Secondly, no one presses on the buyer and does not try to sell the goods unnecessary to him. Thirdly, any goods can be ordered with delivery to the house.

One of the most important political issues related to electronic money is the issue of the issuer, namely the definition of the list of organizations that have the right to issue electronic money in the country. The issue of emission affects both electronic fiat money (expressed in one of the state currencies) and non-electronic electronic money (units of value that are circulated outside the public payment system). The process of issuing electronic money, as a rule, is carried out after the emission of so-called traditional money.<sup>7</sup>

The digital money have positive and negative sides. Positive sides of digital money are the following facts:

- Convenience, mobility, accessibility. EPS operate around the clock on a 24/7 basis. Regardless of the time of day and their location, a person can buy the right product, pay utility or mobile operator services, etc. All this can be done at home, at work, in transport or anywhere in the world. And, without pushing in lines and searches around the city of a working terminal or branch of the bank. All what is needs is access to the Internet.
- Ease of use. Anyone who does not even have special knowledge or experience can become the owner of an electronic wallet, because its creation does not cause any difficulties, and work with the account is extremely simplified.<sup>8</sup>

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<sup>6</sup> **Futureagenda** "Cash continues to be gradually replaced by digital money, providing consumers with more convenience and choice - and organisations with lower cost transactions. Wider adoption enables new offers to proliferate." <https://www.futureagenda.org/insight/digital-money> May 14 2018y

<sup>7</sup> **Positivemoney** Digital Cash: "Why Central Banks Should Start Issuing Electronic Money" <http://positivemoney.org/publications/digital-cash/> may 14 2018y.

<sup>8</sup> **Economicictimes** "ADVANTAGES OF GOING CASHLESS" <https://economicictimes.indiatimes.com/wealth/spend/going-cashless-is-it-good-for-you/articleshow/55908649.cms> may 14 2018y.

- Time saving. Payments are made instantly, on the machine. Another thing to add here is the lack of physical conversion of money. Also there is no need to worry about the availability of change or trivia as it happens with cash.
- Saving money. For transactions using electronic money, as a rule, a person will need to pay a much lower commission. This is particularly noticeable when a person makes transfers abroad
- Portability. Electronic money does not need packaging, transportation, protection and organization of special storage facilities. No cases and safes. The most important thing is to safely store personal data to enter the EPS.
- Anonymity. Another important fact, since not everyone likes, when outsiders have the opportunity to look into his wallet<sup>9</sup>

Digital currencies also have negative sides:

- Insecurity. The guarantor of issuing electronic money is exclusively the issuer, and the state does not give any guarantees and does not bear any responsibility. Given this fact, as well as the presence of scammers, it is not recommended to use the electronic wallet as a savings account, as well as transfer large sums for making payments.
- Limited use. Electronic money is not yet able to cover all areas of services available for ordinary money. People are limited only by the range of services provided by the operator of the EPS they are using. These services, of course, are not limitless and limited compared to services that are available with cash. If a person has wallets in several payment systems, then when transferring electronic money from one EPS to another, he will have to pay commission much higher than for transfer within one system.<sup>10</sup>
- Temporary lack of access to the wallet. If there are problems with connection to the Internet, a PC failure or, for example, switching off the electricity because of weather conditions people may not have access to their electronic wallets.
- The probability of hacking a wallet. Because of the lack of modern means of protection, the risk of hacking bills and stealing electronic money is still quite high, because hackers and scammers are looking for more and more ways to get access to

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<sup>9</sup> **Unichange** “Advantages and disadvantages of electronic payment systems” [https://unichange.me/articles/advantages\\_of\\_electronic\\_payment\\_systems](https://unichange.me/articles/advantages_of_electronic_payment_systems) may 14 2018y.

<sup>10</sup> **Wealthhow** “Electronic payments risks” <https://wealthhow.com/disadvantages-of-electronic-payment-systems> may 15 2018y.

someone else's electronic wallets. Always remember about scammers and their sophisticated methods used to steal credulous and careless people.<sup>11</sup>

To summarizing all disadvantages and advantages it is clearly seen that the main advantage of electronic money is that with their help person can pay for cellular communication or goods in an online store without queues in a quiet, home environment. Virtual money is great for small payments, for example, to buy a ticket to a movie theater or discounts on a coupon site. But also it has problems related with security. Because of that holding big amount of digital money isn't safe.

### 1.3 BLOCKCHAIN

Almost all crypto-currencies based on system which called blockchain. Thatswhy it is important to sort out in blockchain system.

The initial complexity comes from the idea that something represented as a digital object can be safely transferred by one side to the other side. Usually this is done by an electronic transaction - physically money is not transferred. Here everything is simple. But such a transaction implies trust to the bank. There exists one question: "Is it possible that a digital object stored on a personal computer of one person and representing money would be safely transferred to another person's personal computer without involving the bank?" Yes it is possible. However, no matter how this electronic object looks, it can always be copied. This is what creates the problem known as "double-spending" - the opportunity to make payment more than once by the same money. Electronic objects are transferred from one person to another without the possibility of copying and double payment by placing one hashchain in the other. Before explore what is a hashchain it is necessary to understand what a hash is.<sup>12</sup> A hash function is a method of converting data of arbitrary length into a digital string of a fixed length, called a hash. One of the simplest hash functions is modulo division. Any digital stitch can be converted to a number (possibly very large); this number can be divided by a

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<sup>11</sup>**Smallbusiness** "Disadvantages of electronic transactions" <http://smallbusiness.chron.com/disadvantages-electronic-transactions-81309.html> may 15 2018y.

<sup>12</sup>**Blockgeeks** "what is hashing? Under the hood of blockchain" <https://blockgeeks.com/guides/what-is-hashing/> April 16 2018y.

constant; and the remainder of the division will be the result - hash. It is obvious that the result will be less than a constant, and hence the length of the hash is shorter. This hash function is simple, but at the same time it is not used too often, because often I would like to have another property - one-way calculation. It should be easy to compute a hash, but it's hard to find the input data to a given hash, but it's better that it would not be possible at all.<sup>13</sup> If the hash result is presented in some form to give again to the input of the hash function, then it is possible to get a new hash. If this process is repeated and the results are collected in sequence, the hashchain will be obtained. Hashchain is a sequence of homogeneous data blocks connected together by a hash function. Each block consists of a hash and a payload. The hash of each block is computed from the whole previous block. The payload of each block is arbitrary data. This hash property has an important property: the data in the block cannot be changed without disrupting the integrity of the chain. If the payload of the first block is changed, then there is necessity to change the hash of the second block, and so the third, and so on.<sup>14</sup>

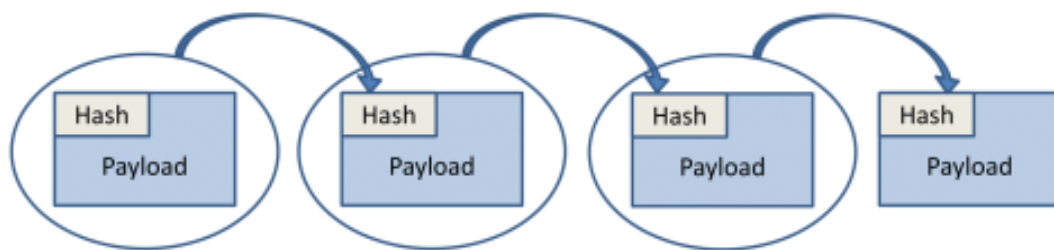


Figure 1.1. Hashchain

Source: figure has drawn by author according to words in book **Andrea Pinna, Roberto Tonelli, Matteo Orru, Michele Marchesi** “a petri nets model for blockchain analysis” 2018y p1-13

The next step is to allow only one person to create a new block in the chain. One of the ways is Public Key Cryptography.

The basic idea of PKC is the same as hash functions - one-way calculation. Having some data  $m$ , anyone can calculate the encrypted value of  $Enc(m)$ . But only one who knows the special key of the cipher can do a reverse calculation, that is, find  $m$  from  $Enc(m)$ . This process is called decryption. To achieve PKC, person need to create a so-called key pair: public and

<sup>13</sup>Interviewbit. “Hashing” <https://www.interviewbit.com/courses/programming/topics/hashing/> April 17 2018y.

<sup>14</sup> **Andrea Pinna, Roberto Tonelli, Matteo Orru, Michele Marchesi** “a petri nets model for blockchain analysis” 2018y p1-13

private. A public key is used to encrypt data and can be opened to all. The private key is used for decryption and must be kept secret.<sup>15</sup>

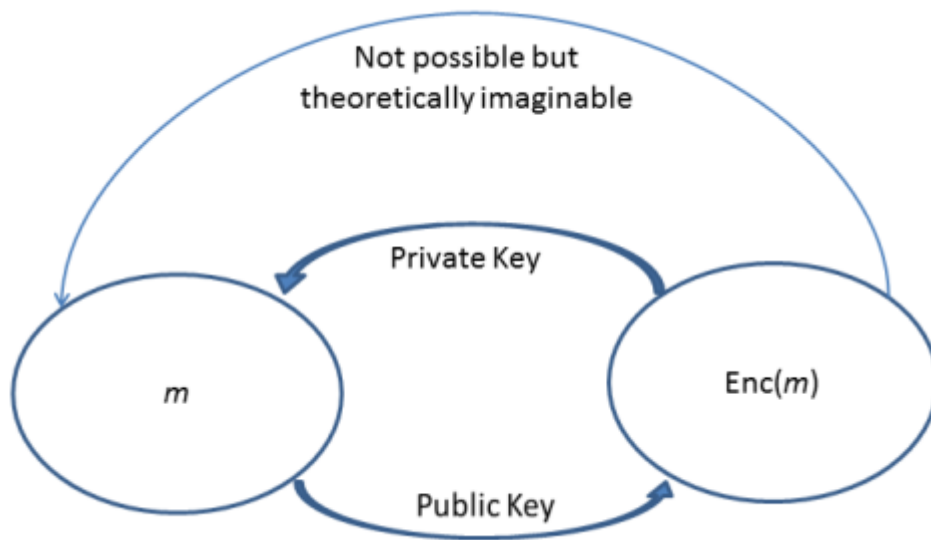


Figure 1.2. Directions of calculations

Source: figure has drawn by author according to words in book **Andrea Pinna, Roberto Tonelli, Matteo Orru, Michele Marchesi** “a petri nets model for blockchain analysis” 2018y p1-13

If someone finds a way to factor a large number (which is the public key in RSA), then he can decrypt the data without knowing the front of the private key, actually hacking cryptography.

There are two scenarios for the work of PKC. In the first scenario, one side wishing to transmit a secret message to the other party encrypts this message with the public key of the second party. An encrypted message can be opened, since only the second party is able to read encrypted messages encoded with their public key. The only vulnerability of this method (obviously excluding the solution of the factorization problem) lies in knowing and trusting the public key initially. To ensure the reliability of the method, there is an entire system of hierarchy of public certificates. The second scenario is the opposite of the first one. One person encrypts some data using his own private key (or only encrypts a hash from this data) and then opens everything: both the original data and the cipher. Now any person who knows the public key can check that the cipher is really calculated using a private key associated

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<sup>15</sup> **Andrea Pinna, Roberto Tonelli, Matteo Orru, Michele Marchesi** “a petri nets model for blockchain analysis” 2018y p1-13

with this public key. This test works as a proof that this person has made the encryption. This process and the encrypted part are called the digital signature.<sup>16</sup>

Is it possible that only one person is allowed to add the unit to the hashchain? If the last block contains the public key of the current owner and the digital signature of the owner of the previous block, then the creation of the next block will require the signature of the owner of the current block, that is, the person who owns the private key. The current owner creating a new block places the public key of the new owner there, as well as his signature on the whole block. So the owner of the next block is the one who knows the private key corresponding to this public key in the new block. And the signature certifies that only the previous owner could do it. Hashchain with PKC authorization can perform the function of secure transfer of digital objects, called tokens. Suppose one hashchain represents a token. It can be something that in the real world is given some value. The owner of the last block is the owner of this value, because only he can transfer it to someone else. However, this type of hash, implemented as it is, would require a certain central place where the blocks are actually created, stored, and can be checked.<sup>17</sup>

Place (possibly in virtual reality), where the process of creating new blocks for a global hashchain is continuously taking place, and in this place any person can put any data he wants into the pile of blocks of this global hash. In such a place and with such a process it is possible to place the hash blocks representing values inside the blocks of such a global hash. In other words, one hash in the other hash. In fact, such a mechanism is called blockchain technology.

#### 1.4. SOCIAL STIMULUS OF USAGE BLOCKCHAIN

After understanding what is blockchain and how it is works it is time to find out which factors stimulate people to use blockchain.

In the network, crypto-global global hash services distributed among many computers. This global hashchain contains many internal hash caches representing some valuable tokens. New

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<sup>16</sup> **Daniel Drescher** “Blockchain Basics” 2017y Stage III: How the Blockchain Works P 55-81

<sup>17</sup> **Daniel Drescher** “Blockchain Basics” 2017y Stage III: How the Blockchain Works P 55-81

blocks created on internal hashchains are called transactions, because they represent the history of crypto currency owners. The owner of the crypto currency creates a new block on the corresponding internal hash and publishes this block as a new transaction, and person need to include it in the next block of the external hash. Publishes - this means it sends out to all other P2P network members. As soon as a new block of external hash was created, it is published in the same way.<sup>18</sup> Any member can create a new block for an external hashchain by including published transactions in it. But it's not easy. To avoid chaos, all participants adhere to a certain set of rules - the protocol. And who violates these rules, he ignores the rest. The protocol is based on three principles:

- the creation of a new unit requires significant computing power;
- the creation of a new block has a reward, so many would like to spend efforts on the successful creation of a new block;
- if branching happens, then the longest branch wins.<sup>19</sup>

The first condition requires that a hash, taken from a block with some random modifier, starts with a certain number of zero bits. So the random modifier is selected until the required number of zero bits results. This requirement makes the creation of the block difficult.

On the other hand, the one who created the block receives a certain number of newly made domestic Hashchains representing value - the Crypto currency. This, too, is part of the protocol. Moreover, since crypto currencies represent in some sense a currency and internal hashchains contain transactions in this currency, transaction owners can offer a small portion of the transaction value to the creator of the new global hashchain block. Thus, the creator of a new block receives a crypto currency plus all the payments collected from the transactions placed in the block.

The third rule guarantees only one valid copy of the database, which is repackaged among many computers. Obviously, many trying to create blocks create them independently different. Since the distribution of blocks is not instantaneous, new blocks can be created on

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<sup>18</sup> **Daniel Drescher** "Blockchain Basics" 2017y Stage II: Why the Blockchain Is Needed P27-49

<sup>19</sup> **IBM** "Three features of blockchain that help prevent fraud" <https://www.ibm.com/blogs/blockchain/2017/09/three-features-of-blockchain-that-help-prevent-fraud/> April 20 2018y.

top of independently created blocks. This situation causes the global hashchain to branch. The third rule defines one longest branch of the correct one. This rule works without problems, since the creation of blocks is difficult, and therefore the probability that two or more branches will survive falls very quickly.

External Hashchain plays the role of the central repository, effectively replacing the authoritarian body. Because external hashchain is global, it stores the elements of internal hashchains unambiguously and reliably linking tokens with their owners, while at the same time making it impossible to "double pay". Database external hashchain distributed among many not trusting each other. This excludes the possibility to oblige the entire community of such parties to follow some external prescription, such as a political law.

## 1.5. THE PROCESS OF MINING CRYPTO-CURRENCIES

The previous subchapter described that the person who created the block receives a certain crypto-currency. And in this subchapter will be deeply described this phenomena.

To add information about transactions to the block, it is necessary to create new blocks. Blocks - this is the "structural unit" of blockchain, from what it consists of its tiniest parts. The process of forming such blocks is called mining. Users from all over the world conduct complex mathematical operations using computer processors and video cards and receive crypto currency. There is no other way to issue this crypto currency - only mining.<sup>20</sup>

The speed of the release of the blocks is extremely low. The reasons for this are the following factors:

- Firstly, the synchronization of computers among themselves is high, but not instantaneous. After the creation, the block should be written to the end of the blockchain to each participant (the versions of the block libraries are identical for all users). This takes a lot of time (network members are scattered around the globe), and it is impossible to shorten the process.

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<sup>20</sup>**Itpro** "what is cryptocurrency mining" <http://www.itpro.co.uk/digital-currency/30249/what-is-cryptocurrency-mining> April 22 2018y.

- Secondly, there is no guarantee that the block will indeed record the correct information.<sup>21</sup>

Due to the increasing complexity of production cryptocurrency began to form pools - union miners. To receive the reward, the miner needs to find a digital signature to close the block. In solo mode, even a powerful computer will take a lot of time. Therefore, pools are created that unite miners. Each member of the pool receives a reward equivalent to the mining capacity.<sup>22</sup>

In crypto-currencies, where the effectiveness of mining directly depends on the performance of the equipment, the protocol Proof-of-Work is used. It protects the network from double spending and is the basis of the reward system in the mining. The more the miner did the work, the higher his reward will be.

Mining can be classified according to the form and equipment used. Types of mining cryptocurrencies:

Mining on computer processors (CPU) is an inefficient way to extract crypto currency. Even powerful personal computers will not yield tangible revenue. Actually except for those who have access to a large number of computers and free electricity.

Mining on video cards (GPU) is relevant for most cryptonyms. Effective when using powerful video cards. In stationary mode, it is suitable only for crypto currency mining, the cost of which can potentially increase many times.<sup>23</sup>

Mining on the ASIC is an effective way to mine the Crypto-currency. ASIC - processors are made with a special architecture, sharpened for mining. Such devices have a high payback rate and are easy to maintain. Minuses - low liquidity in the secondary market and rapid obsolescence of the ash due to the growing complexity of the network.<sup>24</sup>

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<sup>21</sup>**Secureworks** “cryptocurrency mining malware landscape”

<https://www.secureworks.com/research/cryptocurrency-mining-malware-landscape> 1 may 2018y.

<sup>22</sup>**Benzinga** “cryptocurrency mining what it is how it works and whos making money”

<https://www.benzinga.com/general/education/17/08/9953629/cryptocurrency-mining-what-it-is-how-it-works-and-whos-making-money-> 1 may 2018y.

<sup>23</sup>**Steemit** “types of cryptocurrency mining” <https://steemit.com/cryptocurrency/@bitcoinflood/3-types-of-cryptocurrency-mining> 1 may 2018y.

<sup>24</sup>**Sgcoinmart** “types of cryptocurrency mining options available in Singapore”

<http://www.sgcoinmart.com/2017/12/03/types-of-cryptocurrency-mining-options-available-in-singapore/> may 2 2018y.

Farms - an installation that combines a powerful video card (GPU). Connects to one or more computers. It shows high efficiency, with the equipment actually sold on the secondary market. Minuses - the increase in the number of miners increased the demand and, as a consequence, the prices for cards.<sup>25</sup>

Browser mining is the process of extracting crypto currency through the implementation of a special JavaScript script. The effectiveness is minimal. Many browser-based services are created for fraudulent purposes and implement a hidden miner into the file system of users without their knowledge.<sup>26</sup>

Hidden mining is the extraction of crypto-currency using the capacities of foreign equipment through the distribution of a special program (virus). The hidden miner is "glued" to regular files and is crooked by antivirus software. The best assemblies of such viruses are almost impossible to remove from the computer's memory or to be detected by anti-virus software.<sup>27</sup>

Mining on phones and laptops - even the most powerful models show minimal efficiency. With laptops, the situation is similar.

Mining on HDD - is based on the protocol Proof-of-Capacity. The more "miner" can provide disk space for mining, the higher the efficiency will be. To earn at least \$ 1 a day, it is necessary more than 500 terabytes of disk space.<sup>28</sup>

Mining on the server is essentially the same as mining on the CPU, only with high performance. It may have potential in the future with the addition of new crypto currency.

From this subchapter it is clearly seen what mining is. Mining is a rather fascinating process, the essence of which lies in the fact that the computing device is looking for unique solutions for blocks of the crypto-currency network, for which rewards are reimbursed. Its size depends on the value of a particular crypto currency. The miner can redeem his reward for other, more expensive or popular crypto-currencies or withdraw it into real money. Mining has several types and each of them unique. But all of them serve to increase popularity of crypto-currencies buy helping people to earn money.

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<sup>25</sup>**Coindesk** "how bitcoin mining works" <https://www.coindesk.com/information/how-bitcoin-mining-works/> may 2 2018y.

<sup>26</sup>**Scmagazine** "cryptominer uses hidden browser windows to keep on mining" <https://www.scmagazine.com/persistent-cryptominer-hides-to-mine-after-closing-browser/article/710738/> may 2 2018y.

<sup>27</sup>**Securityaffairs** "Cryptocurrency miners hidden in websites" <https://securityaffairs.co/wordpress/66204/hacking/cryptocurrency-miners-browser.html> may 2 2018y.

<sup>28</sup>**Bitgid** "Mining on HDD" <https://bitgid.com/majning-hdd/> may 2 2018y.

## 2. CHANGES WHICH APPEARED BECAUSE OF CRYPTO-CURRENCIES

### 2.1. THE ROLE OF CRYPTO-CURRENCIES IN INTERNATIONAL FINANCIES

In subchapter 1.1. it is described what is international financial system and explained how does it work. At the end of subchapter 1.1 were made conclusion that the main purpose of the international financial market is to collect and redistribute temporarily free financial resources on the basis of it, which supports the development of the world economy. Which means that world economy and international financial market closely related. Because of that it is time to explore the role of crypto-currencies in international finances.

Until now, surges and crashes in the crypto-currency markets did not concern financial markets and the real economy. The prices of Bitcoin and other crypto currencies have risen dramatically, Cardano and Monero (XMR / USD) have risen in price, but if tomorrow all these tokens turn to dust and this should not have a significant impact on the lives of ordinary people.

Companies with publicly traded stocks are starting to make decisions to show that they stand to benefit from crypto-currencies, and markets are beginning to reward them in a big way for those decisions. Should this continue, people not involved in crypto-currencies will suffer when there's a crypto bust. And there will be a crypto bust.<sup>29</sup> A striking example of such a company can be considered Longfin Corp., whose shares soared more than 2000% a week after the announcement of the purchase of a blockchaining company specializing in microcredit solutions. When stocks grow after such press releases, it's important not to get too hung up on the details of the ad or what it means for the business; the hype itself causes distortions in the markets.

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<sup>29</sup> **Bloomberg** “crypto-currencies are starting to affect the real economy”  
<https://www.bloomberg.com/view/articles/2017-12-18/cryptocurrencies-are-starting-to-affect-the-real-economy>  
may 3 2018y.

In 2017, it has been noticed that the crypto-currency market hit an all-time market valuation of over \$600 billion, and while that certainly beats every stroke of the imagination, expect more of the same in 2018. Crypto-currencies have proved to be a revolutionary asset class, and people can expect a horde of organizations - including top brands, government and business agencies from the world over - to enter into the crypto scene in 2018. As was in the past, increased interest in the crypto-currency market seems to translate to increased gains. For example, look when CBOE and CME launched bitcoin futures -- a development that catapulted the short-term market capitalization of the popular crypto-currency Bitcoin.<sup>30</sup>

Market of crypto-currencies very unstable. This phenomenon might be explained. With a bitcoin cost above \$ 10,000 and then \$ 20,000, some traders with several thousand dollars in their pockets can afford to buy only a fraction of bitcoin, and this gives them psychological discomfort. At the same time, this small deposit can be spent on buying hundreds or thousands of cheaper coins, dispersing their rally. Because of those actions of traders unknown crypto-currencies which costs lower than 1\$ might grew up in several times.

This phenomenon gave big boost to small crypto-currencies. That fact that prices for such unknown currencies started to grow as fast as Bitcoin's prices it started new situation in psychological meaning, every participant of financial market started to search new "bitcoin" and started invest money into unknown crypto-currencies which increased in price comparing previous week. This new trend based on logical thinking: "if prices for bitcoin raised so rapidly then prices for other currencies might grow to such big numbers."

As the cryptocurrency market evolves and eventually slows down, ways to assess the fundamentals of coins will evolve. Before the dot-com crash, technology companies were incredibly overpriced; in parallel, the cryptocurrency ecosystem contains coins that are priced much more than they are feasibly worth. But the velocity of money is greater in new, unforeseen fields and when this slows down, the dearth of fresh funding will yield in the weaker companies shuttering and the durable coins will gain vast amounts of market share. With fewer dominant coins, there will be less speculation, and the development of tools to

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<sup>30</sup>**Forbes** "Cryptocurrencies and financial market."  
<https://www.forbes.com/sites/forbestechcouncil/2018/03/20/cryptocurrencies-and-the-market/#2a00c41530f8>  
may 3 2018y.

determine the fundamentals of coins will convert the crypto market from the wild-west into a more robust market.<sup>31</sup>

The Longfin mania shows that markets want more supply of companies with ties to crypto-currencies. And if there's one thing Wall Street is good at, it's meeting investor demand with new supply. Whether via acquisitions, press releases or business model pivots, we're going to see more companies with publicly traded stocks pivot towards crypto-currencies for as long as the mania continues.<sup>32</sup>

And it is unlikely that these companies with suddenly skyward scores will usefully use capital and other resources. They are going to hire people, rent offices, buy equipment and spend money on advertising to participate in a crypto currency boom. This money will come to the real sector companies servicing these speculative crypto-exchange companies, and thus the links between the real economy and the crypto-currency industry will expand. This may lead to a temporary acceleration of economic growth, but growth will be of questionable quality.

## 2.2. HISTORY OF CRYPTO-CURRENCIES. BITCOIN

After seeing the importance of role which plays crypto-currencies in financial markets it is time to deeply examine crypto-currencies as itself from creation till nowadays.

The new type of money appears only in case of necessity, when previous types of money start to hold process of production and exchange. All preconditions for appearing new type of money are constantly searching more economical monetary system at which economy of social labour, reducing costs of money turnover, increasing speed of money turnover, increasing reliability and convince of money movement.<sup>33</sup> It is clearly seen that the process of change starts because of technical and scientific progress. From one side the reason of appearing of crypto-currencies is development of electronically commerce which is

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<sup>31</sup>**Hacker noon** “the economics behind cryptocurrency market pullbacks” <https://hackernoon.com/the-economics-behind-cryptocurrency-market-pullbacks-3e7f200866d4> may 3 2018y.

<sup>32</sup>**Bloomberg** “crypto-currencies are starting to affect the real economy” <https://www.bloomberg.com/view/articles/2017-12-18/cryptocurrencies-are-starting-to-affect-the-real-economy> may 3 2018y.

<sup>33</sup> **Zinisha O. S. Syutkina E. S.** “The role of cryptocurrency in the modern world” p2-4.

happening on internet which becomes new step in economic globalization in the world. And from other side reason of creation crypto-currencies is that crypto-currencies cost less in terms of labour, money turnover, crypto-currencies allows to make faster process of money turnover in compare of currencies which made from paper or metal.

The resiliency of this virtual world is demonstrated by the alternatives that have been developed after governmental actions take place. With the shuttering of E-gold, WebMoney, based In Belize, stepped in to fill the void. WebMoney was founded in Moscow, but the names of the owners and administrators are unknown to the public. Although this system is not anchored to gold, it continued to maintain its value.<sup>34</sup> The creation of E-gold in WebMoney was one of first steps in the way of creation of crypto-currencies.

The next type of crypto-currencies was much more successful.

2008 – The Mysterious Mr Nakamoto. A paper called Bitcoin – A Peer to Peer Electronic Cash System was posted to a mailing list discussion on cryptography. It was posted by someone calling themselves Satoshi Nakamoto, whose real identity remains a mystery to this day.<sup>35</sup>

It's hard to say for sure how long it would take to create and develop all the theoretical aspects of creating a decentralized digital currency. Therefore, the beginning of the history of Bitcoin is considered to be 2008 when a document with a description of the crypto currency published under the name of Satoshi Nakamoto appeared on the Internet. It is not known who was hiding and remained under this pseudonym, whether it was one author or a group of developers it is unknown till nowadays.

In 2008, press releases were published and a domain was registered on which the official site of the bitcoin.org payment system was located. In January 2009, the Bitcoin network began its work with the release of the first bit-client and the creation of the first unit, for which a reward of 50 Bitcoins was received. During this period, the spread of the new currency began gradually, there were few coins and the network participants actively engaged in their production (mining). The concept assumed the creation of a certain number of Bitcoins, and as this number increased, the complexity of the extraction increased. The first miners used personal computers, at the moment for the generation of coins significant computer resources

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<sup>34</sup> **Kenneth Ngai.** “Regulating cryptocurrency to prevent fraud and money laundering” p2-3.

<sup>35</sup> **Forbes** “history of Bitcoin” <https://www.forbes.com/sites/bernardmarr/2017/12/06/a-short-history-of-bitcoin-and-crypto-currency-everyone-should-read/#2cb027203f27> May 3 2018y.

are required. The general public has not yet had an idea of the emergence of a cardinal new payment instrument. Accordingly, the degree of demand for cryptonet was practically zero. By the end of 2009, the rate of Bitcoins was at the level of 700-1600 bitcoins per 1 US dollar.



Figure 1.3. The value of Bitcoin from creation till nowadays.

Source: **Bitcoin** “Bitcoin price”. <https://charts.bitcoin.com/chart/price> May 3 2018y

In 2010, the first exchanger was created, where it was possible to exchange Bitcoins for dollars. The same year was marked by the first acquisition, in which the Bitcoins were the payment instrument. A rapid growth in the rate is associated with the publication of a new payment system on the Slashdot website, a few hours after the publication, the rate of the Crypto currency increased by about 10 times. In July, the first Bitcoin-Exchange MtGox, where users of the system could sell or purchase coins at the most profitable rate, commenced operations. The establishment of the exchange indicated a sufficiently high degree of liquidity of Bitcoin, and high liquidity already provided the opportunity to earn money on fluctuations in the rate of Bitcoin. The founder of the exchange was Jed McCaleb (the owner of a very popular file-sharing network eDonkey2000), in March 2011 the exchange was sold

to the Japanese company Tibanne Co. In November 2011, the trading volume of MtGox reached a limit of \$ 1 million.<sup>36</sup>

Since 2011, the Bitcoin system has faced some difficulties. The currency had no material security, and the course jumps became stronger, so, in one day, the Bitcoin rate could be halved. In addition, the interest in Bitcoin began to be experienced by hackers who hunted for the purses of users of the system. Hacker attacks were aimed not only at the personal computers of users where digital coins were stored. The hackers managed to get the administrator password and log in to the MtGox exchange system. As a result of manipulation, intruders managed to bring down the rate of Bitcoin to 1 cents, after which about 2 thousand Bitcoin were purchased at that price. In addition, hackers got access to the accounts of 60 thousand users of the exchange, after which the site was turned off for a week. However, the events described, in addition to the negative impact on the Bitcoin course, attracted additional public attention to the digital currency. Already in August, the first conferences took place, at which the first bit-start-ups were presented; more publications devoted to bitcoin began to appear in the media.<sup>37</sup>

The beginning of 2013 was the beginning of the mass distribution of Bitcoins, the history of the Bitcoin course developed as follows: at the end of February, the rate of crypto-currency reached \$ 31, in early April 2013, \$ 100 was paid for Bitcoins. Over the next month, Bitcoin reached a bar of \$ 266, but then the rate fell to \$ 65. It is quite natural that the mass media began to widely cover events related to the Bitcoins. At the end of 2013, the rate of crypto currency increased significantly, in November the mark of \$ 300 was overcome. At the same time, a number of scandalous incidents occurred, as a result of which the reputation of the Bitcoin system as a whole was somewhat damaged. The owner of the "black market" Silk Road have been arrested, the website Silk Road was the online trade in drugs and other illicit goods and services. Closer to the winter of 2013, the currency was in the field of view of politicians and financiers around the world. In different countries, the view of the decentralized payment system was different.<sup>38</sup>

Not the most successful period of Bitcoin's history was 2014. In February, there was a sharp drop in the rate of crypto-currency, related to the collapse of the largest stock exchange Mt.Gox. In addition, there were regular thefts of users of the system, and in the press again

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<sup>36</sup> **JONATHAN B. TURPIN** "Bitcoin: The Economic Case for a Global, Virtual Currency Operating in an Unexplored Legal Framework" 2014y. P335-368

<sup>37</sup> **JONATHAN B. TURPIN** "Bitcoin: The Economic Case for a Global, Virtual Currency Operating in an Unexplored Legal Framework" P335-368

<sup>38</sup> **Adrian Blundell-Wignall** "The Bitcoin Question: Currency versus Trust-less Transfer Technology" 2014y p2-20

there were reports about the use of the Bitcoin system by arms and drug sellers. At the same time, state institutions continued to work on the integration of the payment system in the overall financial structure.<sup>39</sup> Since the end of May, 2016, on the eve of doubling the complexity of production, the price for Bitcoin starts to grow rapidly and after a small decline by the end of the year crosses the \$ 1000 mark. At the beginning of 2017, the price slides back a little, and then begins a rapid ascent. In the second half of May, Bitcoin overcame the next important psychological height of \$ 2,000, and in June a limit of \$ 3,000 was taken.

From this subchapter it is noticeable that Bitcoin is one of the first crypto-currencies and has long and interesting history. Despite all unsuccessful periods of history of Bitcoin, this currency is still exists and people extremely use it. Nowadays Bitcoin is the most famous crypto-currency because of hype which occurred in summer of 2017 when price for Bitcoin were higher than \$ 18,000.

### 2.3. BLOCKCHAIN AND BANKING SYSTEM

Bitcoin works on blockchain technology which helps to make transactions and also holds information of those transactions. In other words blockchain technology does the same actions as banks do. Because of it this subchapter will deeply explore connection between blockchain and banking system. The whole essence of the traditional financial system and its institutions was to develop the ability to safely track, store, transfer values. banks coped with this task having spent on the development of infrastructure for its maintenance several centuries. And suddenly the blockchain appeared decentralized platform which showed that the storage and transfer of values can be reliable, safe and without banking structures.

Many modern branches conduct various experiments with blockchain technology. However, practice shows that the most successful projects relate to the financial sphere. Naturally, in the financial market Bitcoin is the most popular crypto currency. Until a certain time, no one took it seriously. And the crypto-currencies themselves were associated with something forbidden (for example, arms trade, drugs). At the end of 2015, serious changes occurred in this area - the interest of specialists in distributed registry technology has increased. In the end, it was interested in large financial organizations. They created the consortium R3 with

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<sup>39</sup> **JONATHAN B. TURPIN** "Bitcoin: The Economic Case for a Global, Virtual Currency Operating in an Unexplored Legal Framework" p335-368

the aim of developing the use of blockchain technologies in the modern financial sphere. In the spring of 2016, the specialists of this association presented a project called Corda. This is a distributed registry, which is created specifically for various financial services. After the Corda source code was published, Hyperledger entered the consortium. He joined IBM, Sawtooth, as well as other systems designed for financial transactions<sup>40</sup>. The participants of this project agreed that the blockchain system can increase the effectiveness of various transactions. According to the IBM C-Suite Study 2017, a third of the companies that conduct experiments and are able to implement the blockchain system in 2017 are in the financial field.<sup>41</sup> This is not surprising, since the blockchain system allows people to work without intermediaries, as well as save significant funds. The difficulties that arise with international money transfers. Currently, the system of cross-border transfers is far from ideal. Therefore, it does not like many users who have to pay a commission to banks. In addition, the system also does not suit modern banks. For this reason, financial institutions are forced to use a more expensive and less reliable SWIFT system (for interbank transfers). The use of blockchain technology for the organization of cross-border transfers is quite promising. The Bitcoin system, which knows no boundaries, has been functioning successfully until nowadays. Of course, there are certain risks and problems in her work, but the blockchain has never been hacked. The simplicity, high reliability of distributed registry technology drew the attention of the largest banks.

Benefits which will get banking system after implementing blockchain technology and crypto-currencies are a lot. On the basis of the blockchain, banks can improve the efficiency of their operations, optimize the functions of the back office, and reduce risks. Smart contracts add dynamics to the market, because they enhance the security of transactions in the blockchain by checking additional data. Blockchain as a whole, reduces the risks of working with unknown counterparties, increases the liquidity of funds and unites people around the world. Crypto-currency, created on the basis of smart contracts and blockchain, has already become an independent financial product that encroaches on the territory of the banking sector. They can be stored, used, redistributed, without relying on any institutions. Insurance of risks is made by the network itself. Nobody should be entrusted for the safety of funds. At

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<sup>40</sup> IBM “How the benefits of open source blockchain can benefit credit markets.”

<https://www.ibm.com/blogs/blockchain/2018/05/how-the-benefits-of-open-source-blockchain-can-benefit-credit-markets/> may 5 2018y

<sup>41</sup> IBM “Blockchain from abstract to practical: data is the basis for all.”

<https://www.ibm.com/blogs/blockchain/2018/04/blockchain-from-abstract-to-practical-data-is-the-basis-for-all/> may 5 2018y

the same time, there are no barriers for international transfers and payments. Perhaps, it is this kind of operations that will be replaced first by postings in the blockchain. Moreover, such firms can carry out such transfers, they need not be banks. They will have to use the technology of blockchain in their work.<sup>42</sup> Crypto currency can be sent from anywhere in the world to any country, it is enough to have access to the Internet. Translation is cheap, carried out quickly. Traditional international bank transfers take weeks or days to implement, and those transactions costs relatively expensive. Thatswhy by implementing blockchain technology in banking sphere those problems would solve. At the conceptual level, the crypto currency simply marks the fact of storing the value, fixes the process of its transfer from person to person. And all this is carried out in an environment with zero confidence between the parties. No intermediaries for operations are required. Tokens that symbolize some value, mark the process of storage or transmission, Bitcoins and its alternatives can be transferred, redeemed, spent. All this process is reliable and confidential. Banks can still benefit from the adoption of Crypto-currency, but they need to show flexibility, learn to act quickly.<sup>43</sup> By implementing blockchain technology and crypto-currencies banking industry will get big profits.

Banks have a good level of capitalization, extensive branch and partner networks, built infrastructure, experience in securing transactions. All these attributes are in the developing market of virtual currencies. His players only need a little time to polish the functions of this system. An example of how banks can tokenize securities is the mortgage market. The bank can lend money to thousands of borrowers, and then combine mortgage loans (mortgage securities) into one collateral that can be sold through over-the-counter transactions. Price models of the secondary market for mortgage securities are now weak, mainly because of lack of transparency. Let's imagine how the same bank fixes all mortgages in the blockchain, breaking all the cash flow into smart contracts, creating mortgage securities that can be checked in real time. Auditors could see there how the first payments were made, how all other fees are paid. This could shorten the time to assess the credit risks that underlie mortgages based on late payments. Mortgage contributions of borrowers could in fact also be carried out in blockchain. Their account would be automated, in real time. This could significantly reduce the cost of evaluating the MIs, their marketing. And such securities could

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<sup>42</sup>**Cbinsight** "How blockchain could disrupt Banking" <https://www.cbinsights.com/research/blockchain-disrupting-banking/> may 6 2018y

<sup>43</sup>**Bravenewcoin** "why blockchain will revolutionize banking industry" <https://bravenewcoin.com/news/why-blockchain-will-revolutionize-the-banking-industry/> may 6 2018y.

be bought and sold in real time around the world, also through the blockchain.<sup>44</sup> And this is just one example of an infinite number of possibilities of distributed registry technology, which is the basis of the blockchain. Tokenization is a symbol of transformation, transition to a fully digital economy from the paper economy, from bureaucracy to transparency and safe work with assets in real time. Traditionally illiquid or complex asset classes can be converted into intellectual assets, and investors and investors can benefit from new sources and more efficient capitalization of liquidity.

## 2.4. EXPANDING THE SCOPE FOR FRAUD AND INCREASING CRIME IN CYBER AREA

Despite safety of blockchain technology there still exists crime and fraud in cyber area. In subchapter 1.5. theme of fraud related to blockchain and crypto-currencies lightly touched. But theme of fraud and crime in cyber area is very huge and it necessary to sort out in it.

One of the pure examples of crime in cyber area is website “Silk Road”. If to consider few years ago, when there was no rumor about the anonymity. The main crypto currency was used by DarkWeb and it was in crypto-currencies that mutual settlements began in different illegal directions. The traffic in narcotics and weapons, contract for killing people and other filth of our world was paid in the crypto currency. This empire actively grew and flourished, until the heads began to pour in the form of a number of arrests. The first feds came to Ross Ulbrecht, the organizer of the famous Silk Road.<sup>45</sup> Ross Ulbricht, known under the pseudonym "Terrible pirate Roberts", founded the "Silk Road" - a site that, from "another online store with an illegal product". In 2010, Ross Ulbricht began to grow hallucinogenic mushrooms and sell them through the Internet on a small amateur site called SilkRoad, named in honor of Great Silk Road. Not entirely legal in the US business was a real pampering by the standards of the "Dark Internet". The trade was conducted for Bitcoin. The first shipment of drugs on the Silk Road Ulbricht almost completely sold himself, creating the

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<sup>44</sup>**Flexiloans** “Blockchain technology and its impact on finance” <https://flexiloans.com/blog/blockchain-technology-impact-finance/> may 7 2018y.

<sup>45</sup>**Blocknomi** “History of silk road: a tale of drugs, extortion and Bitcoin” <https://blocknomi.com/history-of-silk-road/> may 7 2018y.

appearance of good customer service.<sup>46</sup> Step by step, he created a web of relationships with the first real customers, who later turn into a full-fledged market. On the "Silk Road" everyone trusted each other - this was the reputation of the resource. A person who paid for illegal service or goods was sure that he would get what he wanted, and the supplier knew that he would receive money. Ross Ulbricht quickly proved that reputation and confidence are just illusions for which people are willing to pay as willingly as, say, they pay for "elite" brands. The site grew rapidly - a self-sustaining reputation continued to play its role. Gradually, "Scary Pirate Roberts" introduced an automatic rating system that allows sellers to create a reliable reputation for themselves. People with a low corresponding score did not stay on the site - no one wanted to do business with them. On SilkRoad there was a forum whose visitors could gossip about their experience working with sellers and buyers. The payments were processed using an automatic deposit system, within which the buyer could refuse to pay for the goods until it arrived. Finally, the creator of the site turned sellers and buyers into peculiar equivalents of commercial brands.<sup>47</sup> Being honest has become fashionable on SilkRoad. The incentive system would be incomplete without a system of penalties. Ulbricht began to ban sellers convicted of fraud. The ratings and competition of merchants on the site were not at all guarantees of honesty. Often traders tried to create a reputation for honest people only in order to one day to take money and escape. Other fraudsters cheated the system while simultaneously carrying out a huge number of transactions and demanding that customers complete the payment before they received the goods and then hide with the money.<sup>48</sup> Since the scammers were hiding behind pseudonyms and using Tor, the indignant buyers could not do anything but write curses on the forum. Often the sellers who received the addresses of customers for delivering drugs to them did not erase this information after the transaction was completed (as SilkRoad rules required).

All this created a threat to the business: if at least one seller allowed such important data to leak, the marketplace would quickly come to desolation. Ross Ulbricht did not rely on site rules or providence. At first he had to spread hundreds of thousands of dollars to prevent DDoS attacks on his site. After another act of blackmail, he took the next step, and paid \$ 150 thousand to a member of the biker gang "Angels of Hell" for organizing the murder of

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<sup>46</sup> **Medium** Silk Road Memoir-A Story of Crime, Greed and Murder! <https://medium.com/@curtisgreen/writes-book-about-his-silk-road-experience-8f664996c850> may 7 2018y.

<sup>47</sup> **Wired** "the untold story of silk road" <https://www.wired.com/2015/04/silk-road-1/> 7 may 2018y.

<sup>48</sup> **Slate** " what the SilkRoad bust reveals about buying illegal drugs online" [http://www.slate.com/blogs/crime/2013/10/02/ross\\_william\\_ulbricht\\_dread\\_pirate\\_roberts\\_what\\_the\\_big\\_silk\\_road\\_bust\\_reveals.html](http://www.slate.com/blogs/crime/2013/10/02/ross_william_ulbricht_dread_pirate_roberts_what_the_big_silk_road_bust_reveals.html) 7 may 2018y.

blackmailers. After some time, he laid out half a million for the new violence.<sup>49</sup> However, it is not known whether the killings were actually carried out. The order in any market depends on the threat of punishment, no matter what it is - the consequences provided by law on behalf of the state or gang warfare. Ross Ulbricht received life sentence. Three years after the start of the project, the intensity of the passions around SilkRoad grew to such an extent that the FBI had to cover up the largest market for the "dark Internet". "The terrible pirate Roberts" was arrested in October 2013 - and after only a few months the members of his old team tried to create a new market, "Silk Road-2". However, this resource was also closed by law enforcement agencies. Other, smaller resources of clandestine Internet trading could not be compared with SilkRoad - often such resources simply do away with clients and leave the game. Because of the inability to track who exactly owns a crypto currency, it is popular with hackers, arms dealers and drugs. Thus, the Crypto-currency simplifies the circulation of funds between criminal gangs.

But SilkRoad not only one web site with illegal products and services. AlphaBay was launched in 2014. After the closure of the legendary Silk Road - the first of its kind a large trading platform - in a dark web, a lot of clones spread, and users gradually began to buy in other places. Nevertheless, AlphaBay remained unnoticed for more than a year and only in March 2015 began actively recruiting an audience. A sharp influx of customers occurred after the closure of the more popular competitor Evolution. Administrators of the resource simply stole all the funds in the internal purses of customers, sent the site offline and disappeared with money. According to one of the founders of AlphaBay, this situation has allowed to attract 18 thousand customers. In the same year, another major Agora trading platform was announced to be closed.<sup>50</sup> Its administrators for some time did not come into contact and caused serious concern to users. Many suspected that policemen were coming to the founders of the site, and all the information of clients is now under threat, but soon the admins appeared in one of the Reddit threads. They explained that they temporarily went offline because of possible problems with Tor security, as several researchers in 2015 reported several vulnerabilities in the anonymous network. However, the promised restart of Agora did not take place. On the resource AlphaBay appeared more and more goods, from drugs and weapons to large databases and tools for hacking and hacker attacks. Despite the

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<sup>49</sup> **The Daly Dot** "The definitive history of Silk Road" <https://www.dailydot.com/crime/silk-road-drug-ross-ulbricht-dread-pirate-roberts-history/> 7 may 2018y.

<sup>50</sup> **Cyberscoop** "How AlphaBay has quietly become the king of dark web" <https://www.cyberscoop.com/alpha-bay-dark-web-silk-road-amazon-russia/> 8 may2018y.

popularity of drugs in dark web, the main income of the site was brought exactly by stolen data. The site was unavailable since July 5, 2017. This day in Thailand, 26-year-old Canadian Alexander Kaz was detained, who allegedly was the operator of AlphaBay; he was going to be extradited to the United States. In Canada, searches were carried out, in which the site servers were withdrawn. On July 12, Kazan was found dead in a cell. According to the publication, the Thai police seized from Kazan four Lamborghini cars and three real estate objects<sup>51</sup> July 5, 2017, the trading platform AlphaBay, which was inhabited by arms dealers, drugs and other illegal goods, without any warnings, just stopped working. Clients, whose money was left on her internal wallets, immediately raised panic in social networks: apparently, together with the administrators, millions of dollars have gone to nowhere. After a day the users discovered a strange activity: the unknowns withdrew from one Bitcoin-purse to another almost one and a half thousand Bitcoins. After that, many considered that administrators simply curtail activity and go underground with the money of clients.<sup>52</sup> Typically, disassembly due to disruptions in the work of sites in the dark web does not go beyond the specialized forums, but this time Reddit literally broke from the angry messages of clients. On the wave of rumors about the death of the site scammers became active: they offer users phishing links under the guise of a new address AlphaBay and extort money, pretending to be wholesale drug suppliers.

If to consider more frequent criminal schemes, when Bitcoin is used, then it is worth remembering about blackmailers and extortionists.<sup>53</sup> This crypto-currency is required as elicit for Ddos attacks and PC blocking by cryptographic viruses. And such hackers attack not only ordinary mortal users, but also crypto-currency exchange web sites, and government websites. Of course in these cases hackers not getting anything.<sup>54</sup> One of the examples of such attacks may be the theft of copies of films and serials that have not yet been released for hire, with the subsequent demand of an amount of Bitcoins. For refusal to pay the designated compensation hackers can simply break the box office, which will cause serious losses for the creators of the film product.

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<sup>51</sup> **Iseotech** “facts about Alphasbay: the biggest illegal drug marketplace in internet history” <https://1seotech.com/facts-alphasbay-biggest-illegal-drug-marketplace-internet-history/> 9 may 2018y.

<sup>52</sup> **Wired** “AlphaBay takedown dark web in chaos.” <https://www.wired.com/story/alphabay-takedown-dark-web-chaos/> 9 may 2018y.

<sup>53</sup> **Kenneth Ngai**. “Regulating cryptocurrency to prevent fraud and money laundering” p3-4.

<sup>54</sup> **Cnet** “crypto-currency like Bitcoin is easy money for criminals. <https://www.cnet.com/news/cryptocurrency-cybercrimes-mean-easy-money/> 9 may 2018y.

In subchapter 1.5. it is lightly described how hackers could earn money by mining cryptocurrencies using PC of unsuspecting people. But it is necessary to understand how they do that. New technologies generate new threats and viruses. And some greedy hackers figured out how to make money on the crypto currency. Hackers come up with new means of mining crypto-currency. "Kaspersky Lab" stated the existence of viruses-miners and computers infected with this virus.<sup>55</sup> The main way to install a virus-miner is the installers of advertising software distributed through social engineering. The user is looking for legal software on the Internet. But on the search engine he gets links to malicious resources, where he downloads this malicious software under the guise of a normal program. Once the virus is installed, it begins to perform computational operations on the victim's computer. As a result, the attacker receives a remuneration transferred to his wallet. Various mechanisms are used to conceal the virus. There are types of viruses that suspend the process of mining (crypto currency extraction) if the user runs certain applications (games, graphics editors, etc.). Therefore, the work of the virus-miner is not always noticeable.<sup>56</sup> To detect a virus-miner, person should pay attention to computer performance and increased bills for electricity, since a computer running at full capacity consumes more energy. To remove the virus-miner, person must install a protection program. The manual removing program-virus is almost impossible as it is able to recover in the system.

Conclusions from this subchapter are very simple. Anonymity, speed and usability of the crypto currency created a very favorable ground for the prosperity of crime in the dark web. Thanks to their anonymity, criminals feel impunity and are not afraid to buy or sell drugs and weapons. But even with a high level of protection of the crypto currencies in internet wallets of users on suspicious websites can be merged, as the experience of AlphaBay has shown. Despite anonymity, law enforcement bodies manage to calculate illegal activities and punish those responsible people. This was well showed on experience of SilkRoad and AlphaBay. Scammers also attract the anonymity of the crypto currency. And they bravely attack with viruses and then blackmail their victims. In this subchapter, cases have been considered when the possibilities of crypto currency are used for bad purposes, because the possibilities that give the crypto currency are very huge and in bad hands they can do much harm.

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<sup>55</sup>Kaspersky lab "From crypto currency mining to Ddoc attacks: the new multi-featured Trojan loapi discovered" [https://www.kaspersky.com/about/press-releases/2017\\_new-multi-featured-mobile-trojan-loapi-discovered](https://www.kaspersky.com/about/press-releases/2017_new-multi-featured-mobile-trojan-loapi-discovered) 9 may 2018y.

<sup>56</sup>Quora "What is a Bitcoin mining virus and how does it hide itself" <https://www.quora.com/What-is-a-bitcoin-mining-virus-and-how-does-it-hide-itself> 9 may 2018y.

### 3. PERSPECTIVES OF CRYPTO-CURRENCIES

At this part of research work will be considered all perspectives of crypto-currencies. All conclusions will be made according to interviews. In this work, the method of interview was used because the topic related to crypto-currencies is quite new and people who understand what is crypt-currencies and how do they work are few. And method of interview is very helpful because during interview it is possible to ask additional questions which may be very useful for research work. People who have been interviewed are well versed in the topic of crypto-currencies and in the Blockchain. In total, people who agreed to give an interview were 5<sup>57</sup> (i). And the rest were either very busy or they did not want to give an interview.

First person who was interviewed is Jānis Zaltāns. His age is 26. This person ended Latvian University in field of international economy and commercial diplomacy. Now he works at company Digiplus. Digiplus is one of the first companies in Latvia which start to make sales of tokens. Those tokens called Digiplus tokens and those tokens are arise because of creation of Digital safety boxes which are tracking persons activity and in case of persons death all data of that person passes to his relatives or to friends. Jānis Zaltāns is following for crypto-currencies since 2013 year. Preferred crypto-currency is Ethereum

Second person who was interviewed is Jana Kosova. Her age is 30. Nowadays she works as account manager at online gaming company. This person is following for crypto-currencies from 2016 year. Preferred crypto-currency is Bitcoin

Third person who agreed to give an interview is Bakhtiyor Mirzoev. His age is 23. Currently works in finances field in Ipoteka bank in Tashkent, Uzbekistan. This person visited Latvia for tourism proposes. He is following for crypto-currencies from 2016 year. Preferred crypto-currency is Bitcoin.

Fourth person who was interviewed is Lienite Sarova. Her age is 39. Nowadays she works as a manager of the shop which sales clothes. This shop has own home web site where it is

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<sup>57</sup> (i) Due to sensitive information which were in interviews author were under limitations and it weren't possible to upload interviews on internet. But interviews recorded and available.

possible to buy clothes online. Lienite Sarova is following for crypto-currencies from 2016 year. Preferred crypto-currency is Bitcoin

Fifth person who agreed to give an interview is Daniela Dumbrovska. Her age is 25. She is from Serbia but currently works as promotion specialist in IT Company in Riga, Latvia. This person in Latvia because of contract sharing program which she has got because of work. Daniela Dumbrovska is following for crypto-currencies from 2015 year. Preferred crypto-currencies are Bitcoin and Ethereum

### 3.1. THE WAYS OF USING CRYPTO-CURRENCIES

Crypto-currencies nowadays become very popular and the ways of using them also explores. Each way of using crypto currency is unique. Crypto currency is essentially is a way of paying, exchanging money for goods. But because of the huge opportunities that crypto-currency and blockchain technology give, it is possible to use not only as a method of payment. From all interviews it is possible to mention 4 ways of using crypto-currencies: usage as investments; usage as payment; trading on stock exchange markets; possibilities to implement crypto-currencies into business. It is time to sort out in each way of using crypto-currencies separately.

#### **Crypto-currencies as an investments.**

Such way of using crypto-currencies possibly the worst case how crypto-currencies might be used according to words of Jānis Zaltāns. Because this way of using crypto-currencies is the simplest way and person who does that is not feeling all possibilities of crypto-currencies. But still one of the most popular investment sectors at the moment is investment in crypto-currencies. Popular crypto-currencies are growing in price. It happens that the cost drops sharply, but after a while it increases several times. If to go to the right approach to investing, it can be easy to get income by playing only on the difference in the rate. The success of investment in crypto currency depends on the correct choice of crypt-currency. It is important to use a profitable crypto currency, which will not lead to losses. For choosing crypto-currencies for investment it is necessary to sort out in following things: Popularity. It should

be find out how much the crypto currency is common among users. Great interest, availability on exchanges, rising costs - all this indicates the popularity of crypto-currencies; Mobility. Chosen crypto-currency could easily move; Security. A good crypto currency should be protected from scammers. Many modern crypto-currencies have such characteristics. Following crypto-currencies are the most popular for investments: Bitcoin (BTC). The most valuable for investors is the crypto currency. It has existed for 8 years. Bitcoins are safe, mobile and popular. Recently, their cost has greatly increased; Ethereum (ETH). The second most popular and in demand among investors. Investments in Bitcoin and Ethereum make up a large share in the total volume of investments in the crypto currency. Litecoin (LTC). A stable currency, which can become an excellent asset for investors. The rate is not subject to sharp fluctuations.

Crypto-currencies as any assets have their own risks in investment. Following risks are the main in terms of investment in crypto-currencies: There is a risk of losing investments due to a sharp decline in the cost of the crypto currency. Here a lot depends on the investor's foresight and his ability not to panic. In many countries, the rules governing the circulation of the crypto currency have not been adopted. Person cannot pay taxes on income. This could make troubles for investors. In addition, there are countries in which crypto-currencies are banned. Despite some risks, many advanced users are interested in investing in crypto-currency. This is a great chance to make good money in case if investor sots out in sphere of crypto-currencies.

### **Crypto-currencies as a payment.**

During the interview with Lienite Sarova, she mentioned that she made payments using crypto-currency Bitcoin and Lienite was surprised that it was very easy and it gave her possibilities to save money on commissions. In subchapter 2.3 it is fully described all great possibilities which blockchain gives. One of the main points was that by using blockchain people can save money on transactions because banks double charges their customers: first commission would be charged from the buyer's bank and second commission charges seller's bank. Usually commissions which charge banks are a way bigger than commission which charges technology of blockchain. Bitcoin will become a successful world currency only when people will use it as a traditional currency, for which person could buy anything. Fortunately, recently there are many places where it is possible to make payments with Bitcoins. It is often more profitable to pay for goods by Bitcoins than with traditional

currencies. In addition, many shops give additional discounts when person paying by crypto-currency. After a partnership with BitPay, Microsoft added bitcoin as a way to pay for various digital content, including mobile, as well as payment for games and Xbox subscriptions. Overstock, a giant retailer, was one of the first to start accepting Bitcoin payments in partnership with Coinbase. Since November 2013 in Canada, and now in 107 countries around the world, Overstock can buy clothes, shoes, household goods, baby clothes, electronics, household goods, jewelry, watches and much more. Branded goods of famous brands can be bought at a discount of 60-80%, in addition, the goods are manufactured and commissioned by the company. Delivery of goods is available all around the world.<sup>58</sup> Dell Corporation, the largest manufacturer of personal computers and server hardware, last year announced the possibility of paying for purchases of crypto-currency on Dell.com and offered a discount of 10% on all products for customers who spend Bitcoin. In June 2014, Expedia - a worldwide integrator of tourism services - contributed to the recognition of the advantages of crypto currency with the application for Bitcoins, increasing the opportunities for the whole tourist business.<sup>59</sup> Travel by air, by rail and bus, car and hotel reservation, payment for accommodation in hotels - all this added to the already familiar orders of electronic devices and clothes which is possible to buy by internet. From all that it is possible to say that payments in Bitcoins become more and more attractive for people than payments in traditional currencies.

### **Usage of crypto-currencies on stock exchange market.**

Almost all interviewed people told that one of the main ways of using crypto-currencies is trading. In this part of subchapter would be described the ways of trading on stock exchange market. As an example would be used crypto-currency Bitcoin. The profit received during the trade, expressed in hundreds of percent attracts professional traders. The excitement around the crypto-exchange is only warming up the growth rate Bitcoin. In one year only, in 2017, it has grown ten times. Too many perspectives conceal trading with crypto-currency in order to be content with a single transaction. Everyone who trades is trying to improve his reputation in order to stay in business as long as possible. If person do not want to take risk for personal transaction, then for safer trading it is better to use a trusted exchanger. After registering on the exchange, a person becomes a full participant in it and gets the opportunity

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<sup>58</sup>Coindesk “what can you buy for Bitcoins” <https://www.coindesk.com/information/what-can-you-buy-with-bitcoins/> 13 may 2018y.

<sup>59</sup>Coinbase “where I can spend bitcoin?” <https://support.coinbase.com/customer/portal/articles/1834716-where-can-i-spend-bitcoins-> may 13 2018y.

to acquire a crypto currency, exchange their resources at a favorable rate. To develop a successful trading strategy, it is important to anticipate all sorts of risks. Only their control will save money on crypto-exchange. Because too much depends on the ability of person to handle money. Even losses on the exchange commission have to be taken into account. In general, the crypto-exchange market can be compared with the currency market. They share such common features as the existence of the concept of a currency pair, the absence of a single online aggregator and direct regulation. The largest capitalization of electronic currency is provided by Bitcoin. His couples with any altcoins are very popular. An important consequence of diversification in experienced players is the habit of withdrawing purchased assets to an electronic wallets. This negates the possibility of collapse of the crypto-exchange. Many of them make reserves in anticipation of the electronic revolution. However, the role of diversification is exaggerated. The movement of thousands of crypto-currencies cannot be delayed. The growth or decline of the exchange rate hardly depends on single stocks. However, the element of unpredictability still inspires traders to create an investment portfolio. Traders hope that some of the cryptonyms will become the new Ethereum or new Bitcoin. Also what is important is to find reliable crypto-exchange market, because nowadays cases of fraud happen a lot. Summarizing all of the above, it is possible to distinguish four pillars of a successful trading strategy. This is the need for risk diversification, their constant monitoring, financial management, as well as an emphasis on safety.

### **ICO in business.**

During interview with Jānis Zaltāns it was noticed that his company Digiplus works on basis of ICO. And almost all people who were interviewed told that one of the ways of using crypto-currencies is implementing them into business. ICO is the issue of any project coupons, or tokens, intended to pay for the services of the site in the future - in the form of a crypto currency. In this case, unlike IPO, currency buyers do not receive a stake in the company and cannot influence internal management decisions. In fact the ICO is another realization of the crowdfunding model when the participants give financial support for the company now in order to get some profits from it in the future. For example, for Digplus project tokens, it is possible to buy a certain amount of disk space in Digiplus or increase the bandwidth of the channel. Person can also earn tokens by giving a lease on a certain space on his hard drive. By issuing their own "money" and exchanging them for one of the common crypto-currencies (such as Bitcoin or Ethereum) or even for real currencies (dollars, euros), the project can secure the financing necessary for launching or development. In addition,

issuing currency for the project, person who is in charge can accelerate its development (as the introduction of money in ancient times increased trade turnover) and automatically solve the problem of future monetization. By purchasing tokens issued by the project, investors expect: Get the benefit of reselling the tokens at a higher price in the future (assuming they will be in high demand); investors could use coupons in the future, having received (as expected) services at a lower price; To support an interesting project for investors. There are absolutely no laws governing the conduct of the ICO - in any country in the world. ICO by the buyer's side is a transaction based on trust. As in case of any kind of crowdfunding project ICO may not survive to the stage of product appearance or after appearance can become a completely disappointment for investors. Finally some enterprising cheaters can simply deceive investors by conducting an ICO for a project they did not intend to develop. Because of that every project based on ICO should: prove to potential investors the validity of the ICO and the soundness of issuing their own crypto currency; disclose plans for the development of the project and conduct an open dialogue with potential investors; implement a test version of its own protocol before ICO; provide the possibility of direct "extraction" of currency to involve new users and provide the network with the necessary resources for processing transactions; go to the ICO with a clear understanding of how much startup is need to collect; the founding team must own between 10% and 50% of all tokens and should not exchange them during the first three years of operation. Some projects that conduct ICO involve a third party - a kind of arbitrators who can rely on investor confidence, acting as an intermediary between them and projects. Others form legal entities and associate themselves with restrictions on the possibilities of spending funds received through the ICO. A good point for attracting investors is also the disclosure of the personalities of project's key participants (at least a part of them as a rule they are active participants of the crypto-currency community), and none of any significant ICO is complete without a published description of the idea, business plan for the project development and publication of expert evaluations. Startups create a project. Previously, they came to a venture capitalist, who entered the fixed capital and became a co-owner or co-founder. Tokens went the other way. They collect from the people. The people who believe in this project. After the release of the token on the exchanges, its price is composed of the laws of supply and demand. The more people want to invest in a project, the more rapidly its price rises. If person get lucky to have time to be the first to buy cheaper, then in a few months he can sell more, having received benefits in hundreds of percent. The most successful ICO project is Ethereum, a platform for creating decentralized online services that operate on the basis of smart contracts. These are

documents that verify the reliability of the implementation of contracts themselves and fulfill their obligations. ICO started in 2014 and collected at that time \$ 18 million. Sold tokens (Ethereums) became a new currency, which ranked second after Bitcoin by fame. The first units of the air were sold at a price of 0.3-0.4 dollars.<sup>60</sup> Inside its own system, the token can be almost anything. It all depends on what the developer puts into them. Often tokens are something in between stocks, domestic currency and unit of account. Typically, tokens are classified into three main properties: equity tokens - represent the management shares of the company. With the help of this variety, investors can influence the development of the project, and even vote for closing the system with the return of deposits; utility tokens - have value exclusively within the online platform. For example: tokens can be credited, as a reputation, scores for certain actions in the developed social network; to replace the game currency in online games; asset-backed tokens - digital obligations for real products or providing access to a platform for the use of the company's products and services. Such a token can be compared with a receipt that one day investors will receive any manufactured goods, or it can become a key to the developed program. The easiest way to get tokens is to find the site of the ICO investors are interested in on the Internet and buy them there. This choice is accompanied by a great risk: it's easy to stumble on scammers, even if investors thoroughly study all the documentation provided by the developer. A slightly more reliable option is the ICO-token exchange. These are aggregator sites, through which investors can buy and sell tokens of developers, verified by the administration of this site. It should be taken into account that there is still no uniform ICO regulation standard, and therefore each site has its own rules. The safest, but not necessarily beneficial way to get tokens is to get it for free. Bonus programs bounty - many developers pay to their users tokens to popularize their product. For example, decentralized video hosting pays tokens for uploading new videos, attracting new bloggers to their site in this way. Most often these are the simplest requirements to join groups in social networks and make reposts. Also with the bounty programs are special sites, called Bitcoin faucet. These are advertising platforms that were created to popularize the crypto industry, and for the performance of certain actions or tasks, person can get a number of tokens. For example, person needs to read the information about the developed crypto-currency and then answer a couple of questions. For the task is issued several tokens of the same currency. Sometimes it's enough just to see the advertisement and get a reward. Usually this way is given a small number of not popular tokens. The basic rules

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<sup>60</sup>Blockgeeks “what is Ethereum?” <https://blockgeeks.com/guides/ethereum/> 14 may 2018y.

which product will produce the company do not exist. If the creators of startup can attract investments, they can even produce a stylish bottle of water. But according to the original concept, the final product of ICO startup is based on blockchain technologies or uses them in its product. Almost all startups follow this tradition.

### 3.2. THE WAYS OF REGULATION CRYPTO-CURRENCIES

During the all interviews it was noticed that all participants told that regulation of crypto-currencies is possible but it is very difficult. And main idea of people who gave interview is that governmental institutions should generate laws which will help in regulation of crypto-currencies. The law on the crypto currency was long overdue, because the development of this financial industry is active in the world which has been ignored for a long time. And in the legalization of this financial unit, first of all, the state should be interested, because it is influenced by the appearance of a number of currencies that cannot be controlled or otherwise regulated. The international organization FATF nowadays willing to generate laws which will help in problem of regulation crypto-currencies. FATF - a group that fights money laundering and Bitcoins with other virtual financial units are often implicated in criminal acts of a financial nature.<sup>61</sup> Participants of this international organization are leading countries. The laws which would regulate crypto-currencies should solve following tasks: one of the key characteristics of crypto-currencies is their decentralization and anonymity. This is a risk for the illegal operation of the blockchain technology. Because of the legalization of crypto-currencies the country which legalized them can at least partially control what will happen to the money and close them from the influence of the black market; the second task of the law is in determining the legal status of the crypto-currencies. So far, from the legal point of view, Bitcoin has no legal status, and therefore there is no legal basis for control. This means that it is unclear what status this coin will receive and all other crypto-currencies that appeared after it, but there are several reasonable options. In particular most countries in the world want to equate crypto-currencies with a financial asset, which allows using it only for participants of a regulated exchange operating with the Central Bank. In other words, free circulation of the crypto-currency will be banned, and individuals will not be able to use their

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<sup>61</sup>FATF “who we are” <http://www.fatf-gafi.org/about/> 15 may 2018y.

assets, which will significantly slow the development of the market; the third task, connected with the adoption of the law on crypto-currencies, is the protection of market participants. Nowadays the use of Bitcoins is a very risky process, which can end badly for everyone who makes transactions. No one controls transactions in the network, because many scammers appear. Of course transactions are anonymous but if there is a theft, no one can punish the attackers. The same applies to exchanges, where many users keep their wallets with crypto-currencies. If something happens to them to return money or to receive compensation for them from the owner of the resource is impossible, since there is no such item in the legislation; the fourth task is to create a springboard for licensing and taxation of crypto-currencies. Today, no one in the country pays taxes on the funds received in this way. This deprives the budget of a decent income. In addition nowadays it is believed that the use of crypto-currencies is illegal and is associated with financial fraud, which makes the risk of mining or purchase of crypto-currencies quite high; the last task is to create a regulated platform for digital business. But now only few people understand what it should look like and what it's like to be.

There are many countries in the world which have conservative opinion about crypto-currencies. According to this opinion only those currencies that have the support of banks are legitimate, and the finances of the digital format cannot be considered real and continue neither ignored neither negatively perceived. Naturally, this does not have a very positive effect on the overall situation in relation to the crypto-currencies and the mood of people that are involved in using such type of currencies. Following criteria will help to understand what is the conservative position in relation to the crypto-currencies field: Bitcoins and other crypto-currencies are considered as a serious threat to the security of the country's economic and financial sector. This is a tool for intruders, criminals, drug addicts, and other bad people; Complete and unconditional prohibition of crypto-currencies on the territory of the country. Such attempts have even been made, but only the law that promoted such a position, did not find sufficient support in the world; compares crypto-currencies with a financial pyramid, from which many people suffered. Despite all the prejudices towards Bitcoins, sooner or later countries with conservative opinion will have to admit it. It is worth saying at once that the difficulties cannot be avoided, because it is difficult in a few months to rebuild a system that has worked for decades. Here are considerations about what the future difficulties are, and how they can be circumvented: the readiness of the financial system for such a phenomenon as the crypto-currency. Of course many people have heard that it exists and perhaps even

collided with it, but it is worth acknowledging that most of the population of the world which has never used Bitcoins and other crypto-currencies. Naturally, they do not know how to conduct transactions, what it takes to become the owner of coins and how to protect himself from theft in virtual space. Now there is a lot of information where experts explain every step of working with crypto-currencies, but to master it all it will take time. So do not interfere with special programs that clarify what crypto-currencies are and how to behave with them; also, in the law it is necessary to specify that it is necessary to regulate the so-called control points. The new status of coins implies a new attitude to currency exchange and work with other finances. In particular, this applies to special exchanges and exchangers that work with crypto-currencies. The main attention should be paid to exchanges that are professional tools for trading crypto-currencies, and after the adoption of the law on crypto-currency will be able to legally work with these financial units on the same grounds as in the foreign exchange market; the problem of taxes will also be acute as never before.. Perhaps, many will not agree with this, but now taxes will have to be paid even for the income that the user receives due to the currency exchange rate fluctuations; this is very important, given that the crypto-currencies grow in price very quick. To correctly calculate the tax on each Bitcoin holder, it is likely to be regulated by the exchanges where most transactions take place. But the control of transactions in the blockchain network, due to their anonymity, will be more difficult to tax, if it ever happens; another problem that may arise who will be allowed to engage in mining. As a rule it seems that only professionals will be allowed to mining. Most likely, ordinary people will be removed from mining as a way of earning.

Problem with miners could be more difficult than it seems. But how to control the miners, if it's anonymous and miners should be tracked and taxed. These problems can be solved with the help of a special register of miners. This register will be able to include both entrepreneurs and legal entities engaged in mining. And if an individual agrees to be included in the register, then it will also be able to engage in the extraction of the crypto-currencies legally. Taxes are not quite the right solution for miners, because, in fact, they do not earn, but support the blockchain network, and this may hide a loophole in order to hide from taxation. Miners play very important role in blockchain, because they create new blocks in system. That's why this field should be attractive for them and taxes shouldn't be scary.

Regulation of crypto-currencies is not enough. There should be regulation of ICO. ICO regulation provides for the initial placement of coins exclusively on special sites, and not

where anyone wants. To become an exchange that can place tokens, it is necessary to meet a certain list of criteria. In particular, it is important that the site is not just good working conditions or its reputation meets the requirements, but also that the exchange can provide specialists who monitor promising projects, and did not allow questionable tokens-pacifiers that can burst at any time. Another point of regulation is the involvement of only proven professionals who understand the essence of crypto-currency and how to work with it. Unskilled investors can cause a collapse in the industry, which means that all measures will be useless. The size of their investments should be limited with a relatively small amount. Because of the situation around crypto-currencies investments should be reasonable. Government shouldn't limit the work of everyone who wants to use the ICO in own startups. In fact, it is an easy investment. If it ceases to be so, then it is no longer necessary, including its regulation.

Nowadays crypto-currencies' regulations already happening in some countries. Although the use of crypto-currencies in Japan is developing at a fast pace, it cannot be called liberal in terms of regulation; it simply wins the race by attracting the best of the Asian crypto industry, while China and South Korea are creating a hostile or uncertain environment. Undoubtedly, the attitude of the Japanese government to crypto-currency is much friendlier than its Asian neighbours. On the other hand, the enthusiasm of the Japanese may be slightly subsided due to the recent events. The January attack on the Japanese stock exchange Coincheck, which lost \$ 530 equivalent, caused a negative reaction of the community and attracted the attention of the financial services Agency.<sup>62</sup> Despite a number of serious cyber-attacks on large crypto-exchanges, Japan continues to attract capital to promote crypto-currencies and seeks to take a leading position in this market.

Despite the fact that thanks to Brexit in March 2019, the UK and the European Union should part, in relation to the regulation of crypto-currencies their views coincide. The European Union plans to introduce requirements according to which crypto-currency platforms will have to carry out a comprehensive check of their clients and report suspicious transactions. The UK Treasury Department has similar plans although clarifies that there is currently very little evidence that crypto-currencies are used for money laundering although this risk is expected to grow. Calls for more regulation of the crypto currency reflected in the whole of

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<sup>62</sup> News BTC "Japan creates regulatory body to prevent cryptocurrency exchange hacks"  
<https://www.newsbtc.com/2018/03/09/315127/> 15 may 2018y.

Europe. France announced the creation of a working group on the regulation of crypto-currencies, and a representative of the Germany called for the regulation of digital currencies on a global scale.<sup>63</sup> According to this EU and United Kingdom are planning to regulate crypto-currencies. Emphasis will be placed on preventing the use of crypto-currencies for money laundering and other illegal financial transactions.

Nowadays there is no single approach to crypto-currency regulation in the United States. The US Securities and Exchange Commission warned investors about the risks associated with investing in the crypto-currencies, banned some ICOs, and hinted at the need for more extensive regulation of crypto-currencies. The commodity futures trading commission was the first American regulator to allow public trading of crypto-currency derivatives. US Treasury Secretary Steven Mnuchin (Steve Mnuchin) clearly identified the priority of the Fiat currency over crypto-currencies. During a meeting of the Washington Economic club on January 12, 2018, he said that he and other regulators suggest the possibility of using crypto-currency for money laundering. He also said that the Council for supervision of financial stability of the United States has formed a working group to study the crypto-currency market. According to the Steve Mnuchin, first of all he wants to be sure that crypto-currencies are not used for illegal activities.<sup>64</sup> The relationship with crypto-currency is governed not only by Federal law, but also by state law. Crypto-currency activities are subject to licensing if such a requirement is established directly by the state.

China is taking more and more measures to prevent the spread of the use of crypto-currencies. After the ICO ban, the country's government ordered banks to freeze accounts associated with crypto-currency exchanges and imposed a ban on Internet access to everything somehow related to crypto-currency trading. After that, once the world's largest Chinese crypto-currency exchanges lost most of their turnover and were forced to change jurisdiction, and miners also began to look for opportunities to move. Thus, the PRC has turned out to be the strictest regulator of crypto-currencies.<sup>65</sup> This is a strange turn of events, because in 2017, Chinese Bitcoin miners accounted for more than 70% of all the world's

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<sup>63</sup> **The Guardian** "EU finance head: we will regulate bitcoin if risks are not tackled"  
<https://www.theguardian.com/technology/2018/feb/26/eu-finance-head-regulate-bitcoin-cryptocurrencies-risks> 15 may 2018y.

<sup>64</sup> **CNBC** "Your guide to cryptocurrency regulations around the world and where they are headed"  
<https://www.cnbc.com/2018/03/27/a-complete-guide-to-cyprocurrency-regulations-around-the-world.html> 16 may 2018y.

<sup>65</sup> **CCN** "China Will Move Slowly to Regulate Cryptocurrency: Central Bank Governor"  
<https://www.ccn.com/china-will-move-slowly-to-regulate-crypto-central-bank-governor-says/> 16 may 2018y.

miners, and the popularization of the crypto currency in China was at a speed much ahead of other countries. Most likely, the strict measures of the Chinese government are related to the orientation of the country to fight the outflow of capital and corruption.

Known for its progressive attitude to the banking sector, Switzerland's point of view in the regulation of crypto-currencies is positive. This Western European country is significantly different from the EU countries and demonstrates an open attitude to the crypto-currency industry. The country's economy Minister recently said that he would like Switzerland to become a "crypto-state", and the Secretary of state of the Ministry of Finance wants the ICO to flourish.<sup>66</sup> Switzerland has established a working group aimed at "strengthening legal certainty, maintaining the unity of the financial center and ensuring technology-neutral regulation of crypto-currencies and ICO". The use of crypto-currencies for the purchase of goods and payment for services, as well as the acceptance of crypto-currencies as a means of payment do not require the receipt of any license.

There are a lot of attitudes towards crypto-currencies and ways of their regulation and they depend on the conservatism of the country. But the fact that countries are already trying to regulate crypto-currencies is a fact. Laws on crypto-currency regulation should be created because today access to money laundering through the use of crypto-currencies exists and this must be fought. And on the example of China, it is clearly seen that if government too toughen the laws related to the regulation of crypto-currencies people who earn money using crypto-currencies just start looking for opportunities to continue to engage in crypto-currencies but in another country.

### 3.3. PREFERENCES OF INVESTORS IN CRYPTO-CURRENCIES THAN ASSETS

Almost all participants of interview told that they would prefer to invest money in crypto-currencies rather than assets. Jana Kosova and Lienite Sarova already tried to invest in crypto-currencies and both of them already earned money from it. Jana Kosova didn't want to tell

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<sup>66</sup>Financial Times "Switzerland sets out guidelines to support initial coin offerings"  
<https://www.ft.com/content/52820f90-1307-11e8-940e-08320fc2a277> 16 may 2018y.

how much she earned but told that she bought Bitcoins. Lienite Sarova was more open-minded and told that in 2016 year she bought 3.5 Bitcoins and spent 3,500 euro for all of it and when prices for Bitcoins jumped up in summer 2017 she sold 3 of it. She got lucky to find trustable web site where price for 1 Bitcoin was 21,000 euro. Those people told that they 100% sure that they will invest their money into crypto-currencies because they got good experience. Daniela Dumbrovska before investing money to Ethereum thought that it will be more stable if she would invest in assets but her attracted crypto-currencies because for profit which she would make she doesn't have to pay taxes. And that's why she would prefer to invest money into crypto-currencies. Bakhtiyor Mirzoev wasn't sure what way of investing money would be better assets rather than crypto-currencies or invest money into crypto-currencies rather than assets. He told that if he would want stability he would invest money into assets but if he would mind to take some risks he will invest into crypto-currencies. Jānis Zaltāns told that he would invest definitely into assets but he clarified that there exists tokens of different ICO's and one type of them are assets type tokens (equity tokens) and he would invest in such kind of assets. Almost all people who gave interview told that it is risky to invest money into crypto-currencies. In conditions when there is no legislative regulation almost completely, there are always risks of a complete prohibition of crypto-currency. Or a partial ban, as happened with crypto-exchanges in China. Then there is the risk of a sharp decline in demand for the asset with a further drop in its price. There is also the risk of strong crypto-currency regulation, which can increase costs openness in other words, and deprive this market of its current advantages which will also lead to a decline in demand and the price of the crypto-currency. There are risks of hacker attacks, failures when the price of currency can also fall, you can lose access to your crypto funds. There are risks of a new financial hype where investors will rush from the crypto currency, which can also collapse its price. Despite all of risks almost all people who gave interview prefer to invest in crypto-currencies rather than assets. But there are also positive sides exist. The main advantage of the crypto-currency is of course that they have real value and it can be sold at any time through exchangers, exchange market or directly to someone who is willing to buy but afraid to fall into the clutches of a scammer. Another advantage of investing in crypto-currencies is that the main ones (Bitcoin, Ethereum and others) cannot practically be completely depreciated, that means that their scams are unlikely to happen. Investors might be attracted by lack of taxes. They shouldn't pay money from profit which they could get by investing in crypto-currencies. All this positive sides for investors look stronger and they prefer to invest in crypto-currencies.

### 3.4. POSITIVE AND NEGATIVE SIDES OF CRYPTO-CURRENCIES

This subchapter is very important, because it will explore all sides of crypto-currencies. And this subchapter will make general conclusions from interviews. According the interviews it is possible to say that crypto-currencies have a number of important advantages over traditional money and popular financial and physical assets. The fact is that crypto-currencies solve numerous problems associated with the centralized nature of paper currencies and other instruments. There is almost no inflation in the crypto-currency world. However, to some extent, it is still present, because it is necessary for financial stimulation of miners, who are mining blocks. The most important thing here is that the rate of inflation is known and no one is hiding. In the case of the banking system, the rate of inflation is unknown, and Central banks can print any amount of money without the consent of the population. This is one of the main reasons why crypto-currencies are getting more and more supporters. The emission of almost all crypto-currencies is limited their emission maximum is strictly set. No one can turn on the printing press and print money to solve the economic problems, the process of issuing new crypto-currencies is transparent and strictly regulated. A crypto-currency remittance knows no bounds. Being geographically in Thailand, person can work for an American company. In this case, getting money from another country can be very difficult. But now there is no such problem: crypto-currencies do not recognize borders and can be transferred from point A to point b in a matter of seconds. Daniela Dumbrovska already felt this advantage of crypto-currencies. As it is known already she works in Latvia but originally she come from Serbia and when she is trying to send money to her parents which located in Serbia she have got a lot of problems. The main problem which she have got is that money transferring took a lot of time and her parents were wait for couple of days to get money which she transfer. But when she tried to transfer crypto-currencies there weren't any problems or even difficulties. And another big point here is that by transferring crypto-currencies commission for transfer is a way less than money transfers. As she argues that banking system should be replaced by blockchain because transfer via banks is almost always double charging. First commission she pays for Latvian Bank and second time she pays commission for Serbian bank. When person make a transaction, person does not disclose personal data. When paying with a card on the Internet, people have to enter its number and

secret code, hoping that the site is protected from hacking, and we will not lose our money. Paying for goods and services with Bitcoins, person does not enter any personal data with two codes. The idea of the crypto-currency was to create a method of payment, beyond the control of the state, completely anonymous, carried out quickly and with minimal fees. It is absolutely transparent. With some amendments, it happened. No Bitcoin or other digital money has no Central repository. The wallet consists of two long numbers. One is open to everyone, the other is secret. No names, registration details and passport number are required. The identifiers for accepting money can be changed for each transaction, so anonymity is ensured. All transactions are subject to accounting, and any user can get information about when and how many units of crypto-currency were sent and received. However, who and from whom they were made, will not be able to learn. This transparent system ensures the impossibility of repeated charges or charges. Bitcoin has no owner, and the identity of its Creator is still questionable. Crypto-currency is beyond the control of governments and Central Banks. It is not tied to any country in the world and is available to all users of the World Wide Web. People are the free owner of their wallet, which cannot be blocked. This means, among other things that in case of default monetary reform or for any other reason funds of users will not be affected. Crypto-currencies cannot be faked because it has no physical incarnation and transaction history is available to all users.

Also almost all people who gave interview mentioned that ICO gives big advantages for people with great ideas but without capital. A huge advantage is the ability to buy tokens at a low price. In case of a successful project, they will be presented for trading on crypto-currency exchanges, and traders will be able to make significant profits. From the perspective of speculative trading, ICO is what everyone may want to participate. Also the ICO concept means that people can help shape the future of this entire ecosystem. There is a wide range of different projects to raise funds through ICO, and each individual project aims to bring something new to the space of crypto-technologies. And investors just help to publish these projects. In addition, the advantage is transparency. That is, the investor can check how the funds are spent after the ICO. It also allows these investors to use the token to access any platforms or features that developers will create in the future. For the creators of the project, the advantages are that the ICO is much cheaper than the IPO, and requires much less documentation. In addition, this is an excellent marketing move, and with the help of tokens, entrepreneurs have the opportunity to open their project to a global audience, which will allow them to attract funds from investors around the world.

Negative side of crypto-currencies are still enough. The main argument against the crypto-currencies is the fact that this currency is not confirmed. However, gold, which served as a prototype of crypto-currency, is also not confirmed. The value of Bitcoin is determined by the supply and demand, as well as the presence of sellers willing to exchange their goods for Bitcoins. So far, there are few such sellers, and between supply and demand periodically develops a large imbalance. Also it creates instability in rate of crypto-currencies. As mentioned Lienite Sarova she was thinking a lot before buy something for crypto-currencies. She gave example that if she today will buy t-shirt which cost 10 euro for Bitcoin then tomorrow price for Bitcoin might jump up and she will recognize that she spent much more than 10 euro. And she was disappointed when she spent Bitcoins and on the next day price for Bitcoin rapidly increased. Other negative sides of crypto-currencies might be related not to directly crypto-currencies but also to “fool” people according to words Jānis Zaltāns. It is not possible to return an already sent payment. People should carefully check the recipient's data or keep the mnemonic code. If the key to the wallet is forgotten or lost, all digital savings will be lost with it. It is not possible to restore the content. Therefore, people need to be very careful and keep the digital key in a safe and secure place. Where the sender and recipient of the payment are completely anonymous, a favourable environment for criminal activity arises. Bitcoin is used to buy illegal substances and drugs on the Internet, as well as to finance more serious crimes. Because of this, Bitcoin has a scandalous reputation, which makes it difficult to recognize it at the state level. It is banned in some countries, called tools for speculation and surrogates in others, trying to put under state control and so on. It is possible to lose Bitcoins due to hackers. In a virtual environment is not complete without virtual criminals whose actions cause quite real damage. Hackers break into exchanges of crypto-currencies. Internet scammers use various scripts and schemes to lure Bitcoins from users. Users themselves are not careful enough in storing their crypto-keys, lose, forget and lose in the casino. As it mentioned earlier except instability of crypto-currencies other negative sides of crypto-currencies more related to fool people than directly to crypto-currencies.

ICO also has its own negative sides. While ICO is developing, there are many risks for potential investors. First, it is the risk of fraud or just a failed project. Sometimes investors buy startup tokens, the business model of which may not be ready. In most cases, the team has only some part of the code to show what the project will look like. But there is no guarantee that these projects will be completed and, especially, will be successful. The

potential risks associated with the project are extremely difficult to calculate. If, however, something goes wrong, for example, in the case of fraud or hacker attacks, then there is another problem. ICO is not regulated and is not registered, so investors' invested funds may not be reimbursed. In addition, there is no clear pricing mechanism that can lead to the revaluation of the project and tokens.

Crypto-currencies have many positive sides which could give them possibilities to development. Negative sides also enough but mainly they are related to fool people. Because it is impossible to blame currency if thugs doing crime using them. For example drug addicted people could buy drugs using cash EUR. Despite the fact that using cash is also gives anonymity no one blaming EUR cash for those transactions. The next negative side of crypto-currencies is that if keys from crypto-wallet will be lost then it is impossible to enter into crypto-wallet. It is impossible to blame crypto-currencies for that. Mainly in such situation people's fault if they lost keys from crypto-wallet. Because they should be responsible for their own money. The same situation with negative side when people send money to wrong account and they cannot get their money back. Despite all negative sides crypto-currencies still exist.

## CONCLUSIONS AND RECOMMENDATIONS

Until now, it was possible to perceive not a serious crypto-currency boom or ignore it, if it was not interesting for some part of world's society. But as the impact of crypto-currencies spread from Bitcoin to other crypto-currencies, companies that emphasize their connection with the crypto-currency industry from them, and they begin to invest resources in the real economy, it is possible to notice how crypto-currencies begin to influence the real world. Almost all crypto-currencies work on basis of blockchain technology. Which gives to their users great advantages and makes crypto-currencies very attractive. But technology of blockchain could be implemented not only in crypto-currencies, but also it could improve banking system which is already happening.

Following conclusions are based on all materials from bachelor thesis:

1. The international financial market plays an important role in development of world economy. The international financial market collects and redistributes temporarily free financial resources and doesn't allow being deficit of any kind financial resources.
2. Virtual money plays important role in society. Virtual money is good in field of small payments. Virtual money has weak security issues and could be easily hacked by thugs. Also virtual money is expensive to transfer because of double charging.
3. Blockchain is place in virtual reality where everybody could put any data being sure that this data secured and no one else could reach that data except the person who has keys of hashing. Blockchain consist of blocks. Each block consists of many hashed data. And to generate a new blocks requires significant computing power. For stimulation of society to creation of a new block system gives reward in terms of crypto-currency and this action called mining.
4. The Longfin Mania's experience demonstrated that international financial markets want more supply of companies which related to crypto-currencies. Based on that all important players in financial markets started to pay big attention on crypto-currencies. Those actions served for crypto-currencies as a promotion.
5. The way which passed Bitcoin demonstrates how crypto-currency which has strong security, decentralization, anonymity and low exploitation costs could reach success.
6. Blockchain technology could improve banking system by using tokens in it. Tokenization of securities will increase the volume of investments in them, optimize

management efficiency, liquidity of assets in the process of their storage or transfer. Banks have a good level of capitalization, extensive branch and partner networks, built infrastructure, experience in ensuring the security of transactions. All these attributes are present in the developing crypto-currency market. Illiquid or complex asset classes can be transformed into intellectual assets, and investors can benefit from it. The implementation of blockchain into banking system will give huge advantages. Company IBM already working in this field.

7. Anonymity of crypto-currencies attracts many thug people to buy illegal things for crypto-currencies. The experience of SilkRoad and AlphaBay demonstrated how big could be harm of crypto-currencies if they would be used in bad intentions.
8. Regulations of crypto-currencies are very important and it is possible. Conservatism of the country plays important role in regulation of crypto-currencies. Part of conservative countries ignoring crypto-currencies or even banning them. Both of these attitudes are wrong. Example of China's attitude toward crypto-currencies demonstrated that if government banning crypto-currencies then part of society which earn money making actions related to crypto-currencies will start looking for opportunities to continue to engage in crypto-currencies but in another country. And this situation creates cash outflows from country. And ignoring regulations of crypto-currencies creates good environment for cyber-crime.
9. ICO creates great opportunities for startups to make crowdfunding. People who have great ideas but don't have money for their realisation could use ICO for collecting necessary capital to develop their ideas. ICO also creates big opportunities to investors which are willing to earn money. Important point here is that investors should be careful when they are choosing platform where to buy ICO tokens because there are a lot of scammer web sites offering ICO tokens on internet.
10. Majority of negative sides of crypto-currencies related to "fool" people rather than directly to crypto-currencies.

Following recommendations based on all materials from bachelor thesis:

1. Next researcher should develop topic of regulation ICO and everything related to that. Main attention should be paid on internet platforms where it is possible to purchase ICO tokens.

2. Traders of crypto-currencies on exchange markets should secure themselves by not holding all their crypto-assets on exchanges and should hold their assets on crypto-wallet. Due to crypto-wallets will secured and internet exchanges could be hacked.
3. People who willing to purchase crypto-currencies or ICO tokens should carefully look for trustable web sites where it is possible to purchase them due to big amount of scammer websites in internet.
4. People who willing to purchase ICO tokens should pay attention on business idea of ICO and developers name of startup or persons name who plays key role in startup should be known due to the fact that many scammers creating fake ICOs.
5. People who already purchased crypto-assets should be careful with crypto-keys of their crypto-assets due to the fact if they will lose crypto-keys it is impossible to re-establish them.

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## ANNEX

1. What is your name?
2. What is your age?
3. What is your status?
4. How long you are following for crypto-currencies?
5. Do you have preferred crypto-currencies? What are the reasons of your choice?
6. Do you already invest money for some type crypto-currencies? If yes: what were main reasons of your choice of crypto-currencies? If no: why you didn't invest yet?
7. If you will have big amount of money in the future you will invest them to assets or you will prefer to invest them in crypto-currencies? What are main reasons of your decision?
8. Do you believe that technology of blockchain will replace banking system in the future? Why do you think like that?
9. What ways of using crypto-currencies do you know? What ways of using crypto-currencies should be improved in the future?
10. Is it possible to regulate crypto-currencies? What are the main points of regulation crypto-currencies?
11. What are negative sides of crypto-currencies?
12. What are positive sides of crypto-currencies?
13. Crypto-currencies are temporary phenomenon or it would change the world? What are main points of your opinion?
14. What would be your recommendations for research?

## DOCUMENTARY SHEET

The bachelor paper “The Influence of Crypto-currencies on International Economy” is worked out at the faculty of Business, Management and Economics of University of Latvia in the study program “International Economics and Commercial Diplomacy”.

With my signature I certify that the research is made by myself, the information sources shown in the work are truly represented and the electronic copy is corresponds to printed version.

Author: Shokhjakhon Yuldoshboev \_\_\_\_\_ .\_\_\_\_.2018

*(signature)*

**I recommend/ I do not recommend** the work for the presentation

Supervisor: M.sc.soc. Santa Sproģe-Rimša \_\_\_\_\_ .\_\_\_\_.2018

*(signature)*

Reviewer: professor Baiba Šavriņa

The work is submitted at the Study Center on \_\_\_\_\_.\_\_\_\_.2018.

Person authorized by the Dean: methodologist Astra Zaļkalne \_\_\_\_\_  
*(signature)*

Work is presented in the meeting of bachelor`s final probation committee on  
\_\_\_\_\_.\_\_\_\_.2018. protocol N.\_\_\_\_

Secretary of committee: M.sc.soc. Santa Sproģe-Rimša \_\_\_\_\_  
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