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Chapter 1

WHAT IS A CRYPTOCURRENCY?

**Cryptocurrency** (or cryptographic currency) – a distributed accounting system based on cryptography, which stores information about ownership in specific units. The ownership is associated with individual nodes of the system (“wallets”) in such a way that only the holder of a corresponding private key has control over the given wallet, and it is impossible to issue the same unit twice.

Cryptocurrency is not considered to be a currency unit, a means of payment or e-money by most countries, so the creation of units within an algorithm built into the system (the so-called mining or digging) is legal. Usually, for the same reasons it is not subject to any tax reliefs applicable to currency trading – for example, it may be subject to VAT.
The most popular cryptocurrency is bitcoin; however, there are hundreds of other cryptocurrencies, which are referred to as “altcoins” (alternative coins, including ethereum considered “the younger brother of bitcoin”). The creation of some of them was supposed to also realize other goals, for example, namecoin creates a decentralized DNS system, and peercoin aims to distribute the income from mining of its units more evenly. There are also plans to build a crypto-powered prediction market.

Currently, more than 1500 cryptocurrencies are listed on over 7500 special exchanges (so-called cryptocurrency exchanges).
Cryptocurrencies are highly volatile, which may suit investors having high risk tolerance. A calm investor, characterized by risk aversion, should approach cryptocurrencies with a great deal of caution, especially when deciding on the amount of capital for cryptocurrency speculation – says Mark White, trader at https://www.currencies.co.uk. Within a single day, the volatility of cryptocurrency rates may reach approx. 30% - 40%. It’s highly unlikely that we will observe such fluctuations in the case of “traditional” currencies, where the value of market volatility oscillates around 1% - 2%. You should know that the rates of national currencies such as USD, EUR, or GBP are not related to the rates of cryptocurrencies – what is happening to bitcoin has no effect on possible fluctuations of currencies recognized as official means of payment by central banks of specific countries – adds Mark White.

Despite the warnings issued by the Financial Conduct Authority against investing in cryptocurrencies, one of the employees of this institution, Peter Williams, said on 5 January 2018 that “Due to i.a. the high volatility of their value, cryptocurrencies are associated with the risk for investors, which the FCA warns against, but the risk for the system is not big enough to regulate this market today.” Peter Williams also mentioned that “We have a market, and freedom of concluding contracts. It seems to me that the risk at the moment is not big enough to intervene in this market segment and regulate it or restrict the possibility of purchasing these units.”
In the UK, bitcoin CFDs can be traded, for example, in some brokerage houses, but when in December 2017 BTCUSD reached record volatility and record values (one BTC was then worth $19,000), some offices (including XTB, TMS) suspended trading in bitcoin contracts. A few days ago, XTB restored such a possibility, but, among other things, a limit to the invested amount was introduced (max. €15,000) and the duration of a contract was reduced to the maximum of 7 days from the date of the transaction.
Cryptocurrencies seemed to create an interesting investment opportunity, even long before the boom which came in 2017. In the article “How You Should Have Spent $100 in 2013?” Forbes included the following chart:

![Graph showing the growth of different investments from 2013 to 2014.](source:Forbes.com)
While BTCUSD chart looked like this at the beginning of December 2017:

Starting with increases in December 2017, a real bitcoin explosion started:

Friday, 8 December 2017: One unit of this cryptocurrency cost $17 thousand! On one of the Asian stock exchanges (GDAX), one bitcoin cost as much as $19,700 for some time! In 2010, 1 BTC cost ... $0.06! Assuming that someone bought BTC 100, paid $60 and waited until Friday, 8 December 2017... they earned $1,970,000, or nearly USD 2 million, according to the average USDGBP exchange rate of https://www.currencies.co.uk as at 19 January 2017 (USDGBP = 1.3214) it’s ALMOST £2.6 MILLION!
Sunday, 10 December 2017: The Chicago Board Options Exchange (CBOE, the largest options exchange in the world) starts offering bitcoin futures – and the increases on the day of their debut reached 20%!

Monday, 18 December 2017: Bitcoin futures were included in the offer of CME Group – the world’s largest derivatives exchange.

On the night of 21 December 2017: A decrease in the BTCUSD rate to around USD 13,000.

The analysts of Saxo Bank in their forecasts published for 2018 claimed that this year you would have to pay as much as $60,000 for a bitcoin. According to these forecasts, this spectacular surge would result in a spectacular comeback to $1,000 per 1 BTC.
Currently (19 January 2018), the BTCUSD chart looks like this:

Many people compare it to a financial bubble chart:

Source: Stooq.pl

Source: marketpredict.com/articles/mp-bubblecycle.htm
Taking into account the fact that bitcoin has no coverage in any assets (gold, bank guarantees), the question arises: What generates such price fluctuations? Some analysts say: the psychology of speculation, including phenomena such as FOMO (Fear of Missing Out), that is, a fear that you will miss an opportunity to quickly get rich, and HODL (Holding On For Dear Life), which is holding on to something as if it was something that keeps you alive (because of the often inadequate faith in the success of a project).

However, the question of “adequacy” is a relative term – the fact is that in the year 2017 the value of BTCUSD increased over 20 times: from over $800 per one unit of this currency in January 2017 to nearly $19,000 for 1 BTC in December 2017:
What can influence cryptocurrency fluctuations?

The assessment of their value by investors, that is the classic law of supply and demand – the more interest in the currency, the faster the growth in its price.

Actions taken by the governments of individual countries. For example, one of the causes of the December drops of BTC that was mentioned were, among others, the announcements of the government of South Korea (considered a very active cryptocurrency market) concerning a ban on establishing anonymous cryptocurrency accounts and blocking the Initial Coin Offering, i.e. using cryptocurrency keys to raise money for starting new businesses. The uncertainty in the market was also caused by concerns related to the introduction of a ban on trading in cryptocurrencies in China.

Conspiracy theories mention rich investors who hold a majority in the cryptocurrency market and manipulate cryptocurrency prices at their own discretion.

All significant events on the traditional currency market, such as Brexit, and important decisions of central banks can cause both more interest in cryptocurrencies and a negative sentiment about them.

More interest, and thus greater demand for cryptocurrencies, can be observed in markets where citizens are wary of national monetary policies. This results in the search for alternatives to traditional money, greater demand for cryptocurrencies, for instance ... and then, as mentioned before, the classic law of supply and demand.
New cryptocurrencies are created on an ongoing basis, because of the use of open source software and P2P networks. The source code is based on free software, which means that everyone can download it and create their cryptocurrency.

Currently, there are more than 1500 individual cryptocurrencies. Many of them work on the same code basis, and feature only a few minor changes and different parameters (time distribution of blocks, the number of coins, ...) in contrast to the original currency.

The table displays a list of cryptocurrencies with a market capitalization of over $2 billion. The data presented on 24 February 2018.

<table>
<thead>
<tr>
<th>Cryptocurrency</th>
<th>Code</th>
<th>Market capitalization</th>
<th>Rate</th>
<th>Number of coins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bitcoin</td>
<td>BTC</td>
<td>$166,178,955,948</td>
<td>$9,842.48</td>
<td>16,883,850</td>
</tr>
<tr>
<td>Ethereum</td>
<td>ETH</td>
<td>$81,636,529,843</td>
<td>$834.58</td>
<td>97,817,970</td>
</tr>
<tr>
<td>Ripple</td>
<td>XRP</td>
<td>$36,985,012,097</td>
<td>$0.946034</td>
<td>39094802192</td>
</tr>
<tr>
<td>Bitcoin Cash</td>
<td>BCH</td>
<td>$20,360,309,078</td>
<td>$1,198.70</td>
<td>16,985,325</td>
</tr>
<tr>
<td>Litecoin</td>
<td>LTC</td>
<td>$11,304,811,341</td>
<td>$204.20</td>
<td>55,362,008</td>
</tr>
<tr>
<td>Cardano</td>
<td>ADA</td>
<td>$8,336,616,188</td>
<td>$0.321541</td>
<td>25927070538</td>
</tr>
<tr>
<td>Neo</td>
<td>NEO</td>
<td>$7,730,450,000</td>
<td>$118.93</td>
<td>65,000,000</td>
</tr>
<tr>
<td>Stellar</td>
<td>XLM</td>
<td>$6,607,272,092</td>
<td>$0.357772</td>
<td>18467828930</td>
</tr>
<tr>
<td>EOS</td>
<td>EOS</td>
<td>$5,614,935,228</td>
<td>$8.13</td>
<td>690,394,277</td>
</tr>
<tr>
<td>IOTA</td>
<td>MIOTA</td>
<td>$4,839,328,995</td>
<td>$1.74</td>
<td>2779530283</td>
</tr>
<tr>
<td>Dash</td>
<td>DASH</td>
<td>$4,697,946,021</td>
<td>$594.40</td>
<td>7,903,744</td>
</tr>
</tbody>
</table>
Transactions:
Blockchain, originally block chain, is a decentralized and distributed database in the open source model, on an Internet network with a peer-to-peer (P2P) architecture, without any central computers or a centralized place of data storage, used to post individual transactions, payments or accounting records encoded with the use of cryptographic algorithms. In fact, blockchain is a decentralised and distributed transaction log, or in other words it is a decentralized trading platform in distributed network infrastructure. Blockchain is a public open ledger which can be accessed by everyone.

Blocks:
Each data block contains a specified number of records with transactions. The block size depends on the particular implementation. For example, the size of a bitcoin block can be as high as 1 MB, which results directly from the bitcoin protocol specification.

Advantages:
The blockchain technology is resistant to cyber attacks, because safety is ensured by cryptography,

• The blockchain technology, based on a coded cryptographic structure, doesn’t require any intermediary which would verify data from a transaction or confirm its participants, so the costs of its operation are much lower as compared to other systems, and its performance is immense.

To get the current list of Stock Exchanges and Cryptocurrencies go to: www.coinmarketcap.com
Economic calendar of Cryptocurrencies is available at: www.coinmarketcal.com
Thanks to being distributed and decentralized, it is resistant to all kinds of failures of IT systems,
The blockchain ledger is open, public, anonymous and is not subject to supervision,
Safety,
Decentralization,
Disintermediation,
Openness,
Transparency,
Anonymity,
Independence,
Authentication (authorization).

Applications:
Blockchain technology has a lot of various potential applications in many industries. The first area where blockchain is used are cryptocurrencies. The blockchain system serves as the basis for such protocols as bitcoin or ethereum. The first application of blockchain technology was the launch of bitcoin in 2009. It can potentially be used in the area of the Internet of Things (IoT). Blockchain technology is used as the basis for Distributed Autonomous Organizations (DAO) and Distributed Ledger Technology (DLT).

Other applications include:
- stock exchange transactions without intermediaries or institutions,
- land and mortgage registers without the participation of a notary or land and mortgage registry courts,
- register of owners of cars and purchase history as well as their insurance (cf. DVLA),
- accounting ledgers,
- share registers.
Bitcoin is a virtual currency created in 2009 by Satoshi Nakamoto. It is also the name of open source software, which is intended to enable users to use this currency.

Bitcoin is one of the first attempts to implement a concept called cryptocurrency, which was first described in 1998 by Wei Dai on a cypherpunks mailing list. Built on the belief that a coin is any object or any record that can be accepted as payment for goods and services and as a repayment of debts in a certain country or in any socio-economic meaning. Bitcoin was created based on the ideas of the use of cryptography in order to control the creation and transfer of money, instead of relying on a central issuing authority.

https://www.bitcoin.com

**Bitcoin is an innovative payment network and a new kind of money.**

In order to function without centralized control or banks, Bitcoin uses peer-to-peer technology. Transaction management and the issue of bitcoins take place collectively over the network. Bitcoin works as open-source software; it is a public project. No one owns Bitcoin. Everyone can take part in it. Thanks to the many unique properties, Bitcoin enables exciting applications, which had not been available to earlier payment systems.
Chapter 5

INNOVATION IN PAYMENT PROCESSES

Bitcoin protocol is not just about transferring money from A to B. It has many features and opens up a world of possibilities which continue to be discovered by the community. Here are some of the technologies that are currently being developed – in some cases they have been implemented as a real product or service. The most interesting applications of Bitcoin have probably not yet been discovered.

**Easy mobile payments**

Bitcoin for mobile devices allows you to make payments in two simple steps – scanning and paying. Without logging in, using a card, entering a PIN or signing anything. To receive a payment using Bitcoin, you only need to display a QR code in your Bitcoin wallet applications and allow your partner to scan your phone, or bring your mobile phones together (using NFC).

**Security and control over your money**

Bitcoin transactions are protected by military-grade cryptography. No one can make payments on your behalf or collect money from you. Therefore, as long as you follow appropriate wallet security principles, Bitcoin can give you control over your money and a high level of security against various types of fraud.
Works anywhere and anytime

Just like e-mail – you do not have to force your family to use the same software or service provider. This is not a problem; all programs are compatible with each other, since they use the same open technology. The Bitcoin network never sleeps, even on vacation!

Fast international payments

Bitcoins can be sent from Africa to Canada in 10 minutes. No bank participates in the process, as it would slow it down, charge scandalously high fees or withhold transactions. You can make a transfer to your neighbour in exactly the same way in which you would make a payment to a relative abroad.

Low fees or no fees

Bitcoin allows you to send and receive payments at a very low cost. Except in specific cases, such as very small payments, there is no requirement to pay a fee. However, it is recommended that you pay a higher, voluntary fee in order to speed up the confirmation of your transaction and pay the people who operate the Bitcoin network.

Protect your identity

Bitcoin does not require any credit card numbers, which could be stolen in order to steal your identity. In fact, it is even impossible to make payments without revealing your identity, almost as in the case of physical money. You should note, however, that privacy protection requires some effort.
Chapter 5

Control to prevent fraud

Bitcoin guarantees an unprecedented level of security. The network provides users with protection against the most prevalent fraud types, such as chargebacks or unwanted charges, and bitcoins themselves can’t be forged. Users can also create backups of their wallets or encrypt them. Hardware wallets may in the future make theft or loss of money very difficult. Bitcoin is designed to allow its users to have full control over their money.

Global availability

All payments worldwide can be fully interoperable. Bitcoin allows any bank, company or private person to securely send or receive payments wherever and whenever they want, with a bank account or without it. Bitcoin is available in many countries, in which most payment systems are still unavailable due to the specific restrictions in force in those countries. Bitcoin increases global access to trade and can fuel the development of international trade.

Cost-effectiveness

Through the use of cryptography, secure payments are possible without any intermediaries, as they would slow down the process and charge additional fees. A Bitcoin transaction can be much cheaper than its alternatives. It can also be completed in a short period of time. This means that Bitcoin has the potential to become a common method of transferring any currency in the future. Bitcoin can also play a role in combating poverty in many countries, by eliminating high commissions on employee salary transactions.
Tips and donations

Bitcoin is in many cases an effective solution, especially for tips and donations. Sending payments requires only one click and receiving donations can be as simple as displaying a QR code. Donations can be publicly visible, which increases the transparency and credibility of non-profit organizations. In emergencies, such as natural disasters, Bitcoin donations can allow a faster international response.

Crowdfunding

Although its use is not yet straightforward, Bitcoin can be applied to carry out crowdfunding campaigns like those carried out through Kickstarter. In such campaigns, individuals provide funds for projects as a pledge. These funds are collected only when the target amount is reached. Such insurance contracts are processed by a Bitcoin protocol, which prevents the execution of a transaction before all the required conditions are met. Learn more about the technology related to crowdfunding and try out Lighthouse.

Micropayments

Bitcoin can process payments with a worth of one dollar, or even smaller amounts. Such payments are common even today. Imagine that you are listening to online radio paid per second, you are viewing websites leaving small tips for every ad that is not displayed or buy Wi-Fi hotspot transfer paying per kilobyte. Bitcoin is so efficient that it makes all the above possible. Learn more about the technology behind Bitcoin micropayments.
Chapter 5

Mediation in disputes

Bitcoin can be used to develop innovative services of mediation in disputes with multiple signatures. Such websites could allow third parties to approve or reject a transaction in the event of a dispute between the parties, without giving them control over the money. Because this type of services would be available to any user and trader using Bitcoin, they would probably lead to free competition and higher quality standards.

Accounts with multisignature

Multiple signatures allow for approving a transaction over the network only when a certain number of people or their defined group agree to sign the transaction. This can be used by a management board in order to prevent expenditure by individual members without sufficient consent of the remaining members. Also, in this way banks can prevent theft by blocking payments above a certain limit, if a user doesn't provide additional certifications.

Trust and integrity

Bitcoin offers solutions to many problems associated with trust, which banks are currently struggling with. Thanks to transparent accounting, digital agreements and irreversible transactions, Bitcoin can be used as the foundation to restore trust and harmony. Dishonest banks can't cheat the system for profit at the expense of other banks or the public. A future in which leading banks would support Bitcoin could help restore integrity and trust in financial institutions.
Chapter 5

Resistance and decentralization

Through its high level of decentralisation, Bitcoin has created a different form of payment network with an increased level of resilience and redundancy. Bitcoin can operate transactions worth millions of dollars without the need for military protection. Without a central hub, which could fail, like in the case of a data centre, an attack on the network becomes more difficult. Bitcoin could be an interesting step forward in protecting local and global financial systems.

Flexible transparency

All Bitcoin transactions are public and transparent, and the identity of the people carrying out transactions is private by default. This allows individuals and organizations to work on flexible principles of transparency. For example, a company may decide to grant access to some transactions and balances only to certain employees, and a non-profit organisation may make public the amounts it receives from daily and monthly donations.

Automated solutions

Automated services are forced to deal with costs and constraints of payments by cash or by credit cards. This applies to all types of vending machines, from ticket to coffee machines. Bitcoin is suitable for use in a new generation of automated services, and it can also lower their operating costs. Imagine a taxi without a driver, or a store where a shopping cart allows you to pay for the shopping and you don’t have to stand in line. There are a lot of such examples.