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BENEFITS AND DRAWBACKS OF VIRTUAL CURRENCY BITCOIN

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Introduction

According to Šlosár, Šlosárová and Majtán [1] the term currency in general is a comprehensive term referring to a set of money circulation elements regulated by law in a country. Virtual currencies were defined in 2014 by the European Banking Authority as "a digital representative of a value that is not emitted by the central bank or another public authority and it has not a direct relation to a real currency, but is used by individuals and legal entities as a mean of exchange and it can be sent, stored and exchanged in an electronical way." [2] According to [3] "a virtual currency is a digital currency (also called cryptocurrency) or electronic money that do not physically exist as coins or banknotes. People use virtual currencies to purchase goods and services online without expending high transaction fees and charges. The most attractive part of virtual currencies is that they allow their users to remain anonymous." Among many virtual currencies (for example Bitcoin, Ripple, Ethereum, litecoin, Dogecoin, Dash, Peercoin, Stellar and others) the most important and most used currency is Bitcoin. It is also the very first virtual currency, which was created in the year 2009. The issue of virtual currencies is therefore a relatively new area and for many people it is still unknown. This article focuses on the virtual currency Bitcoin. Its aim is to create a complete list of basic advantages and disadvantages of Bitcoin with detailed descriptions of each. In literature these advantages and disadvantages are described only

briefly, so this article should fill the gap and inconsistency in literature. It can be also useful as a support material for the decision-making process in terms of the use of Bitcoin for the realization of business transactions.

1. Virtual currency Bitcoin and basic characteristics of its use

Founder of Bitcoin, acting under the pseudonym Satoshi Nakamoto, defines it as "an electronic payment system based on cryptographic procedure allowing the mutual connection of any two parties who are willing to trade directly with each other without the need for a trusted third party". [4] Bitcoin is a fully decentralized P2P currency (Peer to peer - a computer network, where the nodes are mutually equal, so there is a central control node missing) that is independent of any authority with regard to the technical operations, currency emission and controllership over transactions. Virtual currency Bitcoin can be useful for making payments between the users through the Internet, while transactions in this currency are irreversible and, once accepted by the Bitcoin network it is not possible to cancel the transaction in any way.

Anyone who is interested in making payments via the virtual currency Bitcoin has to install a so called digital wallet on his computer (or his mobile phone) at first. It is a free open-source software, whose task is to generate the first Bitcoin address and also subsequent addresses for every user.

This software wallet can occur in three forms:

- *computer wallet* - installed on a personal computer or a laptop,
- *mobile wallet* - installed on a mobile phone,
- *web wallet* - accessible through a website of the Bitcoin services provider. In this case there is no installation required on a client device - just a Web browser is needed.

After generating a Bitcoin address it is needed to get some Bitcoins, which will be available through the digital wallet after their assignment to this address. Bitcoins can be obtained in several ways, for example they can be bought through Bitcoin currency exchange offices (Mt. Gox or Bitstamp) or through services like BitInstant. This service allows you to transfer funds between money changers and it supports different payment mechanisms. All transactions are carried out through the Bitcoin network, where they are stored publicly and permanently. All transactions and the Bitcoin balance on a specific Bitcoin address are therefore visible to all other members of the Bitcoin network. For this reason, experts often recommend the payers using Bitcoin to create a totally new Bitcoin address for every single transaction in order to ensure privacy and increase of security. It is possible to pay via Bitcoins only in companies that support this type of payment. It works so that such a company sends its Bitcoin address to a given payer who has to transfer the required amount of Bitcoins from his digital wallet. All transactions made with Bitcoins are stored in a publicly available statement, referred to as "a block chain". The block chain is useful to verify whether the payer actually has the required amount of Bitcoins available and it was not a trick. This also has to prevent the multiple use of the same amount of Bitcoins for different transactions. [8]

Virtual currency Bitcoin has a deflationary nature, which means that the total amount of Bitcoins is known in advance and final and this ensures that no one can create more money and devalue the currency as it happens when more money is emitted by a central bank. The final amount of Bitcoins that can be emitted to the market is determined to 21 million BTC (Bitcoins). [6] On February 6th, 2016 there were 15 176 825 BTC in circulation. In addition to that approximately 3600 new BTC are being harvested every day. Every four years, the number of new Bitcoins emitted (i.e. harvested) daily will be reduced in half. In the near future, this will happen in 2017. The whole system of Bitcoins emission is designed in such a way that by the year 2040, the whole and final number of 21 million BTC will be emitted.

Bitcoin is an open source electronic payment mechanism that is available to the general public without restrictions. This system is designed in such a way that there is no single owner or controller of the mechanism and that anyone can become a user (i.e. a member of the Bitcoin network), if he is interested in doing so. Its open source nature is very closely linked to the decentralization of the system. Bitcoin emission and putting them into circulation is decentralized. Bitcoin therefore operates with the absence of a single management authority, institution or intermediary. All transactions take place only between the sender and the receiver. Users communicate with each other in the peer-to-peer manner, without the existence of a central control. [5]

The first Bitcoin has been put into circulation in the year 2009. The volume of this mean of payment in circulation is increased automatically by generating new Bitcoins in the number of 25 pieces in each approximately 10 minutes. This process is called Bitcoin mining. However, for mining the Bitcoins there have to be some miners, i.e. people who are willing to mine these Bitcoins and to store them in their digital wallet as a reward for their effort. It can be implemented by anyone who downloads and runs a program suitable for obtaining Bitcoins (for example GUIMiner, which runs on Windows operating systems). The user of the Bitcoin network who strives for Bitcoin mining is called Miner. [7] The principle of mining works through the use of high-performance computing hardware, which is able to solve very complex mathematical equations that are linked to the process of Bitcoin transaction validation. Every time when these equations or mathematical problems are solved, the miner who is responsible for their solving is allowed to put a reward on his own account in the form of a certain number of Bitcoins. The original amount of remuneration for the miner was 50BTC, however, today it is only 25 BTC. Every four years, the reward will be halved until the market gets filled up, i.e. the maximum possible amount of 21 million Bitcoins will be in circulation. The complexity of the mathematical equations is rising and therefore greater processing power is needed. [5] At first, only a personal computer processor (CPU) was needed as a computational platform for solving the equations. After that, when the complexity of these problems began to rise, high performance graphic cards were used. Today, mining of Bitcoins is possible only using a specialized equipment with a high computing power, known as an ASIC. It is a single-purpose chip that is focused exclusively on solving mathematical problems related to the obtaining of Bitcoins. Even with such a device, however, it may take years for one miner to be successful and therefore the miners are creating groups consisting of people with the same objective – to mine the Bitcoins. These people join their forces and if they are successful, they divide their reward according to the amount of each member's contribution to the success.

2. The advantages of using Bitcoins

In this chapter we will gradually introduce the main benefits that are associated with the use of the virtual currency Bitcoin. These benefits were identified based on an extensive analysis of a wide variety of aspects related to this currency and subsequent synthesis of learned knowledge. The basic advantages of using Bitcoin are:

a. It is a fully decentralized and deflationary currency – virtual currency Bitcoin is fully decentralized, i.e. there is no central authority, respectively no central bank with the privilege to control the process. The whole Bitcoin system is managed only by the regulations that were created by the author of Bitcoin, who is known under the pseudonym Satoshi Nakamoto. The Bitcoin network is consisting only from its regular members and there is no central node responsible for the control of the entire process. This currency can thus function without interference from a managing authority, an institution or an intermediary. The network is fully distributed among network users. The payments within this network are carried out with no cost or with only a little cost. It is designed in such a way that no one - author, individuals or governments could have any influence on the circulation of money.

They can also not cause an inflation. Bitcoin is a deflationary currency, because the total amount of money is finite and known in advance (21,000,000 BTC), which means that after the fulfillment of this limit no one will be able to mine or emit any more bitcoins.

b. (Pseudo) anonymity of Bitcoin - Bitcoin is often referred to as an anonymous currency, because payments via it take place on a separate network consisting of Bitcoin customers. All transactions are recorded and published using the so-called “block chain”, but the exact identity of the participants of these transactions is kept in secret. Their identity is hidden behind a unique Bitcoin address. Every participant of the Bitcoin network may create any number of these addresses and they are not connected to his name, IP address or other identifier, unlike payments via bank transfer or PayPal payments. In reality Bitcoin is only a pseudo anonymous currency because it is possible to analyze the flows of Bitcoin transactions and in most cases also to track their routes so that in the end it is possible to identify the participants with a high degree of certainty despite the fact that their identity was not directly published. Thus, the whole world (or at least people who are able to do such an analysis) can see, from which Bitcoin address the Bitcoins were sent and who is the recipient. Information about individual transactions can be detected with the help of websites that are designed to map the flows of Bitcoins. An example of such a website is Bitcoin Block Explorer, which is an open source web-based tool that allows its user to view information about the blocks, addresses and transactions connected to the Bitcoin block chain. After entering an identifier – a Bitcoin address or a unique ID - a complete account history is displayed. There can be seen some information about the incoming or dispatched Bitcoin transactions and even the current Bitcoin address balance. Each transaction has a unique ID. It is a hash that is assigned to each transaction. This hash hides other interesting details such as the exact time when the transaction took place, transaction charges and more in it.

c. Secure transaction mechanism - cryptography is used to ensure the safety of the peer-to-peer Bitcoin network and for each user it enables to use only the money that he owns and by doing this it prevents the re-use of money that were once spent. Thus, unlike conventional money Bitcoins can not be falsified. Bitcoins are something like an "internet cash". Whereas, during the payment it is not necessary to reveal the identity of the participants – there is no need to enter any personal data, such as the name, card number or any other sensitive data and in this sense it offers a similar security than cash. We also don't have to reveal our name while buying food or clothes in a supermarket so in this sense this can be essentially compared to a cash flow. Thus, there is no bank, card company or merchant who would store the information about our shopping. For this reason, potential attackers do not have a database full of personal data, which they could use for their purposes. The transaction may be carried out only by the owner, respectively the sender of the payment and no one else can download anything from his account, as it happens while using credit cards or bank accounts. The money belongs only to its owner and no one can take it away. That's why the Bitcoin security is very high and there are virtually no effective means to challenge the transaction security mechanism. Although in theory it is technically possible, but in reality any manipulation would be quickly detected. Thus, security of transactions and ownership in the Bitcoin network is very high and transactions via this virtual currency can be regarded as highly secure.

d. Freedom and almost instant transfers worldwide - individual properties of Bitcoin are interrelated and derive one from the other. With the property of decentralization of this currency another feature and advantage is linked and that is freedom of paying. Since Bitcoin is not a subject to any regulation by any governing body, the exchange takes place directly between two parties and therefore no one can be prohibited from accepting or sending Bitcoins. Because of that payments can be cheaper and quicker. Bitcoins move from one account to another quickly and they are not burdened with charges typical for payments using

standard currencies. Moreover, payments are accepted immediately without annoying confirmations, restrictions or bureaucracy. Thus, Bitcoin is a technology that allows quick transfers of considerable amounts of money worldwide. Since this currency is fully digital, it is easy to carry it across the borders and it is resistant to state control. If no failure occurs, it is possible to send and receive any amount of money mainly instantly, almost any time and anywhere in the world (however, a reliable Internet connection is necessary). For banking transactions routing abroad it often happens that the payment “travels” to its destination for a few days. Payments using Bitcoin are usually transferred in a few minutes.

e. No or minimal transaction charges – at present time, Bitcoin payments are processed either free of charge or at minimal charges. These charges are, however, negligible in comparison with the fees for transactions using standard currencies. The question is when and why to pay it. Situations may arise in which a large number of transactions accumulates at the same time. In this case the transactions that are free of charge are of lower priority and they are processed after transactions with higher priorities so there can be some delays and no one can guarantee when these transaction will be processed. Then assigning Bitcoins to a specific Bitcoin address (i.e. Bitcoin account) can take all day. Thus, users have the option to pay a small transaction fee in order to get it processed as quickly as possible. In this case transactions with higher priority are confirmed faster by the Bitcoin network. All payment transactions are processed by miners. The mathematical equations that have we mentioned earlier are linked with the processes of Bitcoin transactions processing and validating. Because of this, transaction fees will get directly to the miners as a part of their reward for their mining activities. Transactions that contain a fee have a different size from fee free transactions and thus the miner knows whether it is a transaction with or without a fee. In the future, these fees are supposed to fully replace the rewards for mining. Because of this, the miners will be still motivated to mine for Bitcoins and to confirm transactions of other members of the Bitcoin network. Recommended charge for smaller payments (up to 1 BTC) is set to 0.0001 BTC (representing approximately € 0.037). For larger transactions, it is better to pay a higher fee so the recommendation is set to 0.005 BTC (the equivalent of approximately € 0.187) in order to be sure that the transaction is processed as soon as possible. However, for the vast majority of transactions the sufficient charge is of 0.0001 BTC only.

f. Investment opportunity - "Foreign exchanges, stock exchanges and payment gateways, as well as the production of hardware and software for mining are gaining the attention of investors, who see a unique opportunity in the development of these kinds of projects. While the investments of venture capital in projects related to cryptocurrency in the year 2012 were in millions of dollars only, in 2013 these investments rised up to 93 million dollars and in 2014 it was almost 400 million dollars. In the first two quarters of the year 2015 the same amount of capital was invested as in the entire year 2014." [13]. According to [10] the average profitability of Bitcoins for the years 2010-2014 was 244.64% and the riskiness of the investment for the same years was 120.6%. This underlines the fact that Bitcoin is more suitable for investors with a positive attitude to risk who could earn a considerable amount of money, but at the same time they were undergoing a huge risk. For comparison, the average profitability of gold in the years 2010-2014 was only 3.11% and the risk level was 17.5%. According to these values, gold is more suitable for conservative investors.

3. The disadvantages of using Bitcoins

In the previous chapter we have focused on core advantages, respectively benefits of using the virtual currency Bitcoin payment system. As each coin has two sides, Bitcoin is also not quite perfect, and there are some downsides of its use. In this chapter we will present the main disadvantages, respectively risks of Bitcoin using:

a. Exchange rate volatility and instability of the payment system in time - a considerable disadvantage of Bitcoin is a strong fluctuation of its market price. Since its value is given only by the development of the market situation, it can fluctuate freely. Therefore, if multiple users wish to exchange Bitcoins simultaneously, the price climbs up automatically. The question whether this currency can be a stable store of value is one of the most debated issues of Bitcoin. The stability of the payment system is influenced by the volatility. Volatility represents the instability, respectively variability of asset prices in financial markets. Price development of Bitcoin throughout its lifetime since its inception in January 2009 until June 2016 indicate that Bitcoin is a currency with high volatility. The price of the Bitcoin from January 2009 to April 2011 was just above zero. In April 14th, 2011 the Bitcoin value reached \$ 1. A sharp increase of price occurred in the first decade of the June, when the Bitcoin price jumped to \$ 29.60. Till the end of June, however, the price fell to \$ 16. Till the end of the year 2011 the price decreased gradually and on December 31th it reached the value of only \$ 5.53. During the next one year, the exchange rate was relatively stable. In January 2012, the Bitcoin price was around \$ 4-6, in summer it rised up to a level of \$ 13.50 and then it fell sharply and by the end of the year and stabilized at a value from \$ 10 to 14. In January 2013 the exchange rate began to climb up sharply, till it reached its peak of \$ 230 then. This increase was due to market expansion because the awareness of Bitcoin among people was bigger. This level, however, had a short duration only and in the same month the price sharply fell to \$ 68. Thereafter, up to October 2013 it ranged from \$ 66 to 150. Since October 2013, when the price was around \$ 100, it began to climb up again and in December 2013 it reached its maximum value of \$ 1147. In the same month, however, the price decreased sharply and it reached a level of \$ 520. In early January 2014 it climbed up to \$ 950 and up to September 2014 it ranged from \$ 400 to 900. From October 2014 to the end of 2015 the Bitcoin price fluctuated between \$ 210 and 460 with a one-time drop to a level below \$ 200 reached in January 2015. At present, the value of Bitcoin is relatively stable and since the beginning of 2016 it ranges from \$ 358 to 458. In these days the evolution of the Bitcoin price is not so turbulent as it was before, which was until now the most criticized property of Bitcoin. In order to identify the volatility of the Bitcoin price we analyzed data available at Coindesk.com [11]

b. Relative anonymity of Bitcoin accounts and their illegal use – the anonymity of Bitcoin transactions appears to be one of the benefits of using Bitcoin, but this may not always be the case. There are suspicions that the relative anonymity of Bitcoin accounts and anonymity of the entire transactions encourage an illegal use and assist in an illegal criminal activity. Because of its properties Bitcoin may be potentially attractive to finance illegal activities, such as drug trading, weapons trading, support of terrorism, etc. This is often an argument for a negative attitude towards Bitcoin on the part of governments and banks. From the nature of Bitcoin transactions benefited also an online market for illegal goods called Silk Road, which is not functioning any more. It was a huge black market, where it was possible to find drugs, guns, to order contracts for killing, to hire hackers, etc. For the purchase of these goods and services virtual currency Bitcoin was used because it enabled the buyers and sellers to remain anonymous. "Silk Road is a part of the deep web (it is also called "the dark net") – a part of the Internet, which is unreachable using usual Internet technologies. The deep web is in fact separated from the so-called "web surface" and common web browsers are unable to make them available. To enter this side of the web special software is needed as Tor (The Onion Router). It is a system designed for anonymous web browsing. Therefore, it was very complicated to trace its users. It was not possible to obtain their IP addresses and to locate their computers based on their MAC addresses. Annual turnover of Silk Road was approximately 9.5 million Bitcoins and there were just over one million registered users. Every day, there took place over a thousand different transactions with an average purchasing

value of \$ 976. "[12] Silk Road is already broken, but there are other versions of it on the deep web.

c. Distrust in the Bitcoin financial system and its non-acceptance – the acceptance of Bitcoin as a means of payment and the confidence of people in it belong without a doubt to the biggest disadvantages of its use. Without the acceptance of Bitcoin as an official and legal means of payment at the side of individual governments or states it is not possible to expect that its acceptance at the side of companies will rise. "The current lack of confidence in the new virtual currency also stems from the unclear objectives of its creation. Many authors consider the use of an electronic payment system as a deliberate means to damage the traditional way of money emission by central banks or other financial institutions. Bitcoin is also perceived as an attempt to destroy the state's ability to gather taxes and as a mean to monitor the financial transactions of citizens. "[5] One of the biggest opponents of the Bitcoin platform are banks. It is quite understandable, since the more accepted Bitcoin is, the more the conventional payment systems are jeopardized. Many central banks already published their official statements on the use of Bitcoin as a currency. Within these statements they noted that the investments in Bitcoin are risky and they do not underlie to the regulation and supervision of some central authority. Because of this, there is no protection of the Bitcoin owners against a theft, stock market crash, and so on. The number of traders accepting Bitcoin gradually grows and it grows also the number of transactions that are made through the Bitcoin network. The acceptance of Bitcoin at the side of large companies (for example EBay, PayPal, Amazon) will probably have a great impact on the speed and way in which Bitcoin will be able to append conventional payment methods.

d. Security and protection against theft and improper transfers - safety is one of the properties of Bitcoin, which is seen as an advantage as well as a disadvantage. On the one hand the security of the transaction mechanism itself is high, but on the other hand the problem lies in lack of knowledge about the principles of data security of the end users (i.e. the members of the Bitcoin network). People do not have the proper safety habits while using their computer, and therefore using Bitcoins is a big security risk. Because of this it is very important to follow certain precautions. The private key that belongs to a specific Bitcoin address, with which a certain user can manipulate with his Bitcoins, must be kept secret. It is also necessary to choose a password to the digital wallet that is strong enough. Exceedingly, the loss the password or the entire digital wallet purse is a very high risk. The password should include a combination of uppercase and lowercase letters, numbers and other characters (such as: ., !, ., ,, ?, ", /, etc.) and it should have a sufficient length. The proper password length is usually considered to be between 8 and 15 characters. The more complex the password is, the more difficult for hackers it is to detect it. Under no circumstances should the password contain whole words, because such passwords tend to be most easily detected. To lose Bitcoins is also possible through realizing an improper transfer operation, when the user sends his Bitcoins to a wrong recipient. If a user sends his Bitcoins to a recipient, then at the time when the transaction has been submitted and confirmed by the network, the entire amount of Bitcoins is gone and it is not possible to cancel the transaction. The sender is no longer an owner of these Bitcoins and their ownership is transferred to the recipient. As mentioned earlier, there is no institution to protect the Bitcoin users against any loss of Bitcoins.

Conclusion

The execution of business transactions using virtual currencies is a relatively new option and many people do not realize the benefits and the risks that are associated with such payments. Therefore, the purpose of this article was to identify and characterize all benefits

and drawbacks of using virtual currency Bitcoin in detail, which is among all virtual currencies the oldest, best known and most widely used. Based on thorough analysis, synthesis and classification of the existing evidence, we have created a detailed list of benefits and risks, which can serve as an initial material for making decisions about the use of this currency to undertake genuine financial transactions.

Abstract

Virtual currencies have existed only since 2009, when the first virtual currency Bitcoin was created. Therefore, many people are not familiar with advantages and disadvantages of its use. Also in literature these advantages and disadvantages are described only briefly. The aim of this article is to create a complete list of the benefits and drawbacks of Bitcoin with detailed descriptions. This list should fill the gap and inconsistency in literature and it should also represent a valuable support material for the decision-making about the suitability of Bitcoin use for business purposes.

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CLOUD COMPUTING – MEANING AND TRENDS

Alžbeta Kanaliková

Summary

Cloud computing technology has already passed its beginning stages, many industries have already realized the benefits it provides, and have already started adopting and integrating the technology to their businesses.

The article dedicated to the field of cloud computing cloud computing, his meaning for the industry, the economy and companies. The first part of the article describes the general types of cloud computing, models, architectures, features and applications and security of cloud computing. The second part of the article deals with trends in cloud computing, describes of the prediction and the developments in security cloud computing.

Keywords:

Cloud computing, computing technology, open learning, meaning of cloud computing, security of cloud computing, feature and trends cloud computing.

Introduction – trends of technologies nowadays

Nowadays technologies focus on network connection and services of network. Services of internet network are big increase, creating a platform for the interconnection electronic devices, artificially intelligence is used. Society Gartner divides the new technologies into 3 groups: [1]:

1. Digital Mesh: