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USING CRYPTOCURRENCY IN THE ACTIVITIES OF UKRAINIAN SMALL AND MEDIUM ENTERPRISES IN ORDER TO IMPROVE THEIR INVESTMENT ATTRACTIVENESS

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Using Cryptocurrency in the Activities of Ukrainian Small and Medium Enterprises in order to Improve their Investment Attractiveness

The aim of the article is to analyze the main features of cryptocurrency with respect to the identification of main advantages and disadvantages of using cryptocurrency as a method of effecting cashless payments by small and medium enterprises in order to increase the level of their investment attractiveness. The article describes the basic characteristics of cryptocurrencies and Bitcon as the most common among them. The Bitcoin emission mechanism has been built and the dynamics of changes in the value, difficulty of its «extracting» or «mining», the market capitalization for 2009–2016 have been analyzed. In this connection the identified main trends and the relationship between the analyzed indicators are highlighted. The attitude of the authorities of different countries to «mining» and using cryptocurrency in calculations is shown, the monitoring of leading international financial institutions in terms of the use of Bitcoinis is carried out. In addition, the leaders among the existing cryptocurrency exchanges are determined, and the level of their market capitalization is shown, a comparative analysis of the traditional currency and cryptocurrency is conducted, an assessment of financial institutions that work with Bitcoin in Ukraine is performed, the attention being focused on the main advantages and disadvantages of using cryptocurrency in small and medium business. Taking into account all the positive aspects there justified the prospects of using the presented in the article finance cryptoinstruments, in particular Bitcoin, in order to improve the investment attractiveness.

Keywords: *cryptocurrency, Bitcoin, mining, cryptocurrency exchange.*

Fig.: *4.* ***Tabl.:*** *4.* ***Bibl.:*** *9.*

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Іващенко А. І. Використання криптовалюти у діяльності малих і середніх підприємств України з метою підвищення їх інвестиційної привабливості

Метою статті є аналіз головних особливостей криптовалюти стосовно визначення основних переваг і недоліків використання криптовалюти як методу здійснення безготівкових розрахунків малими та середніми підприємствами з метою підвищення рівня їх інвестиційної привабливості. У статті визначено основні характеристики криптовалют і найбільш розповсюджену серед них. Побудовано механізм емісії біткоіну та проаналізовано динаміку зміни вартості, складності «добування» або «майнінгу», ринкової капіталізації за період 2009–2016 рр., при цьому окреслено основні тенденції та залежності між проаналізованими показниками. Визначено ставлення влади різних держав до «майнінгу» та використання криптовалюти у розрахунках, проведено моніторинг провідних міжнародних фінансових установ з приводу використання біткоіну. Крім того, визначено лідерів серед наявних криптобірж, і показаний рівень їх ринкової капіталізації, проведено порівняльний аналіз традиційної валюти та криптовалюти, здійснено оцінку фінансових установ, які працюють з біткоіном в Україні, та наголошено на основних перевагах і недоліках використання криптовалюти у малому та середньому бізнесі. З урахуванням усіх позитивних сторін обґрунтовано перспективність використання окреслених у статті фінансових криптоінструментів, зокрема біткоінів, з метою підвищення інвестиційної привабливості.

Ключові слова: *криптовалюта, біткоін, майнінг, криптобіржа.*

Рис.: *4.* ***Табл.:*** *4.* ***Бібл.:*** *9.*

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Иващенко А. И. Использование криптовалюты в деятельности малых и средних предприятий с целью повышения их инвестиционной привлекательности

Целью статьи является анализ главных особенностей криптовалюты относительно определения основных преимуществ и недостатков использования криптовалюты как метода осуществления безналичных расчетов малыми и средними предприятиями с целью повышения уровня их инвестиционной привлекательности. В статье определены основные характеристики криптовалют и наиболее распространенная среди них. Построен механизм эмиссии биткоина и проанализирована динамика изменения стоимости, сложности «добывания» или «майнинга», рыночной капитализации за период 2009–2016 гг., при этом обозначены основные тенденции и зависимости между проанализированным показателями. Определено отношение властей разных стран к «майнингу» и использованию криптовалюты в расчетах, проведен мониторинг ведущих международных финансовых учреждений по поводу использования биткоина. Кроме того, определены лидеры среди существующих криптобирж, и показан уровень их рыночной капитализации, проведен сравнительный анализ традиционной валюты и криптовалюты, осуществлена оценка финансовых учреждений, которые работают с биткоином в Украине и акцентировано внимание на основных преимуществах и недостатках использования криптовалюты в малом и среднем бизнесе. С учетом всех положительных сторон обоснована перспективность использования указанных в статье финансовых криптоинструментов, в частности биткоинов, с целью повышения инвестиционной привлекательности.

Ключевые слова: *криптовалюта, биткоин, майнинг, криптобиржа.*

Рис.: *4.* ***Табл.:*** *4.* ***Библ.:*** *9.*

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Formulation of the problem. Under current conditions of unavailability of usual mechanisms for gaining and saving money for small and medium enterprises, namely lack of bank loans, additional pressure in the form of increasing taxes, rates, restrictions in work with currency and cash flow, customer drain because of population solvency reduction and price growth, there exists under-funding which might except further development of such enterprises. There is also a lack of possibilities for small and medium business to save money, as exemplified by bank deposit, which could become an unreliable means considering the probability of bankruptcy of financial institutions. This can result in a low possibility of obtaining compensation from the Guarantee Fund, because the requirements of individual customers are met first and foremost, but the turn of legal entities comes rarely. Another example is investing in US dollars, but there are a number of limitations imposed by the NBU in relation to their purchase and treatment.

As a result of these circumstances the devaluation of savings happens in many cases. That is why it is essential to find some alternative way for solving these existing problems. The possible way for tackling these analysed problems might become using cryptocurrency.

The cryptocurrency (digital currency) is empowering individuals and businesses by offering them a fast and secure mode of transaction.

Analysis of recent researches and publications. Nowadays there seems to be a lack of research, which is connected with some aspects of using cryptocurrency in bussiness operations, because the majority of researchers, among them Molchanova E., Solodkovskiy Y. [1], Honcharenko S. [2] and others, pay attention to the mechanisms of cryptocurrency production and modern tendencies of development of cryptocurrency markets and exchanges.

The aim of the article. Thus the main aim of this scientific paper is to analyze the basic features of cryptocurrency regarding the identification of advantages and disadvantages of using cryptocurrency as a method of cashless payments for small and medium enterprises to improve their investment attractiveness.

Statement of the basic material of the research. Using cryptocurrency gives small and medium companies the opportunity to save on conversion fees and to expedite payments on commodity exchange transactions.

A cryptocurrency (or crypto currency) is a medium of using cryptography to secure the transactions and to control the creation of additional units of the currency. Cryptocurrencies are a subset of alternative currencies, or specifically of digital currencies [3].

Cryptocurrency is a digital currency, which is based on asymmetric encryption and the use of different cryptographic methods of protection, such as Proof-of-work and/or Proof-of-stake. The operation of the system is decentralized in the distributed computer network.

The most widespread cryptocurrency is the Bitcoin (BTC). The program developer (or development team) of BTC is a person (or a group of people) with the nickname Satoshi Nakamoto [8], who proposed an electronic payment system based on mathematical calculations. The idea was to produce coin exchange without any central authority, in electronic form, more or less instantly, with minimal cost.

This is a digital product with a limited supply, its algorithm is designed in such a way that the system can consist of a maximum of 21 million units, each of which is called "bitcoin". The schedule of emissions is determined by the program and known in advance. After the last of the coins had been generated, their number will not exceed.

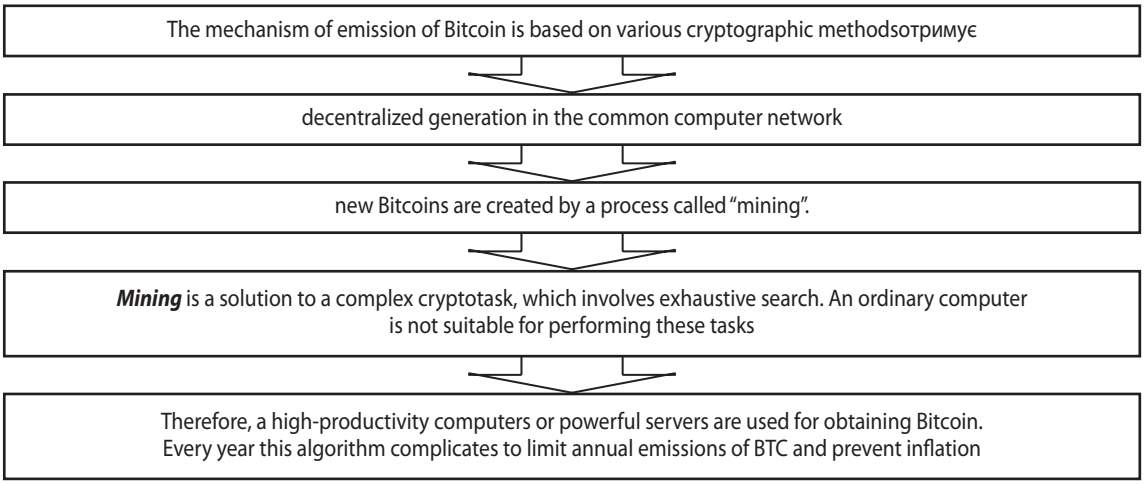

Fig. 1. The mechanism of emission of Bitcoin

The other step, which is required, is assessment of the level of mining difficulty. The next graph (Fig. 2) shows the changes in complexity of BTC mining.

The diagram illustrates the increasing level of difficulty of BTC creation process, which excludes inflation due to the limited range of the number of bitcoins in circulation.

The next essential factor considered is the value of bitcoin. The following picture demonstrates the trend of trade changes during the period of 2011-2016.

Fig/ 3 depicts the ups and downs in the BTC value over the whole period with the last data of calculations amounting to 600 USD per 1 BTC. From the mid-2015 till 2016 a sharp rise in BTC value has been observed.

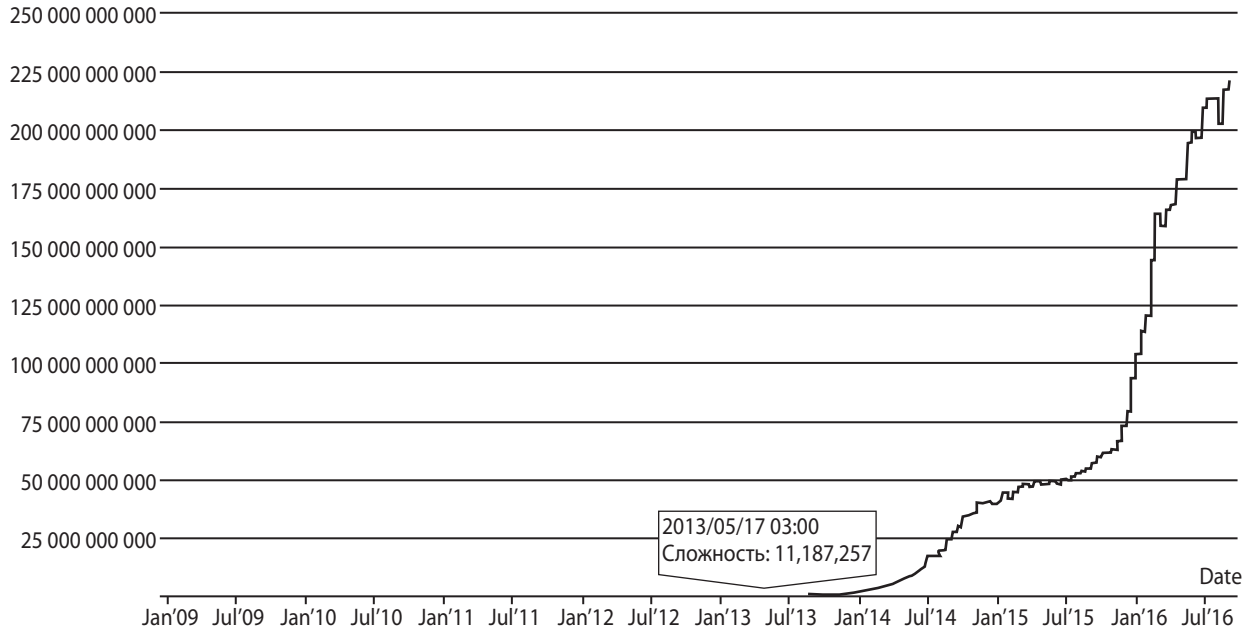

Fig. 2. The complexity of BTC "production" for 2009 –2016 [4]

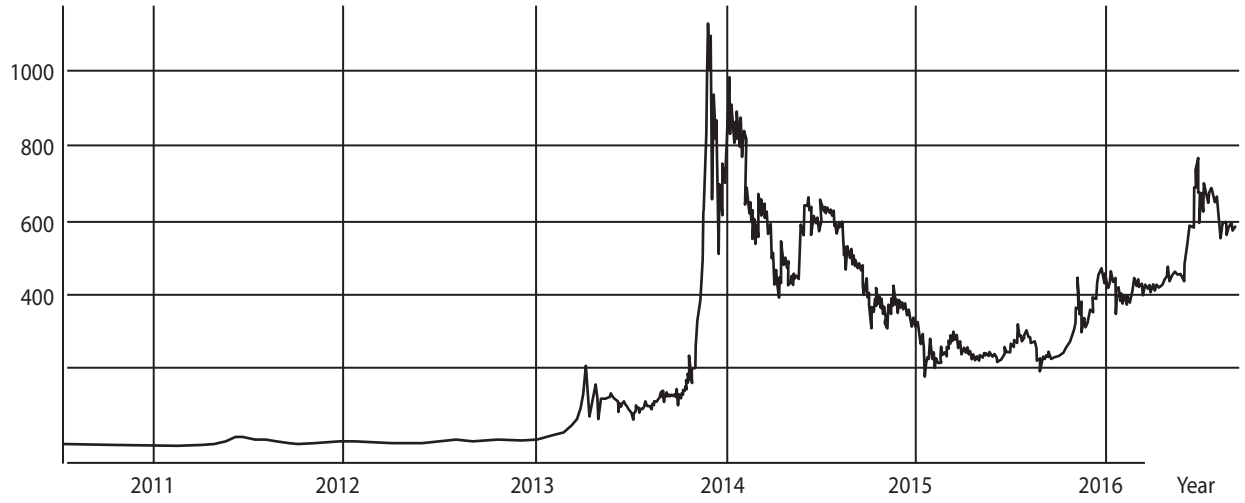

Fig. 3. Dynamics of the value of BTC for 2011 – 2016 in USD [4]

In the course of the research it has been found that the main factors that had a negative impact on the BTC value and caused its reduction proved to be the government declarations of developed countries and different law restrictions. But this decrease was not so lengthy due to the current market tendencies and the demand for BTC by professional financial market and business users.

There is a perception that BTC is similar to gold, because with the production of each new unit of currency it becomes more difficult to mine the next, since the calculations and the numbers become more complicated. In addition, the computation requires a certain amount of power and working time of the computer.

Therefore, it is considered that the disappearing of cryptocurrency will occur when the production of the units consumes more resources than it's worth.

1 bitcoin is divided into 100 000 000 pieces called "Satoshi' in honor of the creator of the system. Sometimes the term of "millibitcoin" (mBTC, one thousandth) and "microbitcoin" (uBTC, one millionth) is used.

The other main feature of all trade resources is market capitalization, which estimates influence on globalization (Fig. 4).

The trend presented in Picture 4 is similar to that presented in Picture 3 because of direct dependence between the BTC value and its market capitalization.

The other evidence of the global impact of BTC is its introduction by leading banks. According to CoinDesk [5], banks are already using bitcoin or experimenting with the technologies. Some of these include:

The French bank Société Générale, which posted a job listing in July for an "IT developer on bitcoin, blockchains and cryptocurrencies."

The Swiss investment bank UBS, which announced it was opening a blockchain technology research lab in one of London's major financial districts earlier this year.

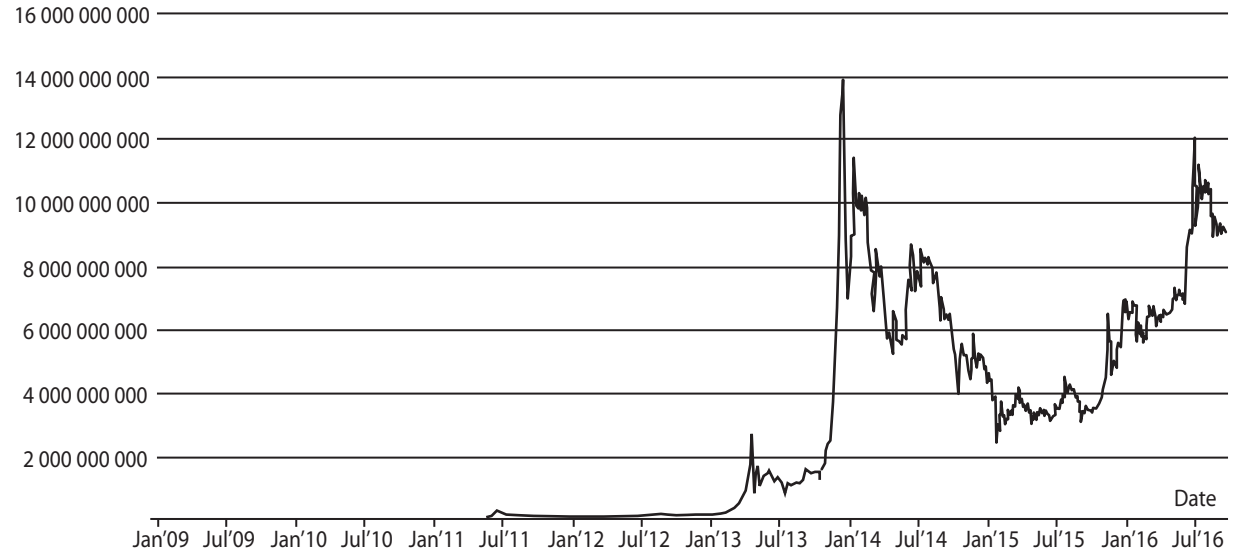

Fig. 4. Market capitalization for 2009 – 2016 [4]

Barclays revealed plans to trial bitcoin technology. In March the bank accepted three startups working on blockchain-related projects into its internal accelerator program. According to the New York Times, Barclays has 20 related internal experiments ongoing.

The Spanish bank BBVA has posted a number of relevant articles on its website, including a video tutorial on how to set up a bitcoin account. The bank has already invested in several bitcoin startups: it has Coinbase and purchased Simple.com, an online banking startup, last year.

The French financial services firm AXA is looking to use bitcoin to cut ongoing expenses from the remittance market. It even announced a 100 million euro tech incubator to explore this and other advanced technologies.

IBM, too, has been developing its own version of blockchain technologies to be used with so-called "smart contracts".

Thus Table 1 shows different authority approaches to this new method of payments and trading, and some of them include strong restrictions because of impossibility of their regulations and high level of possible risks. But this does not interfere with world cryptocurrency development represented in Table 2, which considers trade volumes on different exchange web sites in the world.

Table 1

The attitude of different countries to the use of cryptocurrency

Country	Recognition from the state
Great Britain	BTC = taxable vouchers
USA and Croatia	Private electronic money (suitable for the purchase/sale of goods in online communities adjusted to the fact that sellers have the right but are not obliged to accept them)
Germany (and most EU countries)	Do not encourage or warn a high degree of risk calculations using cryptocurrency, but BTC is recognized as private money, which can be used in clearing operations
Israel, United Arab Emirates, Canada	The availability of ATMs for cryptocurrency, but their place in the legislation has not yet been determined
Thailand, China	The prohibition to use in the calculation of virtual money (mining is permitted)
Russia	The Ministry of Finance of the Russian Federation introduced amendments to the criminal code regarding the possibility of incarceration in connection with the use of BTC
Ukraine	There is no legal regulation, but there is a Bitcoin Embassy in Kiev and some Ukrainian banks are working with BTC, but NBU does not insure the risks of the virtual calculations

Source: created by author on the basis of [7]

According to the data in Table 2, it can be observed that the total amount of existing trade volumes is too huge to be used in business payments.

The main differences between traditional currency and cryptocurrency are reviewed in Table 3.

Two different tactics exist among bitcoin users. The first one is accumulation of cryptocurrency in expectation of appreciation. Another one is exchange of cryptocurrency to traditional money.

Ways for conversion of cryptocurrency into traditional money in Ukraine:

Table 2

The list of Top 12 exchange websites and exchangers of Bitcoin [6]

N	Cryptocurrency exchange	Volume, 24 (BTC)
1	OKCoin	1794656,228
2	Huobi	1718110,8266
3	BTCChina	780688,4515
4	Poloniex	25752,294
5	BTC-e	5290,8995
6	LocalBitcoins	5249,7541
7	Bitstamp	3534,3725
8	LiveCoin	1488,3299
9	BitX South Africa	803,6168
10	Cex:io	440,9519
11	Bitconan	2,5177
12	Cryptonit	1,7343

Table 3

Comparative analysis of cryptocurrency and traditional currency

Difference	Traditional currency	Cryptocurrency
The controlling body	The Central Bank	Nobody (BTC exists only in a decentralized computer network)
The authority responsible for issuing	The Central Bank (Banks can issue any amount of money to cover the national debt, thus devaluing their currency)	Nobody (Cryptocurrency is not issued by the Central Bank and does not work according to its rules. On the contrary, the issuance of BTC is only possible in digital form and anyone can start to mine BTC at any time. Mining of bitcoins is done by means of using the computational power in a network. When you transfer the BTC, the transaction is processed by this network, thereby transforming BTC into an independent digital payment system)
Financial security	GDP or foreign exchange reserves	Bitcoin is not secured by anything, it is pure mathematics. Anyone in the world can run the bitcoin mining script on his/her computer and be like a mini Central Bank. Source Code of the script is posted in the clear, everyone can see how it works

1) using online platforms for purchase/exchange of BTC, such as btc-trade.com.ua, ukrcash.com, btcu.biz kuna.com.ua
2) crypto-ATM in the Bitcoin Embassy (location – Lviv square in Kyiv, which is one of 4 in the world, others work in Warsaw, Montreal, Tel Aviv)
3) the withdrawal of Bitcoin to Ukrainian bank cards. Bank is one of the most convenient and fastest way to convert Bitcoin. Each request is processed within just a few working hours, after that the money will be credited to the card according to Bank's policies. PrivatBank, Sberbank, Alfa Bank, Sberbank of Russia, FUIB, Credit Agricole work with Bitcoin in Ukraine.

Most often, the conversion of virtual money into the real one is accompanied by some commission fee.

But problems of using cryptocurrency for business purposes still remain unsolved. But there are some clear benefits from the introduction of BTC payments into business, such as the opportunity to save on conversion exchange and bank commission fees and the simplified system of payments between residents of different countries in particular. For example, a Ukrainian small company purchases products for its business in Thailand. Traditionally, triple currency exchange is required: Hryvnia – USD – Thailand Baht. All the bank conversion charges and transfer fees have to be paid. Whereas in case of using BTC such operation can be performed within 15 seconds with minimal commission rates.

It is also possible to make payments abroad without the need to exchange the currency for that of the destination country.

According to Table 4, BTC seems to create some competitive advantages for small and medium companies, such as making transactions faster, cheaper and with no boundaries. Besides, it is also the most secure way for making payments. Using all these advantages gives a great perspective for improving the level of investment attractiveness through increasing profitability in business.

Conclusion. Consequently, the use of cryptocurrency in small and medium business can be a significant advantage in enhancing the competitiveness of enterprises, taking into account the number of benefits discussed in this article. Though, given the high volatility and the lack of legal regulation of these

Table 4

The advantages and disadvantages of using BTC for small and medium enterprises

<table>
<tr><th>Advantages</th><th>Disadvantages</th></tr>
<tr><td>1. Open code for mining crypto currency – BTC applies the same algorithms that are used in online banking. The only difference of Internet banking is the disclosure of information about the users. All information about the transaction in the BTC network is shared (how, when), but there is no data about the recipient or the sender of the coins (there is no access to the personal information of the owner`s wallet)</td><td rowspan="3">1. Strong volatility – almost all of the ups and downs of the BTC value depend directly on the declared statements of the governments of different countries. This volatility creates the problem in the short term</td></tr>
<tr><td>2. No inflation – the maximum number of coins is strictly limited by 21 million Bitcoins. As there are neither political forces nor corporations able to change this order, there is no possibility for development of inflation in the system</td></tr>
<tr><td>3. Peer-to-peer cryptocurrency network – in such networks there is no master server, which is responsible for all operations. Exchange of information (in this case — money) is between 2-3 or more software clients. All installed by users program-wallets are part of a bitcoin network. Each client stores a record of all committed transactions and the number of bitcoins in each wallet. Transactions are made by hundreds of distributed servers. Neither banks or taxes, nor governments can control the exchange of money between the wallets of users</td></tr>
<tr><td>4. Unlimited possibilities of transaction – each of the wallet holders can pay to anyone, anywhere and any amount. The transaction can not be controlled or prevented, so you can make transfers anywhere in the world wherever another user with a Bitcoin wallet is located</td><td rowspan="2">2. Large risks of investing in cryptocurrency that should be considered in the medium and long term</td></tr>
<tr><td>5. No boundaries. Payments made in this system are impossible to cancel. The coins cannot be faked, copied or spent twice. These capabilities guarantee the integrity of the entire system. Every month the number of online shops, resources, and companies to accept BTC is expanding.</td></tr>
<tr><td colspan="2">6. Low BTC operation cost. The BTC cryptocurrency works as physical cash, combining the functions of e-commerce. No need to pay commission and fees to banks and other organizations. The main part of such process is mathematics, which does not need money. The commission fee in this system is lower than in any other. It amounts to 0.1% of the transaction amount. The operation interest charges go to BTC miner's wallets.</td></tr>
<tr><td colspan="2">7. Decentralization. There is no central control authority in the network, the network is distributed to all participants, each computer mining bitcoins is a member of this system. This means that the central authority has no power to dictate rules for owners of bitcoins. And even if some part of the network goes offline, the payment system will continue to operate stable.</td></tr>
<tr><td colspan="2">8. Easy to use. Taken into account that the procedure of opening an account for the company in Ukrainian banks is overcomplicated and can be refused without explanation, using BTC is convenient for companies. The company needs approximately 5 minutes to create a BTC wallet and immediately starts to use it without any questions and commissions.</td></tr>
<tr><td colspan="2">9. Anonymity. It is completely anonymous and at the same time fully transparent. Any company can create an infinite number of bitcoin addresses without reference to name, address or any other information</td></tr>
<tr><td colspan="2">10. Transparency. The BTC stores the history of transactions that have ever taken place. It is called a sequential chain of blocks or blockchain. The block chain keeps information about everything. So if the company has publicly used the BTC address, then anyone can see how much BTC is owned. If the company address is not publicly confirmed, then no one will ever know that it belongs to this company. For complete anonymity companies usually use the unique BTC address for every single transaction</td></tr>
<tr><td colspan="2">11. Speed of transaction. The ability to send money anywhere and to anyone in a matter of minutes after the BTC network will process the payment</td></tr>
<tr><td colspan="2">12. It belongs only to the wallet owner. There is a unique electronic payment system where the account belongs to the owner only. For example, on PayPal if for any reason the company decides that the owner somehow uses the account in a wrong way, the system has the right to freeze all funds on the account without even warning the owner about it. Verification of the proper usage of account is the total responsibility of the owner. With BTC, the owner has a private key and a corresponding public key, which is the address to the BTC wallet. No one but the owner can withdraw bitcoins</td></tr>
<tr><td colspan="2">13. No chances to use some personal data for fraud. This is an important point. Today the majority of purchases are made with credit cards. They are unreliable. Filling forms on websites, customers are required to enter the following data: card number, expiration date and code. It's hard to come up with a less secure way to make payment. Therefore, credit cards are very often stolen. BTC transactions do not require disclosure of any personal data. Instead, it uses two keys: public and private. The public one is available to all (i.e. the address of BTC wallet), but the private key is known only to the owner. The transaction needs to be signed by interacting private keys and applying a mathematical function. This creates evidence that the transaction is performed by the owner</td></tr>
<tr><td colspan="2">14. The possibility of investing funds in the transparent and profitable resource</td></tr>
</table>

Source: created by author on the basis of [9]

transactions in Ukraine, doing BTC-related business might be rather risky. Taking into consideration the experience of developed countries, particularly the United States, the use of BTC can be a promising alternative to existing systems of payment calculations.

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