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The Essence and Place of Cryptocurrency in the Financial System

Abstract. Introduction*. The history of the emergence of Bitcoin and other cryptocurrencies is analyzed. Basic concepts related to blockchain technology are explained. The main focus is on issues important from an investor's point of view, as well as on technical aspects, including the essence and importance of blockchain technology.*

Purpose. *The purpose of the article is to generalize and systematize the available information about the emergence of cryptocurrencies and analyze their patterns.*

Results. *The specifics of digital assets and the bitcoin exchange rate in 2012-2021 were studied in more detail. It was found that on the cryptocurrency market you can earn (as well as lose) both as a trader and as a so-called cryptocurrency hodlers. A rating of cryptocurrency exchanges was developed according to the following indicators: security, number of crypto currencies, fiat currencies, advantages of the exchange, disadvantages of the exchange. Cryptocurrency exchanges are a central part of the entire digital collection ecosystem today. Currently, there are already several hundred crypto exchanges on the market, which differ in terms of transactions, security levels or listed values. In this article, we have described cryptocurrency as objectively as possible so that you can assess for yourself whether it will be the right form of investment for you.*

Conclusions. *The wide choice of service providers and the fact that digital currencies are a relatively new form of investment means that finding the best place to trade is not easy. The cooperation of international financial conglomerates in the development of blockchain technology will save these enterprises billions of dollars per year and will be able to improve their operations and eliminate errors related to the human factor. Participants in the financial system are forced to propose standards that would apply to each participant in the network without disturbing the established status quo in international markets.*

Keywords: *cryptocurrency; bitcoin; blockchain technology; cryptocurrency exchanges; financial market.*

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Сутність та місце криптовалюти у фінансовій системі

Метою статті є узагальнення та систематизація наявних відомостей про виникнення криптовалют та аналіз їх закономірностей. Проаналізовано історію виникнення біткойна та інших криптовалют. Розглянуто основні поняття, що стосуються технології блокчейн. Основну увагу зосереджено на питаннях, важливих з точки зору інвестора, а також на технічних аспектах, включаючи суть і важливість технології блокчейн. Технологія блокчейн почала революцію, як і Інтернет понад два десятиліття тому. Співпраця міжнародних фінансових конгломератів у розвитку технології блокчейн заощадить цим підприємствам мільярди доларів на рік та зможе покращити їх функціонування та усунути помилки, пов'язані з людським фактором.

Найбільшою проблемою, з якою стикаються користувачі технології блокчейн, є законодавчі норми, чітко невизначені ще жодною країною. Країни утримуються від регулювання через необхідність вивчити всі можливості, які пропонує ця технологія. Ключ біткойн не зламався з моменту його створення, але все ще необхідні тести, щоб переконатися в стабільності та надійності системи. Учасники фінансової системи змушені пропонувати стандарти, які стосувалися б кожного учасника мережі, не порушуючи встановленого статус-кво на міжнародних ринках.

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Досліджено детальніше специфіку цифрових активів та курс біткойна в 2012-2021 роках. Виявлено, що на ринку криптовалют можна заробляти (як і програвати) як трейдерам, так і т.зв. ходлерам криптовалюти. Розроблено рейтинг бірж криптовалют за такими показниками: безпека, кількість криптовалют, fiat валюти, переваги біржі, недоліки біржі. Біржі криптовалют сьогодні є центральною частиною всієї екосистеми цифрової збірки. Нині на ринку вже є кілька сотень криптобірж в ринку, які відрізняються за умовами транзакцій, рівнів безпеки або перерахованими значеннями. Великий вибір постачальників послуг та той факт, що цифрові валюти є відносно новою формою інвестування, означає, що знайти найкраще місце для торгівлі непросто.

***Ключові слова**: криптовалюта; біткойн; технологія блокчейн; біржі криптовалюти; фінансовий ринок.*

Formulation of the problem. The cryptocurrency market has sparked many controversies and fears related to the threats posed by virtual currency exchanges since their inception. The rapid increase in the value of Bitcoin in 2017 influenced the significant interest of investors, institutions and entities related to financial markets, which was not only related to the desire to get rich. Blockchain technology and the cryptocurrency market based on IT enable technology, fast and secure capital flow and have many other applications that may lead to revolutionary changes and discoveries in the future. However, it should also be remembered that the virtual currency market creates conditions for widely understood criminal and terrorist activity, which is a threat to the functioning of the entire political and economic system. A key element to ensure full market efficiency and take full advantage of development opportunities while maintaining the security of existing entities is the creation of a market that builds the appropriate institutional conditions. They will allow you to maintain a balance between the level of intervention in the financial system related to the implementation of rules on virtual currency and the free development of the market and the opportunities it brings.

Analysis of recent research and publications. In recent years, cryptocurrency has become an active object of many scientific works. In general, research on cryptocurrencies began in the 80s of the last century. A significant contribution to the study of the history of the development and functioning of cryptocurrencies made such scientists as Bonneau J., Miller A., Clark J., Narayanan A., Glotov V., Mihailov D., Kucevol, M., Shevchenko-Naumova, O., Tarasyuk, M. and others. Despite a sufficient number of scientific studies on the essence of cryptocurrencies, however, a detailed analysis of the history of the emergence of this concept is still important.

Formulation of research goals. The purpose of the article is to generalize and systematize the available information about the emergence of cryptocurrencies and analyze their patterns.

Outline of the main research material. Investing in cryptocurrency has brought huge profits to many people despite relatively small capital commitments, but there are also those who have suffered serious losses. Their enthusiasts often see them as the money and assets of the future, or even the embodiment of freedom. Bitcoin itself, which is the oldest and most important virtual currency, is perceived as a means of storing value, something like «digital gold». Opponents of cryptocurrencies see them mainly as toys for speculators, useless assets and even financial pyramids.

Much has been written and said about cryptocurrencies, but for the above reasons, content related to them is often quite biased and emotionally charged. This is a big problem for people who would like to know the real face of this market. We focused mainly on issues important from an investor's point of view, but we could not ignore the technical aspects, including the essence and importance of blockchain technology.

Internet banking and mobile banking are creating new trends in the banking sector and become an obvious element without which functioning in the world around us is impossible [12, p. 11]. Much about what cryptocurrencies are is said by their name, which clearly indicates that we are dealing with cryptography and currencies. However, it should be added right away that these are specific currencies, because they exist only in digital form.

Cryptocurrencies do not have a physical form, but have a certain value, so they can be called virtual or digital money. This means that if the seller accepts payment in a certain cryptocurrency, you can pay for goods or services with it just as legally as with hryvnias, euros, dollars or other fiat currency (so-called fiat). Moreover, if, for example, a friend gives you the address of his wallet of a certain cryptocurrency, you can easily transfer any number of its units to him, bypassing the bank and other intermediaries. In this way, you can easily pay even for joint expenses [1, p. 105].

However, the fact is that today almost no one uses cryptocurrencies for their payment functions. Most people rightly perceive them as financial instruments that are subject to constant evaluation, are characterized by high investment risk, but at the same time provide the opportunity to receive truly impressive returns. They are bought and sold mainly on cryptocurrency exchanges, which in many ways resemble traditional stock, bond, currency or commodity exchanges.

If we talk about the potential profit, it is enough to remember that Bitcoin initially cost only a few cents, but after 8 years its rate reached 20,000 USD, and after another 4 years - almost 65,000 USD (peak in April 2021). However, it should not be forgotten that many powerful, often dynamic price falls have been recorded in the meantime. By buying a cryptocurrency at its peak before the crash, you can lose 70-80% of your wallet value in a matter of weeks or sometimes even days [4].

It is widely believed that the emergence of the concept of blockchain technology was more important than the emergence of Bitcoin itself. The spectrum of its potential applications is wide; this technology is used not only to create new cryptocurrencies, but also to experiment with

many other solutions that are based on cryptography or a distributed database.

Cryptocurrencies that appeared after bitcoin are called altcoins (from the English words: alternative and coin). The oldest and most important of them include ethereum, litecoin, ripple or monero. Today there are already several thousand virtual currencies and tokens. Some offer useful, even revolutionary solutions, but there are also failed projects and even scams. Interestingly, despite the huge, dynamic development of the market, about 40-60% of its total capitalization still belongs to bitcoins [13, p. 184].

It is worth noting that old altcoins were often based on decisions made in Bitcoin, but they were supposed to be faster, more efficient and more useful than Bitcoin. Dozens of such "bitcoins 2.0" were created, but none of them revolutionized the market. More hopes are placed on new cryptocurrencies, especially those that have their own blockchains to create decentralized applications (e.g. ethereum, cardano or polkadot). Projects that lead to solving the communication problem are so-called smart contracts with external data sources (for example, Chainlink), as well as platforms that support several blockchains at the same time (for example, polkadot).

Many cryptocurrencies use the same technology and function in a similar way. Their essence is a decentralized system, which in most cases is based on a blockchain (a chain of blocks). The latter is a public registry of transactions in the network of a certain cryptocurrency, which are concluded, verified and encrypted using cryptography, which are complex mathematical calculations. These calculations are carried out on an ongoing basis by many users of the network (more precisely, their computers with high computing power), for which they are rewarded in the form of units of cryptocurrency.

Importantly, blockchain technology works in a way that prevents counterfeiting of both cryptocurrencies and the transactions in which they are involved. It does not require intermediaries because each transaction takes place directly between the party sending and receiving the funds. It should also be added that all its details are known only to the parties to the agreement, although the accounting register itself and basic data about the operation are publicly available.

Cryptocurrencies and transactions look different than conventional currencies and transactions in the classical financial system. Virtual money does not require intermediaries and is not controlled by a central bank or other institutions. No external organization can decide the size of cryptocurrency problems or directly influence their functioning.

These advantages are provided by the blockchain of a certain cryptocurrency itself, which is a decentralized and distributed database based on a peer-to-peer model. In this case, network users, called miners, are responsible for processing transactions and storing the relevant information. The process by which they verify and add transactions to the public ledger, as well as the mechanism by which new units of cryptocurrency are put into circulation, is called mining.

Since many miners are doing their work at the same time, the network of a particular cryptocurrency can run smoothly. When one of them stops sharing their computer, it will not affect the functionality of the system. The fact is that in the case of the most popular currencies, you often have to wait even several tens of minutes to complete the transaction. Lesser used cryptocurrencies are usually associated with much faster approval of transactions.

It should be emphasized that the described mechanisms are not present in all virtual assets. It is enough to mention that in some of them the mining process does not take place, and some cryptocurrencies (for example, ripple) are not fully decentralized.

Many people refer to cryptocurrencies as all virtual assets that can be traded on exchanges [7, p.243]. This is not surprising, because even exchanges that allow this trade operate under the name "cryptocurrency exchanges". In fact, there are cryptocurrencies such as bitcoin (BTC) or litecoin (LTC) and digital tokens such as binance coin (BNB) [6, p.350].

Cryptocurrency works in its own network of blockchains (one network is one cryptocurrency), while the token is created on the "other" blockchain using the so-called smart contract. Since a certain network allows for the creation of an unlimited number of smart contracts, many different tokens can exist on the same blockchain. In the case of bitcoins (BTC), there are no such tokens at all, but for example, the Ethereum network has hundreds of other tokens in addition to its associated ethers (ETH) [2, p.25].

There are other functional and technological differences between cryptocurrencies and tokens, but they do not matter much to the average investor. Both are listed on exchanges and subject to the same trading rules. Regardless of which one you invest in, the change in their price will be decisive for you. However, it is worth keeping in mind that cryptocurrencies work exclusively as money, while tokens can be used, for example, to raise funds for the development of a project, reduce exchange fees or reward network users (utility tokens) or have functions similar to shares (investment tokens).

Some tokens are partially or 100% backed by standard commodities, such as gold or currency (stablecoins), and their exchange rates correspond to the prices of these commodities. Stablecoins include tokens such as tether (USDT), USD binance (BUSD) or USD coin (USDC). They are mainly used for trading on cryptocurrency exchanges and are a kind of virtual fiat currency (usually dollars) for which investors buy and sell other tokens and cryptocurrencies. They use them mainly because, according to the rules in force in most countries, when exchanging BTC, ETH, LTC or other cryptocurrencies for stablecoins, there is no tax liability (however, this does not mean that income tax is not paid).

Cryptocurrencies attract huge price growth, but also significant fluctuations, which traders willingly take advantage of. Especially those who play on futures contracts. When the market enters a bull (hossy) market, the value of many digital assets increases at least a dozen times in just a few months. Moreover, there are days when the prices of some cryptocurrencies increase by several hundreds and even thousands of percent. No other market offers this kind of profit potential, but it is worth remembering that it also comes with high risk.

In Fig. 1. let's take a closer look at the specifics of digital assets.

Figure 1 - **Bitcoin rate in 2012-2021**

Source: compiled by the authors [4]

The presented graph indicates that it is possible to earn (as well as lose) on the cryptocurrency market both as a trader and as a so-called cryptocurrency hodlers. It is worth noting that the second of these terms refers to long-term investing and comes from a typographical error in the word «hold» made in 2013 by a user of the most popular Bitcoin forum. This is significant because his «I am hodling» post comes after a sudden nearly 50 percent drop in the price of Bitcoin, which had previously topped $1,000 for the first time in history. The mistake resonated with cryptocurrency enthusiasts, who have since called the holding a long-term investment, as well as holding coins until they recoup their losses.

Hodlers usually keep several, or even several dozen, different cryptocurrencies in their wallets. However, this market is also designed for traders who want to take advantage of the high price volatility of virtual assets. This is what makes it possible to get really high profits (or losses) in a few weeks, days and even hours.

Thanks to the presence of futures contracts on cryptocurrency, you can earn (or lose) not only on the increase, but also on the decrease in their price. Moreover, you have the opportunity to play with leverage. In this way, enter into transactions for an amount that is significantly higher than the amount that you have in your investment account. However, it should be borne in mind that in this case the risk is extremely high - even experienced investors will suffer serious losses due to rapid price changes.

Whether you want to become a crypto trader, a hodler, or a combination of both, it's worth remembering that the cryptocurrency market is still young and immature. In addition, it is not subject to the supervision of any international regulatory agency and does not have rules and regulations that would guarantee the safety you can count on when investing in the stock, bond or forex market.

In the past, there have been situations where entire cryptocurrency exchanges have disappeared in an instant, along with all the fiat and investor coins stored on them. Today, many cryptocurrency exchanges care a lot about security and enjoy the trust of investors, but it is better to treat them only as trading platforms. It is worth keeping your assets, especially purchased for a longer term, on external cryptocurrency wallets.

Lack of regulation leads to several important, mostly negative, consequences. One of the most important is that tokens and cryptocurrencies can be freely issued by a wide variety of organizations, including fraudulent ones. They are not required to comply with any information requirements and can usually effectively defend themselves against potential investor claims. However, it is worth noting that most virtual assets are issued according to the rules of a certain country. In addition, the exchanges themselves, at least the ones that care about their reputation, do not introduce random, suspicious coins into trading.

Another important issue is the fact that the cryptocurrency market is constantly trading, which contributes to rapid price fluctuations, especially during periods of reduced liquidity (such as weekends or holidays). We should add, however, that this is still a

relatively small and young market, so even in the "working week", when the turnover is relatively high, there is no shortage of large price fluctuations. The immaturity of the market is evidenced by the fact that strong growth or decline is often the result of some rumor or tweet of a single influential person (example of Elon Musk and his influence on Bitcoin and Dogecoin prices) [5, p.584].

Also, unlike stocks, cryptocurrency trading on exchanges never stops, for example due to extreme market emotions and associated rapid price changes. Crypto investors are not given time to "cool down", so a wave of panic sales can reduce prices by several tens of percent in a short time. On the other hand, the lack of restrictions for dynamically changing exchange rates causes high optimism among investors and the so-called fomo (widespread fear of missing out on a great earning opportunity) sometimes leads to really high price increases.

Effective marketing is important for almost every company, but in the case of the cryptocurrency market, its importance seems exaggerated. There are coins released by teams that work on valuable projects, have real achievements, but cannot make their way to the notice of a wider group of investors. On the other hand, there is no shortage of useless or even ineffective cryptocurrencies that have experienced huge price increases thanks to aggressive marketing.

Central to the entire ecosystem of virtual assets are cryptocurrency exchanges. Cryptocurrency exchanges provide online trading platforms where you can freely trade bitcoins, ethers, litecoins and many other altcoins. At the moment, there are several hundreds of cryptocurrency exchanges, which differ in terms of security, transaction fees or the offer of available digital currencies and tokens.

Let's analyze the rating of cryptocurrency exchanges in more detail.

Table 1. **Rating of cryptocurrency exchanges (January 2023)**

Name of the exchange	Security (max.5)	Number of cryptocurrencies	Producer/ receiver commission	FIAT currency	Advantages	Disadvantages
Binance	5	386	0,1% / 0,1%	EUR, GBP, AUD, BRL, NGN, TRY, UAH, ZAR	a large selection of crypto currencies; a large selection of contracts and options on cryptocurrencies; low transaction fees; the possibility of reducing the commission using Binance coin (BNB) tokens; high level of security	relatively short time to market
Kraken	4.5	217	0,16% / 0,26%	EUR, USD, GBP, CAD, CHF, JPY	long period of activity high level of security the possibility of entering into leveraged agreements	a rather narrow supply of cryptocurrencies
Coinbase	4	237	0,4% / 0,6%	EUR, USD, GBP, AUD, CAD, CHF, JPY	long period of activity high level of security high trading	commissions for low turnover users a relatively small selection of cryptocurrencies

Source: compiled by the authors [8], [9], [10], [11]

On some exchanges, it is possible to trade not only cryptocurrencies, but also futures and even crypto currency options. Derivatives are created only for parts of virtual assets. As the market develops, their offer becomes more and more extensive. Their popularity among investors, including large capital, is also growing. This affects the price behavior of the entire cryptocurrency market.

Cryptocurrency exchanges are a central part of the entire digital collection ecosystem today. It is through them that you can trade Bitcoins as well as altcoins such as Ethereum, Litecoin, Cardano or Ripple.

Currently, there are already several hundred crypto exchanges on the market, which differ in terms of transactions, security levels or listed values. The wide choice of service providers and the fact that digital currencies are a relatively new form of investment means that finding the best place to trade is not easy.

Conclusions. Blockchain technology started a revolution, just like the Internet more than two decades ago. The main technological innovations of the blockchain are decentralization and network security, and the most important beneficiaries of the blockchain network are individual users who are able to implement new solutions themselves and use direct relationships between users around the world. States and financial institutions for which financial intermediation is associated with receiving financial income do not want to allow such changes in the

international arena. There is a race between institutions around the world and organizations that would like to become independent of intermediaries, third parties in contracts and usher in an era of working in a world of low costs, automatic data verification and contract value.

The biggest challenge facing users of blockchain technology is legal regulations, which are not yet clearly defined by any country. Countries are holding back on regulation because of the need to explore all the opportunities this technology offers. The bitcoin key has not been broken since its creation, but tests are still needed to ensure the stability and reliability of the system. Participants in the financial system are forced to propose standards that would apply to each participant in the network without disturbing the established status quo in international markets.

In the coming years, final solutions should crystallize that will be thoroughly tested, useful and safe, and the financial system will benefit from them.

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