

CONCEPT OF VIRTUAL CURRENCIES IN MODERN ECONOMIES

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Abstract. *In recent years, development of blockchain technology and virtual currencies (VCs) have been followed not just by the media and industry professionals all over the world – there rarely could be found a person who has not ever heard the term ‘bitcoin’. Despite the popularity of VCs, there is a lack of comprehensible information in the Latvian language about what the virtual currency (VC) is, as well the concepts of digital and VCs are often misused as synonyms. The research is based on the analysis of special literature and scientific publications on the system of VCs. The aim of the research: to explore the concept of VCs in the modern economy. General scientific research methods are used in the research: the method of monographic or descriptive research, the comparative analysis method for studying the concept of VCs, the classification, legal regulation, and future development possibilities. The results of the research show that VCs are a type of digital currency, though, the opposite statement is not correct. Thus, all VCs are digital, but not all digital currencies are virtual. Exploration of the legal framework of VCs suggests that it is at an early stage of development. With the increasing number of VCs and along with strengthening of the legal framework of VCs, the issue of possible directions of the future development of VCs is raised. Two points of view dominate: the future currency or payment system, for example, smart contracts.*

Keywords: *currency, digital, economy, virtual.*

JEL code: *G15, E42*

Introduction

The VCs, with regard to the potential benefits and potential risks of their use, aroused wide-ranging discussions shortly after their appearance that were followed up not only by the media and industry professionals around the world. There rarely could be found a person who has not heard the term *bitcoin* and the story about Laszlo Hanyecz’s, a Florida-based programmer’s, purchase of two pizzas from Papa John for 10 000 Bitcoin (BTC) on May 22, 2010 (Zuckerman, 2018). Despite the popularity of VCs, the author believes that there is a lack of comprehensible information in the Latvian language on what really a VC is. The results of the author’s research on the use of the concepts of digital and VC both in scientific publications (Lemieux 2016; Zalan, 2018; Zamani, Giaglis, 2018) and the mass media (Apsīte, 2017; Kalniņa, 2018) suggest that often these terms are used as synonyms. *Europol* researchers (Europol, 2017) also admit that the terms “virtual” and “digital” are often misused as synonyms.

The topic of the paper is insufficiently studied in Latvia and creates the necessity to explore the concept, type, legal regulation, and development possibilities of VCs, based on the analysis of special literature and scientific publications of Latvian and foreign researchers.

Aim of the research: to explore the concept of VCs in the modern economy. The following *research tasks* have been set to achieve the aim of the research:

- 1) to explore the concepts of a digital and virtual economy and currencies;
- 2) to systematize VC taxonomy, to develop a VC classification, and provide its characterization;
- 3) to describe the legal framework of VCs and provide an assessment of development opportunities for VCs;
- 4) to draw conclusions.

Object of the research: VC.

The research study is based on the analysis of special literature and scientific publications on the VC system. The research uses general scientific *research methods*: the method of monographic or descriptive research and the comparative analysis method to study the concept, classification, legal regulation and future development possibilities of the VCs.

Linkage between the concepts of a digital and virtual economy and currency

When researching the currencies, the author encountered the concepts that do not have an unequivocal use in both scientific publications and the mass media: digital currency, VC, and cryptocurrency. In the opinion of the author, the most common uncertainties arose right in the use of the words *digital currency* and VC. To clarify common and different aspects of the terms “digital” and “virtual”, the author has added a word “economy”, thus arriving to the terms “digital economy” and “virtual economy”.

The Oxford Dictionary defines a digital economy as “an economy which functions primarily by means of digital technology, especially electronic transactions made using the Internet” (English Oxford Living Dictionaries). The term ‘digital economy’ refers to an economic model and society that is driven by computer technology (ALAERDS et al., 2017), to an economy that is based on digital technologies, although we increasingly perceive this as conducting business through markets based on the Internet and the World Wide Web (Boston Consulting Group) and a term for all of those economic processes, transactions, interactions and activities that are based on digital technologies (Techopedia). The European Association for Business and Commerce (2015) describes a digital economy as all economic activities

mediated by software and enabled by telecoms infrastructure. The researchers of the Bureau of Economic Analysis (Barefoot et al., 2018) includes the following in the term „digital economy”: (1) the digital – enabling infrastructure needed for a computer network to exist and operate, (2) the digital transactions that take place using that system (“e-commerce”), and (3) the content that digital economy users create and access (“digital media”). After summarising the above mentioned explanations of the term „digital economy” and systematization of conceptual approaches towards the notions of a digital economy (Tsyganov, Apalkova, 2016), the author concludes that the digital economy can be described as all economic activity that is based on digital technologies.

The digital economy is also sometimes called the Internet Economy, the New Economy, or the Web Economy (ScienceDaily), in the Akadterm (2015) database – the digital economy; e-economy; Internet economy; new economy; online economy; web economy. The author believes there is a difference between these terms and agrees (Techopedia) that the digital economy differs from the Internet economy, as the Internet economy is based on Internet connectivity, whereas the digital economy is more broadly based on any of many digital tools used in today's economic world.

The term ‘virtual economy’ refers to the process of exchanging virtual items and services with VC within a virtual world (Nazir, Lui, 2016). According to the author, Lehdonvirta and Mirko (2011) have precisely characterised the main elements of a digital and virtual economy: the digital economy – online services, communities, games, online shopping, e-commerce, e-government; the virtual economy – exchange of virtual goods, currencies, links, and digital labour.

The author believes and agrees with Annison (2017) that difference between digital currencies and VCs can be understood in a similar fashion: where digital currencies are non-physical representation of traditional fiat money, VCs represent a truly online asset, which does not have value other than in its virtual world.

Dandapani (2017) evaluates the impact of the Digital Age on e-finance in five key areas, including payment systems, digital and cryptocurrencies. Digital currency is electronic money that serves as an alternative currency in digital or online transactions. A major motivation for the evolution of digital currencies has been the drive to enhance e-commerce productivity by reducing time and transaction costs in commerce.

E-money, also known as digital money, electronic money and e-currency, is a form of money that is digitally stored as opposed to actual paper or coin currency. The use of e-money typically involves computers, the Internet and wireless transfers. E-money is convenient because it does not require the consumer to carry cash and can be used for making purchases

and receiving payments any time, 24 hours a day, seven days a week (Hose, 2017). In *Letonika.lv* (2009), the terms digital cash, electronic cash, e-cash, e-money, digital money are used as synonyms. According to the Financial Action Task Force (FATF), (2014), digital currency can mean a digital representation of either VC (non-fiat) or e-money (fiat) and thus is often used interchangeably with the term “VC”. A VC is a type of unregulated, digital money, which is issued and usually controlled by its developers, and used and accepted among the members of a specific virtual community (European Central Bank, 2012). VCs are digital representations of value, issued by private developers and denominated in their own unit of account (International Monetary Fund, 2016). According to the definitions provided by the FATF, the European Central Bank (ECB), and the International Monetary Fund (IMF), VC is a type of digital currency, though the opposite statement is false. Thus, all VCs are digital, but not all digital currencies are virtual.

VCs share the following characteristics: they are form of private money usually created in a decentralised way; they exist exclusively in digital form; thus far, most VCs have been based on Blockchain technology and most of them have a global character (Dabrowski, Janikowski, 2018). Mikołajewicz-Woźniak and Scheibe (2015) consider that the VC as a payment system is quite new and still a marginalized phenomenon. Nevertheless, the pace of VC market growth after its recent introduction and appearance of Bitcoin successors seems to be the signs of future changes in the financial service sector.

It can be concluded that the VC is a digitally reflected value that, unlike the traditional currency, is not converted into banknotes or coins, which are commonly used to pay for goods and services on a daily basis, but exists as an algorithm.

Classification of VCs and its characteristics

The variety of views regarding the division of VCs has encouraged the author to compile them and create a classification of VCs (Fig.1.).

VCs can be convertible (or open) or closed non-convertible (or closed). Convertible VC can be exchanged back and forth for real currency, while non-convertible VC can only be used in the environment for which it was designed.

According to the FATF (2014), there are the following participants of the VC system: an exchanger, an administrator and a user. *An exchanger* (also sometimes called a VC exchange) is a person or entity engaged as a business in the exchange of VC for real currency, funds, or other forms of VC and also precious metals, and vice versa, for a fee (commission). *An administrator* is a

person or entity engaged as a business in issuing (putting into circulation) a centralised VC, establishing the rules for its use; maintaining a central payment ledger; and who has the authority to redeem (withdraw from circulation) the VC. A *user* is a person/entity who obtains VC and uses it to purchase real or virtual goods or services or send transfers in a personal capacity to another person (for personal use), or who holds the VC as a (personal) investment.

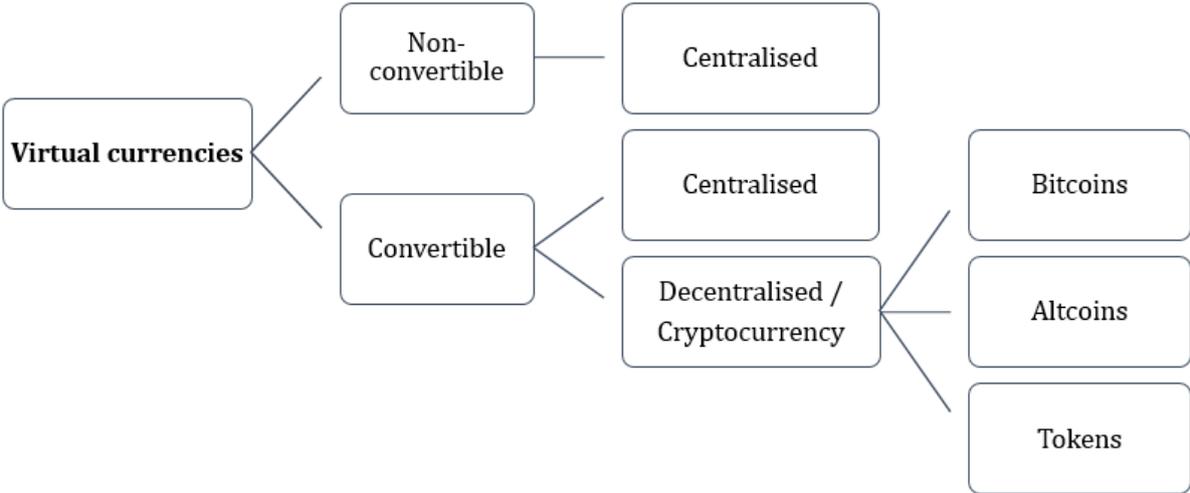


Fig. 1 Classification of VCs (by the author, based on Allen & Overy’s Fintech group, 2015; FATF, 2014; BBVA, 2017; CoinMarketCap, 2018a)

Centralised VCs have a single administrating authority (administrator) – i.e., a third party that controls the system. An administrator issues the currency; establishes the rules for its use; maintains a central payment ledger; and has authority to redeem the currency (withdraw it from circulation). Decentralised VCs (cryptocurrencies) are distributed, open - source, math-based peer-to-peer VCs that have no central administrating authority, and no central monitoring or oversight.

Depending on the participants and possibilities to exchange the particular currency to fiat currency, three types of currency can be distinguished in the classification of VC:

- *Non - convertible and centralised VCs:* an administrator, exchangers, users; a third-party ledger; cannot be exchanged for fiat currency. Example: the World of Warcraft Gold
- *Convertible and centralised VCs:* an administrator, exchangers, users; a third-party ledger; can be exchanged for fiat currency. Example: WebMoney
- *Convertible and decentralised VCs:* exchangers, users (no administrator); no trusted third-party ledger; can be exchanged for fiat currency.

Cryptocurrencies are decentralized peer-to-peer digital currencies based on computer cryptography for security. Popular cryptocurrencies include *Bitcoin*, *Lite Coin*, *Zerocoin* and *Peercoin* (Dandapani, 2017). The existence of a VC/cryptocurrency is based on a decentralized computer network. Emission of VC and its transactions are not monitored by either the central bank, any institution or a commercial bank – it is considered that the VC “regulates itself”. When performing a transaction with a VC, all computers of the network compete, generating a response to a cryptographic question of variable complexity and thus confirming the transaction. These computers are referred to as *miners*. All transactions performed with VCs are fixed in a virtual ledger, based on blockchain technology, and is publicly available. Thus, the transparency of the system is ensured – everyone has the opportunity to make sure, if the transaction has taken place. When performing a transaction with a VC, the sender sends the VC from his/her virtual wallet to the virtual wallet of the recipient. This requires the address of the recipient's wallet, which is the only detail known about its owner. Thus, the individuals/entities of the VC transactions are in fact anonymous because the virtual wallet does not have such identifiable details as, for example, the bank's IBAN code or the name and surname of the natural person (Tomsone, 2018).

The benefits of cryptocurrency: anonymity, preservation of investment value even during an economic crisis, multiplication of investment potential, high liquidity, ability of technological defence, ability to trade in the global market, not affected by inflation. Main disadvantages: not all trading outlets support cryptocurrency, fluctuating prices, possible restrictions on the use, complicated secure storage, and, in case of the loss of interest, cryptocurrency can lose its value (Grišins, 2017; Gavars, 2018).

Grišins (2017) and Gavars (2018) believe that it is necessary to keep up with two of the most popular cryptocurrencies, i.e., *Bitcoin* and *Ethereum*, and do not recommend making major savings in cryptocurrencies. Harwick (2016) admits that in relation to the stability of value, however, cryptocurrencies reveal their inadequacy as day-to-day currency. Bitcoin, for example, despite making up 86 percent of the entire cryptocurrency market, has suffered from frequent and severe jumps and crashes since its inception in 2010.

The *Bitcoin boom* has been around for some time in Asia, especially in China. This year, there is a lot interest of Japanese on this currency as well (Japan has acknowledged bitcoins as a legal method of payment). There are also enough bitcoin fans who call it a new gold and a politically neutral contribution that can be useful when the traditional belief in traditional paper money is gone. In addition, more and more merchants announce that they accept bitcoins as a payment. (Skupelis, 2017). Latvians who want to

invest in purchasing cryptocurrency have to consider that there are only nine companies in Latvia supporting the virtual money payment – a bar, a real estate company, a hostel, an Apple equipment repair centre, and the national airline company *airBaltic*. However, for the most part, it is just a marketing trick for businesses, they do not have their own cryptocurrency account, and the payments received are immediately converted into euros (LNT ziņas, 2018).

Altcoins are alternative cryptocurrencies launched after the success of Bitcoin. Generally, they project themselves as better substitutes for Bitcoin. The success of Bitcoin as the first peer-to-peer digital currency paved the way for many to follow. Many altcoins are trying to target any perceived limitations that Bitcoin has and come up with newer versions with competitive advantages. As the term 'altcoins' means all cryptocurrencies, which are not Bitcoin, there are hundreds of altcoins. ... “Altcoin” is a combination of two words: “alt” and “coin”; alt signifying 'alternative' and coin signifying (in essence) 'cryptocurrency.' (Investopedia).

Nowadays, cryptocurrencies (Turner, Irwin, 2018; Wegberget al., 2018), such as bitcoin, are commonly used in a variety of cybercrimes (for example, the currency of choice for many criminals, money laundering), anonymity/pseudonymity, rapid international transaction settlement, decentralisation and contained networks, money laundering, terrorist financing, fraud, cybercrime (Carlisle, 2017). Public institutions (in Latvia) recognize that cryptocurrencies are also attractive to money launderers, terrorists, and criminal circles. The State Police informs that the investigators have initiated several criminal procedures related to cryptocurrencies. All of them are about trading in prohibited goods (LNT ziņas, 2018).

Cryptocurrencies are divided: coins (i.e., Bitcoin) and tokens. According to William Mougayar, the author of ‘The Business Blockchain’, a token is “a unit of value that an organization creates to self-govern its business model, and empower its users to interact with its products, while facilitating the distribution and sharing of rewards and benefits to all of its stakeholders.” ... In the words of Cristina Carrascosa, a lawyer specializing in blockchains, “a token can be used in whichever way the person or organization designing and developing it decides. Tokens admit several layers of value inside it, so it is the token’s designer who decides what a specific token has inside... An example of this potential ‘replacement effect’ are the so-called ICOs, or Initial Coin Offerings. ICOs are a new business fund-raising alternative: Instead of a traditional fund-raising round, or even an IPO, companies offer tokens – not shares – to the market, and investors use digital currencies such as bitcoin to pay for these tokens. Everything through the blockchain (BBVA (2017)).

In Latvia, the start-up *Digipulse* could be mentioned. The company successfully implemented the ICO campaign, resulting in the investment of 1 million in return for the assets issued by the company – tokens, which were sold for already known coins such as the *Ethereum* currency. The company has developed a solution that will keep all the assets safe and, after the owner's death, will ensure that they get to the “right” hands (Buimistere, 2018; Labs of Latvia, 2018).

A variety of opinions about coins and tokens is described by this example: you can ask 10 different cryptocurrency experts to describe the difference between a coin and a token and you are likely to get 10 different answers. This is because the cryptocurrency community uses the terms “coin” and “token” interchangeably, all the time (Midlife Croesus, 2017).

CoinMarketCap separates coins and tokens using the following logic: “A *coin* is a cryptocurrency that can operate independently. A *token* is a cryptocurrency that depends on another cryptocurrency as a platform to operate. (CoinMarketCap, 2018a). According to *CoinMarketCap* data, there were 1752 VCs, including 823 coins and 929 tokens, used in the market for exchange, in August 2018, (CoinMarketCap, 2018b). The number of VCs is steadily increasing. For example, in June 2017, 745 VCs were recorded (Europol (2017). These facts rise the issue of significance of the regulatory issues of VCs.

Legal framework and future prospects for VCs

Despite the growing popularity of cryptocurrencies, several countries have demonstrated their negative attitude. On social networks (Twitter, Facebook, and Google), it is forbidden to place ads for cryptocurrencies, thus protecting consumers from a high financial risk. In China, deals with cryptocurrencies are completely forbidden since 2018, the Vietnamese government has also banned them, as well Indonesia has declared the cryptocurrencies to be an illegal means of payment. Bitcoin values have been negatively affected by South Korean speculations over bans on trading in cryptocurrencies. The European Union (EU) and the United States of America (USA) have not banned trading in the cryptocurrencies, though they agree on the introduction of an appropriate regulatory framework. Despite the fact that several countries have banned cryptocurrencies, some countries have seen their potential. Thus, the Central Bank of Singapore tests its own cryptocurrency, the Swedish Central Bank is discussing the introduction of cryptoKrona, but Switzerland has created the most favourable environment for development of cryptocurrencies. In Estonia, the *MotherShip* project is implemented – the exchange of cryptocurrencies and linking it with e-residency (Rupeika-Apoga, 2018).

Studies on the legal framework of VCs in the EU countries (European Central Bank, 2015), Japan, Germany, the USA, and Russia (Berdnikova, 2017), the USA, Switzerland, and the People's Republic of China (Dabrowski, Janikowski, 2018) show that the legal framework for VCs is at the early stage of development.

Malta has become the leader in the legal regulation issues and policies area. There are three laws in the process of adoption: the Law on Virtual Financial Assets, the Law on Digital Innovation, the Law on Technology Innovation and Services, as well as the establishment of a control body that will control and license this business. Malta will be the first country in Europe to have a clear set of rules on procedures to be taken in particular situation and stipulating which body is responsible for that. This is the result of close private-public cooperation (Melkıs, 2018).

In Latvia, the Financial and Capital Market Commission (FCMC) in its publication "Opinion on the Legal Regulation of Bitcoins and Similar Instruments" (FKTK, 2017) on 12 February 2014 (updated on September 21, 2017) informed that the regulatory enactments that are in the area of competence of the FCMC are not applicable to the VCs and, therefore, commercial activities related to buying and distribution of the VCs, are not considered to be a financial instrument or emission of electronic money, or performance of payment services, and warns about the risks associated with the use of the VC.

Amendments to the Law on the Prevention of Laundering the Proceeds from Criminal Activity (Money Laundering) and of Terrorist Financing (2017) were adopted on October 26, 2017, and they can be considered as an innovative initiative of the Latvian legislature, encouraging the introduction of the concept of a VC and VC service provider in the regulatory enactments, as well as defining supervisory functions for such activities in the field of money laundering and terrorist financing. This was a step ahead of the EU, as the European Parliament (EP) adopted the Directive on the prevention of money laundering and terrorist financing on 30 May 2018. According to the LR "Law on the Prevention of Money Laundering and Terrorism Financing" (2008), VC is a digital representation of the value which can be transferred, stored or traded digitally and operate as a means of exchange, but has not been recognised as a legal means of payment, cannot be recognised as a banknote and coin, non-cash money and electronic money, and is not a monetary value accrued in the payment instrument.

Directive (EU) 2018/843 of the European Parliament and of the Council of 30 May 2018 amending Directive (EU) 2015/849 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing, and amending Directives 2009/138/EC and 2013/36/EU stipulates that "VCs" means a digital representation of value that is not issued

or guaranteed by a central bank or a public authority, is not necessarily attached to a legally established currency and does not possess a legal status of currency or money, but is accepted by natural or legal persons as a means of exchange and which can be transferred, stored and traded electronically". The aforementioned EU directive will reduce the anonymity that is usually associated with the use of VCs. VC exchange platforms and wallet depositary service providers will have to ensure that customer due diligence checks are applied, as is the case with banks. "The anonymity of VCs allows their potential misuse for criminal purposes. ... To combat the risks related to the anonymity, national Financial Intelligence Units should be able to obtain information allowing them to associate VC addresses to the identity of the owner of VC (Directive (EU) 2018/843..., 2018).

The acquisition, sale, and circulation of cryptocurrencies in Latvia are becoming increasingly popular. The State Revenue Service (SRS) explains the activities with cryptocurrencies for both natural persons and legal entities (VID, 2018).

With the increasing number of VCs, with the strengthening of the legal regulation of VCs, the issue of the possible directions of further development of VCs arises. Dabrowski and Janikowski (2018), analysing the impact of VC on monetary policy, argue that the main question is whether they have the potential to compete with the sovereign currencies issued by central banks. That is, the monetary dominance of major central banks and major currencies seems to remain unchallenged in the near future.

As for the future use of bitcoin, the best-known cryptocurrency, two points of view dominate: the future currency or the payment system, for instance, smart contracts. Cryptocurrencies ensure smart contracts. These are digital contracts between two parties who do not know each other or do not trust the other party, and they allow safe and anonymous business or stock exchange transactions without interference of the intermediaries – central institutions, law or regulatory systems. Smart contracts operate the same way as traditional ones – they define the rules and penalties for executing or breaking the contract, but, unlike the case of the paper-based contracts, everything is done automatically. Decentralization is the key to a safer and more difficult to crack system (Buimistere, 2018)

Experts of *OP Corporate Bank* have proposed three forecasts for the financial industry: cash will start to disappear within 15 years; banks will issue their VCs, and the artificial intelligence will replace the employees of the Latvian banks (LMT Smart Future, 2017).

Most often, the experts are cautious when talking about investing in VCs. Wences Casares, the founder and CEO of the *Xapo*, offers the following formula for the investment: take 1% or less of what you own and invest in bitcoin, then forget it at least for the next five years; better for the next ten

years. You either will lose one percent of your net worth that most people can afford, or you will get a million (Rupeika-Apoga, 2017). Manager of *INVL Index Direct A*. Martinov recommends to those thinking about investing in bitcoins (if they have not yet invested in financial markets, but have savings) to buy bitcoins or some of the altcoins for an amount not exceeding one fifth of the monthly income... Indeed, for those who are already investing and have experience about traditional financial instruments, 1-3% of the total portfolio is a reasonable limit. In addition, when investing money in bitcoins or altcoins, one can immediately say farewell to it and settle for losses, and erase it from balance sheet, and not engage in speculations, and, after buying, wait for several years, as it will not be possible to survive such a large price fluctuations with other mood (Hāka, Ž.)

Today, technologies have become a daily reality, and the digital revolution changes how and what we produce, what services are available, and how we use them. In this aspect, VCs will gain more and more popularity and recognition, along with the ever-expanding range of opportunities.

Conclusions

Difference between digital currencies and VCs can be understood in a similar fashion: where digital currencies are a non-physical representation of traditional fiat money, VCs represent a truly online asset that does not have value other than in its virtual world. VC is a type of digital currency, but the opposite statement is not true. Thus, all VCs are digital, but not all digital currencies are virtual.

VCs can be convertible (or open) or closed non-convertible (or closed); centralised VCs or decentralised VCs (cryptocurrencies). Cryptocurrencies are decentralized peer-to-peer digital currencies based on computer cryptography for security. Cryptocurrencies have high risk and high returns. Advantages of cryptocurrencies: anonymity, preservation of investment value even during an economic crisis, multiplication of investment potential, high liquidity, technological defensive ability, ability to trade in the global market, and they are not affected by inflation. The main disadvantages of cryptocurrencies are: not all of the sales outlets support payment in cryptocurrencies, fluctuating prices, possible restrictions on the use of cryptocurrencies, complicated secure storage, and, in case of loss of interest, cryptocurrencies may be lost. It is suggested to stay on two most popular cryptocurrencies, namely *Bitcoin* and *Ethereum*, and not to make most of savings in cryptocurrencies.

Altcoins are the alternative cryptocurrencies launched after the success of Bitcoin. "Altcoin" is a combination of two words: "alt" and "coin"; alt signifying 'alternative' and coin signifying (in essence) 'cryptocurrency.'

Cryptocurrencies are divided into coins (e.g., *Bitcoin*) and tokens. A token is “a unit of value that an organization creates to self-govern its business model, and empower its users to interact with its products, while facilitating the distribution and sharing of rewards and benefits to all of its stakeholders.”

According to *CoinMarketCap* data, there were 1752 VCs, incl. 823 coins and 929 tokens, being exchanged in the market in August 2018. The number of VCs steadily increases. For example, in June 2017, 745 VCs were recorded. Consequently, the issue of legal regulation of the VCs becomes more significant.

The exploration of the legal framework for VCs suggests that the legal framework for VCs is at the early stage of its development. However, the acquisition, sale, and circulation of cryptocurrencies in Latvia are becoming more and more popular. The SRS explains the activities with cryptocurrencies of both natural persons and legal entities.

With the increasing number of VCs, with the increasing legal regulation of VCs, the issue of possible directions for the further development of VCs is raised. Two points of view dominate: the future currency or the payment system.

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