Digital Currencies As A Substitute Means Of Payment

Assist.prof. **Mladen Rajko,** Ph.D.
University of Zadar, Department of Economics
Splitska 1, 23000 Zadar, Croatia
GSM: +385911626090
e-mail: mrajko@unizd.hr

Abstract

A social community is a group of people involved in the processes of the consumption of results of work of the producer as a seller, and the consumers as buyers who pay for the producer's goods or services. In that process, people, on the daily basis, can contemporarily be producers and consumers. If everyone would produce only as much as he or she consumes, there would be no offer on the market. Since the economic relations within a social community work differently, each community member needs a regular supply of money in order to buy other people's products or finance own production. The money circulation, that is to say the wealth exchange within a social community, favours the creation of a greater variety of products, services and ideas, which implicitly or explicitly enriches every member of that community. In order to make the money work properly, which in praxis is not the case, everyone should have it and everyone should have an equal access to it. For that reason money as a currency should fulfil three objectives: be the unit of measurement for the value of a good or service, be "storage" of the money value for the future acquisitions and, finally, be a medium of exchange. Recently, one of the innovative and alternative means of exchange, especially at a local level, have become digital currencies, known also as alternative money. These currencies, which are the object of this research, are a means of payment or exchange that can be used instead of the national currency, mostly at the local community level. This paper's objectives are to acquire general insight into the presence and frequency of use of this currency in other countries, as well as its advantages and disadvantages. Furthermore it aims to analyse the legitimacy of the use of digital currencies in respect to the traditional means of payment. This paper's hypothesis is that the digital currency can be a legitimate and a successful means of payment of goods and services if the local community embraces it with confidence.

The scientific contribution of this paper is the first detailed analysis of the worldwide present digital currencies from the Croatian perspective as well as opening of new scientific questions on future research in this field.

Key words: *Digital Currency, National Currency, Means of Payment*

1. INTRODUCTION

In the last couple of years digital currencies, in general and Bitcoin in particular, are becoming an object of public interest. A great practicality and efficiency of electronic transactions in respect to the classical ones, are factors that are, beyond any doubt, influencing the growth of the notoriety of diverse forms of electronic payments, and the use of alternative money (currency) which, in praxis, is used as a digital currency. There are diverse factors that reduce the progress or slow down the trend of digital currency development. Some of these factors are the complexity of technical solutions upon which the digital currencies are based on and the lack of understanding of the way of functioning of the mentioned technical solutions.

A non-existence of the central authority which would support such currencies and a concern on potential security lacks in such a system, are also a demotivating factor of use for a certain number of users. The hypothesis of the present research is that the digital currency can be a legitimate and a successful means of payment of goods and services if a community embraces it with confidence. If the institutions do not assure and define a legal-economic framework, the mentioned possibilities hardly can be exploited and a community can hardly take the full advantage of such possibilities. The purpose of this research is a general analysis of the world digital currencies, and the paper's aim is an analysis of mostly used currencies as well as their advantages and disadvantages. Another aim is to research into the legacy of the digital currencies' use in respect to the classical money use in exchange of goods and services.

In the first part of this paper the method of research consists of clarifying basic concepts and definitions, like digital currencies as a means of payment, blockchain technology and others. The part that deals with the technical and the economic aspect of our object of study is approached with the methods of analysis and of deduction. Processing and use of the collected sources, as well as reviewing the current market situation and examining of the works that

belong to the studied area, are partly approached by compilation method. The synthesis method was used for the concluding remarks as well as in providing answers to some research questions.

2. DIGITAL CURRENCIES

The appearance of money, a part from being a consequence of development, it becomes a generator of the development of commerce and of economy in general. Technological progress, as well as the development of the economic theory and praxis, keeps discovering new currency forms and means of payment. In that way a community enjoys new, more efficient and advanced mechanisms of value exchange, thus contributing to social progress. In an ideal case, money has three key characteristics: it is a means of exchange, it is a measure of value and it is an economic good. Unlike the commodity money whose value comes from the commodity of which it is made or from its real use, over time a need for the new kinds of money, like representative money or fiat money, has emerged. From the historical point of view, the representative money use precedes the invention of the money. In the ancient Empires of Egypt, Babilon, India or China, the temples and the palaces used to have commodity storages that issued receipts as evidence for claiming part of the goods stored in the storage. Such receipts are one of the first examples of the representative money[1]. Fiat money is a currency established as money by government regulation or law. The term derives from the Latin word *fiat*, meaning „let it become", "it will become", used in the sense of an order or decree[2]. It differs from the representative money because it is no longer connected to its intrinsic value. Its acceptance in a community depends on legislation or on a government decree, and the trust in its use and value depends on the trust in the government's authority. Digital currency as electronic money emerged as a logical consequence of the development of telecommunication and information technology. It represents any form of money that appears in an electronic or virtual form, regardless of whether that occurrence is exclusive (such as in digital currency schemes) or is an electronic version of a classic, fiat money (as in the case of internet banking, for example). The common feature of all forms of electronic money is to use it with the help of various types of devices (computers) and certain technologies. In economic literature several terms for digital currencies are used. The most common are *cryptocurrencies*, *virtual currencies*, *virtual money*,

[1] MUNDELL, Robert A., *The birth of coinage*. Citeseer, 2002, Available on: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.1009.8953&rep=rep1&type=pdf., Accesses 29.04.2017.).

[2] MANKIW, N. Gregory, The data of Macroeconomics, u *Principles of macroeconomics*, Cengage Learning, 2014, p. 220.

digital money and *digital currencies*. For the purpose of this paper, we will be using the term *digital currency*, selected exclusively according to the criterion of popularity on the Internet. It can be considered a synonym of other popular expressions referred to as blockchain-based currencies. The European Central Bank has opted for *virtual currency schemes*[3]. The term *scheme* has been added to emphasize that it is a multi-component system, one of the key and most characteristic components being the information system. The currency is in fact based on the information system and without its assistance the currency would not function[4]. In practice, almost all the functions of this system are operated with the use of computers and telecommunications technology, so it makes sense to observe virtual currency in this way, as a system, because otherwise they would not exist. Classical money, on the other hand, can fulfil its function both in digital form and in classical form, and for its use, from a theoretical standpoint, the information technology is not crucial (even though today, the exclusively classical use of money, i.e. without the use of information technology, is almost unimaginable).

It should be noted that the concepts of virtual and digital or electronic money in some authors are also mentioned in the context of digital or electronic versions of classical money. As an example we can take the electronic banking system or the card payment system. Such examples are not the primary topic of this paper. Instead, the focus is on decentralized digital currencies based on blockchain technology.

The basic similarities and differences between digital currency and electronic money would be as follows:[5]

- **Format, money appearances**: In both cases currency appears in digital format. There is a possibility of transferring values of digital currency to other media, for example, printing on paper, but this should not be confused with the printing of classic banknotes. The function of such media is solely as a material carrier of information, it can not be falsified in the classical sense of the word since the bearer of its value is a set of symbols, which represents a particular key needed to spend money. Knowing of this key is also the possession of values.

[3] European Central Bank. Eurosystem. 2015. Virtual currency scheme – a further analysis. Frankfurt am Main (25.08.2017), https://www.ecb.europa.eu/pub/pdf/ other/virtualcurrency schemesen.pdf
[4] Virtual currency schemes, oct-2012, Available on: https://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes201210en.pdf., (Accessed 20.03.2017.).
[5] Author

- **Calculation unit:** For electronic money, the calculation unit is a classical currency (USD, EUR, GBP, HRK and others). Digital currencies are calculated in their own calculation units (Bitcoin, Litecoin, Ethereum and others).
- **Currency acquisition**: Electronic money is obtained directly from the issuer, either in a digital or in a material form. Both are shared and controlled on the user account, or by receiving payments directly on the user account or in commodities and services on a variety of grounds. Digital currencies are acquired by buying or trading within a virtual community of users.
- **Legal regulation:** Electronic money is fully subject to the regulations valid for the classical currencies, carried out by national state institutions (national banks and government). Digital currencies are not centrally managed, and are often not legally regulated, that is to say, each member of the community is involved in their regulation. The consensus of most users carried out through the usage of certain technical systems, is the basic system regulator.
- **Issuer:** The electronic money issuer is a legally established institution. For a digital currency, the issuer is a private company, an individual, or an association. In a technical sense, anyone can actually be an issuer of its own currency.
- **Money offer**: the offer of electronic money is a result of the supply and demand of the classical currency. It is regulated by the issuer (the government) and serves as a fiscal regulator of the issuer's economy. Money issuing or withdrawal is subject to strict control and regulation, unlike in the case of digital currency where the offer is usually fixed or it follows some predictable algorithm. There is also a possibility for the issuer to regulate the offer, but such a solution is not popular for the simple reason that in that case the basic advantage of the system, decentralization, is undermined.
- **The possibilities of funds' purchase:** Electronic money as an extension of the statutory payment presupposes an unlimited possibility of purchase by the issuer. The exchange rate is mainly a result of the market for the traditional currencies and in most cases is relatively stable. In the case of digital currency, there is no guarantee of the purchase of funds, i.e. such a guarantee does not make much sense if the same currency is used as an calculation unit. The market, i.e. supply and demand, is the main regulator of the exchange rate with respect to the classical currencies[6]. Volatility is very high and

[6] PLASSARAS, Nicholas A., Regulating digital currencies: bringing Bitcoin within the reach of IMF, *Chic. J. Int. Law*, sv. 14, 2013, p. 377.

currency value is not guaranteed. In fact, the ability to purchase the currency and its acceptance, directly affect its market value.

- **Supervision and control**: in the case of electronic versions of classical currency, supervision and control are carried out, in the same way as for classical money, by legal institutions. The legal framework is defined and the legal proceedings are extensive. Digital currencies are very poorly regulated and many countries have not yet sufficiently defined their status. In cases when they are not considered as money in the legal sense, they are referred to as securities.
- **Security and risk:** An electronic version of classical currency introduces a new, technical component of the system and, consequently, a new risk factor. In practice this is an operational risk and it is not an obstacle to use, i.e. the advantages of the system outweigh the disadvantages. Digital currency besides operational risk, can assume some significant legal and economic risks that users take over completely. Such risks, in the end, significantly affect the value of the currency, i.e. the exchange rate and liquidity, and are much more significant than the technical and operational risks.

Due to the very nature of digital currency, i.e. due to its anonymity, it is difficult to estimate how many users a certain currency has. It is possible to find out how many digital wallets are there for most types of currencies, but since each user can have an unlimited number of digital wallets it can be only said with certainty that the number of users is significantly smaller.[7] Many users have multiple wallets, and there are plenty of abandoned or lost wallets that their users have opened for specific testing needs of the system itself, and after they had stopped to use them, they simply abandoned them.

In the next part of paper the author presents the analysis and evidence that digital currencies can be used as a means of substitute payment because they meet the above mentioned criteria as any other means of payment:[8]

Digital currency as a calculation unit: there is very little data on any digital currency that would suggest that a certain digital currency is being used as a calculation unit. Although there is a small number of transactions between individuals in which parties were negotiating the price, for example in bitcoins, those cases are mostly isolated and unrelated.

[7] RAYMAEKERS, Wim, Cryptocurrency Bitcoin: Disruption, challenges and opportunities, *J. Paym. Strategy Syst.*, sv. 9, issue. 1, 2015, p. 32

[8] Author

Traders, who prefer to express their prices in one of the digital currencies, in order to maintain a desired value, i.e. a stable price compared to a traditional currency, such as EUR or USD, should update them regularly/frequently. This, of course, is the result of the high volatility of digital currencies.

Although an increasing number of companies, in order to make easier and to simplify the payment, express their prices in, for example Bitcoins, they parallelly also use a classical price list, whereas the digital currency serves only as a temporary means of payment. Banks are not really aware of these transactions, because in the end, only the classical currencies can be seen and can arrive on the users' account.

Digital currency as a means of value exchange: one of the indicators to what extent a currency is used as a means of exchange is the number of traders who are willing to accept this type of payment. Currently, there are several thousand traders around the world (mostly online shops, but not exclusively) that accept payments in Bitcoins. The readiness of traders to accept digital currency does not in itself imply that this option is widely used. A much stronger indicator that shows that a particular digital currency is used as a means of exchange, is the number of transactions executed by its customers over a certain period of time, as well as the value of the total number of transactions over a given period. In that sence, a significant growth trend is visible. According to coinmarketcap.com, the total value of the daily turnover of the top 15 most powerful digital currencies exceeds five billion USD.

Digital currency as a means value storage: the value of money is generally based on the present and future belief of the users in its supply and demand. As in the case of decentralized digital currencies there is no central authority controlling them, their value lies exclusively in the trust of their users. The supply is mostly predictable and relatively safe thanks to the built-in mechanisms of the systems, but demand, on the other hand, depends on many factors and is rather uncertain. Because of that, digital currencies are certainly not a suitable medium for short term value preservation. As far as long-term value preservation is concerned, opinions are divided into two streams. The first one concerns the fact that formal institutions and banks believe that investment in digital currencies is highly risky. The second one says that one could expect a great increase in value, so it would be profitable to invest in digital currency. Both approaches have certain arguments. In any case, the lack of legal regulation of digital currencies is already in itself a reason for their non-use for long-term preservation, except in cases of readiness for high speculative risk.

3. THE USE OF DIGITAL CURRENCIES IN THE WORLD AND IN THE REPUBLIC OF CROATIA

Nowadays, there are numerous digital currencies in the market. According to many sources, it is estimated that there are over 700 active ones, and if we count in the quenching ones, the number is significantly growing over 1000[9]. At the moment, there is still a growing trend in the number of digital currencies and in market capitalization. It should be emphasized though that a good part of digital currencies, due to a very small capitalization is of no economic significance. The best indicators of the popularity of digital currencies are market capitalization and daily turnover. According to the market capitalization, on 25 August 2017, there were 13 digital currencies with over one billion dollars of market capitalization. The total market capitalization of all digital currencies is estimated at 163 billion dollars. According to coinmarketcap.com[10], there are currently 782 active digital currencies. Out of which, 605 have recorded at least some kind of market capitalization. This list is not complete because many currencies emerge almost on a daily basis. While only the most liquid ones are present and active on the market and listed on coinmarketcap.com, others are left out due to their lack of liquidity. The following table (Table 1) shows 15 most significant digital currencies:

Table 1 List of 15 most significant and influential digital currencies according to the market capitalization on 25 August 2017[11].

No.	Name of the currency	Market capitalization (millions of $)	Value ($)	Number of active units	Daily turnover in millions ($)
1	Bitcoin (BTC)	75,74	4.581,51	16.531.600	2.474,8
2	Ethereum (ETH)	35,12	372,41	94.317.688	1.184,2
3	Bitcoin Cash (BCH)	8,86	535,32	16.551.938	320,4
4	Ripple (XRP)	8,40	0,22	38.343.841.883	291,8
5	Litecoin (LTC)	3,30	62,63	52.690.857	322,2
6	Dash (DASH)	2,71	360,85	7.521.648	49,4
7	NEM (XEM)	2,53	0,28	8.999.999.999	7,8
8	IOTA (MIOTA)	2,24	0,81	2.779.530.283	26,6
9	Monero (XMR)	1,98	131,71	15.007.994	106,2
10	NEO	1,68	33,61	50.000.000	166,4
11	Etherium Classic (ETC)	1,50	15,79	95.008.442	67,3
12	Hshare (HSR)	1,09	32,48	33.600.000	60,5
13	Qtum	1,05	17,78	59.000.000	207,0
14	OmiseGo	0,93	9,47	98.312.024	85,6
15	BitConnect	0,84	128,04	6.547.883	9,9

[9] KOBLITZ, Neal, MENEZES, Alfred J., Cryptocash, cryptocurrencies, and cryptocontracts, *Des. Codes Cryptogr.*, sv. 78, issue. 1, 2016, p. 9

[10] All Currencies | CryptoCurrency Market Capitalizations, Available on: https://coinmarketcap.com/all/views/all/., (Accessed 25.08.2017.).

[11] Ibid.

From Table 1 it is apparent that Bitcoin is a digital currency with the highest market capitalization. In total, its market capitalization is 3 billion $ higher than the total sum of market capitalizations of the remaining 14 digital currencies. Additionally, the highest value of one unit has Bitcoin, followed by Bitcoin Cash, Ethereum and Dash. At the moment, the use of digital currencies in the European Union is not regulated. The standpoint of the European National Bank in terms of digital currencies is that the system of national banks does not recognize terms like *virtual currency* or *virtual currency scheme* in terms of money, and does not consider these concepts to belong to the world of money or currencies used in economic literature. Neither is the *virtual currency* a currency, nor is it a currency from a legal perspective[12].

In Croatia, since the emergence of Bitcoin, the first digital currency, until today only a few recommendations and instructions on the use of digital currencies have been published. First and foremost, for the public it is important to know whether the use of digital currencies is legal, in what way is defined their legal status and how are they treated in terms of taxation. In 2013, the Croatian National Bank (CNB) conducted a debate on the digital currency circulation and use in Croatia and concluded that Bitcoin is not illegal. According to the CNB legislation, the only official currency in Croatia is the Croatian kuna (HRK), and only exceptionally other currencies can be allowed. CNB does not define and consider Bitcoin and other digital currencies neither as a currency, i.e. an official means of payment, nor as electronic money. Instead, it refers to the European Central Bank official standpoint from October 2012. [13]

For this reason, in Croatia, trading in digital currencies is not illegal. As far as the taxation is concerned, the Tax Administration in Croatia refers to the Article 40, paragraph 1 of The Value Added Tax Law (Official Gazette of RC Narodne novine No. 73/13, 99/13, 148/13, 153/13 and 143/14). From the Croatian financial market and the Croatian economy perspective and on the basis of the present research, it can be concluded that the use of digital currencies in the Republic of Croatia is at the very beginning, and that the first serious steps were taken by setting up three Bitcoin ATMs in Zagreb, Rijeka and Split.

[12] Virtual currency schemes - a further analysis, velj-2015, Available on: https://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemesen.pdf?, (Accessed 18.02.2017.).
[13] Virtual currency schemes, lis-2012, Available on: https://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes201210en.pdf., (Accessed 20.03.2017.).

4. CONCLUDING REMARKS

The use of digital currencies, although in a strong growth, is still limited to a relatively small share of population. The assumption is that these are mainly users coming from the technical and financial fields of activity, with a certain level of technical knowledge, but also various other enthusiasts seeking new technologies or even speculators ready to face significant risks. Of course, it is realistic to assume that a certain percentage is used illegally.[14] Practicality, acceptance, commissions during exchange from digital to classical currency and vice versa, transaction commissions, ATM availability are some of the factors that can affect the digital currency usage. Although the digital currency circulation within the community is relatively easy, and the transactions are rather cheap, entry or exit actions (i.e. buying or selling Bitcoin or other currencies for classical money) still imply certain obstacles. This kind of market situation confirms the example of Bitcoin, the most popular currency, whereas in the example of Altcoin it is even more pronounced. Digital currencies' large volatility and the governmental non-acceptance are also significant reasons of their unacceptability.[15]

From a legal standpoint, digital currencies are treated in a variety of ways. Reactions of individual country legislators vary from ignorance to prohibition. This uncertainty is a major security risk for the users, and the cause of mostly speculative approach to their use.
For example, in December 2013, there was a significant drop of Bitcoin following the Chinese Central Bank's warning to financial institutions and companies not to use it. As the Chinese market of Bitcoin users is one of the largest, this move of the Chinese Central Bank triggered a fall of Bitcoin value on the market. Although formally it is the case of decentralized currency systems without a superior authority, the government has powerful mechanisms to control digital currency usage, if it decides to do it at any moment. An insufficiently defined legal framework in many cases furtherly motivates the abuse of digital currencies, reducing the potential positive effects that otherwise could result in the widespread use of blockchain technology.

Digital currencies offer a completely new system model which represents a real phenomenon in the sense of a new value that was created without any prior need and without a certain fundamental value. The evident Bitcoin's rise to a currency status that can already be used to

[14] TRAUTMAN, Lawrence J., Virtual currencies; Bitcoin & what now after Liberty Reserve, Silk Road, and Mt. Gox?, 2014, p. 8.
[15] LUTHER, William J., Cryptocurrencies, network effects, and switching costs, *Contemp. Econ. Policy*, 2015, p. 2.

buy real products, indicates that money is a social concept or a form of interaction between people.[16] It is also clear that new digital currencies bring a new dimension to value exchange and trade, in practical terms, better efficiency, new opportunities, time and cost savings, etc. depending on one or another type of their usage. In that sense, these new technology are a gain and an advantage for a society.

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[16] BORNHOLDT, Stefan, SNEPPEN, Kim, Do Bitcoins make the world go round? On the dynamics of competing crypto-currencies, *ArXiv Prepr. ArXiv14036378*, 2014, p. 4