

O.O. Borzenko^{1*}, A.B. Hlazova²

Institute for economics and forecasting, National Academy of Science of Ukraine, Kyiv, Ukraine
¹*slozko2003@ukr.net*, ²*annapelo@ukr.net*

¹*<https://orcid.org/0000-0002-1017-5942>*, ²*<https://orcid.org/0000-0003-0102-1420>*

**Scopus Author ID: 57208315150, *Researcher ID: 0782819*

²Scopus Author ID:56602876300

Cryptocurrency as a secondary form of manifestation of finance virtualization

Abstract

Object: Object of the paper is to develop theoretical principles that reveal the content, functions and role of cryptocurrency as new, quite controversial means of settlements appeared in digital society. Cryptocurrency is studied as a secondary form of finance virtualization. The investigation is directed on cryptocurrency's theoretical and practical aspects of functioning.

Methods: The investigation used statistical and economic-mathematical methods to analyze the current trend of development in bank and non-bank payment systems. The authors collected data about legal status of cryptocurrencies, then the obtained data was analyzed according to its official status in developed and developing countries.

Findings: It was found that the biggest non-bank electronic payment system PayPal, as a secondary form of virtualization manifestation it currently shows higher growth of rate than the biggest bank card payment system — VISA. The position of cryptocurrencies in National Legal Systems of developed and developing countries was collected and analyzed, according to its legal status. The possible risks and controversial questions of cryptocurrency's influence on price stability, stability of payment and financial systems are determined.

Conclusions: Emergence of cryptocurrency in modern society is the evidence of global digitalization. Virtualization in its primary and secondary manifestation form affects financial sector. Secondary form of virtualization results in non-bank sector development, namely non-bank electronic payment systems (e.g., PayPal) and non-institutional digital schemes of settlements (cryptocurrency). Developed countries are mostly more progressive in cryptocurrency regulation than developing countries. In the case of global cryptocurrency spreading wide there are some risks national economies may face. They include the problem of price stability, the stability of the financial system, the stability of payment systems. Generally, the authors substantiate the requirement for search of the complete definition of cryptocurrency that may be integrated into national legal system for further regulation and risks controlling.

Keywords: virtualization, cryptocurrency, virtualization of finance, information society, non-banking sector, non-banking electronic payment systems, regulation of cryptocurrencies.

Introduction

Information and telecommunication technologies (ICT) have caused qualitative economic transformation, deepening development of information society, emerging new independent instrument of settlements, i.e., cryptocurrencies. The issue of financial sector modernization through information and telecommunications technologies implementation is on the agenda. Economic aspect of the process is the development of branches, markets, institutions etc. on ITC foundation.

The implementation of IT in the financial sector leads to increased productivity of operating activities, changes of money existence form, highlighting the information component. The use of IT allows financial institutions to obtain information about changes in market conditions, coordinate resources, choose the optimal strategy. The presence of the above-mentioned features is inextricably linked to competitiveness and profitability. The convergence of information and communication technologies with finance and the further development of the latest tools and schemes of settlements on this basis have led to transformation of finance that violates the necessity for investigation the problem of virtual currencies interaction with economic and financial system.

Literature Review

Reviewing recent studies and scientific research in the field of cryptocurrencies, it should be admitted that the lack of investigation about economic effects of cryptocurrencies influence on domestic and global systems in the case of its legal recognition, interaction of real financial system with cryptocurrencies, prob-

* Corresponding author.
E-mail address: *slozko2003@ukr.net*

lems of world monetary and financial system may be faced. While there are studies focused on world monetary and financial system regulation (Bush, Farrant, Wright, 2011), problem of the financial system stability (Solt, 2015), reviewing reserve currencies functioning (Bordo, Levin, 2019) etc.

So, to transform world monetary and financial system different scenarios of transformation were proposed (i.e., SDR as unique global reserve currency, the status quo of the dollar, a new reserve currency on the basic of basket etc.) but no one determines cryptocurrency's place or its role in global financial system. However, cryptocurrency's impacts on financials system are poorly studied and require further investigation as the main indicator of digital society development.

Methods

The purpose of the paper is to develop theoretical principles that reveal the content, functions and role of cryptocurrency and to explore cryptocurrency's possible influence on real financial system as distinctive feature of digital society and its consequences for the global economy.

The theoretical and methodological basis of the study is the position of modern economics, scientific works of leading domestic and foreign scientists in the field of global financial market research, virtualization and globalization.

The study uses modern research methods, namely:

- system approach (to study the theoretical possible foundations of cryptocurrency's influence on the international monetary system);
- statistical and economic-mathematical methods (to analyze the current trend of development in bank and non-bank payment systems);
- methods of scientific analysis (to obtain data about common backgrounds of cryptocurrency's official status in developed and developing countries).

Results and Discussion

As a result of using mathematical-statistic methods it was found that the biggest non-bank electronic payment system PayPal currently shows higher growth of rate than the biggest bank card payment system VISA. The position of cryptocurrencies in national legal systems of developed and developing countries was collected and analyzed according to its legal status. The possible risks and controversial questions of cryptocurrency's influence on price stability, stability of payment and financial systems are determined.

The virtualization of the world monetary and financial system is expressed in the deprivation of the monetary value of intrinsic value, emphasizing its informational nature, as well as the deeper integration of server systems of the global financial market. Finance under the conditions of virtualization takes the form of alienated intrinsic value of goods embodied in electronic payment units circulating in the information economy to mediate exchange.

Conceptually, we have to admit both forms of manifestation of finance virtualization, namely primary and secondary. The primary form of the phenomenon defined money as the alienated intrinsic value of goods, expressed in digital form of information-cash flows to mediate the relationship of exchange and settlement (including bank settlements). It is based on digitalization of operational processes, as well as convergence of information technologies and communication systems with the finance. The secondary form of finance virtualization is expressed as in the transformation of money into financial and information flows, as the emergence of non-banking electronic payment systems, non-institutional monetary units and payment systems (cryptocurrency).

It is concluded that during recent years non banking sector has been steadily growing under digital technologies and communication system influence. Based on the study, ICT development has been causing the evolution and qualitative transformation of the global financial system: the creation and activation of non-bank electronic payment systems expressed in electronic non-bank payment system (PayPal, Stripe, YooMoney etc.) and non-bank cryptocurrencies spreading (Bitcoin, Ethereum, Tether, XRP, Cardano, etc.). Talking about the non-bank payment system, we have concluded that the largest non-bank payment system PayPal demonstrates higher growth rates than the largest bank payment system VISA. It was found that both of them show positive growth dynamics. In spite of larger scale of VISA (USD 11.6 trillion) compared to PayPal (USD 0.712 trillion) (Statista, 2019; Visa Annual Report, 2019), the non-bank payment system PayPal shows higher rate of growth in 2019 compared to 2018 (18 %) than VISA (3 %).

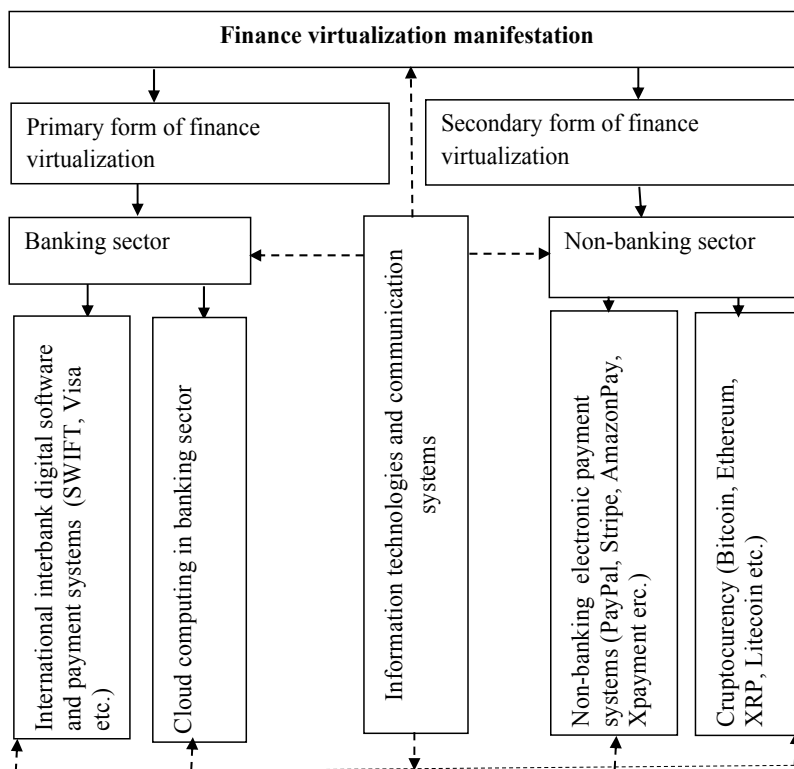


Figure 1. Generalized concept of finance virtualization

Note: made up by the authors

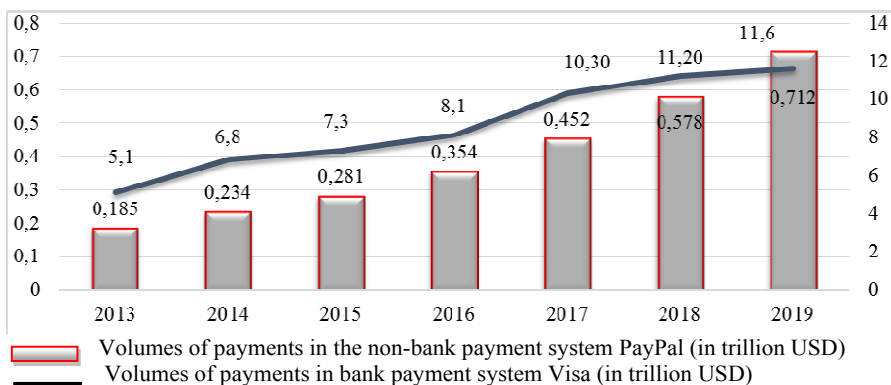


Figure 2. Dynamics of payments in the VISA card payment system and the non-bank PayPal payment system

Note: made up authors on a basis of (Statista, 2019; Visa Annual Report, 2019)

But talking about theoretical and practical side of cryptocurrency functioning, first of all, we have to analyze the possibility of money function implementation by cryptocurrency. So, classical economic theory distinguishes five functions of money: a measure of value, a means of circulation, a means of accumulating capital, a means of payment, and world money. In the context of virtualization, these functions have two aspects: 1) if we consider fiduciary money in the primary form of virtualization, then all five functions of money remain, and virtualization has a positive impact on finance; 2) if we consider virtual currencies as a manifestation of the secondary form of virtualization of the world financial market, then the performance of the basic functions of money by virtual currencies remains in question. The functions of measure of value, means of circulation, means of payment, and world money will exist only as long as they are used and accepted by all the subjects. As for the function of capital accumulation, in modern conditions the volatility of the cryptocurrency market puts the performance accumulation function under risk. Thus, in our opinion, cryptocurrency may not fully perform as a means of capital accumulation, but sometimes may act as a means of capital losing.

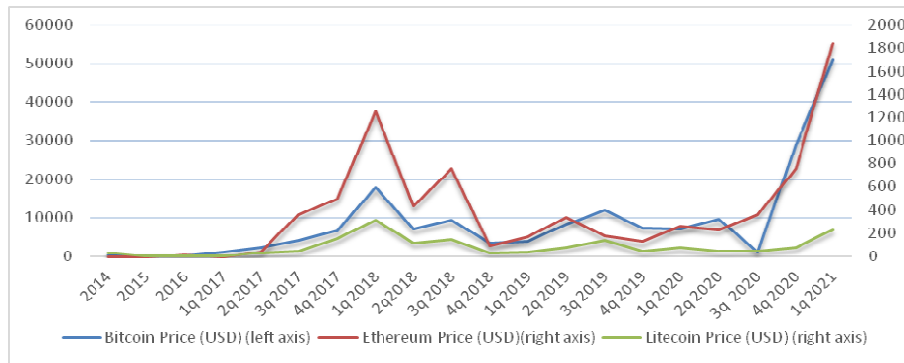


Figure 3. Volatility of cryptocurrencies' price (in USD) (Bitcoin, Ethereum, Litecoin) 2014–2021

Note: compiled by the authors on a basis of Coinmarketcap, 2021

In terms of the impact of virtual currencies on the country's monetary system, a closed in-house scheme of cryptocurrency (non-convertible) that focuses on the functioning of a specific virtual community (e.g. an online game) has no relation to the central bank and has no effect. As for more open schemes (partially convertible and fully convertible), we note that they are related to the real sector of the economy (Report of ECB, 2012). There is the possibility of speculative transactions, and convertible virtual currencies can be used to buy real goods and services, thus creating competition with traditional means of payment. Therefore it is necessary to analyze the potential impact of virtual currencies on international monetary system in relation to the main tasks: 1) price stability; 2) the stability of the financial system; 3) the stability of payment systems (Figure 4).

The most important problems the financial sector may get in the context of virtual payment systems existence are:

- 1) preservation of the unit of settlements;
- 2) risks associated with monetary policy and its adequate implementation;
- 3) possible distortion of monetary aggregates.

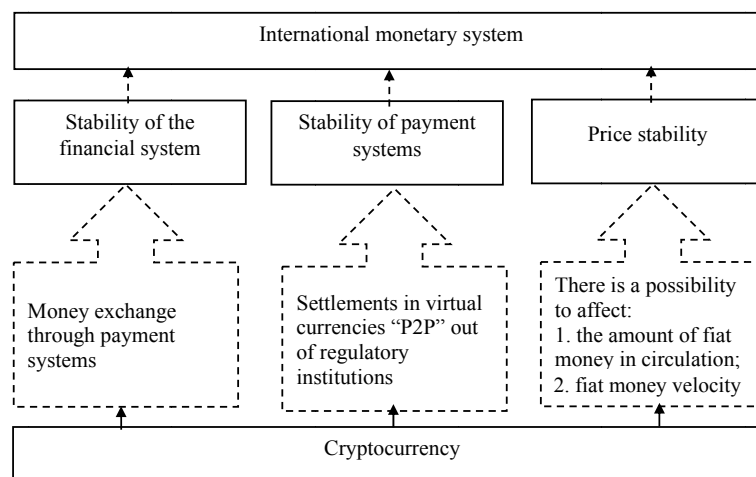


Figure 4. The potential impact of virtual currencies on international monetary system

Note: made up by the authors

Conceptually, virtual currencies can affect price stability and monetary policy if they change the demand for bank liabilities and interfere with the management of money supply through open market operations. Virtual currencies can affect price stability if they significantly change the amount of money in circulation; affect the velocity of money and the use of cash and/or affect monetary aggregates; there is an interaction between the virtual currency and the real economy.

With regard to the first aspect — the impact on the amount of money in circulation — this phenomenon is difficult to assess due to the lack of reliable information on the amount of real money created by virtual one. However, in principle, these schemes operate on a prepaid basis, i.e., the emergence of virtual currency

is possible when fiat money is converted into virtual, and vice versa — virtual currency is absorbed when exchanged back for real money. Therefore, theoretically, there is no significant impact.

In view of the above, the cryptocurrency supply should remain stable without significant changes. It is argued that the issue limit is a safeguard against inflation, as a limited supply will allow upward exchange rate. This stimulates the speculative accumulation of bitcoins. Some authors believe that the limited number of bitcoins is not a sufficient condition to guarantee the absence of exchange rate upward trend, because non-speculative value of bitcoins directly depends on the volume of only those goods and services that can be purchased for them, but not on the global commodity mass.

It is necessary to note two important points: first, the volatility of the money supply in the long term; second, the impact of cryptocurrency supply on the real money sector must be assessed after the exchanging as additional liquidity due to exchange rate fluctuations is still claimed.

The second important issue is the impact of virtual currencies on the velocity of the currency and on monetary aggregates. The velocity of a currency is measured by an indicator that shows how often the currency is spent on the purchase of goods and services produced by the national economy. In the short term, the speed of rotation is stable because it depends on institutional and technological features that can not be changed in a short time. However, it is still unclear how technological innovations represented by cryptocurrencies can change the rate of currency turnover. It will mainly depend on the number of users of the virtual currency (users include buyers who want to use this currency in payments, and sellers who are willing to accept it). In the extreme case virtual currencies can have the effect of replacing the central bank's currency if they become a widely accepted means of payment. Increasing usage of cryptocurrencies can reduce the demand for fiat money, thereby reducing the number of required for transactions. As a result, the widespread replacement of central bank money by privately issued cryptocurrencies could significantly reduce central bank balance sheets and, as a result, their ability to influence on interest rates in the short term. In this case, the Central Bank will have to use a variety of tools to combat new risks (for example, an attempt to set minimum reserve requirements for virtual currencies).

The substitution effect will also lead to difficulties in measuring monetary aggregates and will therefore affect the relationship between monetary aggregates and inflation. Other important point about the impact of cryptocurrencies on monetary aggregates is that because these currencies operate outside the jurisdiction of central banks, the amount of credit granted in cryptocurrency can be significantly increased and central bank has no powers of control it.

But despite the risks cryptocurrencies continue to gradually consolidate their positions, transforming the global monetary system. A comparative analysis of the non-unified policy around the world on the official status of cryptocurrencies revealed that developed countries are stimulating the cryptocurrencies development more than developing countries.

Table 1. Comparative profile of cryptocurrency official recognition in developed and developing countries

Criteria	Developed countries	Developing countries
1	2	3
<i>Official status</i>		
Settlement currency	Germany (2018), Spain (2014), Japan (2017) – legal tender; UK and Switzerland – foreign money	
Investment asset	USA, Canada, Israel (financial asset), Switzerland	
Financial instrument	Germany, UK	Singapore, Hong Kong
Virtual product	Czech Republic, Austria	Hong Kong, Taiwan
Announced launch of cryptocurrency of central banks	France, Germany, Turkey	China, Singapore, Uruguay, Thailand, UAE, Iran, etc.
<i>Adjustment tools</i>		
Taxation of income from transactions	USA, Canada, Great Britain, Norway, Poland, Finland, Spain, Sweden (legally tax-free)	
Licensing of cryptocurrency transactions	Germany, Estonia, Switzerland, USA	Thailand
Crypto stock exchange	USA, Great Britain, Japan, South Korea, Australia, Switzerland	China, Malaysia, Taiwan, Thailand, Malta, Russia, Hong Kong, Singapore

1	2	3
<i>In the process of recognizing the legal status</i>		
Development of regulatory framework	Italy, Australia, Belgium, Israel, the Czech Republic, Denmark, etc.	Brazil, Colombia, Croatia, South Korea, Malta, Belarus, Ukraine, Crete, Greece, Georgia, etc.
Controversial question	Latvia	Montenegro, Libya, Albania, Indonesia, India, etc.
<i>Cryptocurrencies are not given official status</i>		
Illegal means of payment, complete ban		Egypt, Algeria, Morocco, Iraq, Bolivia, Ecuador, Vietnam
Restrictions on the use of "private" cryptocurrencies	Iceland	Bangladesh, India, China, Russia, Lebanon, Venezuela, etc.
<i>Note: made up by the authors</i>		

The policy on cryptocurrencies is differentiated throughout the world. In general, developed countries are more progressive in recognizing and regulating the legal status of cryptocurrencies than developing countries (except Singapore, Hong Kong, Taiwan). The complexity of state regulation lies in the multiplicity of interpretations of the legal status of cryptocurrencies. For example, cryptocurrencies are considered to be an asset (USA, Canada, Switzerland), financial instrument (Germany, Great Britain, Hong Kong, etc.), commodity (Austria, Taiwan), foreign unit of account (Great Britain, Switzerland), legal tender (Japan). In general, many countries recognize cryptocurrencies, but have not yet developed a regulatory framework (Italy, Australia, Belgium, Israel, the Czech Republic, etc.). Among developing countries there are those that restrict the use of private cryptocurrencies (India, China, Russia, Lebanon), and some officially ban them (Egypt, Iraq, Vietnam, etc). However, despite the fact that the status of cryptocurrencies is a very controversial issue, there is a growing trend in the world to introduce blockchain technology and launch cryptocurrencies of central banks (France, Germany, Turkey, etc.).

Talking about practical implementation of cryptocurrency usage, we have to admit large-scale acceptance of virtual money by the biggest companies globally. The world's largest companies such as Microsoft, Dell, Galactic, AirBaltic, Innovecs, VirginGalactic, The New York Times, CNN, Reuters, Zynga, Overstock, Tiger Direct, and the global online store eBay accept cryptocurrency to pay for goods and services (Rysin, Rysin, Fedyuk, 2018). In Europe some institutions have also joined to the use of cryptocurrency, the Swiss University of Applied Sciences in Lucerne accepts tuition fees for students in Bitcoin, and it is noted that payments will be weekly or daily converted into Swiss currency after the threshold of 10 thousand Swiss francs will have been reached (Petruk, Novak, 2017). In early 2017 the world's first Bitcoin-Bank was officially opened in Vienna (Austria). Bitcoins began to serve as a full-fledged currency in Japan dated April 2017 (Halushka, Pakon, 2017). Cryptocurrency is accepted for payment in many restaurants and hotels around the world. There are even known cases of issuing salaries to US civil servants in Bitcoin. In several Asian countries bitcoins are used as an alternative to bank accounts and plastic cards, as banking services in these countries are quite expensive (Likhachev, 2017). Ukraine is also involved in cryptocurrencies usage. Particularly, in 2017 an American client purchased an apartment in Kyiv with the help of the decentralized real estate platform Propy and paid for it with digital currency Ethereum. More than 20 companies in Ukraine officially accept cryptocurrencies to pay for goods and services, for example, grocery store "Natural Products" (Kyiv), service center for repair of equipment Ukrainian iPhone Service (Kyiv), Ukrainian startup Yaware, etc. (Petruk, Novak, 2017). For the first time in 2016 the share capital of firm Axon Partners was formed with the help of cryptocurrency Bitcoin in Ukraine. At the night of PrivatBank nationalization, the exchange volumes of cryptocurrency purchases doubled, and Bitcoin revenue for the week amounted to almost UAH 2.3 million. (Yatsyk, 2017).

Although cryptocurrency can be considered to be a product of labor (as it is the result of operating activities — mining) and the object of purchase and sale, it satisfies neither individual, nor productive needs, in other words, it has no consumer value. Undoubtedly, cryptocurrency, as mentioned before, also has the characteristics of financial instruments, financial investments, financial and intangible assets, securities and so on. However, the analysis of definitions and classifications of these assets in regulations of both Ukraine and foreign countries, as well as the peculiarities of cryptocurrency functioning as an instrument of financial and economic relations, allow us to conclude that this category has its qualitative differences from other assets that do not allow to refer it to a particular type for a number of reasons. Firstly, the fundamental difference

between cryptocurrency and other assets is the multiplicity of ways in which it can be obtained by economic entities. Thus, cryptocurrency on the enterprise can occur as a result of several events:

- exchange for goods, works, services;
- purchase for cash and electronic money;
- as a contribution of the founders to the share capital of the enterprise;
- self-manufacturing (production) — mining;
- settlements with related parties (joint activities, participation in capital, etc.);
- settlements with individuals (settlements for accountable amounts, wages, compensation for material damage, etc.).

Secondly, cryptocurrency as an instrument of financial and economic relations is a multifaceted phenomenon due to the variety of areas of its use in economic activities. Depending on the functional characteristics, cryptocurrency may perform the functions of different types of assets: means of exchange, means of payment, investment instrument, savings funds, product of production, etc. However, in our opinion, based on the analysis of the peculiarities of the creation and operation of cryptocurrency, its main function is communication (information exchange).

Thirdly, the distinctive feature of cryptocurrency is its technical nature of creation and functioning as a tool of financial and economic relations, based on modern information technologies (telecommunication systems, cryptography, etc.), and the environment of creation and development is the Internet. This aspect allows us to consider cryptocurrency as a factor of information economy development.

Thus, the technological features of cryptocurrency as an asset of the enterprise, the multiplicity of ways to obtain it by business entities and areas of economic activity, as well as the complexity of relationships and interdependencies in the system of financial and economic relations determine cryptocurrency as a special type of assets. Thus, in the accounting aspect under the cryptocurrency we understand the information asset (resource), resulting from production, commercial and financial activities of the entity, that is on the balance sheet of the enterprise, and ensuring the achievement of their goals (growth of profits and capital, business processes, etc.). In turn, the information asset (resource) is a communication tool of financial and economic relations, the operation of which is based on modern information technologies, telecommunications systems, cryptography, etc., controlled by the company as a result of past events and the use of which is expected to lead to economic benefits. These specific features and special properties of cryptocurrency as an information asset (resource), a variety of ways to obtain and use it, as well as the novelty of its relationships necessitate detailed analysis of accounting functions of cryptocurrencies to develop the classification and mechanism of financial accounting of its functioning.

Cryptocurrency as a means of payment is not yet popular in Ukraine, due to its uncertain position of public authorities. There are a number of institutions that accept certain types of cryptocurrencies for payment. These include grocery stores, coffee shops, online stores etc.

The development of cryptocurrency in Ukraine is mainly associated with investment activity of representatives of the IT sector, due to favorable conditions for the extraction of cryptocurrency (climate and energy). The existence of cryptocurrency in our country is actually ignored by the authorities, which can cause not only economic but also social problems. For a long time there were discussions about the draft Law “On the circulation of cryptocurrency in Ukraine” [7183] (Draft law “On the circulation of cryptocurrency in Ukraine”, 2017). There was no agreement on a common approach to definition of the nature and role of the financial instrument. Understanding its prevalence throughout the world, an alternative draft Law “On stimulating the market of cryptocurrencies and their derivatives in Ukraine” was proposed (Draft law “On the circulation of cryptocurrency in Ukraine”, 2017). Both projects are currently under development. Ukraine’s integration into the European community, as well as the processes of globalization in the field of cryptocurrency circulation, are complicated by the lack of legal support and objective statistical information.

Cryptocurrency should be positioned at the legislative level as a monetary equivalent or its separate role should be defined, how it is done in highly developed countries. Studies have shown that cryptocurrency in essence can not be equated to a commodity. It is proved that the mechanism of appearance and turnover of cryptocurrency is based on supply and demand. However, the functioning of the financial instrument, based on its essence, requires innovation, particularly in the software field. Most cryptocurrencies aim to ensure the anonymity of transactions, which attracts more and more users. This situation requires immediate settlement of the cryptocurrency's position in Ukraine's economy.

Conclusions

Emergence of cryptocurrency in modern society is the evidence of global digitalization. Virtualization in its primary and secondary manifestation form affects financial sector. Primary form of virtualization is expressed in digitalization of operational processes, as well as convergence of information technologies and communication systems with the finance. Secondary form of virtualization results in non-bank sector development, namely non-bank electronic payment systems (e.g., PayPal) and non-institutional digital schemes of settlements (cryptocurrency).

Current trend demonstrates developing of non-bank system, namely PayPal growth rate is bigger than bank payment system (VISA) rate.

A comparative analysis of the non-unified policy around the world on the official status of cryptocurrencies revealed that developed countries are stimulating the cryptocurrencies development more than developing countries. The complexity of state regulation lies in the multiplicity of interpretations of the legal status of cryptocurrency.

In the case of global cryptocurrency wide spreading there are some risks national economies may face. To these belong the problem of price stability, the stability of the financial system, the stability of payment systems.

Generally, the authors substantiate the requirement for search the complete definition of cryptocurrency that may be integrated into national legal system to further regulation and risks controlling.

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О.О. Борзенко, А.Б. Глазова

Криптовалюта қаржылық виртуализацияның екінші түрі ретінде

Аңдатпа

Мақсаты: Сандық қоғамда пайда болған жаңа, өте қарама-қайшы есептеу құралы ретінде криптовалюта мазмұнын, функциялары мен рөлін ашатын теориялық ережелерді әзірлеу. Мақалада криптовалюта қаржыны виртуализациялаудың екінші түрі ретінде қарастырылған және зерттеу криптовалюта жұмысының теориялық және практикалық аспектілеріне бағытталған.

Әдісі: Зерттеуде банктік және банктік емес төлем жүйелерінің ағымдағы даму тенденцияларын талдау үшін статистикалық және экономикалық-математикалық әдістер қолданылды. Авторлар криптовалюталардың құқықтық мәртебесі туралы мәліметтерді жинады, содан кейін алынған мәліметтер дамыған және дамушы елдердегі ресми мәртебесіне сәйкес талданды.

Нәтижелері: Зерттеу қазіргі уақытта PayPal-дың ең ірі банктік емес электрондық төлем жүйесі екінші виртуализацияның көрінісі ретінде ең үлкен төлем жүйесі — VISA-ға қарағанда жоғары өсу қарқынын көрсетті. Сонымен қатар, дамыған және дамушы елдердің ұлттық құқықтық жүйелеріндегі криптовалюталардың жағдайы олардың құқықтық мәртебесіне сәйкес жиналды және талданды. Сондай-ақ, криптовалютаның баға тұрақтылығына, төлем және қаржы жүйелерінің тұрақтылығына әсер етуі мүмкін тәуекелдер мен даулы мәселелер анықталды.

Қорытындылар: Қазіргі қоғамда криптовалютаның пайда болуы — жаһандық цифрландырудың дәлелі. Виртуализация оның бастапқы және қайталама көріністерінде қаржы секторына әсер етеді. Виртуализацияның екінші формасы банктік емес сектордың дамуына әкеледі, атап айтқанда банктік емес электрондық төлем жүйелері (мысалы, PayPal) және институционалды емес сандық есептеу схемалары (cryptocurrency). Дамыған елдер көбінесе дамушы елдерге қарағанда криптовалюталарды реттеу мәселесінде прогрессивті. Жаһандық криптовалютаның кең таралуы жағдайында ұлттық экономикалар тап болуы мүмкін белгілі бір қауіптер бар. Оларға баға тұрақтылығы, қаржы жүйесінің тұрақтылығы, төлем жүйелерінің тұрақтылығы мәселелері жатады. Тұтастай алғанда, авторлар тәуекелдерді одан әрі реттеу және бақылау мақсатында ұлттық құқықтық жүйеге интеграциялануы мүмкін криптовалютаның толық анықтамасын іздеу қажеттілігін негіздейді.

Кілт сөздер: виртуализация, криптовалюта, қаржыны виртуализациялау, ақпараттық қоғам, банктік емес сектор, банктік емес электрондық төлем жүйелері, крипто-есеп айырысуларды реттеу.

О.О. Борзенко, А.Б. Глазова

Криптовалюта как вторичная форма проявления финансовой виртуализации

Аннотация

Цель: Разработка теоретических положений, раскрывающих содержание, функции и роль криптовалюты как нового, достаточно противоречивого средства расчетов, появившегося в цифровом обществе. В статье криптовалюта рассмотрена как вторичная форма виртуализации финансов, и исследование направлено на теоретические и практические аспекты функционирования криптовалюты.

Методы: В исследовании использованы статистические и экономико-математические методы для анализа текущих тенденций развития банковских и небанковских платежных систем. Авторы произвели сбор данных о правовом статусе криптовалют, затем они были проанализированы в соответствии с их официальным статусом в развитых и развивающихся странах.

Результаты: Исследование показало, что на данный момент крупнейшая небанковская электронная платежная система PayPal, как форма проявления вторичной виртуализации, демонстрирует более высокий темп роста, чем крупнейшая платежная система VISA. Кроме того, было собрано и проанализировано положение криптовалют в национальных правовых системах развитых и развивающихся стран в соответствии с их правовым статусом. Также определены возможные риски и спорные вопросы влияния криптовалюты на стабильность цен, платежных и финансовых систем.

Выводы: Появление криптовалюты в современном обществе — свидетельство глобальной цифровизации. Виртуализация в ее первичной и вторичной формах проявления затрагивает финансовый сектор. Вторичная форма виртуализации приводит к развитию небанковского сектора, а именно небанковских электронных платежных систем (например, PayPal) и неинституциональных цифровых схем расчетов (криптовалюта). Развитые страны в большинстве своем более прогрессивны в вопросе регулирования криптовалют, чем развивающиеся страны. В случае широкого распространения глобальной криптовалюты есть определенные риски, с которыми могут столкнуться национальные экономики. К ним относятся проблемы стабильности цен, финансовой системы и платежных систем. В целом, авторы обосновывают необходимость поиска полного определения криптовалюты, которое может быть интегрировано в национальную правовую систему с целью дальнейшего регулирования и контроля рисков.

Ключевые слова: виртуализация, криптовалюта, виртуализация финансов, информационное общество, небанковский сектор, небанковские электронные платежные системы, регулирование крипторасчетов.

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G. Dinzhanova

University of International Business, Almaty, Kazakhstan

dinzhanovagulbakhyt@gmail.com

<https://orcid.org/0000-0002-4964-2747>

A measure of human development

Abstract

Object: The paper aims to define the appropriate approach to measuring human development in Kazakhstan. A new approach to human capital measurement is proposed.

Methods: We used statistical data analysis, index calculation method, method of UNDP, and method of correlation and regression analysis. The sample mean method is used in the calculation of average national test results.

Results: Results indicate the level of human development in the regions of Kazakhstan, including the level of health, education and life. Also, we have discovered the interrelation of human capital and the average income of the population.

Conclusion: This article investigates the components of human capital development index, the computing of human development within Kazakhstan and its regions, relationship of the human development to income. The effect of income on HDI is explained in the article. The human capital index in Kazakhstan is high, however, in 6 regions it is average.

Keywords: human capital development index, human capital, methodology of HDI, level of education in Kazakhstan, theory of human capital.

Introduction

The theory of human capital, which has an impact on educational and social sciences, is the most controversial and complex in economic theory. The concept of human capital appeared in the XVII century by measuring human value to assess the wealth of a nation (Petty, 1899). So, A. Smith (2020), W. Petty, D. Ricardo (Stigler, 1958) made the basis of the concept "Human capital". However, human capital theory became popular only in the 50s of the XX century. Human capital is a non-renewable resource (Becker, 1964). Humans are not only an aim but a resource in social and economical development. The human factor is becoming more important as an object of investment than fixed assets and technologies (Sagadiyev, 2012). Therefore, countries are interested in developing human resources to get a labour force to implement low skilled and high skilled jobs.

As President K.Zh. Tokayev (2020) pointed out in the message to the people: "Firstly, it is necessary to increase assets of the population by creating workplaces and providing fair wages. However, it is impossible without the rising quality of human capital". Within midterm Strategic plan 2025 of the Republic of Kazakhstan (2018) mentioned that national human capital is a key factor of development in the XXI century.

There are many definitions of the term "human capital". We propose the following interpretation of the term: "human capital is a set of high quality skills and abilities of people who can make an economic contribution to the development of the country".

In a market economy, a quick return on investment is possible in the long term if many countries provide a strong link between physical and human capital. Consequently, sustainable development depends on a person's standard of living or quality of life. One of these aggregate indicators for assessing the standard of living of a person is the human development index (HDI). The human development index is an aggregate indicator calculated to measure the standard of living, literacy, education, and longevity (UNDP, 2019).

Kazakhstan's healthcare expenditures in 2019 amounted to 4.5 trillion tenge, i.e., 6.47 % of GDP (Statistics Kazakhstan, 2020). In developed countries this indicator is significantly higher, for instance, the United States (17.06 %, 2017), Germany (11.25 %, 2017), and Canada (10.57 %, 2017) (Worldbank statistics, 2020). Conversely, the cost of education in 2019 amounted to 2.33 trillion tenge (Statistics Kazakhstan, 2020), which is half of the amount spent on healthcare. In developed countries, such as the USA (4.99 %, 2014), Germany (4.93 %-2014), Canada (5.27 %, 2011), this indicator is higher (Our world in data, 2020).