CRYPTOCURRENCIES AS AN ACCELERATOR
OF SUSTAINABLE DEVELOPMENT

**Hana STEFANOVIĆ[1], Bojan KOCI[2], Ana SAVIĆ[3],
Nikola POPOVIĆ[4]**
**[1] Comtrade Information Technology School of Applied Studies, Belgrade,
Serbia, Email: hana.stefanovic@its.edu.rs**
**[2] Academy of Vocational Studies South Serbia, Kralja Petra I 70, 18230
Blace, Serbia, +381655252952, Email: bojankocic@vpskp.edu.rs**
**[3] Academy of Technical and Art Applied Studies, School of Electrical
and Computer Engineering, Vojvode Stepe 283, 11000 Belgrade, Serbia,
Email: ana.savic@viser.edu.rs**
**[4] Alfa BK University,Faculty of Mathematics and Computer Science,
Palmira Toljatija 3, 11070 New Belgrade, Serbia, +381112609754,
Email: nikolap6901@gmail.com**

Abstract
*Globalization and the changes that have affected the world economy
conditioned the development of new models of thinking, investing, trading and
payment methods in the world economy. The end of the 20th and beginning of
the 21st century was marked by rapid technological progress, which has not
bypassed any economic sector, and all households have experienced the
change. Cryptocurrencies represent a new trade and payments model and a
way for making some form of earnings. It is a form of property that is used as
a digital asset exchange using new cryptographic algorithms.*

Keywords: *economic development; finances; cryptocurrencies;
informatics development; investing.*

JEL Classification: E22, E42, E44, F31, O33.

Introduction

A world economy without borders is undoubtedly the dream of almost all developed countries in the world. Here we are talking about the desire and the possibility that the world's most extensive global powers will manage global financial and international processes (Kocić, 2010, pp.146).

The cyclical movement of the economy has been processed and explained in detail. Cyclical capital movement leads to periodic ups and downs of the economy in individual countries, leading to financial disturbances locally. However, due to globalization, shocks are not local and cause far more complex global consequences (World Economic Crisis 1929-33, 1970-1971, 2001, etc.) (Erić, 2003). These phenomena are related to the cyclical movement of capital, which led to changes in our social lives. Therefore, we are ready to accept any explanation of the present crisis in our civilization except that the current state of the world may be the result of our own mistake (Hajek, 1944, pp.13), which is the desire for rapid wealth.

All imperial countries of the world desire to influence and control world trade, current events, goods and services with their monetary instruments and currency. The influence of the United States on financial flows in the 20th and 21st centuries was dominant. Historically, instability was reflected in the fact that money, prices and production were most affected, where the most dramatic periods were between wars (1920-1921, 1929-1933, 1937-1938) (Fridman, 2002, pp. 56). Economic crises that occur periodically but frequently undoubtedly lead to large macroeconomic shocks, which are widespread globally. To explain the topic at hand, it is necessary to point out that when the most significant economic crisis began, it was called The Great depression 1929-1933. (Fridman, 1963).

Due to the dramatic character, the stock market crash in October 1929 is often considered the beginning of the financial crisis. However, this is not true; the collapse was caused primarily by the individual's willingness to spend, which led to the subsequent collapse of the stock market. This triggered numerous measures reflected in the harsh economic conditions to curb "speculation" (Fridman, 2002). The financial crises that have shaken the world economy periodically every ten years will undoubtedly continue with the authors predicting the next one, according to economic indicators and large oscillations in the stock market and global economy, most likely in the next two years. However, the next crisis will not lead to distortions in the goods and services market but in the financial sector, i.e. the banking sector, which is currently experiencing shocks due to speculation, especially in cryptocurrency trading.

1. Globalization and global processes

From the onset, it is necessary to explain the basics that have primarily shaped social processes in the last forty years of the 20th and 21st centuries, which have changed the world economy and thinking in general. The notion of globalization is derived from the word "global", which means totality, and globalism is a way of looking at global events. Globalization would therefore imply a social process that seeks to comprehend the uniqueness of the world (Turek, 1999, pp. 159). When it comes to globalism, an expanded theory interprets globalism by including arguments of the modern microelectronic revolution (Rodin, 1999, pp. 83-100).

The concept of globalization can be understood and defined in different ways. One way defines globalization as an optimistic process that brings technology development, market expansion, higher profits, a more comfortable life, developmental progress, the breakdown of dictatorial regimes and increased consumer spending. The other interpretation of globalization is a necessary evil through the dominance of economics, politics, science and culture, which acts as a form of colonialism and imperialism over small nations (Martin & Schumann, 1997).

As a result of globalization, relationships between people and countries are intensifying. People are beginning to think globally as a whole and view the world in a new light. Globalization has specific requirements as continuous investment in knowledge, technology, research and development. Whoever starts to lag in globalization or does not get involved in modern processes will be left significantly behind. Today's world is increasingly open, and hence a well-known reference to the world as a "global village" has been created. Globalization as an idea refers to "reducing" the world and raising awareness about the world as a whole (Robertson & Milordović, 1999).

The emergence of the globalization process was favourable for the post-World War II situation in Europe. The European countries, some of which were destroyed but financially supported by the United States (Stanišić, 2000, pp.918-927), began the process of interconnection. The goal and fundamental aspiration were to create a Europe without borders, where goods, people, and capital would circulate freely (Todorović, 2007). Such an aspiration allowed Europe to expand and influenced the trend that helped create a world without borders. When it comes to globalization as a process, it is necessary to mention the role of the General Agreement on Tariffs and Trade (GATT) and its influence and effect, i.e. the free flow of goods and services. The growing economic significance of transnational corporations and transnational flows of goods, capital, information and knowledge

in the global market and the economic environment is the most crucial feature of trans-nationalization (Kocić, 2011). However, at the end of the 20th century, a downward trend in global inequality was witnessed. It is a characteristic of the declining distribution in the income levels of the middle. It lowers social classes in developing countries, both in relative and absolute terms, as shown in Table 1.

Table 1. Global economic distribution from 1960 to 1990

| Year	Percentage of global income that goes to 20% of the richest	Share of global income that goes to 20% of the poorest	The relationship between the richest and the poorest
1960	70,2	2,3	30 : 1
1970	73,9	2,3	32 : 1
1980	76,2	1,7	45 : 1
1990	82,8	1,3	64 : 1

Source: Brown and Kane, The Globalization of World Politics, Oxford University Press, Oxford, 1997, pg. 456.

What we can present today as a consequence of globalization is also reflected in the financial world, including financial transactions involving the creation and enabling of payments by supranational currencies. The topic of this paper is the creation, purchase, sale, disposal and trading of alternative forms and methods of payment. The work itself will also present the thoughts of authors who consider this to be a trade that may introduce another cyclical problem of global financial ratios.

2. Cryptocurrency technology

Over the past years, faster integration of information and communication technologies has influenced many aspects of our lives (Popović et al., 2016). It is essential to mention Bitcoin. Bitcoin (Nakamoto, 2008) represents the first, and at the same time, the most popular cryptocurrency. It was created in 2008 and 2009 in open source software – cryptographic digital monetary and payment systems that exist online. They are based on decentralized, distributed networks, including a standard data transfer technology called the blockchain. The network data transfer relies on security data encryption (Hayes, 2017, pp.1308-1321). Cryptocurrencies are generally based on hash functions. A cryptographic hash function is a

mathematical function that takes any value of any size and creates fixed-size data blocks. With Bitcoin and all other cryptocurrencies based on Bitcoin technology, the block size is 256 bits, 512 bits or more. The Block diagram of SHA-256 is presented in Figure 1.
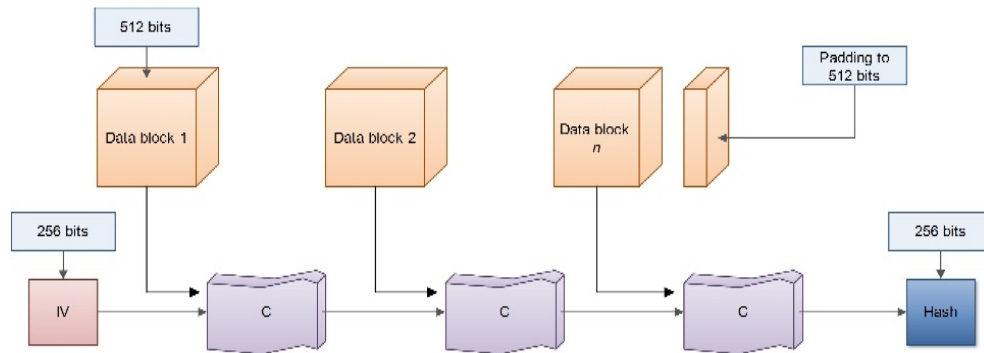
Fig. 1. SHA-256 hash function

Using the cryptographic algorithm SHA-256 (Gallagher & Director, 1995), anonymity in data transmission is achieved, specifically the anonymity of transactions.

The data structures used in these crypts are based on hash pointers, as illustrated in Figure 2. The pointer shows where specific data and cryptographic data are stored, which validates the original data.
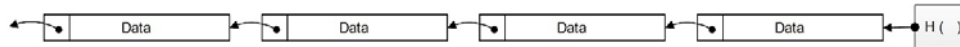
Fig. 2. Data structures based on hash pointers

If we have a hash pointer, we can get the data points and verify that these data have not been changed. Furthermore, for additional protection, hex pointers can be digitally signed. Digital signatures use public and secret key technology. For example, Bitcoin uses an ECDSA-based digital signature scheme (Pornin, 2013) algorithm. In this way, the cursor is digitally signed and the entire data structure that the cursor points to. With cryptocurrency, the public key is used as an identity in transactions. Identities in transactions are addresses where a certain amount of

cryptocurrency can be found. For the transaction to be fully valid, all diggers in the network must confirm the transaction. This type of confirmation at Bitcoin is also known as Nakamoto Consensus (Bonneau et al., 2015, pp. 104–121). This is considered the most crucial innovation in Bitcoin and probably the critical part of the technology for which Bitcoin is booming. Therefore, any network participant can complement the chain by collecting valid pending transactions and forming a block. The critical part is to use a computer "puzzle" to determine which block will be the next blockchain. These computer puzzles are called "proof-of-work" (Aspnes et al., 2005).

Since there is no centralized control system, transaction data is shared by all diggers in such a P2P network. This publication and alignment of all blockchain data achieve complete consistency and avoid possible fraud in currency transfer and the possibility of double consumption of the same unit of currency (double-spending attack). The weight of the puzzles to be counted is calibrated so that the new block is found once every 10 minutes. For this system to be sustainable, the weight is adjusted once in 2016 blocks, approximately every two weeks, using the deterministic timestamp function in the previous 2016 blocks (Bahack, 2013).

3. Economic aspect of the financial market – cryptocurrency trading

Bank circles the world's financial markets called the bubble of cryptocurrencies. All the forces of bankrupt neoliberal capitalism closed their eyes and tacitly allowed them to evolve on all sides of the hidden currency. Today there are over two thousand of them and new ones are opening each day.

The most crucial trading period for virtual currencies is the year 2017. Many of them experienced natural expansion and tremendous growth at 1000% per year. The end of 2017 was the high of cryptocurrency, especially bitcoins, and represented an excellent opportunity for citizens to make a quick return. The value of bitcoin was at that time high of $19,099 at the beginning of 2018, and now it is worth under $10,000. It is, however, necessary to point out that its value only a year ago was only $1,000, which means that bitcoin rose 1909% in one year. Thus, profit rates in the real economy for 10-15% per annum.

4. Possibilities of application and cryptocurrency blockchain technologies

Cryptocurrency and blockchain technology can be used in different ways in business areas, such as tourism. When the popularity of cryptocurrency reaches its peak, the very promotion of certain services that cryptocurrencies can pay can

#

attract much attention. For example, cryptocurrency can be used now to pay for travel and accommodation costs in hotels and other facilities. On the other hand, Blockchain technology can provide operators with a system for sharing information about accommodation and the like. For tourism and services, some companies give circulated own cryptocurrency which can make payments. For example, JIO cryptocurrency is used to pay for various packages and membership fees at travel agencies TamTamTravel (http://tamtamtravels.com/). In addition to this, the Agency accepts other payment currencies, such as Bitcoin, Ethereum, Litecoin, etc. BitAir (https://bitair.io/) is another blockchain technology that allows payment of airline tickets and accommodation bookings. Another exciting idea is cryptocurrency Lif, announced by the Lufthansa Group (http://lufthansagroup.com/). The idea is to use the online market based on blockchain technology to skip mediators in booking accommodation and transportation. There are more examples of how the current popularity of cryptocurrency and blockchain technology can be used to popularise tourism and tourist destinations and how costs can be reduced in business.

Conclusion

Globalization is a process that has significantly changed the way of production, distribution, consumption, and investing in today's world.

One-time payments and universal currencies that served as a means of exchanging slowly began to lose their dominant role. The global distribution of income shows that today there are poorer in the world and that the wealth of the rich is increased by three times in the 20th century. Virtual currencies do not meet the essential criteria that one currency should have. It is expected that it will make sense for some investors to incorporate digital currencies into their portfolios in the future. In banking, cryptocurrencies do not meet the cash criteria, and they should continue to take a significant part to become a national currency. There are proposals to form a cyber-crypto-initiative. The Russian Federation has proposed a cyber initiative to create a new currency connecting developing countries to markets in Asia, Eastern Europe, Africa, and South America through blockchain and innovative technology. Today the currency market is volatile. The most famous and most traded cryptocurrency is under significant oscillations. Due to market failure, inadequate institutional protection, and the underpinning of speculative changes, cryptocurrencies and cryptocurrency markets today are not suitable for individual investors. A new financial crisis will be caused by

Issue 1/2022

investment in cryptocurrencies, and losses can even be measured in the billions of dollars. The influence of cryptocurrencies on the growth and development of different business sectors will be significant in investments and the speed and dynamics of payments. While the future of most cryptocurrencies is quite uncertain, on the other hand, more extensive use of blockchain technology can be expected in different business sectors.

References

[1] Aspnes, J., Jackson, C., Krishnamurthy., A. (2005). Exposing computationally-challenged Byzantine impostors, Technical report, Yale University.

[2] Bahack., B., (2013). Theoretical Bitcoin Attacks with less than Half of the Computational Power (draft). Technical Report, abs/1312.7013, CoRR.

[3] Bonneau, J., Miller, A., Clark, J., Narayanan, A., Kroll, J.A., Felten, E.W., (2015). SoK: Research perspectives and challenges for bitcoin and cryptocurrencies. 2015 IEEE Symposium on Security and Privacy, San Jose, CA, USA.

[4] Brown, Kane, (1997). The Globalization of World Politics, Oxford University Press, Oxford.

[5] Milaradović, A. (1999.): Globalizacija, Pan Liber, Osijek-Zagreb-Split

[6] Ronald Robertson (2003.): Analytical perspectives, Taylor & Francis Group, London and New York, 2003.

[7] Karel Natek, Marjeta Natek., (2000.): Države sveta - Izdavač: Mladinska knjiga Beograd.

[8] Erić, D., (2003). Finansijska tržišta i instrumenti, Ekonomski fakultet, Beograd.

[9] Fridman, M., (2002). Capitalism and freedom, The University of Chicago Press, Chicago.

[10] Fridman, M., (1963). A Program for Monetary Stability, Princeton University Press, Princeton.

[11] Gallagher, P., Director, A., (1995). Secure hash standard (shs), FIPS PUB, 180-3.

[12] Hajek, F., (1944). Put u ropstvo, za srpsko izdanje, JP Službeni glasnik, 2012.

[13] Hayes, A. S., (2017). Cryptocurrency value formation: An empirical study leading to a cost of production model for valuing bitcoin. Telematics and Informatics, 34(7).

[14] Kocić, B., (2011). Zadaci i preporuke u procesu integracije Srbije u EU, EMC Review- časopis za ekonomiju i tržišne komunikacije.

[15] Kocić, B., (2010). Strani kapital u funkciji privrednog razvoja Srbije, Doktorska disertacija, Ekonomski fakultet Priština- Kosovska Mitrovica.

[16] Krugman, P., (2013), Povratak ekonomije depresije i ekonomska kriza, The New York Times.

\#

[17] Martin, H.P., Schumann, H. (1997). The global trap: Globalization and the assault on democracy and prosperity, Pluto Press, Leichhardt.

[18] Nakamoto, S., (2008). Bitcoin: a peer-to-peer electronic cash system. Whitepaper

[19] Popović, O., (2016), Energetski efikasno rešenje platforme za mobilno učenje u cloud computing okruženju, Doktorska disertacija, Univerzitet Singidinum, Beograd.

[20] Popović, O., Marković, D. S., Popović, R. (2016). mTester—Mobile learning system. Computer Applications in Engineering Education, 24(3).

[21] Pornin, T. (2013), Deterministic Usage of the Digital Signature Algorithm (DSA) and Elliptic Curve Digital Signature Algorithm (ECDSA), Request for Comments.

[22] Rodin, D., (1999). Globalizam: nastavak moderne ili nova paradigma, Politička misao, 36, 1.

[23] Stanišić, M., (2000). Globalno gospodarstvo i globalizacija, Ekonomski pregled, 51, 9-10.

[24] Todorović, T., (2007). Carinsko poslovanje, Visoka poslovna škola Beograd, Beograd.

[25] Turek, F. (1999). Globalizacija i globalna sigurnost, Hrvatska udruga za međunarodne studije, Varaždin.