INNOVATION, WORK, SOCIETY

DEVELOPMENT OF BLOCKCHAIN TECHNOLOGY FOR EFFECTIVE INTERACTION OF CIVIL SOCIETY AND STATE

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Summary

The prospects of development civil society and the rule of law in EU and Ukraine are based on the thesis of "autonomous person". Free economic entity – endowed with economic rights and freedoms, including the right of private property, the right to choose forms and types of employment and business activity. Blockchain technology is quite promising for civil society growth, considering that it can be applied to any transaction between any participant globally without intermediaries and partnerships.

Author determines the main reasons for the need for legal regulation of crypto currency and analyses the financial and legal regulation of electronic money and cryptocurrency in EU, USA and Ukraine. This made possible to analyze development of blockchain technology and to formulate benefits of its application for effective interaction of civil society and state.

The application of the historical legal method allowed studying the genesis of scientific research of cryptocurrency and development of relevant legislation in EU, USA and Ukraine. Using the formal-logical method contributed to determine the main reasons for the need of cryptocurrency`s legal regulation. In the process of an analytical review of the financial and legal regulation of the circulation of electronic money and cryptocurrency in USA, UK and Ukraine a comparative method was used, which made possible to formulate benefits of block-chain technology.

Keywords: blockchain, Bitcoin, free economic entity, cryptocurrency, electronic money.

DOI: https://doi.org/10.23856/4421

1. Introduction

Dialectics of relations between civil society and state are complex and contradictory, since there is a peculiar separation of organizational and managerial work between them. Civil society, as a dynamic system, is always under pressure from public authorities. It is independent insofar as the state is tolerant of such independence. On the other hand, a state cannot develop without the free formation of a civil society that controls the actions of political power and

resists the attempts of the state to usurp it. The state and society exist in the form of contradictory continuous interactions. The nature and orientation of which depend to a great extent on the level of development of civil society and its institutions. Confrontation of interests of the state and civil society is an indicator of inefficiency of the state administration and its mechanism. An optimal condition for their compromise is to establish a harmonious unification of private and public interests in order to safeguard human rights.

One of the main characteristics of civil society is the presence of structures that are created to satisfy the people`s material and spiritual needs through self-organization. Civil society organizes itself, from below, and is not constructed from above by order of the state. The rapid development of society in the economy, trade and IT areas opens opportunities for new ways of interaction between civil society and state. The predicted consequence of technological progress is the appearance of unique phenomena at the intersection of the above-mentioned areas. One of the fast-growing phenomena is the emergence of cryptocurrency. And since most countries do not have legal regulation of cryptocurrency at the moment, it attracts the progressive part of society to use it without a burdensome tax mechanism and state restrictions.

Aspects of the circulation of electronic money are actively analyzed by foreign scientists, such as: A. Beger, N. Varfolomeeva, D. Vakhrushev, O. Voleviz, O. Zaitseva, A. Kvitka, E. Mack, E. Seitim Aiganim, M. Swan, etc.

Since 2017, in the Ukrainian scientific discourse, issues of legal status, financial and legal nature of cryptocurrencies receive more attention: L. Akimova, O. Balan, O. Boldachova, D. Bukovsky, M. Burdonosova, O. Danilchenko, I. Klimenko, G. Lozova, O. Strelenko.

The purpose of this article is: – to analyze development of blockchain technology and to formulate benefits of its application for effective interaction of civil society and state; – to determine the possibilities for the application of this technology on the basis of domestic and foreign scientific experience, using current legislation in EU, USA and Ukraine.

2. The occurrence of cryptocurrency in the world

In the current economic and legal space all financial transactions of individuals and legal entities are controlled by the state through taxation and fees. In addition, there is a complete monopoly of each state on the issuance of national currency. For example, the Law of Ukraine "On the National Bank of Ukraine (NBU)" confirms that the functions of NBU include the monopolistic realization of the issue of the national currency of Ukraine and the organization of cash circulation (*National Bank of Ukraine: Law of Ukraine dated May 20, 1999. No. 679-XIV. Bulletin of the Verkhovna Rada of Ukraine. No. 29. Art. 238.*). In addition, banks always mediate between parties. It is clear that this situation compels the society to look for other ways of making payments, directly between the parties of the contract without the involvement of intermediaries, which results in cheaper goods and services. The first cryptocurrency that was created on this basis was Bitcoin.

On October 31, 2008, unknown person or group of people who worked under the alias Satoshi Nakamoto released an official document describing the basics of the project. The founder, characterizing Bitcoin, notes that it is a version of electronic cash that allows making online payments that are sent directly from one side to the other without going through a financial institution (*Satoshi Nakamoto, 2008, p. 1*).

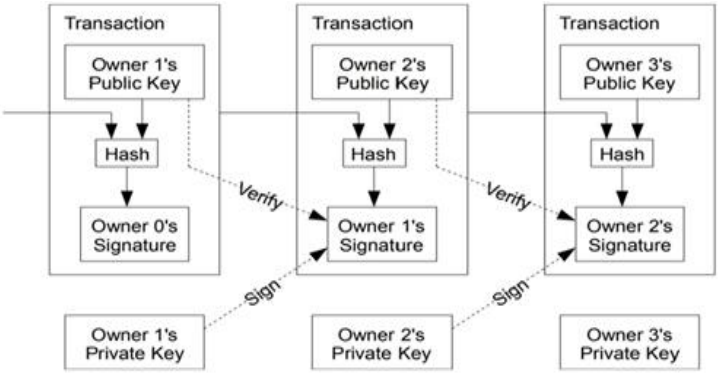

Fig. 1. Satoshi Nakamoto`s transaction verification scheme.

Satoshi Nakamoto defines an electronic coin as "a chain of digital signatures". Each owner of such coin transfers the coin to the next by digitally signing a hash of the previous transaction and the public key of the next owner. And this signature and public key is adding to the end of the coin. A recipient can verify the signatures to verify the chain of ownership (Figure 1) (*Satoshi Nakamoto, 2008, p. 2*).

In 2009, the first block in Bitcoin's blockchain was extracted (this block is called the genesis block and contains 50 Bitcoins). This is how the most influential cryptocurrency of today emerged. At the time, Bitcoin cost absolutely nothing and could be retrieved from a home PC [Schroeder S., 2018]. After Bitcoin has emerged as the first widely-deployed, decentralized global currency, hundreds of copycat currencies were sparked. Overall, cryptocurrencies have garnered much attention from the financial and tech sectors, as well as academics; achieved wide market penetration in underground economies (*Eyal I., Gencer A. E., Sirer E. G., Renesse R., 2016, p. 45*).

The most important aspect of the emergence of cryptocurrency, including Bitcoin, has been the development of blockchain technology, which is considered to be the main innovation of Bitcoin, as it serves as a "trustless" mechanism for verifying all transactions.

The use of a peer-to-peer (P2P) computer network is characterized by the fact that their elements can communicate directly with each other, unlike traditional architecture, where only a single category of participants -servers, could provide certain services to others. Such a network marks transactions by transforming them into a permanent chain of evidence – proof-of-work (POW) thus preventing them from being used twice. The peculiarity of such calculations is the inequality of time spent – they are significant for finding a solution to a particular problem and very small for checking it *(Dwork C., Naor M., 1992)*.

The basic novelty of blockchain lies in its architecture, which enables decentralized transactions, which do not require the establishment of a trust relationship with a transaction partner and thus do not require additional intermediaries (for example, a bank) to carry it out.

Considering the prospects of building civil society and the rule of law in EU and Ukraine, it should be mentioned that such phenomena is based on the thesis of "autonomous person". Free economic entity – endowed with economic rights and freedoms, including the right of private property, the right to choose forms and types of employment and business activity. Autonomous person protected from state`s direct interference and arbitrary restrictions. In addition, subjects of civil society are legally independent from each other; they enter

into legal relationships and interact as free and equal partners. Therefore, the use of blockchain technology is quite promising for the development of civil society, since the principle of P2P interaction (without intermediaries and partnerships, trusts, state or banks) can be applied to any kind of transactions between any participants on a global level.

However, it should be emphasized that such technologies have good prospects for use in civil society, in particular, in a society with a high level of awareness and respect for social and legal norms. As an example, we can speak of the citizens of the European Union as participants in social relations, aware of their responsibility to society, understand the value of law, order and a conflict-free existence.

But in order to fully unlock the potential of blockchain technology, it is necessary to determine the status of cryptocurrency and electronic money at the legislative level. The situation with the uncertainty of such status is inherent in most countries of the world, where there are currently quite opposite approaches to their legal regulation. Mutually exclusive thoughts can occur even in one country. An example of this is the United States of America, where Judge of the Eastern District of Texas (Case No.4:13-CV-416) decided that Bitcoin is a currency. Judge T. Mazant conceded: "…because Bitcoin can be used as money to pay for goods or to be exchanged for other currencies (dollar, yen, yuan, etc.), then Bitcoin is a currency or form of money" *(Court officially declares Bitcoin a real currency. RT.com, 2013)*. In the other case Judge of Florida District Court (Case No.F14-2923) T. Pooler declared otherwise: "…Bitcoin transactions cannot be considered money transmission", which led to the removal of the charge of legalizing proceeds of crime (*Case No. F14-2923 In the Circuit Court of the eleventh Judicial Circuit in and for Miami-dade County, Florida, USA, 2016*).

In the United States, at the federal level, some cryptocurrency exchanges are required to be registered as money transfer operators on the Anti-Financial Crime Network. In addition, in each state, the activities of such companies are subject to licensing. For tax purposes, digital money is treated as property and cryptocurrency transactions are taxed. For example, the payroll paid to employees in Bitcoin is subject to federal income tax and payroll tax.

Also, UK's experience is interesting in the field of cryptocurrency regulation. In 2014, the Financial Conduct Authority confirmed that Bitcoin is neither currency nor money, so the cryptocurrency cannot in any way be governed by UK financial law. Thus, digital currency in the UK is still considered to be a unique combination of numbers resulting from complex mathematical calculations and algorithms. Therefore, Bitcoin is not covered by the UK Law on the Legalization (Laundering) of Proceeds of Crime (Money Laundering Regulations 2007). In April 2016, the Treasury's Action Plan was published to combat the legalization (laundering) of proceeds of crime and the financing of terrorism. In the document, the Treasury proposed to apply legislation in the field of legalization (laundering) of proceeds from crime against the exchange by cryptocurrency companies engaged in currency exchange. However, companies that provide cryptocurrency wallets to users but do not provide digital currency exchange services should not be subject to such legislation (*Axon Partners, 2017, p. 26-27*).

3. The current state of development of blockchain technology in Ukraine

First Ukraine government's official position on cryptocurrencies appeared in 2014, when NBU`s Explanation on "virtual currency / cryptocurrency" Bitcoin use in Ukraine was stated. It considered cryptocurrency as a non-cash surrogate that has the provision of real value. The use of which, as a means of payment, by individuals and legal persons in Ukraine is prohibited, in accordance with Part 2, Article 32 of the Law "On the National Bank of Ukraine" (*National*

Bank of Ukraine: Law of Ukraine dated May 20, 1999. No. 679-XIV. Bulletin of the Verkhovna Rada of Ukraine. No. 29. Art. 238; Clarification on the lawful use of "virtual currency / cryptocurrency" in Ukraine Bitcoin, The National Bank of Ukraine: an official Internet representation, 2014.). This explanation was canceled in 2018 (*On the recognition of the outdated individual letters of the National Bank of Ukraine, Letter of the National Bank of Ukraine from 22.03.2018 p. No 40-0006/16290*).

In order to clarify the legal nature of Bitcoin, it is important to note that the Law on the NBU stipulates that a monetary surrogate "is any documents in the form of banknotes that are different from the official currency of Ukraine". Monetary surrogate not issued by the NBU and made for the purpose of making payments in trade. Further analysis shows that the signs of cryptocurrency do not fall within the concept of "document" or even "electronic document»", where information should be recorded in the form of electronic data, taking into account the required details of the document. Thus, it is wrong to refer the cryptocurrency to the monetary surrogates, since it has other defining features *(Burdonosova M., 2019, p. 10*).

The aforementioned explanation of the NBU drew attention to the need of determine the status of cryptocurrency in Ukraine and initiated wide discussions with the involvement of representatives of various spheres of economy and business. Bitcoin Foundation Ukraine, KUNA Bitcoin Agency, the Bitcoin Embassy and NBU activated discussions and development of the Bitcoin project in Ukraine.

As a result of two-year cooperation, on October 10, 2016, the NBU approved the Cashless Economy roadmap, which first outlined the regulator's official plans for the use of Blockchain technology in Ukraine. Accordingly, in the framework of the development of the National payment system "PROSTIR" (before rebranding it was known as National System of Mass Electronic Payments "NSMEP") will be the "evolution of e-money" as a cashless payment instrument. It will base on Blockchain technology and the issuer will be NBU. This will cause the effect of "cheap acquiring" as an alternative to card payments. In December 2016, the Ukrainian Stock Exchange became the world's first marketplace for cryptocurrency derivatives (*Axon Partners, 2017, p. 87-90*).

In 2018, Ukraine entered the TOP-10 countries by the number of Bitcoin users. There operates biggest in the CIS Bitcoin agency "Kuna" with its cryptocurrency exchange (market). There are also large development and research companies, such as Distributed Lab *(BRDO, 2018)*.

In 2018, the official statement was made by the Secretary of the National Security and Defense Council of Ukraine. During the meeting of the National Cyber Security Coordination Center, it was noted that the development of the cryptocurrency market cannot be ignored by the state. The main results of testing for cyber-vulnerability of information and telecommunication systems of public authorities were considered. Nowadays in many countries the lack of external and internal control over the circulation of cryptocurrency and anonymity of settlements creates potential prerequisites for their use in order to legalize money obtained through crime, drugs and weapons, makes it possible to finance terrorism. The further removal of the state from this issue and the legal vacuum in the cryptocurrency market due to the lack of legislative and regulatory framework "creates threats to the economy and security of the state".

In addition, it has been mandated to develop a mechanism for ensuring access by law enforcement agencies to cryptocurrency exchange data on a reasoned request. The development and implementation of all these measures will also involve the development of international cooperation for the implementation of integrated regulation of cryptocurrency circulation and avoiding criminalization of this segment *(Turchynov O., 2018)*.

The need for legal regulation of cryptocurrency today is caused by the following problems that have recently emerged in practice:

1) The lack of proper regulation prevents single tax payers from accepting payments directly in cryptocurrency, however, for value added tax payers, cryptocurrency transactions are subject to VAT. Regulation of this situation will positively affect the growth of the number of cryptocurrencies` users. Clear and understandable taxation could attract potential users and reduce the possibility of developing fraudulent virtual asset taxation schemes.

2) The lack of clarification of the investigated term in the current legislation creates space for abuse and change of concepts even for law enforcement agencies and participants of the cryptocurrency market. Otherwise, properly regulated and favorable conditions for the participants (miners, buyers) could obtain additional taxation to fill the state budget. The definition of cryptocurrency as an asset that has monetary value would enable its holders to protect their property rights for cryptocurrency in court.

3) Controversial issues regarding the attribution of cryptocurrency to either the property right or the payment instrument. For state regulation, it is easier to consider it as a financial asset and give the following characteristics: – program code as a decentralized digital value measurement; – an object of ownership that may serve as a means of exchange. However, market participants use cryptocurrency primarily as a means of payment. Since its main difference from the usual national currency is decentralization and government control. The fact of the emergence of this independent, with no control center, digital payment system demonstrates that the level of citizen`s trust in the state and in the financial system worldwide is falling.

According to Balan. O., Bukovsky D. the main directions of using blockchain technology in the public sphere can be:

- Public administration. Blockchain technology allows transferring all state data stored electronically to the blockchain platform as well as all state services.
- Health care. By its principle, blockchain is ideally suited to creating a unified registry of patient cards as well as tracking medication supplies.
- Higher education – for storing certificates and diplomas using blockchain.
- Agrarian sector – to maintain an animal identification register.
- Libraries and archives – to transfer all information into electronic form using blockchain technology.
- Retention of property rights.
- Law enforcement agencies – to create a single base of offenders.
- Fiscal service – creation of a unified database for accounting of taxpayers.
- Social services – creation of a unified base of persons in need of social (outside) assistance.
- Banks – creation of a single customer base.
- Infrastructure – creation of a single register of passenger and freight traffic; creation of a unified base of infrastructure investment projects.
- Election system – blockchain technology can be used in elections and referendums (*Balan O. S., Bukovsky D. A., 2018, p. 7*).

As the cryptocurrency community is quite active in EU and in Ukraine, the aforementioned areas have real prospects for their implementation on the basis of decentralized blockchain technology. In addition, at the state level, such systems as: e-Auction 3.0, e-Vox, E-Ukraine are already partially implemented. In February 2016, a group of volunteers signed a memorandum of creation of E-vox, an electronic voting system based on the Ethereum blockchain. E-vox is a system that allows voting at any level, including the election of deputies to

local councils, parliament. Also, the system can hold electronic referendums, current voting on any issues, etc.

In March 2016, a memorandum was signed to launch the Blockchain e-Auction 3.0 platform – a system of decentralized online auctions in government agencies at the municipal and regional levels. e-Auction should be the world's first example of using a decentralized horizontal system for privatization and leasing of state property and licensing. Also, in March 2016 at the Blockchain Conference Kiev was presented the concept of e-government portal e-Ukraine. The system is based on Blockchain technology, and ultimately the platform should be the basis for interaction between citizens, business and the state (*Axon Partners, 2017, p. 89*).

On 10th of April 2018, 22 Member States of EU agreed to sign a Declaration creating the European Blockchain Partnership (EBP) and cooperate in the establishment of a European Blockchain Services Infrastructure (EBSI) that will support the delivery of cross-border digital public services, with the highest standards of security and privacy. M. Gabriel Commissioner for Digital Economy and Society stated that in the future, all public services will use blockchain technology. Blockchain is a great opportunity for Europe and its Member States to rethink their information systems, promote user confidence and protect personal data, foster new business opportunities and create new leadership areas that benefit citizens, public services and companies. The Blockchain partnership declaration was launched at the Digital Day 2018, and was signed by twenty-one EU Member States: Austria, Belgium, Bulgaria, Czech Republic, Estonia, Finland, France, Germany, Ireland, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, UK. In the context of Brexit, UK is no longer an active member of the European Blockchain Partnership. Norway was also a signatory. Since then, eight more countries have joined the Partnership, bringing the total number of signatories to 30. *(European Commission. Strategy. Digital Single Market, 2018)*.

One of the promising areas of application of Blockchain technology for government management is the Blockchain-government. It means using of this platform for the most efficient, cheap and personalized provision of services traditionally provided by public authorities. This could contribute to the development of many new models of interaction between the state and the population.

The blockchain government works on the basis of the technology of storing publicly available data in a distributed journal of records – a universal, permanent, consistent, continuously functioning and publicly accessible archive (*Swan M., 2018, p. 113*). Changing the format from a monopoly on administrative services to personal interaction and clarifying the needs of each individual citizen will lead to the need to build more active, more personalized relationships between government and consumer citizens, the need to offer them better services.

In 2017, the World Economic Forum conducted a survey that confirmed that in 5 years blockchain technology will be actively used in public services by the world's leading powers. The main prospects for technology implementation are to reduce operating costs (73% of respondents) and settlement time (69% of respondents), minimize risks (57% of respondents) and increase the opportunity to generate additional income (51%) *(Tapscott D., Tapscott A., 2017)*.

4. Conclusions

The important consequence of cryptocurrency`s appearance was the development of blockchain technology. This technology opens great opportunities for interaction of society and state. The basic novelty of blockchain lies in its architecture. It enables decentralized

transactions, which do not require the establishment of a trust relationship with a transaction partner and thus do not require additional intermediaries. Maximum benefits from blockchain technology are possible to achieve in civil society where citizens are understanding their responsibility to others, appreciate the value of law, order and a conflict-free existence. In order to fully unlock the potential of blockchain technology, it is necessary to determine the status of cryptocurrency and electronic money at the legislative level.

In civil society where citizens are understanding their responsibility to society, have some independence in relation to the state, are interested in the welfare of the state and contribute to its development, it is possible to achieve maximum benefits from blockchain technology. This can be done by the introduction, at least in part, of blockchain technology in government management.

Electronic government will reduce the number of employees in the state apparatus, and, accordingly, the amount of maintenance costs from state budget. Money saved in this way can be spent on raising the minimum wage, reinforce citizens` interest in such innovations and simplify the transition to an automated economy.

Furthermore, the main directions of using blockchain technology in the public sphere can be: elections, referendums, state services, retention of property rights, creating single base of offenders, storing educational certificates and diplomas, etc. Electronic state services will reduce the number of employees in the state apparatus and the amount of maintenance costs from state budget. Money saved in this way can be spent on raising the minimum wage. This will promote the development of interaction between civil society and state, effective involvement of the population in referendums on a variety of issues and activating a person's civic position.

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