

Blockchain technology and cryptocurrencies - legal and tax aspects

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Abstract— The main objective of the paper is to provide an answer to the question whether new technologies such as blockchain that enter various spheres of public life are safe for users and what impact they have on national legislations. Cryptocurrencies, which are based on blockchain technology, can be used as a means of payment, investment or capital accumulation. Therefore, blockchain becomes more and more popular. The main research method used in the paper consists of the analysis of legislation and jurisprudence as well as linguistic and purposive interpretation which affects the functioning of blockchain and cryptocurrencies. The introductory part of the paper contains a general historical outline and basic principles related to blockchain technology. Real and potential threats posed by the discussed technology are also discussed in the paper as well as the question whether governments or, more broadly, the international community, offer sufficient level of protection against risks related to the use of new technologies such as blockchain and cryptocurrencies. Using blockchain to streamline logistic activities or to speed up transactions is useful in itself, but in the hands of private entities the technology may pose a risk of losing funds if not properly secured. The financial market is and should be supervised and controlled by the state which is the guarantor of economic freedom. Another vital question is whether legislators keep up with the advances in technology. It seems that the development of blockchain technology triggers development of new legal regulations. The more blockchain technology enters everyday life, the more legal documents appear in the form of case law, legal provisions, opinions etc. The role of these documents is to regulate, define and specify new technologies as they appear.

Index Terms— blockchain, Bitcoin, cryptocurrencies, digital currencies, financial law

I. INTRODUCTION

New technologies apart from obvious benefits they bring, may give rise to a considerable amount of controversy and fears. Blockchain, which is one of the most popular and most promising technologies of recent years due to its ability to provide real-time reliable information from many levels to large groups of recipients, is an example of such a controversial technology. The history of blockchain and cryptocurrencies

starts on the Internet in November 2008 when Satoshi Nakamoto signed a document that defined and described a new digital currency, based on the idea of cryptographic linking of data blocks i.e. blockchain. The idea was entirely based on the computer technology and did not need any intermediaries such as human beings or institutions. The new currency was given a name Bitcoin and in no time at all it grew in popularity and value. In the initial phase blockchain was closely associated with Bitcoin only. However, with time blockchain technology has become an independent solution that can be used for many other purposes, for example, to improve payment processes, for data storage and transactions (Technologia Blockchain i jej potencjał w podatkach, 2017).

II. BLOCKCHAIN - TECHNICAL ASPECTS

The basic condition for the operation of a blockchain is the acquisition of the Peer-to-Peer network concept. P2P refers to computer networks that use decentralized and distributed architecture. This means that all computers and devices have a specific share in the network. All connections of the network (hosts) have equal rights with no centralized administrator. These hosts communicate all the resources and data available in the P2P network to each other, without having to use a centralized server. The main purpose of this network is to allow direct networking of network devices. Peer-to-Peer networks are commonly used to transfer files over the Internet, allowing hosts to send and receive them simultaneously. The main feature and advantage of this technology is decentralization and participation in the process of transaction authentication by all users who democratically approve a given operation without any control or supervision from above. An important thing about this technology is that instead of one central host, several decentralized hosts are used at the same time to download data fragmentarily. Another thing worth mentioning is the so-called distributed ledger technology (DLT). It is a record of information or a database distributed in the network. Access to DLT can be open or closed. Blockchain is one of the varieties of the distributed registry and in itself is a collection of



information from computers that are connected by a Peer-to-Peer network. Blockchain technology (as opposed to Bitcoin) can store data of various contents (not only related to exchange and payments). What is important, data transmission in the network takes place in an encrypted form, which allows to secure the transaction. During a new transaction, the host extends the set for new information, and other verifying hosts must confirm its correctness in accordance with the accepted rules, so that it can be added to the block. Each block contains a unique identifier of the so-called (hash) of the previous block that links the blocks into a sequence. The basic features of blockchain technology can be summarized as follows:

- approval of agreements upon consensus of all network participants who confirm the correctness of information;
- cryptographic protection - the blocks are combined into a sequence, which means that the records remain unchanged and it is impossible to delete or change information stored in a block without changing the hash of this block. Even if a part of the network stops working, the blockchain still works because it is decentralized;
- chronological record, with date and time;
- all data are stored in digital form (Technologia Blockchain i jej potencjał w podatkach, 2017).

The system of distributed registers described above offers many benefits. In contrast to centralized systems, the network functionality is maintained even in case of failure of individual joints. This increases the trust and security of transactions, because people do not have to assess the credibility of the intermediary or other network participants. It is enough for users to build trust in the system as a whole. The absence of intermediaries also promotes data security. The current practice of external entities collecting personal data implies a risk of breach of security, while in case of blockchain, the data collected by third parties may become obsolete, which ultimately increases the user's safety (Zyskind, Nathan, Pentland, 2015).

III. VARIOUS APPLICATIONS OF BLOCKCHAIN

The application of blockchain technology is not limited to cryptocurrencies or to the improvement of supply chain control in various types of enterprises, it is also connected with the development of the so-called smart contracts and a revolutionary technology of tax collection. Thanks to this technology the relationship between taxpayers and tax authorities is slowly being redefined and new ways of paying taxes emerge. The presence of digital technologies in this field is well exemplified by the Standard Audit File for Tax in Europe or electronic invoices in the USA. These solutions have been introduced to increase efficiency while ensuring compliance with regulations. Tax authorities use digital technologies to collect and analyze data or to control taxpayers' revenues; taxpayers, on the other hand, expect simplification and acceleration of tax settlement processes.

Blockchain technology is used in various projects in many industries. However, it is the financial sector which is the main user of the blockchain concept. Cryptocurrencies are definitely the best-known application of blockchain but its popularity also stems from the fact that traditional financial settlements are very formalized and limited because they are subject to control and intermediation of various institutions. In the case of Bitcoin, blocks are created by the so-called miners who are rewarded with Bitcoins or other cryptocurrencies e.g. Ethereum and are responsible for the validation of the blocks. The miners dispose of special computing devices (the so-called excavators) by means of which they validate the blocks. The whole process is often called "cryptocurrency mining". The example of Bitcoin shows that the blockchain principle can change the process of money transactions. In the financial sector it will soon be possible to replace a large part of operations by blockchain technology which will considerably improve the payment process. Today, credit card payments are settled within several hours or even several days. With blockchain such delay would be unnecessary as the payments could be settled in real time, through the so-called adjustment of the general ledger (Glaser, 2017). Blockchain can revolutionize the entire process of traditional transactions by automatically executing contracts in a cost-effective, transparent and secure manner (Fairfield, 2014).

The analysis of literature shows that blockchain has other applications too. N. Szabo, for example, introduced a concept of "intelligent contracts" which combines computer protocols with user interfaces to implement conditions of the contract (Szabo, 1997). Thanks to the blockchain system, intelligent contracts are becoming more and more popular because they can be made more easily using blocks. Such an innovative approach, according to the author, can eliminate the participation of lawyers and banks in the process of contracting asset agreements. Intelligent contracts can also be applied to control property ownership, be it material or intangible (Fairfield, 2014).

An outstanding example of blockchain technology, which treats intelligent contracts in a model manner presented above is Ethereum, which is a decentralized system originally proposed by Buterin (Buterin, 2014). Ethereum can be seen as an extension of the Bitcoin blockchain to support a wider range of applications. According to Fairfield, blockchain technology allows contracts to be made by means of cryptography and without involvement of third parties such as a notary public who in the past was necessary to build trust. Now thanks to cryptography people around the world can trust each other and transfer different types of resources in peer-to-peer networks over the Internet. Quoting after N. Woolf: *Georgia has become the first country in the world to rebuild its real estate register with blockchains, getting rid of the old bureaucracy style* (Woolf, 2019).

M. Crosby distinguishes financial and non-financial applications of blockchain which in his opinion can change the nature of interaction in finance and impact many other areas of everyday life. For instance, a British singer Imogen Heap sells

all his songs using blockchain (Crosby et al., 2016). But the areas where blockchain technology can be applied are diversified. The greatest impact, however, may be expected in areas which historically rely on services provided by third parties due to the need of control and supervision by a public trust entity. M Atzori suggests that politics and society as a whole could be restructured by blockchain (Atzori, 2015). Many functions performed by institutions can become unnecessary if societies start to be organized and protected by means of decentralized platforms. M. Atzori states that *decentralization of government services through allowed blockchain blocks is possible and desirable because it can significantly increase the functionality of public administration* (Atzori, 2015). The reorganization of societies is of paramount importance in poor countries. Wealth can be better protected using blockchain. Especially in the third world, where it is difficult to prove ownership in cases when the local government tries to expropriate landowners. These existential threats can be controlled by integrating tenures of land with a blockchain. However, as pointed out by F. Glaser, the interface between the digital sphere and the physical world may turn out to be a weak link that destroys the digital trust established by the blockchain system (Glaser, 2017).

The world of science still debates whether blockchain-based cryptocurrencies can fulfill the functions of real money (Bitcoin virtual currency: intelligence unique features present distinct challenges for deterring illicit activity, 2012). W. J. Luther and L.H. White claim that cryptocurrencies are rarely used as a medium of exchange (Luther and White, 2014). F. Glaser, on the other hand, provides empirical information that Bitcoin is actually used as a speculative resource (Glaser et al., 2014). However, if entrepreneurs accepted cryptocurrencies as a substitute for traditional money, buying and selling of assets would become so much easier. Blockchain can therefore help change the way people pay for goods in the real world. For example, nowadays, home buyers incur significant transaction costs when buying a property. According to Goldman Sachs, *blockchain can reduce premiums for insurance and generate \$ 2-4 billion in savings nationwide (US), reducing errors and manual effort* (Goldman Sachs, 2016).

While IT specialists focus mainly on the technical and cryptographic challenges related to blockchain, researchers of IT engineering systems and representatives of other sciences focus on market design, trust and privacy issues and think how to adopt and implement the new technology so that it can effectively serve societies. What's more, this breakthrough innovation can change many existing business models and create new ones which can have a serious impact on entire industries. That is why research is being conducted on the meeting point of business models, technology and markets. The blockchain technology is continuously improved which confirms the efficiency and usability of the system. Recent developments include new architectural components and a framework of implicational analysis of blockchain systems for digital ecosystems (Glaser, 2017).

IV. THREATS AND SECURITY ISSUES

Any digital technology which involves exchange of goods or information creates dangers associated with theft of data or resources. The main threats related to the usage of blockchain and cryptocurrencies, according to S. Barber, are several weaknesses of Bitcoin such as the possibility of theft or loss through malware attacks, accidental loss of access to accounts, fishing, the so-called Nigerian fraud, scalability problems (e.g. delayed transaction confirmation, data retention and communication errors) and structural problems (e.g. deflation or loss of value, exchange rate fluctuations when compared to other funds) (Barber et al., 2012).

The process of generating new blocks can trigger performance problems if the blocks are added to the network at a high speed. As an alternative to the existing block structure, Y. Lewenberg introduced the so called Inclusive Block Chain Protocols to increase the speed of transactions (Lewenberg, Sompolinsky and Zohar, 2015). The analysis regarding the scalability of Bitcoins is provided, among others, by Croman (Croman et al., 2016).

A wallet of anonymous cryptocurrencies which in fact is nothing more than a sequence of characters, numbers and letters can be an easy prey for criminals. Cyber-crime related to blockchain happens frequently and refers most of all to fishing and data theft with the use of malicious software or other technology. Blockchain in itself seems safe, however anonymity of the network can create a risk of losing accumulated resources. The transactions are made with the so-called key i.e. a sequence of characters that can be mistaken by the user during the transaction. There are known cases when entities claim to run a cryptocurrency stock market and by phone or e-mail they encourage investors to purchase or exchange cryptocurrencies. Individuals who decide to make a transaction on such a stock market soon discover that the wallet number onto which they transferred resources is unknown and the offering entity has not provided counterpart. The identification to whom the resources have been transferred is very difficult due to the anonymity of the system. Reclaiming the invested amount is even more difficult. However, it should be remembered that the technology is constantly being improved in order to increase its security and usefulness (Barber et al., 2012).

V. REGULATORY AND FISCAL ASPECTS

As has already been mentioned, cryptocurrencies arouse great controversy due to the fact that they bypass conventional financial systems such as banks and financial institutions which are traditional providers of cash and non-cash transactions. These institutions owe their revenues to mediating in turnover, therefore from their point of view cryptocurrencies create a risk of losing profits. The same applies to states who may lose income from taxation on traditional transactions. Another very important aspect from a legal standpoint is the anonymity of transactions and the lack of control over the cash flow caused by the fact that there is no single issuer and intermediary who

can collect data on individual capital movements. The concept of anonymity should be understood as absence of supervision or control over the entire process by participating entities that have the ability to influence and regulate the process even to a small extent. When it comes to blockchain technology, there is only a code according to which processes are not subject to supervision and modification. Although entities are required by law to register their participation in the turnover, there is no certainty that all entities will comply with this requirement and that the transactions will become transparent. Therefore, from the legal point of view it is doubtful whether such a system is safe for states and for individuals. Many public entities in many countries strongly deny the lawfulness of this type of solutions. However, prohibition of activities related to the flow of cryptocurrencies would be very difficult as it is impossible to reach the source i.e. the entity offering the services. It is only possible to identify the service provider who in order to authenticate his operations is registered as an entrepreneur. There is also a risk for governments and central banks who as a part of their monetary policies regulate money markets in their respective countries. Public entities react to these issues with anxiety because for them cryptocurrencies pose a threat of money laundering or financing illegal activities. Cryptocurrency turnover creates new factual states for many areas of law including financial law, commercial law, banking law, economic law as well as civil and criminal law. Legislators around the world are trying to adapt to the new reality created by the growing popularity of blockchain technology. Many governments and international institutions proceed with works to produce regulations governing the new phenomenon of capital movements powered by innovative technologies.

VI. RELATED JURISDICTION AND COURT RULINGS IN POLAND

Legislation related to cryptocurrencies is also present in Poland. The Act of 1 March 2018 on counteracting money laundering and financing of terrorism (Journal of Laws 2018 item 723) contains the definition of the so called digital currency. Article 2 point 26 of the Act stipulates that 'digital currency' is a digital representation of value which is *not* a legal tender issued by the National Polish Bank (NBP), a foreign central bank or any other public administration body or an international settlement unit established by an international organization and accepted by individual countries belonging to this organization or cooperating with it, it is also *not* electronic money within the meaning of the Act of 19 August 2011 on payment services, neither a financial instrument within the meaning of the Act of 29 July 2005 on trading financial instruments or a bill of exchange or check exchangeable in the course of trade for legal means of payment and accepted as a medium of exchange which may also be electronically stored or transferred or may be subject to e-commerce. The Act defines in general all potential digital settlements via the Internet and enumerates all means of payment and billing defined by the acts and the items that do not qualify as digital currencies. What remains outside this definition may be interpreted as digital

currencies and it should be assumed that for the legislator digital currencies are mainly cryptocurrencies whose importance in the settlement processes is constantly growing. The justification to the draft to the Act mentioned above reads that the Act serves to *adapt laws to the needs of effective counteraction of the introduction of assets originating from illegal or undisclosed sources to the financial turnover and counteracting financing of terrorism* (Government bill on counteracting money laundering and terrorism financing). The definition of a virtual currency is very broad and does not cover 'cryptocurrency' in itself in the form it is commonly known. As a consequence, many other instruments can be qualified as digital currencies if they meet the assumptions of the provisions of the Act. According to the Act, it is possible to interpret all kinds of virtual products that can be exchanged for real money as digital currencies, or vice versa.

By definition and classification of cryptocurrencies provided by the legislator, cryptocurrencies will be recognized in Poland as a kind of property law, although they will not constitute a legal tender. Thanks to this regulation, the scope of control and supervision over entities involved in cryptocurrencies will increase (Anon, 2018). It should be noted that the Directive of the European Parliament and of the Council (EU) 2015/849 of 20 May 2015, while defining the term 'property', stressed that *property means assets of any kind, whether corporeal or incorporeal, movable or immovable, tangible or intangible, and legal documents or instruments in any form including electronic or digital, evidencing title to or an interest in such assets*.

An important matter determining the legal status of cryptocurrencies is the verdict of the Supreme Administrative Court (hereinafter referred to as the NSA) in the case concerning the obligation to pay income tax on revenue from cryptocurrencies turnover. The NSA issued a judgment in which it upheld the decision of the tax chamber that the income tax from revenue achieved through cryptocurrency turnover must be paid (Judgment of the Supreme Administrative Court II FSK 488/16). The position adopted by the NSA while considering the case is also noteworthy. First of all, the Court referred to Article 227 paragraph 1 of the Constitution of the Republic of Poland of 2 April 1997 (Journal of Laws 1997 No. 78 item 483) which stipulates that the National Bank of Poland shall have the exclusive right to issue money. In addition, article 31 and article 32 of the Act on the National Bank of Poland (Act of 29 August 1997 on the National Bank of Poland, Journal of Laws 2017, item 1373, as amended) state that the Polish currency is banknotes and coins: złote and grosze, therefore Bitcoin cannot be regarded as a form of money in common circulation and is not a legal tender in the light of the law and order. In addition, the NSA considered that in the case of civil law relations, Bitcoin is a type of property within the meaning of article 44 of the Civil Code.

In addition, pursuant to article 18 of the Act on personal income tax, which is an extension of the provision of article 10 paragraph 1 point 7 of the Act, it follows that revenue from the sale of Bitcoin cryptocurrency is an income from property

rights. By virtue of a judgment of 11 September 2015 issued by the Provincial Administrative Court in Warsaw who considered a complaint against the tax ruling of the Minister of Finance of 26 June 2014 regarding personal income tax, in which the complainant acquired virtual means of payment (Bitcoin) for US dollars and then sold them for US dollars and zlotys, the court ruled that Bitcoin cannot be considered domestic or foreign currency. According to the Court, currency should be legally recognized and generally acceptable and exchangeable. Bitcoin, however, does not meet the requirements of exchangeability included in article VIII of the Statute of the International Monetary Fund (the Act on personal income tax) and therefore cannot be considered as electronic money. The complainant purchased and sold Bitcoins on three stock exchange markets and did not act for any specific entity. In addition, he did not register or report to the tax authorities the purchase or sale of Bitcoins nor did he register a business activity. He did not keep the accounting records of Bitcoins acquired and sold and did not pay tax on the basis of tax card neither did he use tax exemptions (Judgment of the Provincial Administrative Court in Warsaw of 11 September 2015, III SA/Wa 3374/14).

Also the Polish Financial Supervision Authority (KNF) reacted to the emergence of digital currencies. In 'Communication on the functioning of cryptocurrency exchanges and stock markets' of 6 June 2018, KNF informed that *entities operating in the area of cryptocurrency exchanges and on cryptocurrency stock markets will become obligated institutions within the meaning of the Act of 1 March 2018 on counteracting money laundering and the financing of terrorism and will therefore have to perform all the duties indicated in the Act*. In addition, conducting such activity, in the KNF's opinion, *may involve carrying out activities covered by relevant provisions regulating the operations of entities on the financial market, and, what it entails, they will be obliged to obtain relevant KNF permits (...)*.

VII. CONCLUSIONS

The market of digital currencies discussed above is a very wide unsupervised area where a lot of transactions take place. It does not come as a surprise then, that the market is considered risky. Control and supervision within the limits of non-interference in the freedom of economic activity seems to be something natural. The most important thing is assurance that any administrative actions only minimally interfere with the economic turnover, while ensuring an adequate level of security for citizens. There are still many threats associated with data theft and other forms of online crime. In this regard blockchain is not safer than other forms of electronic exchange (phishing, spyware, Nigerian crime etc.). There are also hacking attacks on cryptocurrency markets which may result in cash sweeping and transfer of resources to other accounts which is tantamount to their theft.

Following the activities of the Polish state in the field of disseminating knowledge about blockchain technology and

cryptocurrencies (which are advertised as 'an asset of independence from official financial systems'), it should be observed that there is no single coherent campaign to protect citizens who believing in the principle of trust are often unaware of the risks they are taking. The fact that the Polish Financial Supervision Authority, the legislator and courts have already addressed the issue may be insufficient. It should also be observed that the legislator puts heavier emphasis on non-recognition of cryptocurrencies as a means of payment and tends to omit the aspect of security for citizens. Sadly, for the legislator the fiscal side of the problem is of higher priority than the issue of security and development of blockchain technology in Poland. Recalling the thesis put forward in the beginning of the paper, it should be clearly stated that the legislation related to the field of blockchain and cryptocurrencies will undoubtedly develop, both on national and on international level.

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