Mining of Cryptocurrencies: Analysis of Law Enforcement Practice and Problem Solving in Legal Regulation^{*}

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Abstract

Despite the enormous popularity of mining worldwide, which entirely objective reasons have caused, there remains a dissonance in States' approaches to its legal regulation. One of the reasons is that the legal regulation of blockchain technologies in different countries goes completely different ways. In fact, mining is a process of generating cryptocurrencies, as a result of which a new suitable block of transactions is added to the blockchain, and coins are issued. Therefore, to regulate such a process as mining, the legislator needs to create a holistic legal framework regulating the turnover of digital assets in the state.

Keywords: Cryptocurrency; Blockchain; Proof of Work; Miner; Mining Pools

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Penambangan Cryptocurrency: Analisis Praktek Penegakan Hukum dan Pemecahan Masalah dalam Regulasi Hukum

Abstrak

Terlepas dari popularitas pertambangan yang sangat besar di seluruh dunia, yang disebabkan oleh alasan yang sepenuhnya obyektif, tetap ada disonansi dalam pendekatan negara terhadap peraturan hukumnya. Salah satu alasannya adalah bahwa regulasi hukum teknologi blockchain di berbagai negara berjalan dengan cara yang sangat berbeda. Faktanya, penambangan adalah proses menghasilkan cryptocurrency, sebagai akibatnya blok transaksi baru yang sesuai ditambahkan ke blockchain, dan koin dikeluarkan. Oleh karena itu, untuk mengatur proses seperti penambangan, legislator perlu membuat kerangka hukum holistik yang mengatur perputaran aset digital di negara bagian.

Kata Kunci: Cryptocurrency; rantai blok; Bukti Kerja; Buruh tambang; Kolam Penambangan

Майнинг криптовалют: анализ правоприменительной практики и решение проблем правового регулирования

Абстрактный

Несмотря на огромную популярность майнинга во всем мире, вызванную вполне объективными причинами, сохраняется диссонанс в подходах государств к его правовому регулированию. Одна из причин заключается в том, что правовое регулирование технологий блокчейн в разных странах идет совершенно по-разному. По сути, майнинг — это процесс генерации криптовалют, в результате которого в блокчейн добавляется новый подходящий блок транзакций, и выпускаются монеты. Для регулирования такого процесса, как майнинг, законодателю необходимо создать целостную правовую базу, регулирующую оборот цифровых активов в государстве.

Ключевые слова: криптовалюта, блокчейн, доказательство работы, майнер, пулы для майнинга.

A. INTRODUCTION

Mining is a distributed process of verifying and confirming the validity of operations that generates a chain of blocks by solving complex algorithms and creates new bitcoins paid as a reward in the amount predetermined by the protocol to the first "miner" who has solved the algorithm confirming the transaction (Virtual currencies, 2015). That is, mining is not a release of a new type of cryptocurrency but works on cryptographic calculations to produce an already circulating cryptocurrency.

B. METHODS

The method of interpreting the law and the comparative legal practice of research has shown that today the mining of cryptocurrencies remains outside the scope of legal regulation in the Russian Federation. This fact significantly complicates the work of law enforcement agencies. The authors consider two models of possible legal regulation of mining in the Russian Federation and conclude that the lack of regulation in this sphere, as well as the establishment of a complete ban on the turnover of cryptocurrency and its emission, will inevitably lead to an increase in the share of the shadow economy, an increase in crime and destabilization of the industry. Methods of studying law enforcement practice and theoretical sources make it possible to conclude that mining is a type of high-margin entrepreneurial activity caused by the needs of the digital economy and requires appropriate regulation. Also, these methods allow segmenting of mining into four groups based on the organization of the process of its implementation. Considering these segments, the authors analyze the relevant law enforcement practices, apply modelling and forecasting methods, and show the possible criminal risks and threats associated with cryptocurrency mining.

C. RESULTS AND DISCUSSION

The concept of mining is not given in the FATF recommendations. Still, it contains a definition of a "miner" which is an individual or legal entity participating in a decentralized network of virtual currency by running special software to solve complex algorithms in a distributed system based on proof-of-work consensus or other consensus used to confirm transactions in the virtual currency system (Virtual Currencies: Key definitions and potential AML/CFT risks, 2014).

May 19, 2022, Kazakhstan (which, according to Cambridge University, is the second country in the world in terms of mining capacity (Bitcoin mining map, 2022) has allowed mining again (Miners again allowed to work in Kazakhstan, 2022). The Law of the Republic of Kazakhstan No. 418-V (November 24, 2015) "On Informatization" in para. 55-3 of Art. 1 defines digital mining as the process of conducting computing operations using computer and energy capacities according to the specified algorithms of encryption and data processing, confirming the integrity of data blocks in objects of Informatization through the blockchain. In Appendix No. 1 to the Decree of the President of the Republic of Belarus No. 8 (December 21, 2017), mining is defined as an activity different from the creation of its digital signs (tokens) aimed at ensuring the functioning of the register of transaction blocks (blockchain) by creating new partnerships in such a register with information on the operations performed. A person engaged in mining becomes the owner of digital signs (tokens) that have arisen (mined) as a result of his mining activities and can receive digital signals (tokens) as a reward for verifying the execution of operations in the register of transaction blocks (blockchain). Thus, mining is not simply a means to create new coins, which works based on proof-of-work consensus. It is necessary to ensure that this consensus is reached and that certain transactions are valid so as not to allow any of the participants in the blockchain network to spend the coins already used in another transaction. The person engaged in mining becomes the owner of the generated coins and can receive additional remuneration for verification of transactions in the blockchain. In this case, mining is an activity to make a systematic profit.

In the Russian Federation, mining is not legally regulated to date. However, the explanatory note to the draft federal law "On Mining in the Russian Federation" (Explanatory note to the Draft Federal Law No. 127303-8, May 20, 2022) states that, according to expert estimates, more than 12 million cryptocurrency wallets have been opened by citizens of the Russian Federation. The amount of funds in wallets is approximately 10 trillion rubles. In addition, according to estimates of the monthly absolute hash rate indicator, Cambridge University on 01.01.22 put the Russian Federation in 5th place in the world regarding the volume of "mining" capacities (Bitcoin mining map, 2022).

De facto, the situation is that cryptocurrencies are issued in Russia by an unlimited number of anonymous entities. Given the high risks of their illegal use, it is possible to state that such ignoring by the legislator of the ongoing processes leads to an aggravation of the operational situation in digital currency circulation.

Due to the lack of regulation of "mining", it can be considered under Art. 2 of the Civil Code of the Russian Federation No. 51-FZ. (November 30, 1994) as an independent activity aimed at making a profit, i.e., such a business equals entrepreneurship. According to the current legislation in Russia, one can engage in any entrepreneurial activity directly not prohibited by law in compliance with the requirements. Accordingly, a person who mines cryptocurrencies must be registered as an individual entrepreneur or legal entity under the most suitable OKVED code for mining: 63.11 "Data processing activities, provision of information hosting services and related activities" or 63.11.1 "Activities for the creation and use of databases and information resources"; or choose the status of self-employed, proceeding from the fact that cryptocurrency is property. In some cases, the legislator, following the path of legal fiction, for the purposes of specific federal laws equates cryptocurrency with property (Article 3 of the Federal Law No. 115-FZ (August 7, 2001) "On Combating the Legalization (Laundering) of Income Received by Means of and the Financing of Terrorism", Article 2 of the Federal Law No. 127-FZ (October 26, 2002) "On Insolvency (Bankruptcy)", Article 68 of the Federal Law No. 229-FZ (October 2, 2007) "On Enforcement Proceedings" and in Article 8 of the Federal Federal Law (Bankruptcy)", Article 68 of the Federal Law No. 229-FZ (October 2, 2007) "On Enforcement Proceedings" and in Article 8 of the Federal Law No. 273-FZ (December 25, 2008) "On Combating Corruption"). However, according to the Ministry of Finance of Russia, due to the absence of the concept of mining in the Russian Federation and the uncertainty of the legal status of "miners", the issue of state registration as entrepreneurs of individuals engaged in mining and their application of the taxation system can be considered only after the adoption of the relevant legislative acts on this issue (The letter of the Ministry of Finance of Russia No. 03-04-05/813, January 12, 2022). Nevertheless, all the above allows us to assert that cryptocurrency mining is a popular high-margin type of entrepreneurial activity.

For example, in the Republic of Belarus, the mining, acquisition, and alienation of tokens, carried out by individuals independently without involving others under labour and (or) civil law contracts, is not an entrepreneurial activity. Individual entrepreneurs and legal entities are also not prohibited from carrying out cryptocurrency mining activities, but to do so, they must be residents of the High-Tech Park (<u>Decree of the President of the Republic of Belarus No. 8, 2017</u>).

There are two possible models for the legal regulation of mining in Russia. The first one, supported by the Central Bank of the Russian Federation, which in its report suggested that the optimal solution for Russia would be a complete ban on activities aimed at mining cryptocurrencies, as it was done in China and Iran.

The Bank of Russia justifies its position by high electricity consumption, which jeopardizes the infrastructure of the energy supply and the implementation of the environmental agenda (<u>Cryptocurrencies: Trends, risks, measures, 2020</u>).

The second model is described in the draft Federal Law No. 127303-8 (May 20, 2022) "On Mining in the Russian Federation" developed by the Ministry of Finance of the Russian Federation, aimed at regulating relations related to the peculiarities of the issue and generation of digital currency in the Russian Federation, including mining pools. Russian law applies if mining activities are conducted in Russia or using the Russian information infrastructure. Within this framework, such actions are allowed in the Russian Federation, taxed and officially equated with entrepreneurial activity. Such a decision will not only remove mining from the zone of the "grey" economy. Still, it will also lead to a significant budget replenishment by taxing a new type of entrepreneurial activity and help avoid excessive unregulated load on the energy systems.

Due to the lack of proper measures of liability in Russian legislation concerning the high profitability of cryptocurrency mining activities, there is an increasing number of "underground" "miners" illegally using electricity in large volumes, which leads to an increase in the load on the power grid that can cause accidents and fires Thus, R. purchased equipment for the creation of a mining hotel. And instead of a transformer substation, he illegally installed a more powerful substation, bypassing the metering device for consumed electrical energy; he ensured the operation of 350 energy-receiving devices for mining cryptocurrencies. As a result, he carried out illegal unaccounted electrical energy consumption with a total volume of 1,327,628 kWh for 5,706,875.34 rubles. The Syktyvkar City Court of the Komi Republic (The verdict on case No. 1-37/2022, 2022) qualified R.'s actions under paragraph "b" of Part 2 of Article 165 of the Criminal Code of the Russian Federation No. 63-FZ (June 13, 1996).

Cryptocurrency mining activities can be divided into four different segments:

- Own mining, when "miners" use and maintain their equipment for profit;
- remote hosting, when "miners" rent data centres specially equipped in cool rooms with a stable power supply with maximum connection power from the resource-supplying organization, a sufficient level of security and stable high-speed Internet;
- cloud mining, when customers rent out computing power for use by a third party;

- mining pools, when "miners" collectively use their computing resources to mine new coins and divide the reward between participants according to their contribution.

Given that the organization of mining requires specific knowledge, there are risks of fraudulent actions in this sphere. This may be due to the dissemination of information about the provision of services for setting up mining equipment by persons who do not have special knowledge in this area to steal equipment, with the supply of fake equipment for mining or with the lack of intentions of intruders to fulfil the obligations to purchase such equipment in order to steal the money received. Thus, by the Cassation Decision of the Second Court of Cassation of General Jurisdiction No. 7U-6569 (July 19, 2022) was found guilty of committing a crime under Part 4 of Article 159 of the Criminal Code of the Russian Federation. According to the case files, M. gathered funds from four victims to purchase the mining equipment but did not take any action eventually and used the funds to pay off his debts. He did not react to the victims' demands to return the money but began to avoid contact. It is not uncommon to participate in the so-called "fake" pools when the owners of servers that distribute the task of calculating the block signature among all connected participants turn out to be fraudsters who do not pay the generated cryptocurrency under the pretext of hacking attacks or for other knowingly false reasons.

The most popular method of fraud associated with cryptocurrency mining is fictitious cloud mining. Fraudsters receive large sums of money to purchase mining equipment, but the equipment is not bought, and the mining process itself is not carried out. Such schemes work most productively when creating fake sites that copy real service providers. In addition, the equipment has a high cost, so it often becomes the subject of theft. Thus, L. committed a secret theft of computer equipment on a mining farm under the following circumstances. During the year, L. was ensuring the maintenance of equipment on the mining farm of his acquaintance F. on the territory of the tourist centre "Fairy Tale" he had a key to the house where it was located and free access to his computer with equipment in this house, from where he stole 50 video cards and 1 complete with video cards, causing F. damage for 1 million 911 thousand rubles. By the verdict of the Semiluksky district court of the Voronezh region in case No. 1-85/2022 (June 21, 2022) L. was found guilty of committing a crime, provided for para. "b" of Part 4 of Article 158 of the Criminal Code of the Russian Federation.

The commonly used type of criminal encroachment that is committed for the purpose of generating (mining) cryptocurrency is cryptojacking, which is the unauthorized use of malicious software to gain access to the computing power

of an infected computer facility for cryptocurrency mining. (Nguyen et al., 2021) Thus, S., acting on selfish interest, copied from the sites of the information and telecommunication network "Internet" to his personal computer a malicious program designed to generate cryptocurrency. After that, by launching the specified computer program, he carried out computer influence on the server with the IP address N belonging to PJSC, as a result of which S. received the login and password necessary to access the server, using which he made a remote login. However, he could not finish these actions concerning the suppression of illegal activities by the FSB of Russia. Therefore, the Solnechnogorsk City Court of the Moscow Region qualified S. under Part 2 of Art. 273 of the Criminal Code of the Russian Federation (Sentence No. 1-227/2020, 2020). Given the high capabilities to detect such unauthorized use of devices by the users themselves and the high risks of being held criminally liable for such actions, the attackers choose more hidden forms of crypto-jacking using fileless malware, which makes it difficult to detect them compared to desktop application-based programs. Therefore, we agree with the position of S.L. Nudel and D.A. Pechegin, according to whom the elements of crimes included in Chapter 28 of the Criminal Code of the Russian Federation suggest that the corresponding script that uses the resource of the user's computer without their permission should be installed in the computer system, which does not happen with hidden mining, which is a gap in the current legislation (Nudel, Pechegin, 2022).

The analysis of modern law enforcement practice shows that criminal encroachments that are committed to generating (mining) cryptocurrency provide for encroachments, the responsibility for which is provided for by all elements of crimes under Chapter 28 of the Criminal Code of the Russian Federation "Crimes in the field of computer information" (Russkevich, Malygin, 2021).

The growing popularity of cryptocurrency mining has inevitably led to the convergence of this type of activity with crime. First, with the help of mining, criminals can launder their criminal proceeds independently (Pushkarev et al., 2019). When organizing the work of mining pools (at the moment, an increasing amount of electricity is required for successful mining and combining into mining pools provides much more chances for their participants to mine successfully), KYC/AML is not carried out. The probability of entering assets of criminal origin into such a process is very high, and it is difficult to track them by law enforcement agencies. Usually, even registration in large mining pools, such as BTC.com or Poolin, only requires an email address and phone number.

In addition, by analogy with the concept of abandoning personal transport in favour of transportation service providers (MaaS), mining can be used as a service to convert proceeds from crime (fiat or cryptocurrencies with a traceable history of illegal origin) into "pure" coins. In such a scheme, remote hosting or cloud mining services receive payment for mining activities without verifying the source of incoming funds. In return, "miners" send "customers" newly generated coins with no transaction history. The risk of using "pure" newly developed cryptocurrencies for criminal purposes is very high. On the one hand, realising all the advantages of cryptocurrencies as digital assets created on a decentralized blockchain platform becomes possible. On the other hand, new "clean" investments do not have a criminal trace, and it is almost impossible to associate them with assets obtained by illegal means. Thus, the European Parliament confirms that mining can be one of the ways to carry out money laundering since recently mined "coins" are pure, which means that if someone converts them into fiat currency or other crypto assets, they will also be clean (European Parliament may create body to regulate crypto market, April 14, 2020).

D. CONCLUSION

The active growth in the number of cryptocurrency users in the world, as well as the advantages of their use in criminal activities (laundering of proceeds from crime, drug trafficking, financing of terrorism, illegal sale of weapons, illegal withdrawal of funds abroad, embezzlement, extortion, corruption), allow us to assert that such activities continue to develop. Thus, creating a regulation model of cryptocurrency turnover in Russia, including cryptocurrency mining activities, is relevant. The lack of regulation of this sphere and establishing a ban inevitably leads to a growing share of the shadow economy, increased crime and destabilization of the industry. Implementing a chosen strategy will create favorable prerequisites for successfully preventing crimes in cryptocurrency trafficking. To date, law enforcement agencies, in the absence of a legally established system of traceability of crypto-financial flows and information about identified holders of digital currencies, cannot effectively respond to offences and crimes committed with their use.

It should be noted that the proposed changes in the norms of the Code of Criminal Procedure of the Russian Federation should be appropriately reflected in the training courses of criminal procedure law taught in the framework of bachelor's and master's programs. Furthermore, taking into account the fact that due to the specifics of higher education in the Russian Federation, the training of specialists of the appropriate profile is conducted not only by universities and

departmental educational institutions but also by technical universities, this will require additional "actualization of the need to create and maintain a humanitarian component in a higher technical educational institution, allowing students to expand their worldview".

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