Revista Jurídica unicuritiba

Submetido em: 11/02/2024
Aprovado em: 18/05/2024
Avaliação: Double Blind Reviewe
ISSN: 2316-753X

FATORES SOCIOLEGAIS QUE AFETAM A EFICÁCIA DO ESTABELECIMENTO DE UM SISTEMA DE MEDIDAS ABRANGENTES PARA MINIMIZAR OS RISCOS DA OPERAÇÃO DO MERCADO DE CRIPTOMOEDAS

SOCIO-LEGAL FACTORS AFFECTING THE EFFECTIVENESS OF ESTABLISHING A SYSTEM OF COMPREHENSIVE MEASURES TO MINIMIZE THE RISKS OF CRYPTOCURRENCY MARKET OPERATION

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RESUMO

Objetivo: O artigo tem como objetivo examinar os fatores sociolegais que afetam o estabelecimento de um sistema abrangente de medidas para minimizar os riscos no mercado de criptomoedas. Foca-se na identificação dos aspectos positivos e negativos da regulamentação das criptomoedas e seu impacto nos direitos de propriedade, investimentos e relações socialmente significativas na sociedade moderna.

Metodologia: O estudo utiliza análise de conteúdo e comparativa baseada na metodologia PRISMA, permitindo uma investigação sistemática da literatura existente e das práticas no campo das criptomoedas. A análise enfoca a incerteza jurídica, os desafios técnicos e os riscos potenciais associados às criptomoedas.

Originalidade: Esta pesquisa oferece uma exploração única de como os fatores sociolegais influenciam o desenvolvimento e a regulamentação do mercado de criptomoedas. Destaca como a regulamentação abrangente, especialmente em áreas como tributação e anonimato, pode mitigar os riscos associados ao ecossistema das criptomoedas.

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Resultados: Os resultados revelam desafios críticos no mercado de criptomoedas, como o risco de roubo por malware, a instabilidade das bolsas de criptomoedas, o baixo retorno sobre o investimento e a ambiguidade legal. O estudo propõe medidas legais para melhorar a transparência e a segurança dos usuários nas operações com criptomoedas.

Conclusão: O artigo conclui que a regulamentação eficaz e o aumento da conscientização pública são essenciais para minimizar os riscos no mercado de criptomoedas. Uma abordagem abrangente de regulamentação, focada na transparência e na clareza legal, é necessária para prevenir fraudes e melhorar a segurança das operações com criptomoedas.

Palavras-chave: Mineração; Regulamentação legal; Atividade criminosa; Criptofraude; Transações; Proprietários de criptomoedas.

ABSTRACT

Objective: The article aims to examine the socio-legal factors affecting the establishment of a comprehensive system of measures to minimize risks in the cryptocurrency market. It focuses on identifying both positive and negative aspects of cryptocurrency regulation and its impact on property rights, investments, and socially significant relations in modern society.

Methodology: The study employs content and comparative analysis based on the PRISMA methodology, allowing for a systematic investigation of existing literature and practices in the cryptocurrency field. The analysis focuses on legal uncertainty, technical challenges, and the potential risks associated with cryptocurrencies.

Originality: This research provides a unique exploration of how socio-legal factors influence the development and regulation of the cryptocurrency market. It highlights how comprehensive regulation, particularly in areas such as taxation and anonymity, can mitigate the risks associated with the cryptocurrency ecosystem.

Results: The findings reveal critical challenges in the cryptocurrency market, such as the risk of theft through malware, the instability of cryptocurrency exchanges, low return on investment, and legal ambiguity. The study proposes legal measures to enhance transparency and user safety in cryptocurrency operations.

Conclusion: The article concludes that effective regulation and improved public awareness are essential for minimizing risks in the cryptocurrency market. A comprehensive approach to regulation, focusing on transparency and legal clarity, is necessary to prevent fraud and improve the security of cryptocurrency operations.

Keywords: Mining; Legal regulation; Criminal activity; Crypto-fraud; Transactions; Crypto-owners.

1 INTRODUCTION

The world's first cryptocurrency was created in 2009. At the time, it occupied a small portion of the market compared to real currency. Today, cryptocurrency has a great

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impact on the global economy (Bai et al., 2024). Between 2015 and 2019, the share of cryptocurrency-related professions in the economy increased by 1,500%. Apart from Bitcoin as the most famous cryptocurrency, more than 17,000 cryptocurrencies are currently traded on exchanges. The number of transactions in a wide variety of sectors of the economy is growing (Pillai, 2024).

The use of cryptocurrencies is fraught with problems related to the legalization of transactions carried out through it and the legal status of this new segment of the economy (Bolotaeva et al., 2019; Sopilnyk et al, 2018; Vysotskaya et al., 2022). As the crypto industry increases its influence on the global economy, it is important to properly establish these problems and find ways to solve them (Burnie et al., 2018; Morozova et al., 2020). The crypto industry, due to its features and undeveloped legislation regulating this aspect of life, draws the attention of criminals who take advantage of the existing areas of uncertainty and legal gaps (Chaum et al., 1990; Iarutin & Gulyaeva, 2023). For this reason, some countries have already de-legalized cryptocurrency, and some are trying to establish clear legal relationships for the crypto industry. Different countries are building interactions with cryptocurrency in different ways, from a total ban to legalization (Muradyan, 2023; Potgieter & Howell, 2021). We believe that a complete ban and criminalization of cryptocurrency is an extreme solution. This step will lead not to the cessation of its use, but to its withdrawal into the shadow economy, causing the state to lose a potentially significant source of income within its financial structure (Morozova et al., 2020; Sharma et al., 2020).

The study focuses on the creation, functioning, and state regulation of the cryptocurrency market. We attempt to outline possible solutions to these problems. The article aims to highlight the factors that researchers, government agencies, and stakeholders should consider to effectively form comprehensive measures to minimize the risks of cryptocurrency functioning.

2 LITERATURE REVIEW

In its current understanding, cryptocurrency is a piece of software, i.e., an intangible asset, the ownership of which is difficult to prove, because the legal framework usually does not contain any rules on the owner's rights to crypto assets. Cryptocurrency can be stolen from a virtual wallet; in this case, finding the robbers is difficult due to the anonymity and decentralized nature of cryptocurrency ownership processes

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(Milutinović, 2018).

Research papers emphasize the uncertainty and ambiguity of the future of the cryptocurrency market, especially the lack of evidence-based mechanisms to understand the macroeconomic and social implications of the active inclusion of cryptocurrency in the economy (Abdullayev et al., 2024; Nosova et al., 2018; Safiulin et al., 2019). Because of the emerging loopholes in legislation, cryptocurrencies are always on the verge of legality, which fuels attempts to systematize and collect these gaps in one place to successfully neutralize them (Pshenychna et al., 2023).

One of the main problems with the legal framework encompassing cryptocurrencies is the lack of a unified approach to regulation. Different governments hold different positions: some prefer outright bans on certain cryptocurrency-related activities, while others are working on the legislative legitimization of their use (Karisma, 2022).

There is also another regulatory uncertainty that raises the question of whether and how cryptocurrency should be regulated at all. This uncertainty may prevent cryptocurrencies from becoming more involved in the economy, as businesses and investors may be reluctant to engage with a financial instrument that does not have clear legal rules in place (Abdullaev & Khamraev, 2020; Monem et al., 2022; Srimathi & Bharathi, 2023).

Although regulation is necessary to prevent illegal activities and protect consumers, there is a risk that excessive regulation may stifle innovation and the development of the cryptocurrency market. Striking the right balance between regulation and freedom is a challenge that regulators must address (Benigno et al., 2022; Borodina et al., 2023).

The varying approaches of different governments — from bans to positive legislative steps - create a fragmented legal environment. This fragmentation can cause problems in cross-border transactions and complicate the global integration of cryptocurrencies into the financial system (Kirobo et al., 2024).

A few studies suggest that future cryptocurrencies are likely to be government-issued and heavily regulated. This could lead to a scenario where private cryptocurrencies will face stricter regulations or will not be able to compete with government-backed digital currencies, which will also affect market dynamics (Artemov et al., 2020; Wilson, 2019).

Finally, cryptocurrencies have already been used in crime, pyramid schemes, and financial fraud. In doing so, fraudsters use a variety of scam schemes to rob a person

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of their accumulated crypto resources. This negative perception may influence regulatory decisions and lead to stricter controls (Saha et al., 2024).

These challenges highlight the difficulty of creating a legal framework that would support cryptocurrencies while also ensuring security and compliance in the market. Addressing these challenges is critical to the future development and adoption of cryptocurrencies as a mainstream financial instrument (Wilson, 2019). To eliminate the fragmentation of the legal field and find a balance between control and freedom, it is essential to have a clear understanding of the specific advantages and disadvantages of cryptocurrencies and the experience of different states in interacting with these assets.

3 METHODS

To achieve the set research goal, a set of scientific publications were selected. The selection procedure followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The research algorithm consisted of the following steps. At the first stage, we selected publications containing the definitions of cryptocurrency market functioning, cryptocurrency legislative regulation, cryptocurrency usage problems, and cryptocurrency benefits from sources indexed by Scopus, WoS, and Google Scholar. Papers were selected for the analysis if the author(s) had at least five publications on the topic in question for at least 10 recent years and if research on digital rights constituted at least 40% of all other studies by the author(s). After analyzing the abstracts and conclusions, 61 of the most relevant papers were chosen.

The selected sources allowed us to outline the various aspects of cryptocurrency market functioning and the most relevant features of cryptocurrency as a legal phenomenon, determining the problems contributing to the criminalization of this sphere and preventing the creation of a sustainable legal landscape for its functioning. As a result of the analysis, we proposed ways to solve the existing problems.

4 RESULTS

Reviewing research on cryptocurrency applications, we should note that the topic of creation and functioning of the cryptocurrency market causes heated discussions.

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Many researchers highlight the advantages of cryptocurrency. They emphasize the following positive aspects of using cryptocurrency (Table 1).

Table 1. The advantages of cryptocurrency

Advantage	Essence	References
1. Anonymity in use	Cryptocurrencies use digital signatures and keys to mask real identities	Kucheryavenko et al., 2019; Luchkin et al., 2020
2. Decentralization	Unlike traditional currencies controlled by central banks, cryptocurrencies are free from centralized control	Magizov et al., 2019a, 2019b; Mincewicz, 2021a, 2021b
3. Quickness of transactions	Special algorithms and advanced routing tools make modern cryptocurrencies superior to other systems like VISA	Ammous, 2018; Bunjaku, 2017
4. Low costs	The costs are reduced primarily through the elimination of intermediaries and blockchain technology	Sinelnikova-Muryleva et al., 2019; Mincewicz, 2021a, 2021b

Researchers' discussions about the main problems of cryptocurrency market functioning are of great scientific and practical interest. In their works, scholars address several problems and highlight the leading ones. Having analyzed selected studies on the problematic functioning of the cryptocurrency market, we identified the following shortcomings (Table 2).

Table 2. The disadvantages of cryptocurrency

Disadvantage	Essence	References
1. The possibility of cryptocurrency theft via malware	The software used to steal from payment systems has been adapted to the cryptocurrency market. Fake links, viruses, phishing, and ransomware are in active use	Li & Whinston, 2020; Magizov et al., 2019a, 2019b
2. The bankruptcy of cryptocurrency exchanges	Many cryptocurrency exchanges have been shut down because of hacker attacks and have been forced to file for bankruptcy. Customers often have no time to enter their cryptocurrency, which results in multimillion-dollar losses	Anferova et al., 2022; Giudici et al., 2020
3. Low profitability	Achieving profitability on crypto exchanges requires large volumes of cryptocurrency trading	Mkrtchian, 2019; Sławiński, 2019
4. Technical malfunctions	Technical failures lead to the loss of cryptocurrency stored in special electronic wallets. Technical malfunctions can occur at the fault of operators who develop the software and defenses against hacker hacks	Budkin & Budkin, 2023; Savona, 2023
5. Legal uncertainty	Legal uncertainty manifests itself in matters of the issuance, taxation, and government control of cryptocurrency	Cvetkova, 2018; Wilson, 2019

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6. Volatility	Cryptocurrency exchange rates depend on many factors, including information, political, and economic, which can make a cryptocurrency both fall in value and grow significantly. Lack of stability forces investors to act cautiously and invest in more reliable financial instruments	Tredinnick, 2019; Vaz & Brown, 2020
7. Lack of literacy among investors	Awareness of the features and benefits of cryptocurrency and how it can be used as a means of payment	Efremenko et al., 2019; Malherbe et al., 2019

Expanding the understanding of the possibility of cryptocurrency theft (Table 1), we should add that apart from malware, criminals use other modern technologies to implement fraudulent schemes in the cryptocurrency market. This is explained by the fact that cryptocurrency transactions do not require criminals to use real names, accounts, or other personal data, which allows them to avoid prosecution.

In 2017, there was a scheme of initial currency offerings (ICO) to raise cryptocurrency for startups and its ostensible similarity to initial public offering (IPO) attracted many investors. This public offering involved a complex criminal scheme: in 2017 alone, investors lost more than 1.5 billion dollars through ICOs (Ghosh et al., 2020).

Discussing legal uncertainty (Table 2), we should point out the lack of cryptocurrency insurance on exchanges. In cases of theft, hacking, and bankruptcy, investors cannot claim compensation for losses, as cryptocurrency exchanges do not have the funds to cover possible damages. When performing transactions with cryptocurrency through an exchange, customers do not own the funds, instead, they transfer them to intermediaries, while the exchange provides access for transactions. Some exchanges (e.g., BFX) choose to reimburse losses in such cases to prevent investor outflows and build trust between customers and the exchange (Abdullaev et al., 2023; Tomić et al., 2020), but some do not take this step (Mosteanu & Faccia, 2020).

Due to legal uncertainty (Table 2) and the vagueness of legislation concerning the ownership of cryptocurrency, there is a possibility of losing the secret code. In practice, this happens when owners lose the access key to the electronic wallet where they store cryptocurrency. Importantly, the password cannot be recovered, nor can the cryptocurrency be returned. Statistics show that the loss of secret codes and passwords occurs in 25% of cases. For 2023 alone the amount of losses resulting from the loss of access codes exceeded 18 billion dollars. Therefore, the problem of loss of access to an electronic wallet with cryptocurrency should be recognized as very

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important and requires an appropriate response (Słapczyński, 2019).

Apart from the highlighted problems in the functioning of the cryptocurrency market, it is worth mentioning the monopolization of the settlement system, the unsecured nature of crypto assets, the lack of state control over the circulation of cryptocurrency, and mining with high costs of equipment and high electricity consumption (Muradyan, 2023; Muradyan et al., 2023). These challenges stand in the way of legalizing cryptocurrency, but recognizing cryptocurrency as a means of payment is necessary because the lack of control can create serious problems, such as money laundering, financing of terrorism, and large-scale fraud (Muradyan et al., 2022).

Experts note (Daskalakis & Georgitseas, 2020) that different countries have different definitions of legal status and can be divided into three groups based on the criterion of cryptocurrency legalization (Table 3). Of note is the large share of countries that have a favorable attitude towards cryptocurrencies.

Table 3. Classification of countries based on the status of cryptocurrency

No.	Status	Countries in the group
1	a complete ban on cryptocurrency circulation and ICOs	Iceland, China, Bolivia, Indonesia, Kyrgyzstan, Ecuador, Thailand, Lebanon, Vietnam, Bangladesh
2	the legal status of cryptocurrencies is not defined, but the countries are interested in legalizing cryptocurrency	Spain, Germany, Czech Republic, Colombia, Russia, Belgium, Poland, Hong Kong, Slovenia, Turkey, Switzerland, Singapore, Croatia, France, Israel, New Zealand
3	cryptocurrency is recognized as a means of payment and the state controls cryptocurrency transactions through intermediaries and licensing	Finland, Belarus, Estonia, Denmark, South Korea, Australia, USA, UK, Canada, Netherlands, Sweden, Netherlands

5 DISCUSSION

Given the problematic nature of the cryptocurrency market, many countries adopt prohibitive measures in the sphere of crypto circulation. Notwithstanding, it is important to keep in mind the advantages of cryptocurrency (Table 1). In our opinion, these benefits outweigh the disadvantages. This is why we believe legalization to be a more promising trend, especially given the development of the modern economy in the direction of Industry 4.0, where technology is starting to play an increasingly vital role (Eskerkhanova et al., 2023; Fiorino et al., 2022; Kirillova et al., 2023). In this connection, it is important to identify the problems in the functioning of the cryptocurrency market and the positive experience of countries that have solved these problems. This analysis is needed to propose initiatives for those countries where

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cryptocurrency either has an undefined status or has been de-legalized.

The analyzed experience of the countries that have legalized cryptocurrency shows that control over cryptocurrency transactions and the system of taxation in this area needs to be established at the legislative level (Table 3).

In 2014, the United States introduced a tax on the exchange of cryptocurrency for money, but due to the disregard of this rule by taxpayers, in 2017, it was decided to tax all cryptocurrency exchange transactions (Gikay, 2018). The example of the US was followed by Japan, which legalized cryptocurrency circulation but also imposed strict tax requirements (Milutinović, 2018). Thus, when creating a legal landscape for cryptocurrencies, special attention should be paid to the tax rule.

Taxation should be carried out not only in the sphere of exchange of crypto assets, but also in the sphere of mining, cryptocurrency transactions, and the storage of cryptocurrencies in electronic wallets (Bobrova et al., 2023). For example, Canada has introduced a tax rule on the custody of crypto assets (Sockin & Xiong, 2023).

A solution to problems with anonymity is to develop a standard for an electronic registry to store the personal information of cryptocurrency owners and information on transactions with cryptocurrency. Given that almost all countries have legislation protecting customers' personal data and information, these rules need to be amended so that they do not apply to information about cryptocurrency transactions. It is worth noting that digital data is already successfully used to prove some types of crimes (Chirkov et al., 2022).

Only the introduction of these measures can significantly reduce the risks of cryptocurrency being used by criminals and in financing terrorism, funding extremist organizations, and other fraudulent schemes. In addition, through taxation, the state will be able to take advantage of the lost tax benefits and control the crypto business (Kochetkov et al., 2023; Polovchenko, 2021).

6 CONCLUSIONS

The study achieved the set goal; the advantages and disadvantages of cryptocurrencies were highlighted, and proposals for possible interaction between the state and the cryptocurrency market were made. Despite the fact that cryptocurrency has several significant drawbacks that can be used by criminals, the experience of countries that have already legalized cryptocurrency gives reason to conclude that the

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positive aspects still outweigh the negative ones. The positive experience of countries with legalized cryptocurrency can help take the first steps to legalize this asset. In this connection, based on the conducted analysis, we proposed possible measures in the sphere of taxation and anonymity.

The scale of the study is limited by the sample of analyzed sources. However, the sources chosen for the study were carefully selected following the PRISMA procedure.

Considering further research prospects, future studies on cryptocurrency circulation should consider the primary measures to combat criminal activities in the crypto business.

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