

PROBLEMS AND PROSPECTS OF STATE REGULATION OF CRYPTOMINING IN KAZAKHSTAN

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Abstract. *The cryptocurrency mining sector in Kazakhstan has witnessed remarkable expansion, attracting global miners due to favourable conditions. However, this growth has underscored the country's energy scarcity, leading to the enforcement of stringent regulations by the government.*

This article seeks to offer a thorough comprehension of the regulatory framework governing cryptocurrency mining in Kazakhstan.

Examining diverse aspects such as the legal status of mining, licensing structures, tax considerations, and the impact on energy infrastructure, the study utilizes international experiences and stimulus materials. Through the analysis of media representation and examination of primary trends, it is revealed that while the government has addressed legal gaps and instituted transparent tax procedures, taxing digital mining may discourage foreign investments, given the industry's current fragility due to excessive regulations. The article provides insights into the regulatory landscape, emphasizing challenges and opportunities.

Keywords: *state regulation, cryptocurrency mining, content analysis, energy security, taxation framework, information agenda.*

Reikšminiai žodžiai: *valstybinis reguliavimas, kriptovaliutų kasyba, turinio analizė, energetinis saugumas, apmokestinimo sistema, informacinė darbotvarkė.*

Introduction

Cryptocurrencies are currently capturing substantial attention from investors, giving rise to a burgeoning entrepreneurial pursuit known as “mining.” Mining, in this context, encompasses both the creation and extraction of cryptocurrency.

In Kazakhstan, the emergence of cryptocurrency mining has emerged as a critical element of the national economy, capturing global attention. As of 2021, the nation claimed the second-highest global ranking in cryptocurrency mining hashrate, according to the (Cambridge Bitcoin Electricity Consumption Index (CBECEI) 2023). This noteworthy position signifies Kazakhstan’s significance in the global cryptocurrency landscape. However, the ascendancy of cryptocurrency mining in Kazakhstan has not been without its challenges. The country encountered impediments such as illicit mining operations and strains on its electrical infrastructure. The latter issue was exacerbated by an influx of miners relocating from China, seeking more hospitable environments for their operations (Liu et al., 2023). The sudden surge in demand for electricity posed a substantial strain on the existing infrastructure, necessitating comprehensive measures to manage the increased load.

In response to these challenges, the Kazakhstani government implemented a dual-fold strategy. Firstly, it actively encouraged investment in the cryptocurrency mining sector, recognizing its potential economic benefits and global appeal. Simultaneously, to ensure responsible and sustainable growth, regulatory controls were instituted.

This paper conducts a comprehensive examination of challenges arising from the rapid growth of cryptocurrency mining in Kazakhstan and evaluates the implications of the government’s mining taxation framework. The research synthesizes existing literature, analyzes government policies, and draws insights from comparable international cases to provide a holistic understanding of the issues.

Employing a content analysis of domestic media, particularly news websites, the study scrutinizes coverage of the mining industry in Kazakhstan, revealing key trends and problems. By exploring public opinion and regulatory perceptions, the research contributes valuable insights to the discourse on the industry’s development in the country. The study addresses research questions related to government regulation, responsibilities for miners, and the impact of the special tax regime, aiming to inform policymakers, industry stakeholders, and researchers.

Literature review

This literature review serves to synthesize diverse perspectives on cryptocurrency mining, delving into its economic, legal, and environmental dimensions. In particular, it addresses the evolving regulatory landscape, economic implications, and the pressing environmental concerns associated with this burgeoning industry.

The regulatory dimension emerges as a focal point, with scholars such as (Afzal 2019, 103-130) and (Liz Guinan 2023) shedding light on the challenges of regulating cryptocurrency mining amid rapid technological advancements. Notably, Afzal underscores the widening gap between regulatory measures and technological progress, emphasizing the need for proactive regulatory frameworks to navigate the complexities of modern technology.

An intriguing facet of this discourse revolves around divergent views on the classification of cryptocurrency mining. (Maksurov 2018, 256-265) posits a nuanced perspective, arguing for its recognition as a distinct economic and legal technology rather than a conventional entrepreneurial activity. Conversely, (Ershova and Trofimova 2019, 73–82) advocate for viewing mining participants as self-employed individuals, positioning mining as a form of entrepreneurship spurred by the demands of the digital economy.

The decentralized nature of cryptocurrency mining, a key attraction for many, is explored by (Olander 2015, 128–136), while (Bhatnagar, Taneja, and Rupeika-Apoga 2023, 136) caution against the inher-

ent volatility of cryptocurrency markets. They highlight regulatory changes, liquidity challenges, technical complications, and market outlook as factors contributing to the instability, emphasizing the importance of investor awareness.

The environmental impact of cryptocurrency mining emerges as a significant concern, with scholars such as (Halaburda and Yermack 2023) drawing attention to substantial energy consumption. This is further quantified by Swain (2023), indicating a notable fraction of the global energy consumption attributed to blockchain and crypto assets in 2022. (Arslanian 2022, 259-276) underscores global media coverage of the industry's unfavorable aspect – substantial electricity usage for both mining and transaction processing.

In light of these complexities, the literature review concludes by stressing the imperative of a comprehensive and balanced regulatory approach to cryptocurrency mining. It underscores the need to address economic stability, energy consumption, and the evolving role of miners in the digital economy. The multifaceted nature of this topic emphasizes the ongoing requirement for research and dialogue to inform effective policies and practices within the cryptocurrency mining sector.

Materials and Methods

The research employed a method of analyzing secondary data obtained from open sources, including the Committee of State Revenues of the Ministry of Finance of the Republic of Kazakhstan, the Ministry of Digital Development, Innovations and Aerospace Industry of the Republic of Kazakhstan, and the Ministry of Energy of the Republic of Kazakhstan. Additionally, the study also included a review of international experiences in countries with significant global mining capacity, specifically China, the USA, and Russia. This review aimed to gather data on regulatory measures employed in the mining industry in these nations, which are recognized as leaders in terms of their mining capabilities.

This study utilized content analysis to examine internet resources focused on mining in Kazakhstan. The analysis considered media language and energy-related aspects of digital mining. The research focused on internet media accounts discussing digital mining in the country. Content analysis was used to process information from news sites between 2015 and 2023, revealing patterns in the presentation of mining information. Four key indicators were identified: regulatory measures, local attitudes (negative and positive), and energy system impact.

Analysis and Results

In order to elucidate the trajectories of state regulation within the mining industry, it is judicious to undertake a comprehensive analysis of regulatory practices observed in three prominent nations: China, the United States, and Russia. The pertinent data, as outlined in Table 1, pertains specifically to the regulation of cryptocurrency mining activities. A meticulous examination of the institutional frameworks implemented by these nations to govern the mining sector is imperative, as it promises to yield valuable insights into the varied global experiences that characterize this domain.

Indeed, the experience of each country in the digital mining industry is distinctive, and government regulation is shaped by a variety of factors. Economic priorities, regulatory frameworks, energy resources, and technological capacities all contribute to the specific approach taken by each nation towards regulating cryptocurrency mining.

In 2020, the Republic of Kazakhstan implemented the Law “On Amendments and Additions to Certain Legislative Acts of the Republic of Kazakhstan on the Regulation of Digital Technologies.” This law brought about changes to the Civil Code of Kazakhstan and the Law of Kazakhstan “On Informatization,” specifically addressing the inclusion of digital assets in the realm of civil rights and establishing their legal framework. Notably, the law introduced a prohibition on the issuance and circulation of unsecured digital assets, commonly referred to as cryptocurrency, within the Republic of Kazakhstan.

Table 1. *State regulation of mining in foreign countries*

Country	State regulation measures
China	<p>In 2021, a Notice on Regulating Virtual Currency ‘Mining’ Activities was jointly issued by China’s National Development and Reform Commission (NDRC) and nine other authorities. The objective was to impose restrictions on cryptocurrency mining operations within the country. The notice establishes official guidelines at the national level for cryptocurrency mining activities and imposes limitations on new investments in this sector. It specifically prohibits companies from labeling their cryptocurrency mining businesses as „data centers.“ Furthermore, supplying electricity to cryptocurrency mining enterprises is also forbidden. Illegal provision of electricity to existing mining operations will be investigated and subject to sanctions. The price for supplying electricity should be equivalent to the electricity tariffs specified in the Industrial Structure Adjustment Guidance Catalogue’s outdated category (Zhang, Laney 2022).</p>
USA	<p>Regulations regarding cryptocurrency mining in the United States were still evolving and varied by state. Some states have imposed specific regulations or requirements on cryptocurrency miners, such as obtaining permits or licenses to operate mining facilities. Electricity rates can also impact the viability of mining operations, and some states have implemented regulations to address concerns related to power consumption. Some states have taken steps to regulate mining operations with an emphasis on energy efficiency or to promote the use of renewable energy sources. Some states have implemented licensing or registration requirements for businesses engaged in cryptocurrency-related activities, including mining. These regulations aim to ensure consumer protection, prevent fraud, and promote transparency in the industry. The Digital Asset Mining Energy (DAME) excise tax is a newly proposed measure in this year’s Budget, demonstrating the President’s dedication to tackling existing national issues and emerging risks. Following a gradual implementation period, companies would be subject to a tax equivalent to 30 percent of their electricity expenses related to cryptocurrency mining (The White House 2023).</p>
Russia	<p>Russian legislation doesn’t explicitly mention terms like „cryptocurrency,“ „mining,“ or „mining pools.“ Instead, it broadly states that the regulation of digital currency issuance and circulation in Russia should follow federal laws, which are yet to be established. As of January 22, 2023, the State Duma is reviewing Draft Law No. 237585-844. This draft law defines mining as the activity of performing mathematical calculations using computing devices and software to create digital currency. It also introduces the concept of a mining pool, where multiple device owners combine their capacities for mining and share the resulting digital currency. The bill allows miners to conduct transactions involving digital currency obtained through mining, provided that Russian information infrastructure is not involved, except in cases governed by an experimental legal regime. While the draft law doesn’t specify the tax framework for digital currency mining, it mandates individuals engaged in mining to provide information about their address-identifier to the appropriate authorities in line with Russian tax laws and regulations (Korzhova 2023, 88–95)</p>

Interestingly, despite the restrictions on unsecured digital assets, the law also fully legalized digital mining in Kazakhstan. Table 2 below shows state regulation measures in the field of mining in Kazakhstan.

A subsequent section of this article will undertake a content analysis of the chronologically ordered significant events within the Kazakhstani mining industry, as portrayed in the national media. This analysis aims to shed light on the dynamic path of the industry’s challenges and the corresponding solutions, thus capturing the evolving narrative of Kazakhstan’s mining landscape.

Table 2. A comprehensive set of measures and principles established by the government of Kazakhstan for the systematic supervision and management of cryptocurrency mining

№	Measures
1.	Introduction to the conceptual framework of mining activities
2.	Licensing of mining with the establishment of a legislative prohibition on activities without a license. Cryptocurrency miners are obligated to obtain licenses categorized into two types based on ownership of data processing centers, with associated fees ranging from \$40 to \$15,300 USD.
3.	Introduction of a registry of used equipment
4.	Introduction of electricity consumption quotas for miners
5.	Establishment of a legal framework for the operation of a mining pool
6.	Ensuring the operation of an exchange for unsecured digital assets within the territory of MFCA «Astana»
7.	Staged introduction of mandatory sale of a portion of mined digital assets on the exchange, at a rate of no less than 50% from 2024 and no less than 80% from 2025 of the total volume of digital assets
8.	Establishment of administrative liability for violation of legislation on digital assets, Violations may lead to fines, ranging from \$112 to \$1,144 USD, and potential license suspension (adilet.zan.kz 2023).
9.	Regressive tax rate

Source: Authors.

The analysis commences by examining the earliest news related to mining, establishing the ground-work for the industry's subsequent evolution. The initial mining phase showcases the state's increasing interest in cryptocurrency mining, leading to its rapid expansion.

As the industry progresses, various regulatory interventions and governmental actions become prominent. These interventions reflect the government's acknowledgment of emerging issues and its efforts to address them in a lawful manner.

The graphs depict the results of content analysis of the mining industry in Kazakhstan, which was extensively covered in Kazakhstani news portals during the period from 2016 to 2023. In general, during the mentioned period, a total of 180 mentions on the Internet were identified, related to the benefits of mining, negative consequences associated with energy shortages, and regulatory changes in the law.

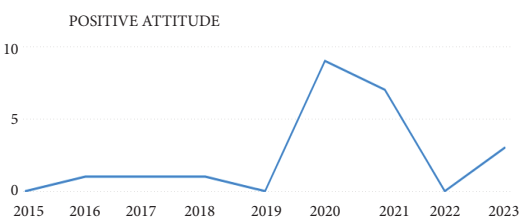


Figure 1. Positive dynamics of the publication of digital mining from 2016 to 2023

Source: Authors.

The Government of Kazakhstan has shown increasing interest in the cryptocurrency mining market since 2019, leading to positive developments such as the establishment of mining farms, heightened tax revenues, and governmental support. The peak of activity was observed in 2020, with a notable surge in mentions. However, 2022 saw a significant decline in mentions due to government measures aimed at regulating the industry, reflecting a proactive approach to enforcement (Figure 1).

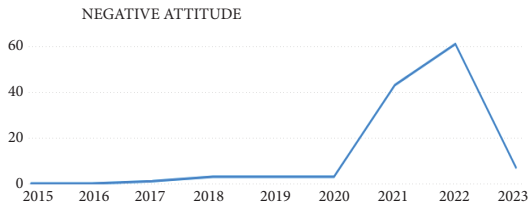


Figure 2. *Negative dynamics of the publication of digital mining from 2016 to 2023*

Source: Authors.

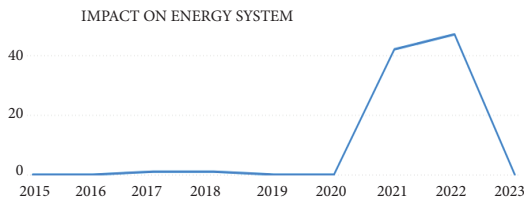


Figure 3. *Dynamics of the publication on the impact on the energy system of the country*

Source: Authors.

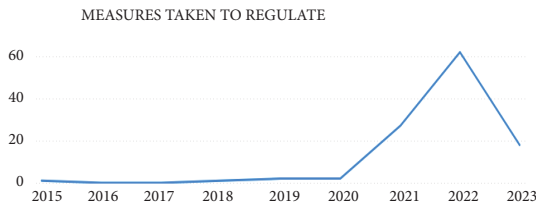


Figure 4. *Dynamics of the publication on the adopted state measures*

Source: Authors.

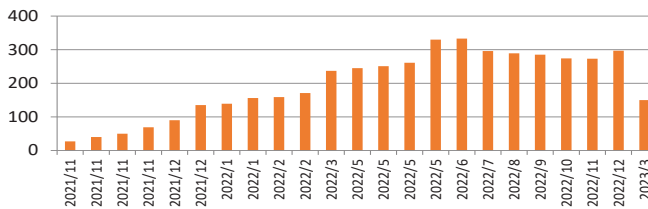


Figure 6. *The dynamics of registration for mining organizations in the field of digital mining from November 2021 to July 2022*

Source: Ministry of Digital Development, Innovations, and Aerospace Industry of the Republic of Kazakhstan 2022.

Amidst positive developments, there has been a parallel stream of negative information, including reports of illegal mining, economic crimes, corruption, and gray mining. Throughout the period analyzed, a total of 121 mentions on news portals were recorded (Figure 2).

An interesting trend emerges when examining articles discussing the impact of mining on the country’s energy system. The years 2021 and 2022 witnessed a peak in mentions, totaling 91, indicating a growing awareness and concern regarding (Figure 3).

The narrative shifts in 2022-2023, marked by a significant increase in mentions, suggesting an active government engagement in implementing legislative measures to legalize and regulate mining activities. This shift reflects a dynamic policy environment responding to the evolving landscape of the cryptocurrency mining industry (Figure 4).

Figure 6 clearly shows the dynamics of official registration of organizations engaged in digital mining activities.

According to (Ministry of Digital Development, Innovations, and Aerospace Industry of the Republic of Kazakhstan 2022), in October 2021, a total of 27 companies engaged in digital mining were registered in the country. By mid-2022, a total of 330 mining companies were officially recorded in Kazakhstan. This figure reflects the number of companies that were engaged in cryptocurrency mining activities and had undergone the necessary procedures to be recognized within the country’s regulatory framework.

Discussions

President Kassym-Jomart Tokayev's 2020 initiative to attract more companies and investments to the country's mining sector resulted in a substantial influx of miners. The President publicly supported and highlighted the growth of the emerging digital mining sector in a message to the nation on September 1, 2020, instructing the government to raise digital mining investment to \$1.18 billion by 2025 (Akorda.kz 2020). Notably, this surge in mining activity coincided with China's cryptocurrency ban.

In the same year, a shift in perception occurred, and accusations were levied against miners by the Ministry of Energy and other government agencies. Miners were blamed for causing an electricity shortage in the country, leading to a decision to disconnect them from power grids starting from the end of 2021.

The introduction of a cryptocurrency mining tax, starting with a fee for electricity consumption in the form of an additional fee of 1 tenge electricity (approximately 0.0023 USD) for every 1 kilowatt-hour, starting from January 1, 2022 (PricewaterhouseCoopers 2023), and subsequently escalating in 2023, underscores the government's effort to balance economic interests and address energy consumption concerns. These changes entail higher fees for the use of low-cost electricity, with the upper limit of the scale reaching 25 tenge (approximately 0.056 USD), (State revenue committee Ministry of finance of the RoK 2023).

Report from JSC 'KOREM' reveals a significant change in electricity consumption by miners in the Republic of Kazakhstan. In 2022, miners consumed approximately 3 billion kWh of electricity, while in the first quarter of 2023, the consumption dropped significantly to only 650 million kWh ("Quarterly reports | Analytics | JSC 'KOREM'" n.d.). This data indicates a notable reduction in electricity consumption in 2023, likely as a response to the introduced taxation and regulatory changes.

Kazakhstan's energy landscape is grappling with challenges, notably a shortage of energy capacity, particularly impacting the mining sector. To address this, the country has resorted to importing 1.5 billion kWh from Russia, placing a financial burden on consumers and the state (Ministry of Energy of the Republic of Kazakhstan 2022). The Ministry of Energy's 2022 report emphasizes the gravity of the situation, projecting an energy deficit until 2029 (Kazakhstan Today 2023). Overcoming this requires substantial investment to secure 7 GW of additional energy capacity, but current infrastructure is insufficient. The urgency lies in adopting comprehensive strategies to enhance domestic capacity, reduce dependency on external sources, and build a sustainable and resilient energy future for Kazakhstan.

The decline in revenues from mining fees in 2023, compared to the previous year, has direct implications for Kazakhstan's national budget. The shift from a \$7 million boost in 2022 to revenues exceeding \$541,000 USD in the first quarter of 2023 signals a potential economic downturn in the sector (Haqshanas 2023).

The government's strategic shift from a notification-based system to a licensing regime in 2020 (Adilet.zan.kz 2023) appears to have prompted a noteworthy surge in "white" miners. This shift towards a more transparent and legitimate framework suggests that regulatory adjustments, albeit met with initial resistance, have fostered a sense of compliance within the industry.

These regulations have already led to observable outcomes, as evidenced by the reduction in the number of entities engaged in paying for digital mining. In the first quarter of 2023, there were 150 companies as paying entities for digital mining, whereas in mid-2022, the number was 330 (Ministry of Digital Development, Innovations and Aerospace Industry of the Republic of Kazakhstan 2022).

It's worth noting that the introduction of such a specialized mining tax is not anticipated in most other countries, and many foreign countries typically allow deductions for electricity consumption expenses. In contrast, the Republic of Kazakhstan's law not only lacks provisions for deductions but also obliges individuals engaged in digital mining to pay for the consumed electricity twice.

A comprehensive assessment of the government's actions will be possible in early 2024, once the final report for the year 2023 becomes available. This report should provide valuable insights into the impact of regulatory measures and developments within the cryptocurrency mining industry in Kazakhstan, enabling a thorough evaluation of the outcomes.

Conclusions

1. **Regulatory Milestone:** The introduction of the “On Digital Assets in the Republic of Kazakhstan” law marks a significant stride in regulating the cryptocurrency mining industry. By mandating licensing for participants, the legislation fosters transparency, control, and effectively addresses challenges posed by grey mining.
2. **Energy Stability:** A critical aspect of the regulatory framework is its strategic approach to energy stability. Allowing miners to optimize electricity consumption during stable periods is a noteworthy provision that contributes to the resilience of the national energy grid.
3. **Government Imperatives:** To sustain and enhance the cryptocurrency mining industry’s growth, the government is urged to expedite the development of new energy capacities, including the exploration of nuclear power options. This is pivotal in ensuring a stable and resilient electricity supply.
4. **Economic Incentives:** The suggestion to reconsider digital fee rates for imported electrical energy used in mining is a pragmatic step. This has the potential to incentivize increased investment, offering a dual benefit through enhanced fees and corporate income tax deductions.
5. **Sustainable Development:** The proposal to establish a fund, financed by the mining sector, for modernizing existing energy infrastructure underscores a commitment to sustainability and efficiency. This initiative aims to create a self-sustaining ecosystem that supports the long-term viability of cryptocurrency mining.
6. **Future Trajectory:** As Kazakhstan continues on this trajectory, the judicious management of regulatory frameworks and proactive measures to bolster energy capacities will play pivotal roles. The nation’s trajectory in navigating the evolving landscape of cryptocurrency mining will be crucial in determining its long-term standing in this dynamic industry.

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KRIPTOVALIUTŲ GAVYBOS VALSTYBINIO REGULIAVIMO KAZACHSTANE PROBLEMOS IR PERSPEKTYVOS

Anotacija. *Kripto valiutų kasybos sektorius Kazachstane labai išsiplėtė ir dėl palankių sąlygų pritraukė pasaulinius kasėjus. Tačiau šis augimas išryškino šalies energijos trūkumą, todėl vyriausybė ėmėsi taikyti griežtas taisykles. Šiame straipsnyje siekiama išsamiai supažindinti su kripto valiutų kasybą Kazachstane reglamentuojančia reguliavimo sistema. Nagrinėjant įvairius aspektus, tokius kaip kasybos teisinis statusas, licencijavimo struktūros, mokesčiai ir poveikis energetikos infrastruktūrai, tyrime pasitelkiama tarptautinė patirtis ir skatinamoji medžiaga. Analizuojant atstovavimą žiniasklaidoje ir nagrinėjant pirmines tendencijas, atskleidžiama, kad nors vyriausybė pašalina teisinės spragas ir nustatė skaidrias mokesčių procedūras, skaitmeninės kasybos apmokestinimas gali atgrasyti užsienio investicijas, atsižvelgiant į dabartinę šios pramonės šakos pažeidžiamumą dėl perteklinio reguliavimo. Straipsnyje pateikiamos išvalgos apie reglamentavimo aplinką, pabrėžiant iššūkius ir galimybes.*

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