

Research on the Legal Risks of Digital Currency in the Big Data Environment

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Abstract: With the widespread application and growth of blockchain technology, cloud computing, and big data analytics in the financial industry, digital currencies have emerged. However, relevant regulations specifically targeting digital currencies have not been officially promulgated yet. In the process of promoting digital currencies, legal risks such as unclear boundaries of compensation liability, unclear ownership, potential privacy breaches, and financial regulatory challenges still need to be overcome. Therefore, it is essential to prioritize the prevention and management of legal risks associated with digital currencies in the big data environment, ensuring the smooth circulation and use of digital legal currencies across regions and promoting the internationalization and legalization of China's digital legal currencies.

Keywords: Big data; Digital currency; Legal risk

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1. Introduction

As the economic system continues to evolve, the existence of currency is gradually changing. In recent years, the global economy has gradually moved towards digitization and technology, and digital currency has attracted widespread attention from global finance and the economy^[1]. The rapid growth of digital currencies has led to the active involvement of a large number of institutions and investors. However, different regions have different regulations on digital currencies, so it is necessary to appropriately control digital currencies and avoid their legal risks.

2. Legal risks of digital currency in the big data environment

2.1. Information security risks

In the development of digital currencies, there are multi-faceted information security risks^[2]. Apart from the leakage of personal account data, it also includes potential security challenges faced by various software

applications and underlying network architectures during data manipulation and information transmission, leading to a plethora of risk factors such as potential poor performance of hardware and software, weaknesses at system integration points, and negligence in information security management during the advancement of information technology^[3]. Driven by both network technology and blockchain technology, the issuance of digital currency and other related steps require a decentralized accounting method, but the technology is still in its infancy. Meanwhile, the regulatory rules for digital currencies are not comprehensive, resulting in a lack of rigor in transaction verification processes^[4]. Technical vulnerabilities such as the instability of the trading system and the possibility of individual data breaches may cause financial losses. Owing to the diversity among different exchanges and network enterprises, various cryptocurrencies also exhibit distinct security risks.

2.2. Circulation environment risks

As digital currencies continue to evolve, market chaos also emerges. Digital currencies, being a new form of currency, may bring changes to the traditional “central bank - commercial bank” financial landscape. In this process, network infrastructure and telecommunication service providers play a crucial role in the widespread circulation of digital currencies^[5]. Due to the lack of a stable value benchmark, digital currencies can easily be used as a medium to implement Ponzi schemes. Private digital currencies, such as Bitcoin, are highly volatile, have unstable value, and lack transparency in relevant information, which can easily trigger speculative behavior among market participants and become a means for speculators to profit^[6]. The risks of digital asset investment mainly come from two factors: one is the speculative attitude of investors towards digital currencies^[5]. For instance, Bitcoin, due to its extremely complex generation algorithm and limited total supply, is expected to gain value and thus accumulate holdings, resulting in reduced market circulation and pushed-up prices. If inadequately regulated, traders may disturb market patterns, potentially leading to a contraction in currency supply and the disappearance of digital currencies from the market, severely infringing on investors’ interests. The second factor is that the value fluctuation of digital currencies is controlled by multiple elements. Some investors exploit current regulatory deficiencies and lax supervision to manipulate the virtual currency market maliciously. If the digital currency trading ecology is unhealthy, it not only triggers illegal speculative habits but may also facilitate tax evasion, money laundering, and other illegal activities^[6].

2.3. Risks of insufficient supporting laws

Before the legal system catches up with the development of digital currencies, the challenges of information security management for digital currencies are both complex and severe, lacking a professional regulatory framework. China has not yet established a corresponding comprehensive legal text and supervisory entity, making it difficult to control and audit digital currency trading platforms. The existing legal system is primarily established for traditional currencies and does not explicitly include digital currencies within its legal regulatory scope, resulting in legal gaps in the issuance, application, circulation, and regulation of digital currencies^[7].

3. Legal risk prevention strategies for digital currencies in the big data environment

3.1. Continuously strengthen information technology research and development

Firstly, it is necessary to continuously enhance technological upgrading and actively build information systems. Relevant departments need to strengthen research and development work, implement blockchain technology

and encryption methods for digital currencies, and enhance advanced planning for information system structures. In the process of building a digital currency data system, it is necessary to deeply consider the stability and scalability of the system. Taking into account the system's need for instant transaction processing capabilities, the current digital currency system built using distributed ledger technology still faces technical difficulties in parallel processing efficiency that have not been effectively solved^[8]. Therefore, in terms of design, we can refer to Libra's multi-layer hybrid technology strategy, integrate the system structure of domestic third-party payment platforms, and achieve breakthroughs in computing power growth limitations in the technical dimension.

Secondly, it is necessary to further enhance information security. Based on system-level communication protection, information protection, data guardianship, transaction prevention, and terminal authentication security, we will continue to promote technological improvements, adopt multiple strategies to strengthen the encryption technology architecture according to distributed ledger technology and ensure the security and ease of operation of digital currency production and reception systems. Besides that, strengthen the cleaning action of cyberspace to effectively prevent cybersecurity risks. Relevant departments should improve the network supervision structure, combine technical means to implement disciplinary actions against individuals and groups engaged in network attacks, carry out specific tasks such as investigating hacker activities and eliminating network viruses, strengthen monitoring and preventive measures, and ensure the stability and security of the network environment.

3.2. Accelerate the construction of digital currency financial systems

Firstly, it is necessary to improve the legal framework for digital currencies. The introduction and circulation of digital currencies require a complete legal framework and a solid institutional foundation. To ensure the steady growth of the national economy and minimize the impact of digital currency issuance on financial markets, the legality of digital currencies needs to be established. Relevant departments should revise legal provisions, including defining digital currencies as part of formal currencies, clearly stipulating key elements such as the issuer and method of digital currencies, and addressing issues related to legal payment and ownership transfer. It is proposed to enhance the integrity of legal systems such as anti-counterfeiting currencies and anti-money laundering, develop and implement specific regulations for digital currency counterfeiting and money laundering, and strengthen supervision structures. Simultaneously, the competent authorities should formulate specific management regulations for digital currencies to ensure that the legal environment for digital currency issuance and circulation is optimized. As digital currencies are put into market operation, it is necessary to adjust existing laws based on actual conditions to adapt to possible challenges.

Secondly, it is necessary to improve the digital currency regulatory system. As an innovative form of currency, digital currencies have many new attributes beyond traditional currencies, so it is necessary to upgrade the existing digital currency regulatory framework to prevent potential risks^[9]. A regulatory system should be established to clarify the respective responsibilities and collaboration content of different agencies. By allowing the People's Bank of China to take on a leading and coordinating role, establish a digital currency monitoring and analysis unit, and use modern technological means such as big data to analyze the impact of central bank digital currencies on China's credit currency production, the replacement of traditional currencies, and the efficiency of financial system operations. This will provide data support for the management of digital currencies and decision-making by national macro-regulatory departments, and mitigate the adverse effects that central bank digital currencies may have on the real economy and financial system. Additionally, to address

the challenges that may be encountered during the issuance and circulation of digital currencies, it is necessary to maintain the flexibility and transparency of supervision, accurately identify potential dangers, build a robust digital currency transaction ecology, and reduce risks caused by inadequate supervision or regulatory gaps. Finally, the People's Bank of China needs to supervise the innovative business structures potentially triggered by digital currencies, ensure the business continuity of digital currency brokers and supporting service providers, and prevent and eliminate systemic risks.

3.3. Promote the construction of a digital currency circulation environment

Firstly, it is necessary to provide strong policy support and funding. Relevant departments need to establish a cross-departmental collaboration team for digital currency promotion, define the responsibilities of different departments, design a coordination framework, and develop relevant regulations to ensure the smooth issuance of digital currency. By introducing tax incentives, tax relief can be provided to enterprises and individuals who widely use digital currency for business transactions. Fiscal preferential measures targeting the high-tech industry will also be launched, and companies implementing smart mobile device popularization in remote areas will receive government financial assistance^[10]. Moreover, communication service providers are encouraged to improve their service levels and expand network coverage of infrastructure. Administrative regulations applicable to government agencies and public institutions should be established to build dedicated and convenient digital currency payment channels, facilitating fund transactions for the public. Furthermore, the widespread use of digital currency is expected to increase the operating costs of traditional banks, corresponding financial institutions, and telecommunication service providers, including expenses for the installation and maintenance of software and hardware facilities, staff training, and the construction of suitable environments. Therefore, financial support should be provided in terms of funding.

Secondly, it is essential to develop supporting digital currency terminal markets and application scenarios. Following the principle of gradual advancement, the stability and security features of the digital currency system should be fully tested before selecting locations for pilot implementation. Monitoring local residents' acceptance and usage of the emerging digital currency, gradually expanding the trial area, continuously accumulating relevant experience, and continuously optimizing and upgrading the system will enable widespread application across the country. Additionally, significant attention should be given to digital currency promotion activities, introducing its usage processes and risk prevention strategies through various communication channels and methods that are easy for the public to understand. Initially, promotion points can be set up in major banks and financial institutions, and periodic knowledge lectures and training on digital currency can be organized to educate the public about its convenience and superiority. Special emphasis should be placed on increasing publicity efforts targeting marginalized groups such as those with lower education levels, the elderly, and individuals with disabilities, to avoid social differentiation issues caused by the digital divide. Lastly, it is crucial to ensure smooth consumer rights protection pathways, addressing incidents that cause consumer fund losses due to system issues, forgotten passwords, or telecommunication fraud, and eliminating public concerns about the security of digital currency funds.

4. Conclusion

In conclusion, with the rapid advancement of big data technology, particularly its deep integration into the

financial sector, digital currency has embraced a rapid growth opportunity. However, in recent years, as a new form of currency, digital currency has been associated with numerous illegal activities, which not only harm society but also pose challenges to the security and stability of the financial system. Due to the legal risks of digital currency, although simple approaches may effectively address issues in the short term, it is necessary to actively promote targeted regulatory solutions and implement precise governance in the future to ensure that digital currency develops along the right track and maintains financial security. Therefore, it is imperative to establish a regulatory framework and clear legal regulatory policies tailored to digital currency to standardize transaction activities, guide its healthy growth, and safeguard the stability of the financial system.

Disclosure statement

The author declares no conflict of interest.

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