Research on the Impact of Digital Currency on Anti-Money Laundering and Countermeasures

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Abstract:

With the development of financial technology (Fintech), digital currency, as an emerging financial instrument, has become the focus of global attention. While transparency and traceability contribute to anti-money laundering (AML), decentralized trading platforms lack know-your-customer (KYC)and AML measures and can be used for money laundering. This thesis explores the potential applications of digital currencies in anti-money laundering, such as transaction tracking and decentralized identity authentication, starting from the regulatory measures of digital currencies in various countries around the world. At the same time, this thesis analyzes the challenges faced by digital currencies in anti-money laundering, such as anonymity, irrevocability and information asymmetry caused by transnational issues, and puts forward countermeasures and suggestions, including strengthening technology application and innovation, strengthening supervision and cross-border cooperation, and strengthening education and training.

Keywords: Digital currency; Supervision measures; Anti-money laundering.

1. Introduction

Digital Currency is a form of money circulated through electronic payment systems, featuring rapid transfer, decentralisation and global transactions, such as Bitcoin and Ethereum. With the acceleration of the global digitalisation process, digital currencies are rapidly emerging as a new form of money, which not only changes the traditional financial system, but also brings new challenges to governments and regulators. Countries have adopted different strategies in responding to the regulation of digital currencies, and there are significant differences between developed and developing countries in terms of regulatory focus and approach.

Developed countries, such as the United States and Europe, typically take an inclusive but cautious approach to digital currencies, ensuring their compliance and security through a range of legal and regulatory measures. In contrast, developing countries such as China and India favour stricter regulation to prevent potential financial risks. At the same time, the technical characteristics of digital currencies, such as decentralisation and the irrevocability of

transactions, have created new opportunities and challenges for anti-money laundering. Anti-money-laundering measures have been enhanced by using the transparency of blockchain technology and the data analysis capabilities of artificial intelligence. However, these features may also be exploited by unscrupulous elements, increasing the covertness and complexity of money laundering activities. Therefore, how to effectively use the technical characteristics of digital currencies to prevent and combat money laundering activities has become an urgent issue for global regulators and financial institutions.

This thesis will explore the existing measures of digital currencies and their regulation in countries around the world, analyse the potential applications of digital currencies in anti-money laundering as well as the challenges, and propose strategies and recommendations to address these challenges.

The reserch significance of this paper is to provide a reference for global financial regulation, and the future outlook includes the convergence of technology and regulation, the enhancement of cross-border co-operation, and the enhancement of public awareness of the risks of digital currencies.

2. Existing Measures on Digital Currencies and Their Regulation in Major Countries

As digital currencies gain popularity, developed and developing countries have adopted different strategies in dealing with this emerging field.

2.1 Policies of Developed Countries

The United States is tolerant of digital currencies, but has tightened regulations. The U.S. Treasury Department's Financial Crimes Enforcement Network defines digital currencies as "money services businesses" and requires compliance with AML and KYC regulations. The U.S. Securities and Exchange Commission considers some digital currencies to be securities and subject to securities laws [1,2].

Europe has stricter regulations on digital currencies. The EU's Fifth Anti-Money Laundering Directive (5AMLD) requires digital currency trading platforms to comply with anti-money laundering regulations and register as financial service providers. The European Central Bank (ECB) has also studied the introduction of a digital euro [3].

2.2 Policies of Developing Countries

China adopts strict regulation of digital currencies. In 2017, China completely banned Initial Coin Offering and domestic digital currency trading, and pushed forward the development of Digital Chinese Yuan [4].

India is wary of digital currencies. Although the Reserve Bank of India had banned financial institutions from servicing digital currency transactions, a ban that was overturned by the Supreme Court in 2020, India is still considering stricter regulatory measures [5].

3. The Potential Applications of Digital Currency in Anti-Money Laundering

Through transaction tracking, decentralized identity verification, data analysis and artificial intelligence, and enhancing the transparency of cross-border transactions, digital currencies can play a significant role in anti-money laundering. The combination of these technologies can improve the detection and prevention of money laundering activities, providing strong support for the transparency and security of the global financial system.

3.1 Transaction Tracking

Digital currency transactions are typically recorded on the blockchain, which is public, transparent, and immutable. This feature makes transaction tracking easier and more efficient. Through blockchain analysis tools, AML institutions can monitor the flow of funds in real time, identify abnormal transaction patterns, and suspicious fund transfer paths, allowing for quicker identification of potential money laundering activities. For example, blockchain analysis companies use these tools to detect suspicious activities such as large-scale transactions, frequent cross-border transfers, and rapid movements of funds through multiple wallets. Digital currency service providers and other AML regulatory subjects can use digital currencies to establish and improve customer identity records and transaction records, thereby implementing the system of reporting large and suspicious transactions [6].

3.2 Decentralized Identity Authentication

Digital currency exchanges not only support currency exchanges between digital currencies but also facilitate the exchange of digital currencies with fiat currencies. They feature low cost, speed, strong anonymity, and decentralization, making them attractive for money launderers. Zhong believes that decentralized identity (DID) technology can help ensure that the identities of traders are trustworthy and verified during transactions. By using DID, a trader's identity can be verified without exposing personal privacy, reducing the anonymity risks that facilitate money laundering. Additionally, decentralized identity authentication systems can be integrated with other AML measures, enhancing the understanding of traders through a combination of on-chain identity verification

and transaction records, thus more effectively preventing and combating money laundering activities [7].

3.3 Data Analysis and Artificial Intelligence

AML regulatory agencies for digital currencies have shifted from traditional oversight-based, rule-based regulatory models to data-embedded AML regulatory paradigms. They employ and rely on new digital technologies such as big data, cloud computing, blockchain, and artificial intelligence to monitor, verify, control, and identify money laundering activities. Hua and Wang believe that big data analytics and artificial intelligence (AI) hold great potential in digital currency AML. These technologies can be used to process and analyze large volumes of transaction data to uncover hidden money laundering patterns. AI can automate the analysis of transaction records, detect abnormal transaction behaviors, and improve the accuracy of detection through machine learning. For instance, pattern recognition techniques based on historical data can help predict suspicious future behaviors, assisting AML institutions in making more timely and effective decisions [8].

3.4 Enhancing Cross-Border Transaction Transparency

Digital currencies can enhance the transparency of cross-border transactions, which is a weak link in the traditional financial system. Digital currency transactions have a cross-border nature, requiring strengthened international cooperation in regulation to jointly address cross-border money laundering risks. Therefore, regulatory agencies need to strengthen cooperation with international AML organizations and other countries by establishing information-sharing and collaboration mechanisms. Wang believes that, due to the global nature of blockchain technology, regulatory agencies in different countries can more easily share and access transaction data, thereby strengthening cross-border cooperation to combat cross-border money laundering activities. Moreover, smart contracts and transparent transaction rules can also ensure that cross-border transactions adhere to specific AML requirements, reducing the illegal flow of funds across borders [9].

4. Challenges faced by the technical characteristics of digital currencies in anti-money laundering

4.1 The Regulatory Tracking Dilemma Posed by Decentralization

The decentralized characteristic of digital currencies provides unprecedented freedom and privacy for financial transactions, but also poses serious challenges for anti-money-laundering regulation. This decentralization means that there is no single central authority that can monitor or control transactions and identities, leading to a significant increase in the crypticity of money-laundering activities. For money-laundering, criminals can take advantage of this characteristic to move criminal funds quickly, making it more difficult to track and stop the flow of criminal funds. Lin mentioned that in crypto-digital currency systems, it is not possible to find a central responsible controlling body that implements and enforces the regulations as well as obligations related to anti-money laundering, as in the case of traditional financial institutions such as banks [10]. Liu and Han also mentioned in their paper that digital currency has the characteristic of "payment as settlement". This characteristic brought about by decentralization, so that transactions do not need to go through clearing, settlement and other complex conversion procedures, its reliance on financial intermediaries is extremely low, which makes the digital currency out of the traditional financial institutions of the anti-money laundering monitoring scope. Criminals use this regulatory loophole to bypass the monitoring of traditional financial institutions, leaving an opportunity for lawbreakers to take advantage of, and making the hidden nature and diversity of money laundering methods rise by one level [11].

4.2 Difficulty in Identifying Information due to Anonymity

While traditional financial institutions rely on centralized agencies to verify customer identity and monitor for unusual activity, decentralized platforms often use anonymity, which makes investigations by law enforcement agencies difficult. Wu and Liu believe that even with controlled anonymity, it is more difficult to identify customers than with ordinary currencies. Especially when anti-money laundering agencies analyze and judge the upstream and downstream counterparties of abnormal transactions, they do not have the authority to identify customer identity information through cell phone numbers, and they cannot grasp key elements such as the age, household registration, residential address and occupation of customers. For crypto-digital currencies, there is even no way to know the actual user of the digital currency [12]. Mi also mentioned that anonymity can make AML activities difficult to detect. She believes that crypto-digital currencies are issued by unregulated anonymous subjects without legal responsibility, and the transaction behavior is easier to be involved in illegal activities, and its decentralized management institution leads to the obstruction of anti-money laundering regulation. From the perspective of the entire transaction process of digital currency, it involves a wide

range of customer accounts, payment institutions and trading platforms, which makes it easier to circumvent formal financial regulation [13].

4.3 Information Asymmetry due to Transnationality

The global circulation of digital currencies allows funds to be quickly transferred across national borders, thus circumventing the regulation of a single country. This characteristic makes money-laundering activities more insidious, and criminals can quickly transfer assets between multiple countries, making tracking more difficult. In addition, there are differences in the regulations, policies and regulatory frameworks of different countries. Li summarizes the existing regulations on digital currencies and AML in different countries and finds that certain countries may have more lax regulations on digital currencies and lack uniform AML standards globally. This inconsistency in regulations complicates cross-border cooperation and information sharing, enabling lawless individuals to find regulatory loopholes to commit money laundering, leading to difficulties for law enforcement agencies in tracking and combating money laundering [14].

5. Response Strategies and Recommendations

While the anonymity and other functional features of some digital currencies may induce money laundering, these features can be utilized or improved to track and monitor money laundering.

5.1 Strengthening Technology Application and Innovation

DID technology is based on the blockchain, which allows users to have an autonomous and controllable unique digital identity and to realize identity verification without compromising privacy. Regulators can work with DID service providers to require digital currency users to register their DIDs and bind them to their real identities. This will not only prevent anonymous transactions, but also provide important identity information for anti-money laundering authorities.

AI technology can also assist in identification. Combined with big data analysis, AI can identify whether transaction behavior is abnormal, discover the characteristics of suspicious traders, and improve the accuracy of anti-money laundering. Regulators can establish an AI identification system to intelligently analyze digital currency transactions to detect and stop money laundering activities in a timely manner. By continuously optimizing technical means and sharing successful experiences, a more trans-

parent and secure digital currency environment will be created, effectively reducing the risk of money laundering. In addition to the possibility of exploring the use of DID and other technologies to improve trader identification, strengthening the application of big data analysis, AI and other technologies in anti-money laundering is also one of the very effective methods. The blockchain records the whole process of digital currency transactions, which contains a large amount of data information needed for anti-money laundering. Combined with big data analysis technology, transaction patterns can be mined, suspicious behavior characteristics can be found, and the automation and accuracy of anti-money laundering can be improved. For example, multi-dimensional features such as transaction size, frequency and place of origin can be analyzed to identify abnormal flow of funds. At the same time, combined with natural language processing and other AI technologies, it can also monitor online public opinion and discover discussion clues related to suspicious funds. Through the in-depth mining and analysis of big data, it helps the anti-money laundering department to improve its insight into the flow of funds, and to detect and stop money laundering behavior at an early stage.

In addition, the regulatory authorities can also utilize the non-tampering characteristics of the blockchain to establish permanent traceability records of digital currency transactions. Once a suspicious transaction is found, the transaction chain can be traced back to quickly find the source and direction of money launderers' funds, providing strong support for the subsequent crackdown.

5.2 Strengthening Regulation and Transnational Cooperation

The anonymity and global nature of digital currency transactions made money-laundering difficult to track. Supervisory authorities of various countries need to strengthen communication and coordination and establish an information-sharing platform. Through real-time exchange of transaction data, suspicious activity information, etc., it can help cross-border tracking of money-laundering transactions. At the same time, the establishment of a global anti-money-laundering monitoring center can be explored to integrate intelligence from various countries and improve the synergy of cross-border law enforcement.

In addition, specific provisions applicable to digital currencies, such as real-name authentication, retention of transaction information and suspicious transaction reporting, can be formulated with reference to the existing Financial Action Task Force (FATF) standards. This will not only plug regulatory loopholes, but also facilitate cross-border law enforcement convergence. At the same time, it strengthens laws and regulations and enhances law enforcement to ensure that money launderers cannot use

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digital currencies to circumvent their legal responsibilities. Only through close international cooperation can we effectively curb digital currency money laundering and maintain the security and stability of the financial system.

5.3 Enhanced Education and Training

Due to the innovative characteristic of digital currencies, public awareness of their risks is still weak. Regulators should therefore strengthen financial education for the public, enhance their ability to recognize illegal activities and increase the public's motivation to participate in anti-money-laundering. Through the provision of specialized courses and seminars, staff and the public can acquire the skills to identify suspicious transactions and understand the latest money-laundering techniques and regulatory requirements. In addition, strengthening public education and raising social awareness of the risk of money-laundering in digital currencies can lead to a broader atmosphere of prevention. At the same time, governments and regulators should encourage technology-related education programs to cultivate composite talents who understand technology and compliance. Through all-round education and training, a more solid line of defense can be established to reduce the risks posed by digital currency money-laundering. The traceability of digital currencies themselves can also be utilized to enhance the trust of both sides of the transaction through information disclosure and other means, so as to maintain the healthy development of the digital currency ecosystem.

6. Conclusion

With the rapid development of digital currencies, the field of AML faces new challenges and opportunities. The research questions in this paper focus on how the technological characteristics of digital currencies affect AML efforts and the dilemmas faced by current regulatory measures in responding to money laundering activities. This paper analyzes the decentralized, anonymous and transnational features of digital currencies, explores how these features facilitate money laundering activities, and examines the corresponding countermeasures.

The main research ideas first include an in-depth analysis of the technical characteristics of digital currencies, clarifying the regulatory tracking dilemmas caused by decentralization, the difficulty of identifying information brought about by anonymity, and the challenges of information asymmetry triggered by transnationality. In addition, this paper proposes a series of response strategies focusing on technology application and innovation, strengthening regulation and cross-border cooperation, as well as reinforcing public education and training, aiming to provide effective solutions for anti-money laundering in

digital currencies.

Based on the above, it is concluded that, despite the complexity of anti-money-laundering efforts brought about by the characteristics of digital currencies, anti-money-laundering capabilities can be effectively improved through the innovation of technological means and international cooperation. For example, blockchain technology and artificial intelligence can be utilized to enhance identification and data analysis, and transnational regulatory cooperation can be promoted to fill regulatory gaps. At the same time, the public's heightened risk perception can form a stronger social line of defense and reduce the incidence of money-laundering. In the future, with the continuous evolution of digital currency technology, regulatory policies for money-laundering in digital currencies need to be more flexible and adaptable. Enhancing international cooperation and coordination is key, and different countries should actively establish information-sharing mechanisms and implement unified anti-money laundering standards. In addition, as public awareness of the risks of digital currencies improves, the joint participation of all sectors of society in anti-money laundering will become an important safeguard for the maintenance of financial stability.

Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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