Central Bank Digital Currency Development, Challenges and Future Recommendations in Global Countries

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Abstract. The introduction of Central Bank Digital Currency (CBDC) is an inevitable trend in the context of the deepening of digital finance. In recent years, the innovation of financial technology has received the attention of various countries, and many new tools have appeared in the field of payment and settlement of medium of exchange, and the use of cash in many countries has shown a clear trend of reduction. As the impact of the development of the digital economy gradually strengthens, central banks have begun to explore the feasibility and necessity of CBDC issuance. This paper provides a literature review of the current status of CBDC development in each major country in the world, so as to analyse and derive an analysis of the problems and challenges in the development of global CBDC, and ultimately give suggestions for the future development of CBDC.

Keywords: Central bank digital currencies (CBDC); International finance; monetary system.

1. Introduction

Over the past 20 years, the US dollar-dominated international monetary system has revealed many shortcomings and flaws, and is no longer able to adapt to the new international political, economic and financial development trends, and there are serious structural deficiencies, which make it difficult to solve the long-standing "Triffin problem" [1]. Monetary policy adjustments by central banks in Europe and the United States have triggered negative spillover risks, seriously threatening financial stability. The wave of "de-dollarisation" in recent years is reflected in the increasing proportion of non-US dollar settlements in energy trade and the increasing size of gold reserve assets, on the one hand, and the accelerated progress in the development and testing of global central bank digital currencies (CBDCs) on the other. Many countries have joined the CBDC project, and the digital dollar, digital euro, digital yen, etc. are moving from prototype to technical testing, which may further promote relevant legislation and regulation, market application and cross-border use in the future [2]. Overall, the progress of global CBDC research and development will be accelerated in the coming years, CBDC cooperation projects will increase, global central banks will coordinate around the legal norms and international rules for the international coordination and regulation of CBDC, and it is expected that there will be more and more central banks, commercial banks, technology companies and other types of organisations to participate in CBDC research and development, testing, scenario development, technological updates and other diversified fields. Moreover, in addition to the pilot application of CBDC in domestic payment, there will also be a big breakthrough in international payment and cross-border payment. Considering the accelerated changes in the international monetary system, CBDC may also further expand its influence in new areas such as reserve assets and financial market transactions.

2. Elaboration of Issues on CBDC Development

After the subprime mortgage crisis in the United States in 2008, blockchain technology, as an important technological innovation, has prompted digital currencies to become a classic financial application from the technical level with the advantages of high degree of anonymity, inerrancy and decentralisation that it possesses. According to whether they have legal attributes or not, digital currencies can be divided into two categories: legal and non-legal digital currencies. Legal tender digital currencies include Central Bank Digital Currency and Central Bank Digital Account. Non-

statutory digital currencies include institutional digital currencies, private digital currencies, etc. Institutional digital currencies include Libra, which was launched by Facebook in 2019. The digital currency was originally designed to convert Libra into fiat currency at a ratio of 1:1, making it a secure, digital currency with a stable value that can be used for activities such as online and offline shopping or trading. Private digital currencies (e.g., Bitcoin) have grown by leaps and bounds due to the deep involvement of blockchain technology and are highly recognised in certain countries or regions [3]. For example, in June 2021, El Salvador enacted the Bitcoin Law, the first of its kind to consider Bitcoin as a legal tender and to regulate its healthy development through legislation.

However, non-statutory digital currencies have been successively challenged by the United States and other countries, arguing that non-statutory digital currencies pose huge security risks in terms of consumer privacy protection, financial stability, and financial security [4]. With the deep involvement of blockchain technology and the development of non-statutory digital currencies, the competitive pressure faced by fiat currencies is increasing, and countries are deeply aware of the need for change in digital currencies, and have accelerated the localised research and development of digital currencies for central banks. For example, the People's Bank of China (PBOC) piloting the digital Chinese Yuan (e-CNY) at the end of 2019 has become a milestone event in driving the development of CBDC [5]. These events were quickly reflected in global governance issues, with the G20 Finance Ministers and Central Bank Governors meeting highlighting crypto asset risks in 2018, discussing global stablecoin risks at the end of 2019, and including CBDC and global stablecoin in the "G20 Roadmap for Enhancing Cross-Border Payments" in 2020[5]. The above governance trends show that CBDC has been highly valued in global financial governance. In addition, the technological evolution and testing progress of CBDC provides strong support for CBDC cross-border payment application innovation, which is expected to promote the formation of a new type of international monetary system with broader inclusiveness and compatibility in the future. However, it should be considered that, in the international context of "anti-globalisation" and "re-globalisation", the globalisation of CBDC may not be smooth, and in addition to technology, it will also involve the reform of the international monetary system and international regulation. Research CBDC international process need to grasp two major issues: on the one hand, CBDC international competition. On the one hand, the issue of international competition in CBDC. The acceleration of the global CBDC development process and the participation of more central banks in CBDC projects imply that competition will become more intense in the future, and how to promote international consensus and avoid the impact on the new existing financial order will be related to the prospect of a new international monetary system [4]. On the other hand, the issue of international regulatory coordination of CBDCs. The technical design, regulatory style, and financial ecology of global CBDCs differ greatly, so how to coordinate across central banks and establish an internationally recognised CBDC cross-regional application platform, as well as how to establish international standards and security norms for CBDC applications, will become a challenge to be solved for the development of CBDCs [4].

3. Current Status of CBDC Development in Individual Countries

A 2022 BIS study of central banks in 110 countries and territories around the world concluded that 86 per cent of the countries and territories studied had conducted research on legal tender digital currencies, and 14 per cent of central banks had gone live with pilots 错误!未找到引用源。, and Table 1 summarises the current state of development of CBDC in major economies and countries.

Table 1. Current Status of CBDC Development in Individual Countries.

Numble	Country	Designation	Development Status
1	USA	Digital Dollar	On 15 November 2022, the New York Federal Reserve of the United States stated that the New York Fed's Center for Innovation had embarked on a 12-week digital dollar pilot project with Wall Street financial institutions such as Citi, HSBC, MasterCard and Wells Fargo.
2	European	e-Euro	In July 2021, the European Central Bank (ECB) launched the digital euro(e-Euro) project and initiated a two-year research study on the subject. 2022 saw the successful testing of advanced token and digital wallet settlements between the two CBDCs in a cloud environment. 2023 will see a decision on whether or not to roll out the issuance programme, with the actual issuance expected to take a few years yet.
3	Japan	PoC	In March 2022, the Bank of Japan concluded the first phase of thetrial to validate the basic system design of the CBDC, launched the second phase of the trial to implement validation of the transfer prearranging and interest calculation functions in April, and launched the empirical trial with large banks in the spring of 2023, and launched the empirical trial with large banks. In April, the Bank of Japan launched the second phase of the trial to validate the functions of the CBDC, such as transfer prearranging and interest calculation, and in spring 2023, the Bank of Japan will launch a trial to validate the CBDC in cooperation with a large bank and will The Bank of Japan is considering the implementation of a trial involving ordinary consumers.
4	UK	RSCoin	In February 2023, the UK Central Bank and HM Treasury published a CBDC consultation paper that will strongly support a 'digital pound', setting out a roadmap to 2030 for the introduction of a new central bank currency.
5	Russian	Digital Ruble	In June 2022, the Central Bank of Russia announced that it would launch a roadmap for the implementation of the digital ruble in 2023, and that the spread of the use of the digital ruble would address issues arising from the exclusion of Russian banks from the Society for Worldwide Interbank Financial Telecommunication (SWIFT).
6	India	Digital Rupee	By the end of 2022, the Central Bank of India plans to launch a retail CBDC pilot and will implement the CBDC strategy in a phased manner by 2023.
7	China	e-CNY	The Digital Currency Research Institute of the People's Bank of China actively promotes the multilateral central bank digital currency bridge (mBridge) project with the Bank of Thailand and other countries
8	Brazil	Digital Real	In December 2022, the Central Bank of Brazil announced plans to launch a CBDC in 2024, which will be a pilot programme in partnership with a number of financial institutions.
9	Saudi Arabia	/	Currently working with local banks and fintech companies, focusing on one phase of a domestic wholesale CBDC use case project, with no decision yet on deployment.
10	Norway	e-Krona	The Central Bank of Norway has completed a three-phase study on CBDCs for the retail sector, analysing the motivations for issuing CBDCs and clarifying the basic design ideas. On 22 April 2021, the Central Bank of Norway announced that it would test the technical solution for CBDCs.
11	Singapore	Ubin	In November 2016, the Monetary Authority of Singapore (MAS) embarked on the Ubin project. The project has completed five

			phases of blockchain experiments involving more than 40 financial and non-financial firms, enabling RTGS functionalities such as inter-bank transfers, liquidity savings, and payment deadlock processing.
12	Canada	Jasper	In June 2020, the R3 Alliance, in partnership with the Bank of Canada, launched the Jasper project, which has completed four phases of proof of concept. Currently, the Bank of Canada is seeking partners with new technologies for digital payments.
13	Venezuela	Petro	Venezuela launched the Petro, the first CBDC backed by asset credit, in 2018
14	Bahamas	Sand Dollar	The Bahamas launched the Sand Dollar, the world's first internationally recognized CBDC, in October 2020
15	Ecuador	Dinero Electronico	Ecuador issued Dinero Electronico in December 2014

3.1. European Union

At present, there are differences in the attitude of the world's mainstream central banks towards the development of CBDC, and their research and development process and regulatory attitudes are also at different stages. Overall, the European region's attitude towards central bank digital currencies is more cautious, especially the European Central Bank (ECB) has placed extra emphasis on prudential regulation, and the digital euro (e-Euro) project is progressing slowly [6]. The ECB considers "the CBDC as a digital form of central bank currency that can be used by all institutions and the public", emphasising firstly its legal tender properties and secondly its electronic payment methods [7]. As of 2022, the digital euro staging project, supervised and implemented by the Bank of France, has made significant progress, successfully testing advanced tokens and digital wallet settlements between two CBDCs in a cloud environment, laying the groundwork for the next step in the application of the digital euro in cross-border payments and clearing[8]. Yet the UK is one of the most open countries in the world to digital currencies [3]. In order to attract international capital and expand business in London's international financial centre, the UK opened up to the cryptocurrency market early on and committed to improving the regulatory system, gradually establishing a regulatory system covering taxation, anti-money laundering and investor protection [9]. As of June 2021, the number of cryptocurrency holders in the UK has risen to approximately 2.3 million people, or 4.4 per cent of the total adult population, while median holdings per capita have risen from £260 to £300 in a single year [10].

3.2. The United States of America

The United States has been more active in CBDC development than Europe, with Biden signing an executive order that places the highest priority on CBDC research and development, stating that the United States should demonstrate leadership in international forums and multinational dialogues involving CBDC [11]. As required by the Executive Order, the U.S. Department of the Treasury issued a report in September 2022 titled "Future Currency and Payment Systems," which explored potential U.S. CBDC design options [11]. In addition, the White House Office of Science and Technology Policy (OSTP) will be joining the CBDC working group led by the Treasury Department and will also be working with the National Science Foundation (NSF) to develop a national digital asset research and development programme in support of the Federal Reserve's efforts[11]. For regulatory techniques, the United States, Europe, and other countries mainly implement sandbox regulatory techniques for CBDCs. That is, CBDCs are placed in real market environments to test their real use.

3.3. China

China has the most open attitude towards CBDC, and in April 2020, digital RMB started localised pilots in five cities, and by the end of 2022 there are already 26 districts in 17 provinces and

municipalities carrying out digital RMB pilots [11].1 In addition, the People's Bank of China (PBOC) and the People's Bank of China (PBOC) have also launched the digital RMB pilot programme. In terms of international cooperation, the Digital Currency Institute of the People's Bank of China has actively promoted the multilateral central bank digital currency bridge (mBridge) project with the central bank of Thailand and other countries. As of August 2022, the platform had issued over US$12 million worth of CBDCs, facilitating over 160 payment and foreign exchange payment transactions with a total transaction value of over US$22 million, making it the largest cross-border CBDC pilot test to date [12].

3.4. Japan

It is noteworthy that, as the world's third-largest economy, Japan's central bank, while stating that it will not issue its own CBDC in the short term, has been steadily proceeding with the institutionalisation of its CBDC and has indicated that research on the institutionalisation of its CBDC, which is being jointly promoted with the central banks of major economies in Europe and the United States, will also continue. In fact, the Bank of Japan began to pay attention to central bank digital currencies at an early stage and pointed out that the demand for central bank digital currencies for future socio-economic activities would increase dramatically against the backdrop of the leaping development of digital technology [13].

3.5. Developing Countries

Developing economies are generally more positive about central bank digital currencies. Of the countries that have issued central bank digital currencies, the vast majority are small developing economies. For example, Venezuela launched the first CBDC backed by an asset-based credit, the Petro, among others, in 2018[14]. In contrast to the wholesale model prevalent in developed economies, most developing economies have adopted a retail model and a single-tier "central bank-user" circulation framework, whereby the central bank issues central bank digital currencies directly to the public. However, in order to minimise the impact of central bank digital currencies on the existing monetary system, a few developing economies (e.g., the Bahamas, China) have adopted a two-tier circulation framework of "central bank-commercial bank-user" [14].

4. Analysis of Issues and Challenges in Global CBDC Development

4.1. Increasing Competition for CBDC in Various Countries

Recently, the Central Bank of Japan has proposed that it will launch a CBDC pilot programme in 2023, the Central Bank of Saudi Arabia has indicated that it is accelerating its research on CBDC, and the Federal Reserve and the European Central Bank's perceptions of CBDC have gradually changed [15]. In the face of the new global CBDC R&D situation, the Fed and ECB's position on CBDC R&D has shifted from hesitation to cautious openness, and there has been a marked increase in the regulatory discussion about CBDC by the legislature and the public[16]. The ECB has not only proposed a concrete plan for the digital euro, but will enter a new phase of regulatory rule-making in 2033. ECB President Christine Lagarde previously stated that issuing a digital euro would facilitate the expansion of payments innovation across the euro area, thereby reinforcing Europe's strategic autonomy[17].2022 Since 2022, tests related to the digital dollar have been on the agenda, with the U.S. White House, federal regulators, the Department of the Treasury, and the Federal Reserve intensely focusing on the progress of digital dollar research, and the New York Federal Reserve Innovation Centre proposing to explore a network of regulated liabilities in November that year[16]. Centre proposed to explore the feasibility of a US pilot project for a regulated liability network, in which Wall Street financial institutions would participate by issuing tokens and simulating central bank reserve settlement transactions[1]. R&D testing of digital dollars and digital euros and regulatory rulemaking are expected to accelerate further, but there may also be competition between digital dollars and digital euros in the future given the competitive relationship between the US dollar

and the euro, with the European Central Bank likely to be one step ahead of the completion of legislation on CBDC regulation within the EU.

Unlike developed countries in Europe and the United States, which have shown more interest in domestic compatibility, privacy protection, and multilateral co-operation for CBDCs, central bank CBDC development and testing in Asia, while accelerating, is currently focused on upgrading payment systems and developing financial inclusion [5]. In addition, Venezuela is very much represented as an important emerging economy in South America. Venezuela launched petrocoin in 2018, but hastily withdrew due to insufficient preparations for preliminary research and development, plunging into a " digital currency crisis" that ended in failure just after its inception. Its relevant lessons can provide a reference for other countries to develop central bank digital currencies. From the point of view of the issuance purpose, Venezuela hopes that through the issuance of Petro, to cope with the comprehensive sanctions of the developed economies of Europe and the United States, especially at the economic level, to resolve the country's serious economic crisis. In recent years, Venezuela's serious inflation and continuous economic downturn have forced it to stabilise the domestic price level and alleviate the government's debt crisis through the issuance of Petro[14].

In conclusion, with the increasing trend of re-globalisation, the design route, operation mode and cross-border payment application of CBDC may differ greatly in the future between the central banks of Europe and the United States and the central banks of the emerging countries due to the differences in the financial environment, the regulatory rules as well as the objectives, which will also likely lead to competition.

4.2. Impact of CBDC Issuance on the Monetary System

Studies on whether CBDC issuance affects the stability of the existing monetary system are currently not uniform in their views. As the development of globalisation enters a new phase, the development process of CBDC is increasingly influenced by international macro factors such as politics, economy, trade and finance. Distinguished from the speculative attributes of private digital cryptocurrencies, the development of CBDC is not only concerned with the stability of the monetary system and financial security, but also the global governance issues it raises will become more and more prominent, and it is expected to further shake the traditional international monetary system, while the cross-border application of CBDC will likely accelerate the promotion of a new type of international monetary system change.

China's digital RMB issuance is a digital virtual currency that mainly replaces cash in circulation while retaining the traditional paper RMB issuance mechanism. Combined with the "central bank-commercial bank" binary model that the digital RMB follows, i.e., the traditional model of issuing and circulating existing banknotes, this ensures that the digital RMB will be able to gradually replace banknotes under the existing currency operation framework without subverting the existing currency issuance and circulation system. The People's Bank of China (PBOC) believes that the nature of the digital RMB is cash in circulation, which is currently not interest-bearing, and that the central bank's method of releasing the digital RMB is basically the same as that of the physical RMB, so there is no competition with bank deposits, and therefore the digital RMB will not affect the stability of the monetary system[18].

From the international community, in the last decade or so, the use of cash in daily retail transactions in major developed economies has been declining year by year (Figure 1), and data released by the Central Bank of Sweden in 2019 also shows that the use of cash in the Nordic countries, exemplified by Sweden, has also shown a significant decrease [19]. The BIS believes that CBDC has the ability to adequately alleviate the distress caused by the reduction in cash circulation in developed economies and contribute to the stability of the monetary system. Some scholars have further discussed the "cashless society" and "de-cashification" in developed economies in recent years, especially in the Nordic countries, and pointed out that the issuance of CBDC can fully alleviate the problems brought about by the reduction of cash circulation in developed economies, and thus guarantee the security and stability of the financial system [20]. security and stability of the financial

system [21]. However, some studies have pointed out that the issuance of CBDC, while squeezing out cash, may also squeeze out bank deposits, raise interest rates, increase the financing costs of commercial banks, and reduce the scale of commercial bank deposits and loans, and in serious cases, financial disintermediation may occur, which not only has a greater impact on the monetary system, but also poses a huge challenge to financial regulation [22].

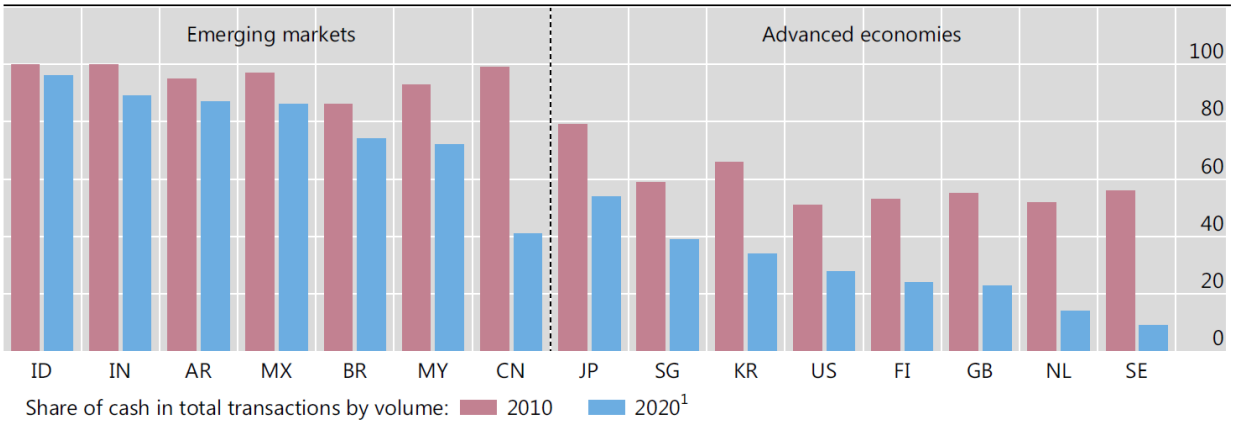


Fig 1. Cash use had been declining before the pandemic.

4.3. Global Regulatory and Coordination Development of CBDCs

Although the Bank for International Settlements, the International Monetary Fund and other international institutions actively promoted international coordination of CBDC as early as 2016, and proposed the establishment of an inclusive, interconnected and inclusive CBDC sharing platform, it has not yet been responded to by the majority of central banks, and the existing research and development as well as the regulatory rules of CBDC are still fragmented and dispersed, with a lack of a consensus basis, and it is more difficult to build an international financial infrastructure for CBDC, and the risk of "decentralisation" of global CBDC governance is even greater. The global CBDC governance faces the risk of "decentralisation", and "data silos" and regulatory fragmentation will not be conducive to the stability of the international monetary system. The global CBDC ecosystem faces the risk of fragmentation as many central banks develop their own digital currencies based on different technologies, standards and protocols. Friction between countries means that all central bank digital currencies will not be fully interconnected.

But recent research shows that the Monetary Economics Department under the BIS has been conducting annual CBDC research with monetary authorities in major countries around the world since 2019, and its reports reflect that more and more central banks are showing positive attitudes towards CBDC. The results of the research released in 2020 show that about 80 per cent of the 66 central banks participating in the research are engaged in CBDC research and development, an increase of 10 percentage points from the previous year The percentage of central banks planning to issue generic CBDCs in the short or medium term is 10% and 20%, respectively, both of which have increased by a factor of one from the previous year[23].The third research report released in 2021 shows that 86% of the 65 central banks surveyed are exploring the benefits and pitfalls of CBDCs; the percentage of central banks that are likely to issue generic CBDCs in the short and medium term is the same as that of the previous year [23]. The percentage of central banks with CBDCs remained the same as the previous year, but more central banks showed a higher likelihood of issuing CBDCs in the short- and medium-term, and more central banks entered the proof-of-concept or pilot stage of CBDC development [23].The fourth research report released in 2022 covered 81 central banks, and the percentage of central banks actively engaged in CBDCs rose to 90 per cent, and the percentage of central banks entering the development and pilot stage of CBDCs increased to 90 per cent, and the percentage of central banks actively engaged in CBDCs increased to 90 per cent. The proportion of central banks in the development and pilot phase has risen to 26 per cent, up from 14 per cent in the previous year [23].

Since 2020, the BIS has begun CBDC co-operation projects with key countries to work on CBDC standards. in January 2020, six of the G7 central banks (excluding the Federal Reserve) announced that they would co-operate on digital currency research and set up a CBDC research group with the BIS to explore potential CBDC application scenarios in their respective jurisdictions, and to share knowledge and experience on technical CBDC topics. in October 2020, the BIS announced that it would establish a CBDC research group to explore potential CBDC applications in their respective jurisdictions and share knowledge and experience on technical CBDC topics. In October 2020, the BIS and the central banks of the G7 countries jointly released a report on the first phase of cooperation, analysing the impetus, value, opportunities and challenges of CBDCs, and on the basis of which they proposed the basic principles and core features of CBDC issuance and elaborated on the relevant technical options. In the report, the participants emphasised that interoperability of cross-border payments should be considered at the initial stage of CBDC, and expressed their intention to collaborate in this regard [24].

5. Suggestions for the future development of CBDC

Firstly, the development of globalised CBDC applications should be integrated into the international regulatory network. Global central banks have joined in CBDC R&D and testing, and have formulated medium- and long-term development plans, although some of these plans are still in the exploration and pilot stage, reflecting the fact that global central banks have shown a higher degree of concern for the long-term prospects and impact of CBDC. From the current pilot situation of global central banks' CBDC, it mainly focuses on retail-type CBDC and wholesale-type CBDC, and the technical application of wholesale-type CBDC has already been well demonstrated in some multilateral central banks' CBDC research and development projects, but when it comes to wider cross-border payment or financial market application in the future, the cross-border regulatory issues of CBDC need to be considered. As there are big differences among countries in terms of legal system, financial regulatory rules and financial environment, international regulatory issues are inevitably involved. In this regard, it is necessary for all parties to actively explore the expansion of multilateral cooperation on CBDC, and authoritative international organisations such as the International Monetary Fund, the World Bank, the Bank for International Settlements, as well as the Financial Stability Board and the Basel Committee on Banking Supervision, etc., should strengthen their regulatory communication with global central banks, study the possible impacts of CBDC on the traditional international monetary system, the international payment network, the financial market and the banking industry, and revise CBDC regulations in a timely manner in accordance with the development trend of CBDC. They should revise and update the international regulatory rules in a timely manner according to the development trend of CBDC, and consider formulating an operable and compatible international standard for CBDC, provide CBDC technical and network support for global central banks, and promote a consensus on CBDC regulation among global central banks, so as to prevent and respond to the risk of CBDC decentralisation at an early stage.

Secondly, multilateral CBDC cooperation based on security and stability is sought. From the current progress of global multilateral CBDC cooperation, the existing CBDC transnational (regional) cooperation is still in the early stage, a small number of projects, such as the Multilateral Central Banks Digital Currency Bridge Project (mBridge) launched by China's Hong Kong Monetary Authority and four other institutions, and the Helvetia Project launched by the Swiss Central Bank have made some progress, but they are still in the early stage of commercial application, and they still need to testing in multiple scenarios and fields [24]. It is expected that more international organisations and central bank departments will participate in CBDC multilateral cooperation in the future, focusing on two aspects that need to be considered: on the one hand, the technical security of CBDC multilateral cooperation; on the other hand, the stability issue. Although the current joint test focuses on the consumer side, and a small portion of it involves commercial banks, as the application of CBDC technology becomes more and more mature, it is expected to expand the scope of

application to the banking system, financial markets and other areas. Compared with the mature payment and settlement systems in the past, CBDC will face a more complex network environment, and there is an urgent need to build a secure and stable CBDC cross-border payment or transaction environment. Whether it is necessary to consider the introduction of new cutting-edge technologies such as quantum settlement and artificial intelligence in the future remains to be researched and tested, and it is expected that international organisations such as the BIS and the Society for Worldwide Interbank Financial Telecommunication (SWIFT) will accelerate the demonstration and testing work around the multilateral and cross-border application of CBDC.

Finally, we should accelerate cooperation in promoting the construction of the CBDC international financial infrastructure. As Europe and the United States have frequently used the CBDC system to arbitrarily expand sanctions, the neutrality of the international financial infrastructure has been challenged, threatening the financial security of sovereign countries and triggering concerns about the independence of the international financial infrastructure. However, the future cross-regional and international application of CBDC still requires a financial infrastructure with international credibility that strictly follows the basic principles of inclusiveness and neutrality, but whether it should be developed separately or be compatible with existing financial infrastructures remains to be demonstrated. In October 2022, the Society for Worldwide Interbank Financial Telecommunication (SWIFT) announced a successful trial with 14 central and commercial banks around the world of CBDC's seamless interaction with existing financial infrastructure systems. Building an international financial infrastructure based on CBDC will require international institutions, central banks, and commercial banks and enterprises to work together to continue to promote existing cross-border payment schemes and CBDC platforms, and to interconnect with existing international payment systems, but the key remains to ensure the independence of the international financial infrastructure [10].

6. Conclusion

Overall, This paper provides an in-depth look at the development trends of central bank digital currencies (CBDCs), issues and challenges in the development of CBDCs globally, as well as suggestions for the future development of CBDCs.CBDCs, as a form of digital currency, have potentially revolutionary impacts, and as such, their development and application have triggered a wide range of discussions and research.

Firstly, the development trend of CBDC shows a global diversity. Developed countries such as Europe and the United States focus more on the domestic application of CBDC, including compatibility, privacy protection, and multilateral cooperation. In contrast, developing countries focus more on upgrading payment systems and promoting financial inclusion. This difference reflects the economic and financial needs of different countries, but can also lead to challenges in interoperability and cross-border use of CBDCs. Second, the impact of CBDC issuance on the existing monetary system is controversial. On the one hand, some studies have argued that CBDC issuance can help stabilise the monetary system, especially in the context of a gradual reduction in cash circulation, and that CBDCs can provide a digital alternative. However, on the other hand, the issuance of CBDCs may also have an adverse impact on commercial banks, potentially crowding out bank deposits and leading to financial disintermediation, as well as posing new challenges to monetary policy and financial regulation. It is therefore crucial to balance these pros and cons in the development of CBDCs. Third, the development of global regulation and coordination of CBDCs is not yet coordinated. While international organisations such as the International Monetary Fund and the Bank for International Settlements have actively promoted international coordination of CBDCs, most central banks have not yet responded positively. This could lead to disagreements and inconsistencies in the international ecosystem of CBDCs, making cross-border use and interoperability more difficult. Therefore, stronger international co-operation and regulation are needed to address these issues.Finally, the paper makes a number of recommendations for the future

development of CBDC.First, there is a need to strengthen the international regulatory network to ensure the security and stability of CBDC. This includes the development of international standards, the provision of technical and network support, and the construction of an international financial infrastructure for CBDC. Second, cross-border CBDC co-operation should be promoted, particularly with regard to security and stability. This requires the joint efforts of international organisations, central banks and commercial banks to ensure the smooth operation of CBDCs globally. Finally, there is a need to ensure that the international financial infrastructure of CBDC is neutral and independent in order to prevent certain countries from abusing the CBDC system to implement measures such as sanctions, thereby maintaining the stability and fairness of the global financial system.

In conclusion, the development and application of CBDC has great potential, but it is also accompanied by complex problems and challenges. It is only through the concerted efforts of the international community that the potential of CBDC can be fully realised and make a positive contribution to the future development of the international financial system. This requires the combined efforts of global cooperation, regulatory coordination and technological innovation.

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