

AN ALTERNATIVE MONETARY SYSTEM REIMAGINED: THE CASE FOR CENTRAL BANK DIGITAL CURRENCY

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ABSTRACT

Thanks to technological advances, central bank digital currency (“CBDC”) is receiving more attention than ever before. One theory predicts that the development of blockchain and other internet application technologies will cause digital currencies to replace cash. This theory treats digital currency as a technological tool—an evolution of the form of currency through information technology. In fact, currency as a credit carrier is an institutional arrangement. The history of currency development, from precious metals to paper currency and the processing of bank bills, is driven by the evolution of a monetary system structure, not the advancement of currency carrier technology.

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The history of currency development clearly shows that currency is a credit arrangement and an advancement of the human transaction arrangement system. Until recently, currency credit has evolved uniformly to be based on national sovereign credit. From the perspective of convenience and economic compatibility and stability, this form of credit arrangement is irreplaceable, no matter what form the currency carrier adopts.

Non-traceability is one of the disadvantages of the current credit currency system. The modern economy is based on a credit economy. The integrity of individuals in economic and social behavior has a significant impact on the efficiency of economic and social operations. With economic and social activities, it is often necessary to legalize and verify the source of money individuals hold. Verification and confirmation is necessary for various purposes, such as compliance. If currency is traceable, then a trustworthy society has an institutional operating foundation, which is undoubtedly a major advancement in human institutional arrangements.

Digital currency based on internet information technology undoubtedly provides the foundation and advances the kind of human institutional arrangement discussed above. Some countries have successfully launched various digital currency pilot projects and have developed private tokens such as Bitcoin, which is evidence of the foundation created by digital currency created by information technology. Despite this, there fails to be a consistent understanding and arrangement with digital currency credit creation and recovery. Clearly, because of this inconsistency, digital currency and traditional currency will coexist for a long period of time.

Different countries around the world have developed various designs choices for CBDC. This Article is based on a comprehensive review of central bank experiments by different countries. After surveying recent research and experiments, this Article explores the different attitudes countries have toward CBDC, the role of banks, the stakeholders among CBDC, the impact of currency policy, and the pros and cons of CBDC. This Article concludes with a discussion on whether countries should use CBDC.

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INTRODUCTION

In recent years, the rapid development of blockchain and financial technology has affected the global industrial chain. At the same time, blockchain and financial technology are gradually changing the entire economic system. In addition, countries have begun to study the feasibility of the proposed progressive digital currency. This is evidence that the establishment of the Internet and digital currency based on encryption technology has become a very important change in the development of financial technology. These financial technology innovations have changed the payment patterns and continue to alter the role of traditional financial institutions.

In the process of moving into the digital age, many payment services are no longer provided by traditional financial institutions. In fact, payment market has developed more diversity and competition because of the increase of non-bank payment institutions, as well as the innovation of payment technology and the change of currency patterns. Coupled with the popularization of mobile devices and the Internet, payment accounts are no longer limited to bank accounts.

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Funds can also be stored in electronic payment accounts. In addition to cash, checks, financial cards, credit cards, and electronic money, future payment options may also use CBDC. Similarly, current payment methods include more than only physical ATMs and Point of Sale (“POS”) Mobile phones. Instead, payment methods include the Internet and widely-used public apps.

Nonetheless, with the increasingly complex division of labor and composition of the market, forming a safe and efficient payment ecosystem is necessary. It is also crucial to create an environment suitable for innovation, maintain the efficiency of market competition and the role of the central bank, and ensure currency functions as the foundation of trust will be the key. In addition, central banks can also take advantage of the opportunities brought by digital technology to innovate, especially the CBDC, which has recently emerged in international research. If CBDC is feasible through research and experimentation, it can be expected to serve as a new foundation for future digital payments.

Within modern economies, “some of the smallest and largest payments . . . are carried out using central bank money.”¹ This is because “central banks provide money to the public through cash, and to banks and other financial companies through reserve and settlement accounts.”² As a new type of central bank currency, CBDC is also divided into “general purpose” for the general public and “wholesale” only for inter-bank use.³ As the central bank reserves have been digitized, if the wholesale CBDC is only technically switched to the decentralized design of distributed ledger technology (“DLT”), the additional benefits that can be brought are limited.⁴ Therefore, recent international research has gradually turned to focus on general-purpose CBDC that reproduces cash functions in digital form. Accordingly, this Article focuses on general-purpose CBDC.

1. THE BANK OF CANADA ET AL., *CENTRAL BANK DIGITAL CURRENCIES: FOUNDATIONAL PRINCIPLES AND CORE FEATURES 2* (2020).

2. *Id.*

3. *Id.* at 3.

4. Rachael King, *The Central Bank Digital Currency Survey 2020 – Debunking Some Myths*, CENT. BANKING, (May 7, 2020), <https://www.centralbanking.com/fintech/cbdc/7540951/the-central-bank-digital-currency-survey-2020-debunking-some-myths>.

From the perspective of banks, financial technology creates challenges and opportunities for innovation. The use of financial technology-related technologies such as big data and artificial intelligence can improve the security and efficiency of the payment system, strengthen the monitoring capabilities of the payment system, and fulfill the responsibility of the central bank to promote price and financial stability.⁵ However, banks are also worried about how CBDC, as a financial technology, could damage the transmission channel of monetary policy, affect the ability to control the total currency count, increase the difficulty of financial supervision, and impact financial stability.

In addition, there are risks that cannot be ignored, such as money laundering, capital terrorism, data privacy protection, and financial stability threats. How the financial supervision authority strikes a balance between innovation and regulation is also facing a major challenge.⁶

The digitalization of the economy is changing our payment methods. After the financial crisis in 2009, the public's distrust of the existing financial system has intensified.⁷ Coupled with the rapid development of financial technology, payment methods that support the use of virtual currency for decentralized payment have attracted increasing attention. So far, more than 5,700 virtual currencies have been issued globally, and the overall market size has reached 270 billion US dollars. In 2019, Facebook, backed by its 2.6 billion active users, proposed the Libra project (now known as "Diem"), intending to open up third-party serial services, hoping to become one of the global currencies in circulation and improve financial services penetration rate, but it may weaken the effect of national monetary policy, thus making financial supervision more difficult.⁸

5. Tom Butler, *What's Next in the Digital Transformation of Financial Industry*, IT PRO., Jan.–Feb. 2020 at 29, 29.

6. SVIERIGES RIKSBANK, PAYMENTS IN SWEDEN 2019 19–20 (2019), <https://www.riksbank.se/en-gb/payments—cash/payments-in-sweden/payments-in-sweden-2019/the-payment-market-is-being-digitalised/>.

7. ED SAIEDI ET AL., DISTRUST IN BANKS AND FINTECH PARTICIPATION: THE CASE OF PEER-TO-PEER LENDING 2 (2020); *see also* THE BANK OF CANADA ET AL., *supra* note 1 (discussing the challenges and risks of CBDC).

8. *See generally* David Kuo Chuen Lee, Li Yan & Yu Wang, *A Global Perspective on Central Bank Digital Currency*, CHINA ECON. J., Jan. 20, 2021, at 1.

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Under this trend, central banks of various countries have begun to take a more positive attitude towards CBDC, believing that CBDC should be used to meet the digital needs of the people. Since 2020, the COVID-19 has accelerated the trend of declining cash utilization and increasing demand for digital finance, which has further promoted the change of central banks' attitudes towards CBDC research and development.⁹ This Article will first analyze the role of central banks in digital currencies, explore the current attitudes and practices of various countries towards digital currencies, and also explore the laws and risks involved in digital currencies.

I. BACKGROUND

A. *FinTech Innovation*

“Financial Technology ([“]FinTech[“]) plays a key role in the digital transformation of the financial industry.”¹⁰ The financial industry is heavily regulated and subject to unique challenges, such as data governance, regulatory compliance, and risk management.¹¹ These are information-intensive. As such, the implementation and utilization of financial technology to manage these information architectures is a highly discussed topic.¹²

In addition to well-known FinTech, newer technologies are emerging in the field. Regulatory Technology (“RegTech”) and Supervisory Technology (“SupTech”) are gaining attention within the financial industry. These technologies are possible after the emergence of key technologies such as artificial intelligence, DLT, and smart contract.¹³

RegTech is described as having the following four primary characteristics: agility in data organization, speed in report generation, ease of integration, and complex analytic capabilities.¹⁴ These four

9. THE BANK OF CANADA ET AL., *supra* note 1.

10. Butler, *supra* note 5, at 29.

11. *Id.*

12. *Id.* at 30.

13. *Id.*

14. DELOITTE, REGTECH IS THE NEW FINTECH: HOW AGILE REGULATORY TECHNOLOGY IS HELPING FIRMS BETTER UNDERSTAND AND MANAGE THEIR RISKS

characteristics are designed to address the common problems faced by financial institutions under heavy regulation. Governments also seek to revise laws and regulations in response to the digital transformation of the financial industry. Financial institutions are turning to RegTech to help cope with changes in regulations. RegTech can assist in the management of legal compliance processes and automatically produce reports for review.¹⁵ Currently, RegTech is mainly used to assist companies in automating general legal compliance process and reducing related administrative costs.¹⁶

DLT combines technology with a high audit mechanism and tracking capabilities to provide participants in multiple systems the ability to share information in a low-trust environment. As a result, participants can exchange and reuse the same data in different thinking and geographic environments. Blockchains are DLTs, but all DLTs are not always blockchains. DLTs are not always in a “block” form when information is stored.¹⁷ Regardless, blockchains and DLTs have the same characteristics, namely “decentralization, security, censurability, and autonomous enforcement.”¹⁸ These characteristics make tracking financial transactions easier and more secure.

Prior to the creation of blockchains and DLTs, cash flow was complicated and difficult to track. Overseas transactions and money laundering emerged nearly simultaneously. Therefore, when financial institutions began to use decentralized ledgers or blockchains to record transactions, the internal control became easier to manage. Additionally, the new technologies made supervision by external authorities easier.

One transaction type that results from DLTs and blockchains is smart contracts. The prevalence and usefulness of smart contracts is derived from DLTs and blockchains. Smart contracts can be divided into automation and execution planes. Automation is completed with computers and potential manual controls and input. Execution planes

5, <https://www2.deloitte.com/tw/tc/pages/financial-services/articles/regtech-the-new-fintech.html> [<https://perma.cc/R5YG-RK5N>] (last visited Jan. 25, 2021).

15. *Id.* at 4–5.

16. *Id.* at 3.

17. Edwin Ayisi Opare & Kwangjo Kim, *A Compendium of Practices for Central Bank Digital Currencies for Multinational Financial Infrastructures*, 8 IEEE ACCESS 110810, 110815 (2020).

18. Butler, *supra* note 5, at 31.

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can include legal rights or obligations, and help prevent falsified execution.¹⁹ The emergence of smart contracts and their automation and execution planes will bring great changes to the financial industry. The aforementioned decentralized ledger and blockchain can ensure the security of transactions, which relieves one of the financial industry's greatest transaction concerns. Secure transactions are a concern across the board for financial institutions, such as the loan business of the banking industry, the online insurance underwriting of the insurance industry, and the transaction matching of derivatives. Smart contracts can be used to ensure the fulfillment of the obligations of both parties, thereby increasing the effectiveness and convenience of transacting with DLTs and blockchains.

B. Central Bank Digital Currency

“Since the introduction of Bitcoin, private sector actors have issued more than five thousand digital currencies that lack intrinsic value and are not backed by any tangible resources.”²⁰ When Bitcoin appeared in 2009, the initial price was U.S. \$0.1.²¹ The highest price of Bitcoin since then was more than U.S. \$42,000.²² Bitcoin has skyrocketed more than forty-two million times in roughly twelve years. The risks and derivative problems associated with the global issuance of digital currencies by private sector actors challenges the traditional role of central banks. “Facing the threat of monetary policy and financial market instability by private sector digital currency issuances, many central banks have delved into research and experimentation on central bank-issued digital currencies (CBDCs) to guarantee financial market stability and monetary policy preservation.”²³

Caitlin Long, president of the U.S. blockchain company Symbiont, proclaimed the Bank of England may be the first major

19. *Id.*

20. Opare & Kim, *supra* note 17, at 110810.

21. Ryan Browne, *Bitcoin hits fresh record high near \$42,000, climbing 40% so far this year*, CNBC: CRYPTOCURRENCY (Jan. 8, 2021, 11:00 AM), <https://www.cnbc.com/2021/01/08/bitcoin-btc-price-hits-41k-up-40percent-so-far-in-2021.html>.

22. *Id.*

23. Opare & Kim, *supra* note 17.

central bank to put currency on the blockchain, and forecasted this change to be a game-breaker for payments.²⁴ This can be explained in the context of foreign exchange. There are three major central banks are the Federal Reserve Bank, Bank of England, and Bank of Japan—and most international payments must go through at least one of these banks. If one of the three major central banks does not put money on the blockchain, digital currencies are not likely to be game-breakers. Conversely, if one of the three major central banks puts its currency on the blockchain, it will change how corporate treasurers transfer cash.

Cash transfer will change because most of the liquid currencies in the foreign exchange market are in these three banks. For instance, London is the financial center, but the liquidity of United Kingdom currency, the pound sterling, makes it difficult to move from Paris' currency in euros to London. However, if the Bank of England puts the pound sterling on the blockchain, all international payments it handles will be resolved more efficiently. Consequently, the increased efficiency in international payments will be reflected in corporate treasurers by freeing up funds on corporate balance sheets and lessening the need for a financial cushion and the fear of account overdrafts. Therefore, it is not enough to put the currency of a country on the blockchain. The central bank is a key feature to elicit the anticipated changes in payment systems from digital currencies.

To understand the effectiveness of the changes brought on by digital currencies, it is useful to consider current cross-border payment operations. Currently, for example, if a Taiwanese resident uses Bank A to transfer money to relatives living in Australia. Bank A will first send the remittance information, through the Society for Worldwide Interbank Financial Telecommunication (“SWIFT”) system,²⁵ to Bank B in Australia. After Bank B receives the information, Bank A will essentially have an account with Bank B, from which the money will be withdrawn. This withdrawal does not actually signify that a transfer

24. Victoria Beckett, *The BoE launching digital currency on blockchain tech would be international payments 'game changer,'* GLOBE TREASURER (Dec. 1, 2017), <https://www.theglobaltreasurer.com/2017/12/01/the-boe-launching-digital-currency-on-blockchain-tech-would-be-international-payments-game-changer/>.

25. SWIFT, <https://www.swift.com/> (last visited Mar. 31, 2021); *see also The development trend of cross-border payment*, MIC (Jun. 2, 2019), <https://mic.iii.org.tw/industry.aspx?id=345&list=60> (last visited Mar. 22, 2021).

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of the money from Bank B to Bank A has occurred. Rather, the bank simply adjusts the balance in each account. This adjustment is not instant. The bank will settle the remittances over a period of time. For instance, although the transfer of funds from the United States to the United Kingdom is usually overnight, it can take up to five days for the United States to pay a company in an emerging market.

In addition to lack instantaneous transfers, intermediate related operations usually result in a lot of costs for the transferor, including remittances, intermediate transfers, procedures for the bank to settle the money, and message fees. For example, if a medium-sized company has 1,000 bank accounts, it needs to monitor and adjust these banks accounts daily, to ensure the minimum capital requirement is met and avoid penalties, which can cause a financial burden on the company. Nonetheless, blockchain can solve these labor intensive, administrative delays and other problems by speeding up payments.

In recent years, many nations' central banks have successively invested in CBDC research. Most central banks believe that the possibility of issuing CBDC is not high because they have no need to issue CBDC. These countries have high-efficiency payment systems that provide instant payment systems, so CBDC is not a necessity. At present, only a few countries have started to pilot and implement CBDC related plans, such as e-CNY in China, Sand Dollar in the Bahamas, DXCD in Eastern Caribbean, and E-krona in Sweden. This Article will further explain the current CBDC design.

C. Difference between Stable Coin and CBDC

One of the most well-known characteristics of cryptocurrency is its instability.²⁶ The price of the currency may increase by 80% in a day, which though it may have certain advantages for some investors, it is generally not allowed in business activities due to its risky or unstable nature. In other words, stable coin arose due to a need for greater stability in the cryptocurrency market. A stable coin is a form of cryptocurrency that maintains a stable exchange rate with a certain target currency. On example is USDT launched by Tether. Users can

26. Mirza Yuneline, *Analysis of Cryptocurrency's Characteristics in Four Perspectives*, J. ASIAN BUS. & ECON. STUD. 206, 213 (2019).

use USDT to exchange at a 1:1 rate with the US dollar.²⁷ Because the exchange rates of countries around the world are regularly fluctuating, there has been a focus on finding a stable exchange rate for stable coins. There are currently three main stable coin models: fiat currency as collateral, cryptocurrency as collateral, and stable coin supply through algorithms.

VirgoX and GDA Capital, two cryptocurrency exchanges, jointly announced the establishment of the world's first international stable coin organization, the World Stablecoin Association ("WSA").²⁸ They hope to unite in mainstream stable coin projects, promote cooperation and jointly promote the development of the stable coin economy.²⁹ However, various countries have differing approaches to stable coins regulation. Among these, the United States has issued the most legislation this year. On September 21, 2020, the U.S. Securities and Exchange Commission ("SEC") and the U.S. Office of the Comptroller of the Currency ("OCC") simultaneously issued stable coin guidelines.³⁰ They announced that the guidelines will provide National Bank and Federal Savings Association with the ability to hold reserves for stable coin issuers in accordance with regulations.³¹ This is the first time the US government has proposed relevant legal regulations for stable coins.

27. See TETHER, <https://tether.to/> (last visited Mar. 31, 2021); see also Jake Frankenfield, *Tether (USDT)*, INVESTOPEDIA (Mar. 21, 2021), <https://www.investopedia.com/terms/t/tether-usdt.asp> (explaining how Tether works).

28. *VirgoX and Global Digital Assets Launch World Stablecoin Association in Switzerland*, CISION PRNEWswire (July 23, 2020, 1:00 pm), <https://www.prnewswire.com/news-releases/virgox-and-global-digital-assets-launch-world-stablecoin-association-in-switzerland-301098830.html>; see also Helen Partz, *World Stablecoin Association Launches in Switzerland*, COINTELEGRAPH (Jul. 23, 2020) <https://cointelegraph.com/news/world-stablecoin-association-launches-in-switzerland>.

29. *Id.*

30. Nikhilesh De, *SEC, OCC Issue First Regulatory Clarifications for Stablecoins*, COINDESK (Sept. 21, 2020, 1:02 pm), <https://www.coindesk.com/occ-banks-can-hold-some-stablecoin-reserves> (last updated Sept. 30, 2020, 7:59 am).

31. Jonathan V. Gould, *Interpretive Letter of OCC Chief Counsel's Interpretation on National Bank and Federal Savings Association Authority to Hold Stablecoin Reserves*, Office of the Comptroller of the Currency #1172, 3–4 (Sept. 21, 2020) <https://www.occ.gov/topics/charters-and-licensing/interpretations-and-actions/2020/int1172.pdf> (last visited Jan. 31, 2021).

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The OCC also announced on its website on January 4, 2021, that it would allow American banks to use public blockchains and USD stable coins as the settlement infrastructure in the US financial system.³² This news demonstrates that in the future, financial institutions will be able to use stable coins to purchase financial products, thereby accelerating the speed of cross-border clearing and settlement. Various states have also begun to take further action regarding stable coins. For example, Superintendent of Financial Services, Linda A. Lacewell, announced on December 29, 2020 that the New York Department of Financial Services (“DFS”) granted a charter under New York banking law to GMO-Z.com Trust Company Inc. (“GMO”), to operate as a limited liability trust company.³³ With DFS approval, GMO is authorized to issue, administer, and redeem Japanese Yen and U.S. Dollar-pegged stable coins in New York. The Japanese Yen stable coin will be the first of its kind available to the public.³⁴

Just as every country begins to develop its own CBDC, there are two differing views within the United States. U.S. Federal Reserve Chair, Jerome Powell, expressed his view by stating the following in a panel discussion on digital payments hosted by the International Monetary Fund: “We do think it’s more important to get it right than to be first and getting it right means that we not only look at the potential benefits of a CBDC, but also the potential risks, and also recognize the important trade-offs that have to be thought through carefully.”³⁵ With Powell’s words of caution, Chris Giancarlo, the former chairman of the US Commodity Futures Trading Commission, established the non-profit organization Digital Dollar Foundation and

32. OFFICE OF THE COMPTROLLER OF THE CURRENCY, INTERPRETIVE LETTER 1174: OCC CHIEF COUNSEL’S INTERPRETATION ON NATIONAL BANK AND FEDERAL SAVINGS AUTHORITY TO USE INDEPENDENT NODE VERIFICATION NETWORKS AND STABLECOINS FOR PAYMENT ACTIVITIES (2021).

33. Press Release, N.Y. St. Dep’t of Fin. Serv., Super Intendent Lacewell Announces Grant of DFS Trust Charter to Enable GMO to Engage in New York’s Growing Virtual Market (Dec. 29, 2020), https://www.dfs.ny.gov/reports_and_publications/press_releases/pr202012291.

34. *Id.*

35. Reuters Staff, *Fed’s Powell: More important for U.S. to get digital currency right than to be first*, REUTERS, Oct. 19, 2021, <https://www.reuters.com/article/us-usa-fed-powell-digitalcurrency-idUSKBN2741OI>.

the collaboration of the consulting company, Accenture, the Digital Dollar Project, which is proposing a framework for creating CBDC.³⁶

In judging the operating modes of stable coins and CBDCs, their differing operating structures becomes more evident. CBDC is designed with the central bank as the top-level to promote digital currency from top to bottom. The U.S. stable currency structure is dominated by major financial institutions and follows a bottom-up plan. As they are still undergoing initial stages, their effectiveness requires further evaluation. However, it is certain that the stable digitalization of currency is currently needed.

II. CBDC DESIGN AND EXAMPLE

A. Design Choices for CBDC

On October 9, 2020, the Federal Reserve, European Central Bank, Bank of Japan, Bank of England, Bank of Canada, Swiss National Bank, Swedish Central Bank, and Bank for International Settlements (“BIS”), together, issued the first large-scale phased research report on CBDC: “Central Bank Digital Currencies: Foundational Principles and Core Features.”³⁷ The report details the seven central banks’ consensus on the core features and basic principles for issuing CBDC and analyzes CBDC’s motivations, challenges, and risks of CBDC development. The report also describes the CBDC design and technical considerations.³⁸

36. Press Release, Accenture, Former CFTC Chair Launches The Digital Dollar Project (Jan. 16, 2020) (on file with author), <https://newsroom.accenture.com/news/former-cftc-chair-launches-the-digital-dollar-project.htm>; *see also* DIGITAL DOLLAR PROJECT, <https://www.digitaldollarproject.org/> (last visited Mar. 23, 2021).

37. Press Release, Bank for International Settlements, Central banks and BIS publish first central bank digital currency (CBDC) report laying out key requirements (Oct. 9, 2020) (on file with author), <https://www.bis.org/press/p201009.htm>.

38. BANK FOR INT’L SETTLEMENTS ET AL., CENTRAL BANK DIGITAL CURRENCIES: FOUNDATIONAL PRINCIPLES AND CORE FEATURES 12 (2020), <https://www.bis.org/publ/othp33.pdf>.

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The traditional monetary system adopts a two-tier structure.³⁹ For example, although cash is issued by the central bank, it relies on intermediaries, such as banks, as distributors of cash and dispenses the cash to the public via bank counters and ATMs. CBDC, on the other hand, can adopt a single-tier structure that directly issues currency from the central bank to users without relying on intermediaries.⁴⁰ Figure 1 below gives an overview of possible architectures for CBDCs and the alternative of a narrow payments bank.⁴¹ These examples differ in terms of the structure of legal claims and the record kept by the central bank.⁴²

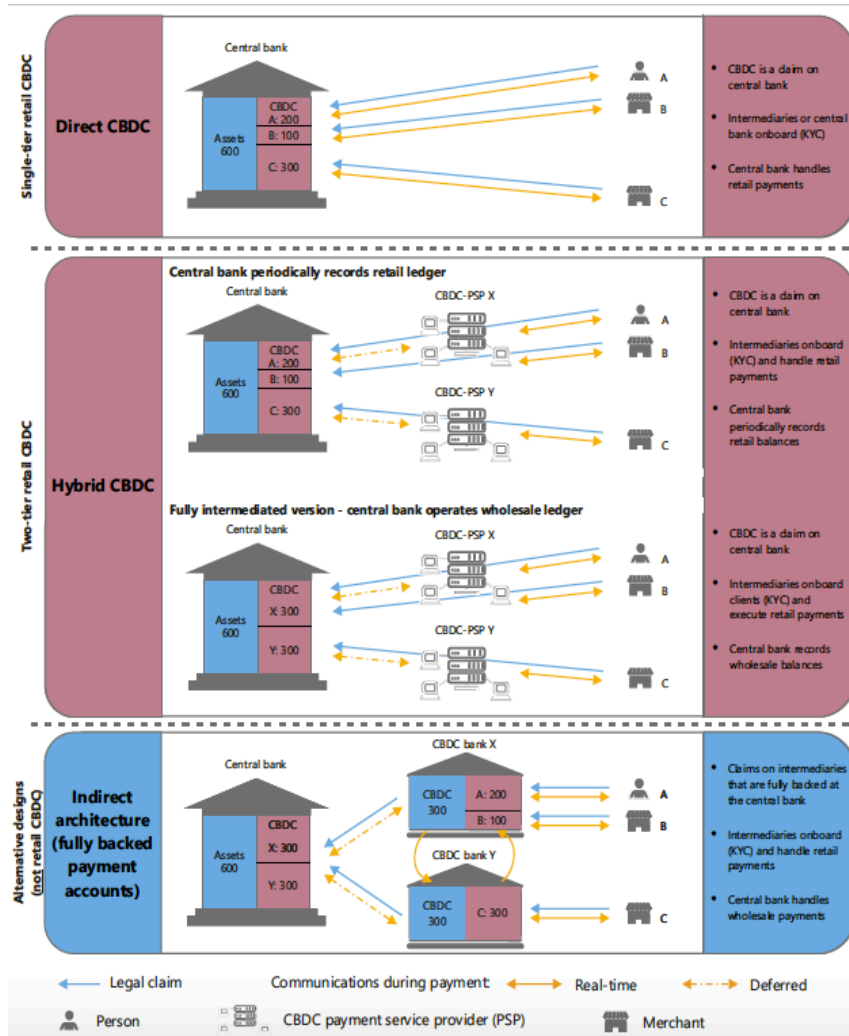
39. Raphael Auer & Rainer Böhme, *CBDC architectures, the financial system, and the central bank of the future*, VOX EU, Oct. 29, 2020, <https://voxeu.org/article/cbdc-architectures-financial-system-and-central-bank-future>; see also John Huber, *Analysis of the present money system*, SOVEREIGN MONEY, <https://sovereignmoney.site/21-defining-money> (last visited Mar. 23, 2021).

40. Auer & Böhme, *supra* note 39.

41. *Id.*

42. *Id.*

Figure 1: Retail CBDC architectures and fully backed alternatives⁴³



B. Examples

According to a BIS survey, 80% of the world’s central banks have researched CBDCs, and half of the central banks have already

43. *Id.*

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advanced to trials and operation pilots.⁴⁴ Sweden and China demonstrate how using cash is gradually decreasing and the more positive reasons for developing CBDC to supplement or replace cash.⁴⁵

1. Sweden: e-krona

When Sweden first began developing electronic payments, the main focus was crime reduction. As Sweden transitions to a cashless society, Swedish bank robberies have correspondingly declined from 110 in 2008 to merely *two* in 2016.⁴⁶ Although cash is still legal tender, stores may refuse cash and some banks do not accept cash deposits due to the principle of freedom of contract.⁴⁷

Sweden started a pilot test of e-krona in February 2020 and is working with Accenture for a one-year trial, which is expected to end in February 2021, but it can be extended by up to six years.⁴⁸ Sweden hopes to build an e-krona technology platform in an isolated test environment to show how e-krona can be used by the public to improve the public's understanding of e-krona.

Figure 2 below demonstrates the e-krona pilot experiment's two-tier structure. Here, the central bank is responsible for the issuance of e-krona. Participating institutions first pay the central bank reserves to the Swedish Central Bank through Swedish Central Bank Large Payment System in exchange for an equal amount of e-krona. Then the participating agencies are responsible for allocating e-krona to

44. CODRUTA BOAR, HENRY HOLDEN & AMBER WADSWORTH, BIS PAPERS, NO. 107: IMPENDING ARRIVAL — A SEQUEL TO THE SURVEY ON CENTRAL BANK DIGITAL CURRENCY 3 (Bank for Int'l Settlements: Monetary and Econ. Dep't. eds., 2020).

45. Rakesh Sharma, *Sweden Takes Another Step Toward a Digital Currency*, INVESTOPEDIA (Dec. 14, 2020), <https://www.investopedia.com/sweden-takes-another-step-toward-a-digital-currency-5092069> (discussing the evolution of China's and Sweden's digital currency).

46. *Bank robberies decline as Sweden ditches cash – but more people are turning to black market crime instead*, BUS. INSIDER NORDIC (Jun. 18, 2018), <https://www.businessinsider.com/swedens-reduced-cash-circulation-means-black-market-crimes-increase-2018-6>, (last visited 03/26/2021).

47. Riksbank, *supra* note 6, at 12.

48. The Riksbank's e-krona pilot, Sveriges Riksbank, Reg. no 2019-00291 (Feb. 2020).

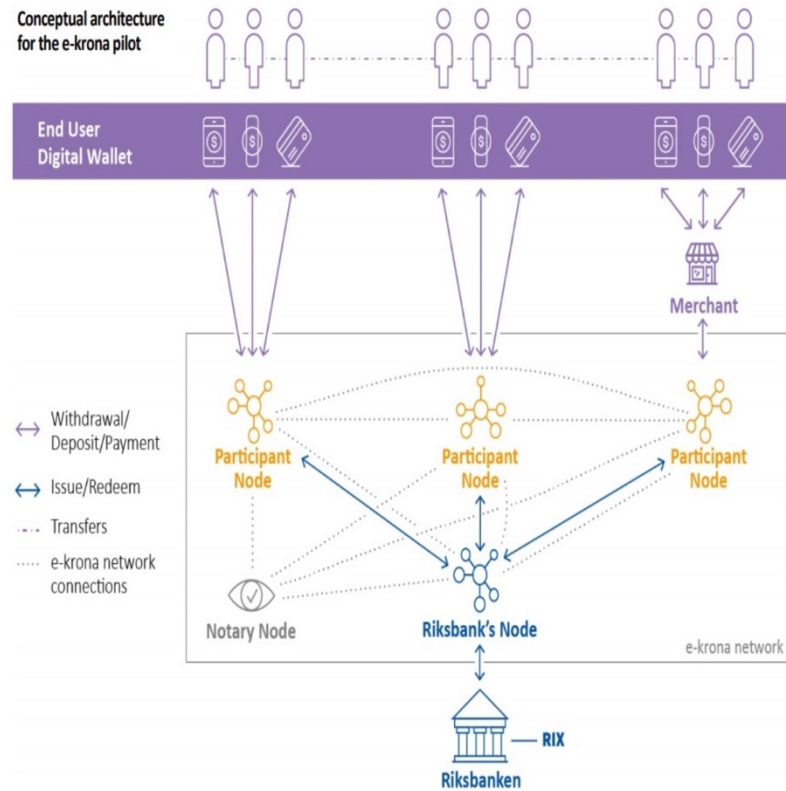
users. After the user completes the activation of the digital wallet through the participating institutions, bank deposits can be converted to e-krona, and payments can be made with e-krona through digital wallets on mobile devices such as smartphones.

Although it has not been decided which technology e-krona should use, R3 Corda's DLT technology will be tested in pilot trials.⁴⁹ Unlike Bitcoin and other DLTs that operate on public networks, e-krona networks are private, and participating institutions must be approved by the Swedish Central Bank.⁵⁰ In addition, Corda's transaction verification is not as energy-consuming and time-consuming as Bitcoin, and each transaction will only be processed by a small number of nodes.⁵¹

49. *Id.*

50. *Id.*

51. *Id.*

Figure 2: Conceptual architecture for the e-krona pilot⁵²

2. China: e-CNY

The People's Bank of China ("PBoC") launched its own digital currency in 2020, called Digital Currency Electronic Payment ("DCEP"), but DCEP had not been fully developed as a payment product.⁵³ Rather, DCEP became a two-tier research and development ("R&D") pilot project plan, not a payment product. This R&D plan

52. *Id.*

53. Michael, *China's National Digital Currency DCEP / CBDC Overview*, BOXMINING (Jan. 13, 2021), <https://boxmining.com/dcep/>.

included various payment products, which China eventually named e-CNY.⁵⁴

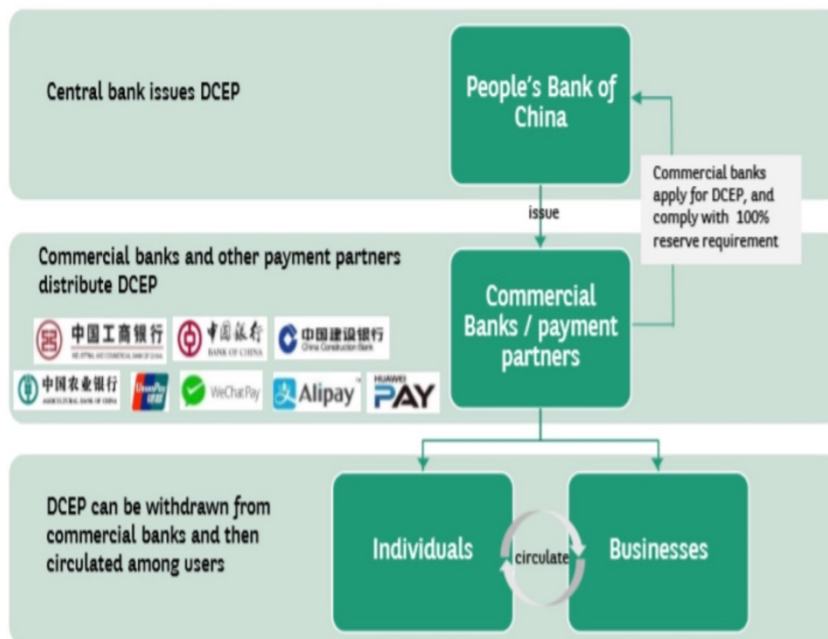
Figure 3 below demonstrates how e-CNY adopted a two-tier structure.⁵⁵ PBoC could issue digital RMB to commercial banks, which could be responsible for the circulation of digital RMB in the retail market.⁵⁶ In terms of roles and responsibilities, PBoC issues and manages e-CNY, including authentication, registration, and big data analysis.⁵⁷ The commercial banks then could provide public wallet opening and e-CNY exchange.

54. Zhou Xiaochuan's *in-depth interpretation: DC/EP and digital RMB e-CNY* (周小川深度解讀：DC/EP 和數字人民幣 e-CNY), CHAINNEWS (Dec. 5, 2020), <https://www.chainnews.com/zh-hant/articles/889273933439.htm>.

55. Johannes Duong, *Overview of Central Bank Digital Currency – State of Play*, SUERF: THE EUR. MONEY & FIN. F. (Apr. 2020), <https://www.suerf.org/policynotes/12575/overview-of-central-bank-digital-currency-state-of-play>.

56. *Id.*

57. *Id.*

Figure 3: Technical Architecture of e-CNY⁵⁸

Zhou Xiaochuan, the former governor of the Central Bank of China, said that the concept of DCEP is completely different from CBDC in other countries.⁵⁹ The main differences are: (1) DCEP's second-tier institutions actually own the ownership of e-CNY, the payable guarantees, as well as corresponding systems, technologies and equipment; (2) in order to support currency stability, PBoC does not use products like Bitcoin, but adopted different methods, such as requiring 100% cash reserves; and (3) PBoC and second-tier institutions are not simply engaged in wholesale and retail relationship.⁶⁰ The responsibilities of the second-tier institutions include understanding customers, anti-money laundering, and

58. *Id.* (citing *BNP Paribas: „The NEW Era of Currencies of China: Digital Currency Electronic Payment (DCEP), mimeo*).

59. Zhou Xiaochuan's in-depth interpretation *supra* note 54.

60. Duong, *supra* note 55.

protection of users' private data.⁶¹ These compliance responsibilities are all held by the second-tier institutions.⁶²

Mobile payments in China have matured rapidly with the number of people using non-cash payments exceeding 86% in 2019.⁶³ Consequently, China has created small-scale closed scenarios, where cities, such as Xiong'An, Suzhou, Chengdu, Shenzhen, and Beijing have become cashless pilot programs.⁶⁴ Taking Shenzhen as an example, PBoC plans to launch three rounds of e-CNY pilot projects, generating a total of six million yuan in e-CNY.⁶⁵ At the end of December 2020, Beijing officially launched a e-CNY pilot in the Beijing Winter Olympics venue and attempted offline payment functions.⁶⁶ Looking forward, in 2021, China plans as a key task to implement the e-CNY.⁶⁷ Its introduction into the country will connect more banks and turn all currency exchanges into "data," bringing revolutionary innovation to banks by fully transitioning the country to e-payments. Consumers will also be able to make payments offline. This opens new possibilities: in the future, all assets—including human identities—may be digitized.

61. *Id.*

62. *Id.*

63. *China Inclusive Financial Indicators Analysis Report* (中国普惠金融指标分析报告), PEOPLE'S BANK CHINA FIN. CONSUMER RTS. PROTECTION BUREAU (中国人民银行金融消费者权益保护局) 7 (2019 年), <http://www.gov.cn/xinwen/2020-10/16/5551834/files/6965d1041c5446029297bff94ee6cbf4.pdf>.

64. Zhu Chenning (記者：朱晨寧), *Digital RMB accelerates tosStart Beijing and Shanghai will become pilot sites* (數位人民幣加速起跑 北京、上海將成試辦點), CTWANT.COM (Jan. 25, 2021), <https://www.ctwant.com/article/98453>.

65. *Id.*

66. Orrick, Herrington & Sutcliffe LLP, *China's Digital Currency and What This Could Mean for Foreign Companies and Financial Institutions In China*, JDSUPRA.COM (Feb. 10, 2021), <https://www.jdsupra.com/legalnews/china-s-digital-currency-and-what-this-7987963/>.

67. *Id.*; see also Dorcas Wong, *China's 2021 Policy Priorities: Achieving Continuous, Stable, and Sustainable Growth*, CHINA BRIEFING (Jan. 19, 2021), <https://www.china-briefing.com/news/chinas-2021-forecast-policy-priorities-achieving-continuous-stable-and-sustainable-growth/>.

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3. CBDC Research Project in Taiwan⁶⁸

In 2018, Taiwan began experimenting CBDC and focused on how blockchain can improve the bank efficiency.⁶⁹ The CBDC research project team was established in June 2019, and the “Wholesale CBDC Feasible Technology Research” was completed in March 2020.⁷⁰ This study believes that for Wholesale CBDC to be effective, it must be safer and more efficient than the current system, while still being able to meet the needs of the future large-value payment market. In terms of operation, the system needs to be able to operate twenty-four hours a day, provide person-to-person (“P2P”) payment functions between financial institutions, and reduce the demand for large capital costs of participants, a liquidity-saving mechanism (“LSM”) is required.⁷¹ In addition, the report also mentioned that “if Wholesale CBDC is to adopt a decentralized structure such as DLT, additional consideration must be given to issues such as transaction finality, privacy protection and supervision.”⁷²

Compared to Wholesale CBDC, which is limited to large-value payment transactions between banks, the transaction volume for processing is relatively limited. Users of general-purpose CBDC are widespread and prolific through various payment scenarios. Therefore, the Central Bank of Taiwan will start the “General Purpose CBDC Pilot Program” at the end of 2020, with the following design considerations:

68. See generally Reference materials for the press conference after the Central Bank Board of Supervisors on September 17, CBC.GOV, <https://www.cbc.gov.tw/tw/cp-357-121444-0439d-1.html> (last visited Apr. 7, 2021) (discussing research being conducted in Taiwan).

69. *Id.*

70. *Id.*

71. *Id.* LSM means that when the payment bank’s account balance is insufficient, the payment instruction is not returned directly, but enters a waiting queue. After a certain time, the waiting multiple payment instructions are offset, and the net payable after offset is the payment if the bank account balance is sufficient to cover the deduction, the funds receipt and payment for these payment instructions will be completed. In this way, bank liquidity can be saved and inter-bank fund gridlock can be avoided.

72. *Id.* § 4.

1. Keep cash advantage

General Purpose CBDC should be used in the same way as cash, with a very low threshold for use, allowing anyone to open a CBDC digital wallet to benefit financial inclusion. Under the premise of complying with Anti-Money Laundering/Combating the Financing of Terrorism (“AML/CFT”) and other regulations, provide anonymous payment functions. The system can operate twenty-four hours a day, seven days a week, making CBDC as readily available as cash.

2. Use digital technology

General Purpose CBDC has the ability to use digital technology to realize functions that cash could not provide for, such as providing loss handling mechanism, supporting interest design, programming, etc., to meet the additional needs of future digital payments.

3. Combining centralized systems and DLT

Modify the completely decentralized design of traditional DLT to move closer to the centralized mechanism in exchange for higher performance. That is to say, based on a centralized system, some functions (such as transaction data storage, etc.) are combined with DLT to enhance the system’s resilience, and continue to provide transaction and data services without interruption.

4. Two-tier architecture

The central bank issues CBDC to intermediary agencies, and the intermediary agencies provide them to users. After obtaining CBDC, CBDC can be used to directly make P2P payments between the bank and users.⁷³

The second phase of the “General Purpose CBDC Pilot Project” is currently underway, and is expected to be complete in two years. Upon completion, the results of the test at this stage will be evaluated, and if feasible, the central bank will plan to enter into pilot testing.

73. *Id.*

III. THE RISKS AND REGULATORY ISSUES OF CBDC

As central banks of various countries began to research and experiment on CBDC, the risks and regulatory issues of CBDC have continuously raised. This Article mainly focuses on three aspects that have received more attention: regulatory supervision, information security and privacy, anti-money laundering, and identity authentication.

A. Regulation

Cases in Sweden and China show that detailed evaluation and testing of related technologies are required before the actual issuance of CBDC. For example, DLT is not yet mature and thus has its limitations in application. Due to the limitations, neither Sweden nor China has adopted DLT in core systems.

It is also necessary to clarify the legal feasibility of issuing CBDC. For example, the use of account based CBDC involves publicly setting up an account in the transition. This account is regulated by the possibility of facing repercussions for illegal behaviors.

On one hand, PBoC published a draft law in October 2020 that aims to provide regulatory framework and legitimacy for a forthcoming e-CNY. The draft law states that the yuan is the official currency of the People's Republic of China whether in physical or digital form.⁷⁴ The draft law also appears to take aim at third-party efforts at yuan-backed digital currencies, stating that individuals and institutions are prohibited from making and issuing a currency designed to “replace” digital yuan circulation.⁷⁵

On the other hand, internationally there is supervision of cryptocurrency. For example, in 2019, The Financial Action Task

74. Steve Kaaru, *China's new draft law seeks to legalize digital yuan but ban competitors*, COINGEEK (Oct. 29, 2020), <https://coingeek.com/chinas-new-draft-law-seeks-to-legalize-digital-yuan-but-ban-competitors/> (discussing the Draft Law).

75. Blockchain Consultants, *China's central bank lays regulatory foundation for CBDC*, BLOCKCHAIN CONSULTANTS (Oct. 24, 2020), https://blockchainconsultants.io/chinas-central-bank-lays-regulatory-foundation-for-cbdc/?utm_source=rss&utm_medium=rss&utm_campaign=chinas-central-bank-lays-regulatory-foundation-for-cbdc.

Force (“FATF”) issued an Interpretive Note to Recommendation 15 on New Technologies (“INR 15”), which further clarifies the FATF’s previous amendments to the international Standards relating to virtual assets and describes how countries and obliged entities must comply with the relevant FATF Recommendations to prevent the misuse of virtual assets for money laundering and terrorist financing and the financing of proliferation.⁷⁶ This report proposes relevant regulatory guidelines for the country, including requiring: countries to assess the risks of virtual asset-related activities, relevant industries to obtain government regulatory licenses, and national authorities to have sufficient capacity to supervise the virtual asset industry.⁷⁷ It is important to note the supervision cannot rely on self-regulatory organization.⁷⁸

FATF recommends that when these virtual asset service providers (“VASPs”) fail to comply with FATF’s relevant regulatory regulations, the competent authorities of various countries must force the providers to comply with relevant regulatory regulations or adopt their own sanctions to implement anti-money laundering and anti-terrorism mechanisms. Countries should assess the risks and regulatory environment in accordance with its own environment, and formulate relevant regulatory policies. This means that if the country cannot afford high-intensity supervision, it may need to slow down the pace of opening up the virtual asset industry.

The other part of the FATF report is aimed at VASPs and proposes risk control guidelines to further help these companies that provide related services to understand and comply with their anti-money laundering and anti-terrorism obligations. Just like other regulated companies, VASPs need to coordinate with relevant agencies to ensure compliance with anti-money laundering and anti-terrorism regulations, while also requiring the company to protect user data privacy.

In response to the FATF’s virtual asset supervision guidelines, various governments have begun to take specific regulatory actions.

76. FIN. ACTION. TASK FORCE [FATF], *Public Statement on Virtual Assets and Related Providers*, FATF (Jun. 21, 2019), <http://www.fatf-gafi.org/publications/fatfrecommendations/documents/public-statement-virtual-assets.html>.

77. *Id.*

78. *Id.*

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For example, in March 2020, the Financial Transactions and Reports Analysis Centre of Canada (“FINTRAC”) issued a report, which states cryptocurrency companies will be more strictly regulated in the future. Cryptocurrency companies must register as money service providers and are also obliged to comply with the following regulations: including identifying customers, monitoring business relationships, keeping records, and reporting certain types of financial transactions.⁷⁹ An example comes in the form of The Monetary Authority of Singapore (“MAS”), which issued a guide on VASPs, with the hope to further regulate the anti-money laundering and anti-terrorism financing.⁸⁰

B. Information Security and Privacy

Under the trend of digital finance, crisis response and defense against cyber-attacks also need to be paid more attention. After the 2020 launch of e-CNY in China, it has been discovered that fake e-CNY has appeared—especially when merchants are making payments offline.⁸¹ Regardless of whether it is real or virtual currency, there is still the problem of anti-counterfeiting. In fact, the problem may be exacerbated because cost of counterfeit digital currency may be lower.

When CBDC begins to circulate in the global economy, the threat posed by cyber-attacks may cause a huge financial crisis. For example, due to service interruption, the balances of key banks may be destroyed, or encryption cannot be used, which may cause a serious liquidity crisis. Worse yet, this failure may even cause a catastrophic

79. FIN. TRANSACTIONS & REP. ANALYSES CTR. CAN. [FINTRAC], 2020-21 DEPARTMENTAL PLAN 7 (2020), <https://www.fintrac-canafe.gc.ca/publications/dp/2020-2021/dp-eng>.

80. *See generally* MONETARY AUTHORITY SING. [MAS], GUIDELINES TO MAS NOTICE PS-N02 ON PREVENTION OF MONEY LAUNDERING AND COUNTERING THE FINANCING OF TERRORISM (2020), https://www.mas.gov.sg/-/media/MAS/Regulations-and-Financial-Stability/Regulatory-and-Supervisory-Framework/Anti_Money-Laundering_Countering-the-Financing-of-Terrorism/Guidelines-to-PSN02-on-Prevention-of-Money-Laundering-and-Countering-the-Financing-of-Terrorism—DPT.pdf.

81. Huang Jingzhe, *Digital Renminbi has been found to be counterfeit, information security issues are not optimistic*, TECHNEWS (Oct. 29, 2020), <https://technews.tw/2020/10/29/digital-renminbi-has-been-found-to-be-counterfeit-information-security-issues-are-not-optimistic/>.

systemic financial crisis, leading to a global economic recession. Bearing these concerns in mind, the most important consideration central banks using, or implementing, CBDC should be building and supporting a technical architecture that is resistant to cyber-attacks.

On a smaller scale, many people have questioned the privacy protection of CBDC users. After the currency is digitized, all the cash flows may be more obvious, especially in the case of extensive use of big data, which often risks personal information protection. In 2019, ECB published a report “Exploring Anonymity in Central Bank Digital Currencies,”⁸² which discussed privacy concerns. ECB used the Corda platform to develop a proof of concept called “EUROChain,” which featured four parties, including two intermediary agencies, a central bank, and anti-money laundering agency. All parties participated in the network as a node, and the node ran a Corda Distributed Application (“CorDapp”), which allows assets to be transferred between entities.⁸³ Within this proof of concept, the central bank established a solution to prevent money laundering and combat capital terrorism compliance procedures while still maintaining the anonymity of user identities and transaction history. This means that so long as a user does not specify open permissions, no unit can see the data.

Privacy could be further enhanced by using mechanisms such as rotating public keys, zero-knowledge proof, and enclave computing. Rotating keys, which would involve users generating new pseudonyms on a regular basis, would limit nodes’ ability to link transactions to individual users because users would be using various different pseudonyms over time.⁸⁴ At the same time, intermediaries would still be aware of all transactions initiated and received by their respective clients. AML authority would know the real identities of the payer and the payee whenever transactions without anonymity vouchers were sent for approval.

In 2021, Massachusetts Institute of Technology (“MIT”) will conduct a research project with the Federal Reserve Bank of Boston

82. See generally European Central Bank, *Exploring Anonymity in Central Bank Digital Currencies*, IN FOCUS, no. 4, Dec. 2019, at 1, <https://www.ecb.europa.eu/paym/intro/publications/pdf/ecb.mipinfocus191217.en.pdf> (last visited Feb. 2, 2021).

83. *Id.* at 4.

84. *Id.* at 10.

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on the security of bitcoin and the design architecture of CBDC.⁸⁵ MIT will also cooperate with some major central banks and financial and technology companies. These companies, in turn, will use easy-to-understand distributed systems, cryptographic libraries and protocols, and give priority to those systems that have been used in the real world.

At the same time, relevant research will be conducted on the security of bitcoin, such as whether the decentralized system can withstand attacks from cyber hackers and how to improve the global security infrastructure of the bitcoin network.⁸⁶

C. Anti-Money Laundering and Identity Authentication

In the international financial system, money laundering has always been a topic of discussion. International Monetary Fund (“IMF”) estimates that the total amount of global money laundering is as high as three and a half trillion dollars each year, which is equivalent to about five percent of the global GDP.⁸⁷ PeckShield, a blockchain security company, presented data, which was collected both through the online and offline medium, that depicted more than \$1.4 billion laundered money has moved to crypto exchanges in 2020.⁸⁸ Throughout the world, major countries are accelerating the deployment of blockchain technology and central bank digital currencies. At the same time, supervision is constantly strengthening and advancing. As blockchain technology matures, it may be possible

85. *Digital Currency Initiative – 2020 4th Quarter Newsletter*, MIT MEDIA LAB (MIT/ Media Lab, Cambridge, Mass.), Feb. 8, 2021, <https://mailchi.mp/bbd561657fe3/2020-q3-mits-digital-currency-initiatives-seasonal-update-1615614>.

86. *Id.*

87. *IMF: The scale of money laundering has exceeded 5% of global GDP*, CNYES.COM (Feb. 11, 2015), <https://news.cnyes.com/news/id/339251>; see also Rhoda Weeks-Brown, *Cleaning Up*, 55 INT’L MONETARY FUND: FIN. & DEV., no. 4, 2018, at 1, 1–2, <https://www.imf.org/external/pubs/ft/fandd/2018/12/imf-anti-money-laundering-and-economic-stability-straight.htm>.

88. PECKSHIELD, RESEARCH REPORT ON THE COMPLIANCE OF DIGITAL ASSET EXCHANGES IN THE FIRST HALF OF 2020 (2020), https://mp.weixin.qq.com/s/?_biz=MzU3MTU2NTU1MA==&mid=2247484945&idx=1&sn=52d57178c879df251a74e052bfd4f754&chksm=fcd7290cba8fb86a69c94a9be54511ac39589fcb2920e8a9a2dc39ac2555f84557caf218aed&scene=158#rd.

to simplify the money laundering prevention process and improve efficiency by sharing financial transaction information with distributed ledgers.

Despite the optimistic potential, digital currency transactions remain difficult to track and it is difficult to completely avoid interception by government taxation and customs management systems. Instead, these transactions, collectively, have become one of the biggest black holes in the international underground economy, and even threaten foreign exchange control, thereby causing money laundering. In order to comply with anti-money laundering and anonymity requirements, the PBoC plans to install limits for wallet handling at different levels.⁸⁹ If users register with a mobile phone number, the wallet limit is at its lowest level to enable small daily transactions.⁹⁰ The limit can be raised by disclosing more personal information.⁹¹ Furthermore, tax fraud will become more difficult in digital transactions which are traced by the government.⁹²

CONCLUSION

The process of creating computer software application is an evolutionary process of “centralization-decentralization-recentralization-decentralization again.” Just as there has never been a completely decentralized system or a completely centralized system in human society, after eliminating data asymmetry, there will still be central and intermediary links in the blockchain system—and even new ones may arise.

Digital currency represents of decentralization and re-centralization. The design of digital currency is intended to be decentralized, aimed at changing the traditional pattern of trust monopoly, centralization, and state machinery. Objectively, it empowers enterprise centralization, thereby forming a re-centralization trend. CBDC is a good example of decentralized technology applied to recentralization. In other words, the central bank is a centralized organization that builds CBDC through

89. Duong, *supra* note 55.

90. *Id.*

91. *Id.*

92. *Id.*

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blockchain decentralized technology. This cycle of decentralization and recentralization is borne not only for the convenience of supervision, but also for the country's subjectivity, monetary policy, and enhancement of subjectivity.

Scholars have theorized that CBDC will bring a future where digital currency replaces, or at minimum competes with, the dollar. For example, professor Niall Ferguson of the Department of History at Harvard University pointed out that China will eventually integrate their various digital platforms into a global payment system.⁹³ By then, the U.S. dollar will lose its position as the world's largest currency, and the United States will also lose its status as a superpower in financial sanctions.⁹⁴ Hui Feng, a researcher at Griffith University in Australia, also pointed out that China may use CBDC as a weapon to challenge the international status of the dollar.⁹⁵

There has not yet been a case of CBDC being widely adopted. Whether users have any demand for CBDC depends on how it is designed and whether there are better alternatives. As far as developed economies are concerned, the issuance of CBDC may only be in response to the disappearance of cash, so that the public can still have another small anonymous transaction tool. For countries with low access to financial services and inefficient clearing technology, it is more likely to be issued.

From the perspective of the central bank, the benefits of issuing CBDC include reducing the social cost of using cash and promoting inclusive finance. In addition, under the monopoly of private payment companies, the issuance of CBDC provides the public with another choice of payment tools, which can improve the security of the payment system and Strengthen consumer protection. These promising qualities are not a panacea meant to cure the financial and monetary concerns of all countries; each country's situation is

93. *Disruption, Money and a World of Change, Feat. Niall Ferguson*, COINDESK (Mar. 28, 2020), at 17:18–17:42, 26:33–26:48, <https://www.coindesk.com/disruption-money-and-a-world-of-change-feat-niall-ferguson>.

94. *Id.* at 17:43–17:57, 18:04–18:17, 18:19–18:35.

95. Hui Feng, *What is behind China's digital currency aspirations?*, CENT. BANKING (Nov. 6, 2019), <https://www.centralbanking.com/fintech/cbdc/4531196/what-is-behind-chinas-digital-currency-aspirations>.

different. In many countries, the utilization rate of cash is still increasing, the payment and clearing system is efficient, and there is no monopoly problem in the multi-competition of private payment companies. Therefore, the development of innovative retail fast payment systems and effective supervision may be needed to be issued by the central bank alternative to CBDC.

In summary, according to the various aspects and developments of CBDC in this Article, we can get the following conclusions:

1. Regulations must continue to innovate to keep up with technological progress;
2. Supervision technology (RegTech, SupTech) will become one of the focuses of future development;
3. Privacy and information security have become the most valuable assets in the future;
4. The dominance of fiat currency is national power. The advent of the digital age allows small countries to use financial innovation to differentiate (i.e., Sweden, Taiwan), and even rebuild the global economy;
5. The ultimate goal of digital currency is to pursue financial inclusion, not to create a greater gap between rich and poor; and
6. CBDC uses decentralized technology, but at the same time re-centralization of nation states control.