

DESIGN AND LEGAL ASPECT OF CENTRAL BANK DIGITAL CURRENCY: A LITERATURE REVIEW

Fitri Handayani,^a Fatma Yuliana^b

^{ab}BPS-Statistics Indonesia, Indonesia

e-mail: fhandayani@bps.go.id

Submitted: 1 July 2022 - Last revised: 7 September 2022 - Accepted: 9 September 2022

Abstract

The development of digitalisation in the financial services sector has compelled Bank Indonesia to develop Central Bank Digital Currency (CBDC). CBDC as a new type of money requires adjustments in terms of applicable laws and regulations. In an attempt to identify the design and legal regulations regarding CBDC, this paper performs a literature review through various related studies carried out internationally and in Indonesia. The novelty of this paper is to apply the rule of law to each selected CBDC design. Based on the study, CBDC design consists of wholesale and retail that can use token or account-based authentication. Then, CBDC transactions can be managed by the central bank or transacted through a Distributed Ledger Technology (DLT) system. In addition, another CBDC characteristic is based on interest-bearing and non-interest-bearing. The different implementation and selection of CBDC resulted in regulations that needed to be improved. Related to the legal aspect of CBDC in Indonesia, revisions are required to the substance of Law No. 7 of 2011 on Currency which must state that the form of rupiah includes CBDC. Furthermore, other rules that need to be considered are privacy and property laws, DLT, and insolvency law, as well as regulation of competition between CBDC and depository banks.

Keywords: *CBDC, legal tender, payment system, legality, digitalisation*

I. INTRODUCTION

Developments in digitalisation occurs in all economic sectors. All sectors are entering the flow of digitisation, starting with media, trade, tourism, education, and health. The development of digitalisation in these industries encourages the digitisation of financial services as well. For example, a payment system must be established online by consumers who use these services. Thus, financial services must transform to provide an infrastructure that supports the development of digitalisation. Transaction data from Bank Indonesia (BI) showed that the number of digital payment transactions through electronic money in Indonesia is increasing every year. In 2021, BI recorded 305.45 trillion Rupiah, an increase of 122.89 percent compared to 2017, which was

only 12.38 trillion Rupiah. Moreover, the form of digital payment (for example OVO, Go-Pay, LinkAja, Dana, Jenius, Doku, and T-cash) have been widely used. These figures indicate that the Indonesian economy has begun to move toward a cashless society.¹

Subsequent development regarding the digitisation of payment systems is the emergence of virtual money or so-called cryptocurrencies, including Bitcoin and Ethereum. Virtual money offers a decentralised system that stores transactions within each agent so that transaction information can be accessed directly and provide better security because all agents developed the system, not centralised in the central banking system.² However, this virtual money has only been used as a store of assets and has not been approved as a means of payment in Indonesia. This restriction is due to the volatility of virtual money prices due to the absence of institutions that control the money.³

Based on weaknesses in the virtual money already in circulation, many countries are researching the possibility of implementing Central Bank Digital Currency (CBDC), virtual money controlled by a central bank. It has been reported that 90% of central banks surveyed are engaged in developing some form of CBDC.⁴ The difference between a CBDC and existing virtual money is that it is legalised by the state and is a central bank liability. Thus, the money has legal force and a higher level of trust. Bossu et al. divide the definition of CBDC related to its legal aspects into two components, namely the “CB” Central Bank and the “C” Currency. “Central Bank” means that the CBDC must be issued and authorised by a central bank.⁵ Because of that, a legal framework will be required to state that the central bank is mandated to issue CBDC currency. Second, “Currency” means that CBDC can be used as currency as a means of payment as well as a store of value. Therefore, a law that regulates this function will also be needed. Meeting the need for these regulations will also be influenced by the chosen CBDC design.

Bank Indonesia, as the monetary authority in Indonesia, has concentrated on this CBDC issue. The CBDC discussion remains a priority agenda item for the financial pathway in the G20 Presidency 2022, which will be held in Indonesia.

¹ Felice Valeria and Treviliana Eka Putri, “‘Cashless Society’ Di Indonesia : Risiko Dan Tantangan,” *Center For Digital*, no. April (2020): 2.

² Mitsuru Iwamura et al., “Can We Stabilise the Price of a Cryptocurrency?: Understanding the Design of Bitcoin and Its Potential to Compete with Central Bank Money,” *Hitotsubashi Journal of Economics* 60, no. 1 (2019): 42.

³ Bastian Muzbar Zams et al., “Designing Central Bank Digital Currency for Indonesia: The Delphi-Analytic Network Process,” *Buletin Ekonomi Moneter Dan Perbankan*, vol. 23, 2020: 415.

⁴ Anneke Kosse and Ilaria Mattei, “Gaining Momentum-Results of the 2021 BIS Survey on Central Bank Digital Currencies,” no. 125 (2022): 1.

⁵ Wouter Bossu et al., “Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations,” *SSRN Electronic Journal*, 2021: 7.

As part of the agenda, the principles of CBDC development will be discussed. However, a detailed discussion of the design selection and the consequences of the rules have not been widely identified in the form of published research. Previous research focused on the design and the features of CBDC itself. They analyse several possible CBDC models regarding its infrastructure and the consequences thereof.⁶ Further research explains the legal implication of currency law in the formation of CBDC but not in a detailed elaboration.⁷ The probable designs and the legal implications have been discussed by Bossu et al. in general, not targeting a specific country.⁸ Indonesia is in the research and exploration stage of issuing CBDC. According to Bank Indonesia, they expect to release a white paper containing a report on the development of CBDC by the end of 2022. They set prerequisites regarding the issuance of CBDC. First, the design of CBDC should not disrupt the prevailing financial system. That means the design of CBDC should be integrated into the available financial market and payment system. Moreover, Bank Indonesia should provide the technological support for the DLT blockchain or non-DLT. The selection of CBDC design should be discussed accordingly based on the characteristics needed and the impact that may be caused. Therefore, it is necessary to research the selection of designs and preparation of regulations so that it can inform Bank Indonesia to support the acceleration of CBDC implementation.

This paper aims to explore the design and legal regulations related to CBDCs, identify the development of studies on CBDCs that exist in Indonesia, and describe the designs and legal rules recommended for Indonesia. CBDC can be divided into five different models based on each characteristic. It also implies the different legal regulations that should be amended to accommodate the implementation, especially in the article in Law Number 7 of 2011 on Currency. This paper is structured as follows. Section II identifies various types of CBDC designs, Section III explains the legality of CBDC issuance, Section IV describes research related to CBDC Indonesia, Section V discusses the legal aspect of CBDC in Indonesia, and Section VI concludes the paper.

⁶ Raphael Auer, Giulio Cornelli, and Jon Frost, "Rise of The Central Bank Digital Currencies: Drivers, Approaches and Technologies," BIS Working Papers, August 2020, 16–19, <https://www.bis.org/publ/work880.pdf>.

⁷ Bachelius Ruru et al., "The Impact Of Crypto-Asset Utilisation as Payment Instrument Toward the Rupiah as Legal Tender in Indonesia," *Journal of Central Banking Law and Institutions* 1, no. 1 (2022): 141–80.

⁸ Bossu et al., "Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations": 8–11.

II. GENERAL CBDC DESIGN

Currently, very few central banks have issued CBDCs. Most countries are still in the research and pilot stages of their CBDC implementation.⁹ At this stage, countries conducting research are still debating some key design features, which are also discussed by the central banking community and academia.¹⁰ The following are various CBDC designs that a central bank can consider.

II.A. Based on Access Restrictions (Wholesale vs. Retail)

A wholesale CBDC is a CBDC issued by the central bank for Real Time Gross Settlement (RTGS) users, especially for commercial banks and large public institutions.¹¹ By restricting wholesale CBDC access to only commercial banks or large institutions, this type of CBDC tends to have minimal impact on society.¹² However, it is still essential to further develop wholesale CBDCs regardless of other products.

Here are some reasons is important to issue wholesale CBDCs.¹³ First, issuance of wholesale CBDC can improve operational efficiency and innovation. Second, wholesale CBDC facilitates cross-border payments, and third it improves the transmission of monetary policy and central bank supervision. Wholesale CBDC eliminates the cost and time required to settle current account clearance. In addition, the technology in CBDCs can also make it easier for financial institutions to access central bank reserves to increase efficiency. Concerning cross-border payments, BIS piloted Project Dunbar by bringing together the central banks and financial institutions of Australia, Malaysia, Singapore, and South Africa to offer a common platform for CBDC exchange. This platform can eliminate the need for currency conversion. Additionally, concerning monetary policy and central bank supervision, wholesale CBDC can be fully supervised by the central bank on the condition that there is transparency.

On the other hand, retail CBDCs are issued for circulation by the general public. That means that retail CBDC do not limit who owns them. It has

⁹ Raphael Auer et al., *Central Bank Digital Currencies: A New Tool in the Financial Inclusion Toolkit?*, 2022: 13.; Ruru et al., “The Impact Of Crypto-Asset Utilisation as Payment Instrument Toward the Rupiah as Legal Tender in Indonesia”: 168.

¹⁰ Bossu et al., “Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations”: 9.

¹¹ Bossu et al.: 9.; Payments Canada, “Central Bank Digital Currency (CBDC): Wholesale CBDC Global Developments,” *Payments Canada Series 4* (2022): 3.

¹² Anton N. Didenko and Ross P. Buckley, “Central Bank Digital Currencies: A Potential Response to the Financial Inclusion Challenges of the Pacific,” *SSRN Electronic Journal*, no. 3 (2021): 16.

¹³ Payments Canada, “Central Bank Digital Currency (CBDC): Wholesale CBDC Global Developments”: 4-6.

an impact on more equitable financial inclusion. Retail CBDCs can increase financial inclusion in countries with underdeveloped financial systems and low financial penetration. The government does not have the infrastructure to distribute cash in remote or large rural areas. Moreover, private institutions such as commercial banks and other financial institutions are reluctant to provide banking services due to the high capital costs involved. One proposed solution is to provide banking services through digital innovation, such as this retail CBDC. Retail CBDCs reduce cash-intensive costs by approximately 0.2 - 2.5 percent of GDP.¹⁴

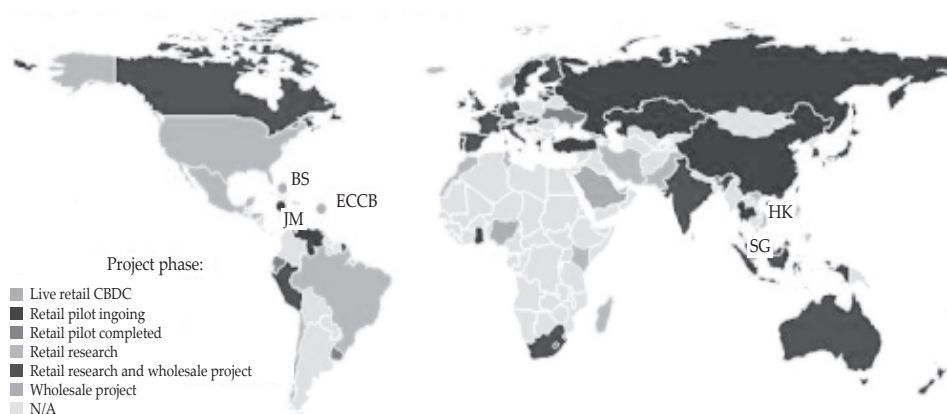
The following is an overview of the summary of research and pilot projects carried out by many countries (Figure 1).¹⁵ From the figure below, many countries have conducted research on CBDC (except on the African continent). Retail CBDCs have been more extensively researched than wholesale CBDCs and Indonesia is conducting studies on both. The Bahamas (Sand Dollar), The Eastern Caribbean Central Bank/ECCB (Dcash), and Nigeria (eNaira) have been launched as retail CBDCs. Sand Dollar, the first CBDC, was launched by Central Bank of The Bahama on October 2020, whereas Dcash was launched on March 2021 by ECCB. Meanwhile, eNaira as Nigeria's digital currency was launched in October 2021 by The Central Bank of Nigeria. In July 2022, Jamaica also launched the digital currency called Jam-Dex.

Based on the Global CBDC Index 2022, which measures the level of perfection of CBDC development, it can be concluded that the three highest indexes for wholesale CBDC projects are Thailand, Hong Kong, and Singapore, while retail CBDC projects are Nigeria, the Bahamas, and China.¹⁶

¹⁴ John Kiff et al., "A Survey of Research on Retail Central Bank Digital Currency," *IMG Working Paper*, 2020: 12.

¹⁵ Auer, Cornelli, and Frost, "Rise of The Central Bank Digital Currencies: Drivers, Approaches and Technologies," 7; Payments Canada, "Central Bank Digital Currency (CBDC): Wholesale CBDC Global Developments," 3.

¹⁶ PwC, "Pwc Global CBDC Index and Stablecoin Overview 2022," 2022: 10-12.

Figure 1. CBDC Across the World

BS - The Bahamas; ECCB - Eastern Caribbean Central Bank; HK - Hong Kong SAR; JM - Jamaica; SG - Singapore. The use of this map does not constitute, and should not be construed as constituting, an expression of a position by the BIS regarding the legal status of or sovereignty of any territory or its authorities to the demarcation of international frontiers and boundaries and/or to the name and designation of any territory city of area.

Source: Auer et al (2020) enhanced by Payment Canada (2022)

II.B. Based on Identity (Account vs. Token)

Based on the requisite identity, CBDCs are divided into account-based CBDCs and token-based CBDCs. Account-based CBDC requires the identity of the account holder at the central bank for payment authentication. Therefore, this type of CBDC cannot be used by people who do not have are not accountholders.¹⁷ From a legal perspective, this CBDC falls under both public and private law. However, the presence of identity can also affect the data privacy and security.

The second form is a token based CBDC. This CBDC does not require the account holder's identity, also called anonymous, much like traditional currency in circulation today.¹⁸ In contrast to the identity type, this CBDC has security related to data privacy because it is not connected to the owner's identity. However, the anonymity of currency identification makes it difficult for the monetary authority to monitor and check the ownership of transactions if there are suspicious activities, especially those related to money laundering and terrorism financing.¹⁹

One of the concerns regarding the differences between these two CBDCs is the issue of cost. An account-based system would be much cheaper than

¹⁷ Auer, Cornelli, and Frost, "Rise of The Central Bank Digital Currencies: Drivers, Approaches and Technologies," 18.

¹⁸ Hossein Nabilou, "Central Bank Digital Currencies: Preliminary Legal Observations," *SSRN Electronic Journal*, 2019, 17, <https://doi.org/10.2139/ssrn.3329993>.

¹⁹ BIS, "Central Bank Digital Currencies," 2018: 6.

a token-based system. The account-based system only requires a fee when initialising an account, but for subsequent transactions, it only requires identity verification (for example using a pin or password). Meanwhile, token-based systems require more expensive verification costs. The entire chain of each token's transaction must be stored in an encrypted ledger (blockchain), and a copy of the ledger must be stored at each node of the payment network. However, using an account-based system could be impractical because there would be many accounts under the central bank system. An alternative solution is to create an account using a particular account at commercial banks supervised by the central bank.²⁰

II.C. Based on Transfer Mechanism

The difference between these CBDCs lies in the ledger structure used. The first CBDC, which is centralised, requires an institution or central bank that regulates and manages transactions. Meanwhile, decentralised CBDC uses a ledger in the form of Distributed Ledger Technology (DLT), which allows direct transactions between individuals (peer-to-peer).²¹ The DLT is further divided into two types, licensed DLT and unlicensed DLT, the latter of which is the mechanism used for already circulating cryptocurrencies (for example, Bitcoin).

The transfer mechanisms are subdivided into more detail: centralised ledgers, centralised but verifiable ledgers, semi-centralised ledgers, and decentralised ledgers. Centralised ledgers present the possibility of damage to the central server due to hacker interference, changes in settings by the central bank itself, or system failures. This damage could happen because a centralised system is only regulated and controlled by one party. The second form is a verifiable centralised ledger. This system allows consumers to verify that their CBDC transactions are valid by being verified using a cryptographic proof of participation available to consumers. Then the third system is semi-centralised. Under this system, the CBDC can be operated by an independent party chosen or approved by the central bank to reduce the possibility of hacking. The last is a decentralised system, one of the proposed techniques is Proof of Stake (PoS), which places operators as system participants. However, there is the possibility of fraud by 2, 3, or 4 miners or top stakeholders who could collude, so this system cannot be fully used in a CBDC environment.²²

²⁰ Michael D Bordo and Andrew T Levin, "Central Bank Digital Currency and The Future of Monetary Policy," NBER Working Paper, 2017: 6–8.

²¹ Kiff et al., "A Survey of Research on Retail Central Bank Digital Currency," 26–28.

²² Sarah Allen et al., "Design Choices for Central Bank Digital Currency: Policy and Technical Considerations," *SSRN Electronic Journal*, 2021: 19–24.

II.D. Based on Claims and Transaction Records

Based on these characteristics, several studies have divided CBDC into various types, direct CBDC and indirect CBDC, otherwise referred to as synthetic CBDC. Direct CBDC is issued and circulated directly by the central bank, while an indirect CBDC is issued and circulated by commercial banks.

Auer and Bohme (2021) further break it down into four types of CBDC, direct, hybrid, intermediate, and indirect CBDC. The definition of direct CBDC is the same as before. Then, a hybrid CBDC is a CBDC with payment transactions carried out by an intermediary institution, but where the CBDC is still a direct claim processed through the central bank. The central bank keeps records of all transactions and prepares backup in case of transaction failure at intermediary institutions. Furthermore, intermediate CBDCs have similar characteristics to hybrid CBDCs, but the central bank only stores wholesale transactions.

Indirect CBDC is discussed in more detail by proposing synthetic CBDCs. While direct CBDCs increase the risk of cyber-attacks, entail high costs, and could jeopardise a central bank's reputation. The synthetic CBDC model is cheaper and less risky for central banks by maintaining the private sector's comparative advantage of innovation and interaction with consumers to provide trust and efficiency. Those innovations have the potential to change the banking and currency landscape.²³

II.E. Based on Interest Bearing

Researchers also divide CBDC based on the presence of interest characteristics. These CBDCs are divided into interest-bearing CBDCs and non-interest-bearing CBDCs. Interest plays a role in controlling CBDC demand and facilitating interest rate-based decision-making. However, designing CBDCs that switch from cash-like attributes to "deposit-like" CBDCs could accelerate the disintermediation of existing deposit takers.²⁴ It is technically possible for a CBDC to have interest (positive or negative) in both token and account-based types. Interest-bearing CBDCs can also be applied to retail and wholesale CBDCs.²⁵

However, non-interest-bearing CBDCs can hinder financial inclusion. The existence of interest in a CBDC can attract both new and existing consumers into the formal financial sector. People who do not have a bank account would take advantage of the savings benefits of an interest-bearing CBDC. However,

²³ Tobias Adrian and Tommaso Mancini-Griffoli, "Fintech Notes: The Rise of Digital Money," *IMF FinTech Notes* Note/19/01 (2019): 14-15.

²⁴ Katherine Foster et al., "Digital Currencies and CBDC Impacts on Least Developed Countries (LDCs)," in *Dialogue on Global Digital Finance Governance Technical*, 2021: 14.

²⁵ BIS, "Central Bank Digital Currencies": 6.

a CBDC with non-interest-bearing status can remove the person's incentive to hold many CBDCs.²⁶ On the other hand, there are several implications of interest-bearing CBDCs. First, the use of CBDC without an attached identity cannot be used because it is related to regulations regarding tax payments. Second, interest-bearing CBDCs do not significantly affect monetary policy based on the central bank's adjustment of interest rates. Then, interest-bearing CBDCs can increase the risk of political interference and lead to reduced autonomy of the central bank. In addition, interest-bearing CBDCs can impact volatility and present challenges to financial stability due to the possible deposit-runs. Moreover, interest-bearing CBDCs can benefit retail payments but have no significant impact on large-value payment systems (RTGS).²⁷

Another CBDC design deals specifically with cross-border payment transactions. Researchers have proposed several designs of multi-CBDC (m-CBDC) so that transactions between countries with different types of CBDCs can be facilitated, analogous to when international payment transactions occur in various currencies. However, the m-CBDC use case would be more complex because it contains each accompanying system design.

There are three m-CBDC models available for cross-border transactions.²⁸ The model can also be seen below in the Figure 2.

- 1) m-CBDC Model 1: This m-CBDC arrangement is based on compatible CBDC systems.

In this model, compatible standards allow CBDC transactions between different countries. The standards are general technical standards, such as message formats, cryptographic techniques, data requirements, and user interface design. In addition, there are also legal and regulatory standards to simplify the supervision of the KYC process and transaction processing. Many private companies could carry out the inter-CBDC transaction process.

- 2) m-CBDC Model 2: This m-CBDC arrangement is based on interlinked CBDC systems.

This model links the payment systems through two types of channel options, a shared application technical interface and a decentralised or centralised clearing system.

²⁶ Peterson K. Ozili, "Central Bank Digital Currency Research Around The World: A Review of Literature," *Journal of Money Laundering Control*, 2022: 7.

²⁷ Walter Engert and Ben S C Fung, "Central Bank Digital Currency: Motivations and Implications," *Bank of Canada Staff Discussion Paper*, no. 16 (2017): 17-22.

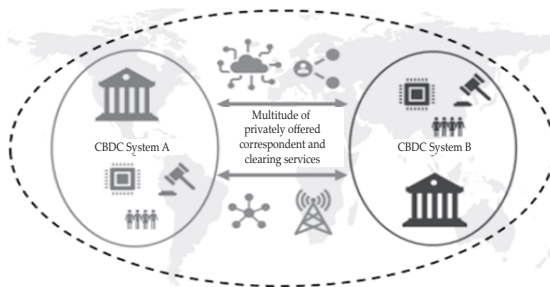
²⁸ Raphael Auer, Philipp Haene, and Henry Holden, "Multi-CBDC Arrangements and the Future of Cross-Border Payments," *BIS Papers*, no. 115 (2021): 4-9.

- 3) m-CBDC Model 3: This single m-CBDC functions in multi-currency systems.

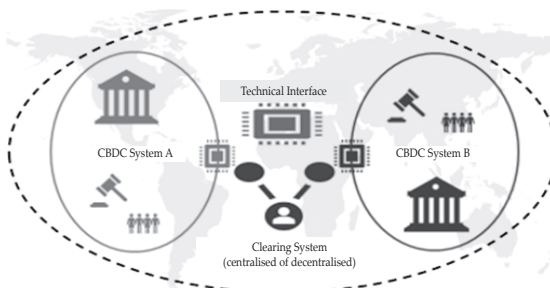
This model involves a cooperative m-CBDC payment system. These CBDCs can be issued to a shared distributed ledger and managed jointly. This joint management, however, creates a weakness in the central bank in terms of domestic monetary policy, financial stability, and payment policy influenced by joint operators. As a result, the central bank can no longer independently or effectively carry out its control and monitoring functions.

Figure 2. Model of Multi-CBDC

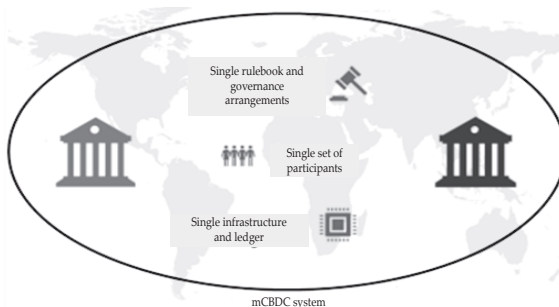
Model 1.
m-CBDC arrangement based on
compatible CBDC systems



Model 2.
m-CBDC arrangement based on
interlinked CBDC system



Model 3.
single m-CBDC multi-currency
systems



III. LEGALITY OF CBDC ISSUANCE

Legitimate payment instruments have several core characteristics; they can be accepted as repayment of obligations to creditors, creditors who refuse to accept legal currency tenders are prevented from using all or part of their rights to make payments and apply in a unit of account that are regulated by law and at face value.²⁹ In designing a legal tender law, several approaches are considered.

1. Repressive, where a jurisdiction may impose penalties on parties who do not use or refuse to accept legal tender;
2. Exclusive, where a jurisdiction requires the use of monetary objects that have legal tender status and the parties involved must agree to it as a form of payment but are not penalised for failure to do so;
3. Indicative, where a jurisdiction grants legal tender status to particular monetary objects but allows the parties to contractually agree on other forms of payment; and
4. Privileged, where a jurisdiction does not grant legal tender status to particular monetary objects but create legal incentives for their use.

Consideration of the issuance of a CBDC depends on recognising the currency as legal tender within a central bank's jurisdiction.³⁰ This legal status means of payment makes it mandatory to accept it in its territory or as a right of the citizenry. The rules related to CBDCs themselves can be divided into central bank laws, laws and regulations for participants in the CBDC ecosystem, and thematic laws and regulations.³¹

Regarding central bank law, the preparation and review of the legal basis for the application of CBDC in a country are needed to support the central bank's participation in carrying out its role as a monetary authority.³² With the proper regulatory framework, the emergence of CBDCs is expected to support the role of the central bank, not weaken the role of the institution's authority. Central bank laws are useful for providing authority and jurisdiction in issuing CBDCs and oversight of the CBDC ecosystem. Legal considerations of CBDC will also lead to the function of CBDC as legal tender.³³ Those functions are tools for calculation, medium of exchange, and store of value. The central bank needs to consider not legalising CBDC as a store of value because of fears about runs on banks. In addition, there are also legal considerations for cross-border CBDC systems, where attention must be paid to regulations for

²⁹ BIS, "Summary of the Webinar on Legal Aspects of Digital Currencies," 2021.

³⁰ Panagiotis Papaschalis, "Retail Central Bank Digital Currency: A (Legal) Novelty?," in *ESCB Legal Conference 2016*, 2021, 203–16.

³¹ Auer et al., *Central Bank Digital Currencies: A New Tool in the Financial Inclusion Toolkit?*: 33

³² Papaschalis, "Retail Central Bank Digital Currency: A (Legal) Novelty?"

³³ Auer et al., *Central Bank Digital Currencies: A New Tool in the Financial Inclusion Toolkit?*:30-31.

holding and managing foreign currencies due to the opportunity for holding accounts in currencies other than those issued by their central bank.

There are three regulatory approaches to be studied for the success of CBDC issuance.³⁴ First, a central bank issuer must choose the governing law for transaction disputes in its CBDC. In the design, it is necessary to consider the users because the trade control is with them. If the users feel that it is not under what is expected from a CBDC, they will lose confidence in the central bank and reduce the effectiveness of CBDC issuance. Second, a governing jurisdiction must be chosen, generally the same as is dictated by governing law. It should also be noted that there is no conflict in these rules. Third, it should be noted that property laws apply to transfer, generally based on the laws of the intermediation jurisdiction in which the seller's account is located.

III.A. CBDC Legal Aspect

In issuing CBDCs, the analysis of statutory provisions relating to the central bank's mandate is the primary consideration for whether a central bank has the right to issue the CBDC.³⁵ That mandate consists of two aspects, the function and power of the central bank. In terms of function, the central bank has two functions related to CBDC, currency issuance and payment systems. In terms of currency issuance, it is necessary to identify the functions of the central bank in a country, whether it includes the issuance of currency in broad form, especially digital related to CBDC, or only in the form of physical currency.³⁶ In addition to being related to central bank law, the legal issues surrounding the type of currency that can be used in a country is also associated with currency law.³⁷ If the applicable regulations state that any currency in the central bank's function is only banknotes and coins, then the regulation needs to be revised by clarifying the use of CBDC in it. On the other hand, if there is no specific explanation regarding the "currency" in the regulation, the central bank has the right to issue CBDC.

The Netherlands and Chile are countries that explicitly limit the definition of currency as banknotes and coins in central banking laws, so they need to implement new rules or revising existing regulations to obtain the legality of CBDC issuance.³⁸ The Netherlands has a rule in the Dutch central bank law,

³⁴ Reuters, "The Missing Legal Framework for Central Bank Digital Currencies," 2021.

³⁵ Bossu et al., "Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations":13-14.

³⁶ Andrew Rizk, "Central Bank Digital Currency: Legal and Regulatory Issues," *University of Westminster* (2022): 45-47.

³⁷ Arman Nefi and Agus Sardjono, "The Urgent Need to Amend the Indonesian Law on Currencies to Face the Digital Age," *Journal of Central Banking Law and Institutions* 1, no. 1 (2021): 23-46.

³⁸ Rizk, "Central Bank Digital Currency: Legal and Regulatory Issues":48-49.

Section 3 Article 1(d), which states that the central bank's task is "to provide for the circulation of money as far as it consists of banknotes."³⁹ The Central Bank of Chile falls under the Basic Constitutional Act, Article 28, which states, "The Bank has the exclusive authority to issue banknotes and to coin money in accordance with the provisions of this Title."⁴⁰

There are also examples of countries that do not restrict currency on banknotes and coins, such as Bahrain and the United States. Article 4(1) of the Bahrain central bank law states that the responsibility and authority of the central bank is "to issue currency in accordance with this law."⁴¹ Without specifying the currency in question, this opens up opportunities for adopting CBDCs as sovereign currencies. Another example is the United States which states in its law that "United States coins and currency (including Federal reserve notes and circulating notes of Federal reserve banks and national banks) are legal tender for all debts, public charges, taxes, and dues."⁴² The regulation, the central bank of the United States specifically mentions the types of currency, namely banknotes and coins. However, there is a chance that the CBDC could be adopted based on the word "including," which implicitly allows new currency formats to be entered.

Regarding the central bank's function of operating and supervising payment systems, it is necessary to examine whether the central bank has a legal basis for open payment system access to the general public.⁴³ Rules can be focused on regulating existing financial institutions and regulations for new players.⁴⁴ Laws and regulations relating to payment systems using CBDCs must be able to support flexible and innovative market practices because they can affect government payment programs.⁴⁵ The role of CBDC as a legal tender in settling private or public debts and fulfilling financial obligations also needs to be reviewed for its legality. It is useful for ensuring that governments and the private sector can accept CBDCs to meet their payment obligations.⁴⁶

³⁹ Netherlands, "Bank Act 1998 Articles of Association of De Nederlandsche Bank n.v., and Statute of the European System of Central Banks and of the European Central Bank" (1998).

⁴⁰ Chile, "Basic Constitutional Act Central Bank of Chile 1989" (1989).

⁴¹ Bahrain, "The Central Bank of Bahrain and Financial Institutions Law 2006" (2006).

⁴² United States, "Money and Finance Subchapter I Monetary System § 5101" (1983).

⁴³ Bossu et al., "Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations": 17.

⁴⁴ Auer et al., *Central Bank Digital Currencies: A New Tool in the Financial Inclusion Toolkit?*: 31.

⁴⁵ World Bank Group, *Central Bank Digital Currency: A Corporate Finance Perspective* (Washington DC: International Bank for Reconstruction and Development / The World Bank, 2021): 23 <https://doi.org/10.2139/ssrn.3911132>.

⁴⁶ Bossu et al., "Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations.": 9-10.

When viewed from the central banks power, two things related to CBDC are the power to issue certain types of currency and open accounts on the central bank's books. As with the function of issuing currency, the legal rules that need to be considered are whether the central bank widely involves "digital currency," "currency" in general, or "other forms of currency," without currency specification in physical form.⁴⁷ However, there are still gaps from a legal perspective for the issuance of a CBDC if the rules listed are not specific.⁴⁸ This is because CBDC does not only convert traditional money into digital form but in its operation involves the digital programming of money. Another necessary legal rule is whether the central bank has the authority to open cash current accounts for the general public or is only limited to certain parties, such directly for the government and bank financial institutions.⁴⁹

Under monetary law, the legal status of the CBDC tender is also required to make the CBDC a legal tender, officially used by the monetary authority, especially as a valid means of payment on state territory.⁵⁰ The legal tender status is essential to give a debtor the right to pay off debts by presenting them to creditors. The legal recognition of CBDC is also used as an acceptable method of fulfilling other legal requirements, such as paying taxes. Moreover, being a real CBDC requires the "currency" to be a direct obligation of the central bank, which eliminates risk. With the stipulation of the CBDC as a legal tender and the central bank having the authority to issue the digital currency, the monetary law that had been applied to the previous physical currency remains in effect. Central bank liabilities remain valid, as do monetary liabilities in banknotes and book money.

III.B. CBDC Legal Aspect Based on the CBDC Design

The design used in the issuance of a CBDC is closely related to the applicable regulations and the draft rules that will be enforced from a legal point of view.⁵¹ The central bank needs to carefully consider and analyse the determination of a chosen CBDC design, which must also be supported by a strong legal basis as an integral part of the design.⁵² The following is the legal basis required based on the selected CBDC design.

⁴⁷ Bossu et al.: 18-21.

⁴⁸ Nabilou, "Central Bank Digital Currencies: Preliminary Legal Observations": 1-30.

⁴⁹ Bossu et al., "Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations": 22-23.

⁵⁰ Bossu et al.: 28-29.

⁵¹ Rachael King, "Podcast: The Legal Implications of CBDC," Central Banking, 2021.

⁵² Papapaschalis, "Retail Central Bank Digital Currency: A (Legal) Novelty?": 214-215.

III.B.1. Based on Access Restrictions (Wholesale vs. Retail)

From a legal point of view, the selection of the chosen wholesale or retail design takes effect because central bank law contains specific requirements for opening a checking, or demand deposit, account.⁵³ In addition, concerning retail CBDCs, the legal basis for consideration is the central bank's authority to issue legal currency to control the monetary base and inform the implementation of monetary policy.⁵⁴ For retail CBDCs to be widely available in households, at least their participation in the CBDC system must be approved by the securities payment and settlement authority.

III.B.2. Based on Identity (Account vs. Token)

Account-based CBDCs are understandable under both private and public law, while the legal status of digital token-based CBDCs is unclear.⁵⁵ There are many legal implications if the design chosen is a token-based CBDC.⁵⁶ Token-based CBDC issuance requires legislation that explicitly allows the circulation and use of digital tokens, without limiting its powers to banknotes and coins.⁵⁷ It also makes innovative CBDC features across a boundary. There is a study that found about 61 percent of central banks could not issue token based CBDCs, while 16 percent had no clear legal framework for whether the central bank could allow the design.⁵⁸

If the national system is based on digital tokens, then the CBDC is accessible to foreign residents.⁵⁹ It is different for account-based, so interoperability will be a design choice. Furthermore, regarding the falsification or counterfeiting CBDC, the rule under private law is required.⁶⁰ When an account based CBDC is lost, the claim remains intact from a legal standpoint. Meanwhile, if the CBDC token is lost, the associated monetary value is considered lost.

An account based CBDC is essentially a bankbook. Its issuance will only be authorised for entities whose central bank has the legal power to open demand deposit accounts. For account based CBDC issuance, most banking laws would have to be revised to allow central banks to open accounts for the

⁵³ Bossu et al., "Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations": 9-10.

⁵⁴ Papapaschalis, "Retail Central Bank Digital Currency: A (Legal) Novelty?": 208-210.

⁵⁵ Bossu et al., "Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations": 9-10.

⁵⁶ King, "Podcast: The Legal Implications of CBDC."

⁵⁷ Ledger Insight, "IMF Outlines Legal Issues for Central Bank Digital Currencies," 2020.

⁵⁸ Bossu et al., "Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations": 21.

⁵⁹ Papapaschalis, "Retail Central Bank Digital Currency: A (Legal) Novelty?": 206.

⁶⁰ Bank of Japan, "Summary of the Report of the Study Group on Legal Issues Regarding Central Bank Digital Currency," 2019.

general public.⁶¹ There are examples of rules that allow and do not allow the general public to open accounts directly at the central bank.⁶² Germany is one example that enables the opening and acceptance of deposit accounts by the public. This allowance is contained in section 22 of the Bundesbank law, which states that the German central bank can accept savings accounts from “natural and legal persons in Germany and abroad.” However, German regulations are still limited by the European Central Bank (ECB) regulations, which state that the rules for accepting the opening of public deposit accounts are not the central bank’s main task.

On the other hand, Sweden has ambiguous rules, as seen from two reports on its E-krona digital currency.⁶³ The first report legitimises the issuance of deposits publicly in the absence of a direct prohibition on crypto holdings in consumer accounts, and e-krona that makes a payment system safer and more effective might be regarded as a mandate. The second report provides limitations on the existence of the Riksbank Law, which states that the said deposit receipts are only for monetary policy purposes. It has led to ambiguity in licensing the issuance of CBDCs using direct accounts with the central bank. Another case, the Bank of Japan, is an example of where CBDC is not allowed under current law. It can be seen from Article 1(1) of the Bank of Japan Act, which only allows opening a limited deposit account for monetary policy purposes.⁶⁴

III.B.3. Based on Claims and Transaction Records

Based on direct and indirect CBDC design, there are differences to be considered under an appropriate regulation. Under the indirect design, the issue of legal relevance is “whether to regulate” and “how to monitor” the risks associated with new entrants providing payment services in a CBDC scheme. This is because the entity’s activities will inevitably differ from those specific to financial institutions, in which the focus is on liquidity and capital needs and is aimed at solvency and viability.⁶⁵

In addition, indirect CBDC designs present more complex legal challenges than direct or hybrid designs.⁶⁶ This is due to consideration of the role of intermediaries. First, interoperability must be ensured for intermediaries who control the necessary technology for CBDC distribution. It is helpful so that

⁶¹ Ledger Insight, “IMF Outlines Legal Issues for Central Bank Digital Currencies.”

⁶² Simon Hess, “Regulating Central Bank Digital Currencies: Towards a Conceptual Framework,” *SSRN Electronic Journal*, 2020, 1–44, <https://doi.org/10.2139/ssrn.3582501>.

⁶³ Hess: 16–17.

⁶⁴ Japan, “Bank of Japan Act No. 89 of June 18 1997” (1997).

⁶⁵ Papaschalis, “Retail Central Bank Digital Currency: A (Legal) Novelty?”: 207–208.

⁶⁶ Papaschalis: 203–216.

technology neutrality is maintained, and financial operators can receive equal treatment. It relates to initial infrastructure development where guarantees and representations from the central bank regarding the suitability of the infrastructure for purposes may be subject to the terms of the release. This framework would form the basis for the contractual obligations. Second, to ensure non-discriminatory access to CBDCs, a “basic account service” offering is required by intermediaries. Third, tasks involving a central bank’s exercise of public authority and policy discretion cannot be outsourced to the financial operators. As a result, the central bank must distinguish “outsourced” from “non-outsourced” activities. In addition, related to indirect design is the legal basis for settlement.⁶⁷ Currently, the existing rules are essentially inter-bank settlements, which will differ from CBDC settlements that allow inter-community settlements.

If the design chosen is a direct design, the central bank is responsible for keeping records of crypto transactions. It results in the existence of current obligation rules that no longer need to be maintained. First, the obligation to know your customer (KYC) under anti-money laundering (AML) and combating terrorism financing (CFT) laws. Second, transparency, access to payment accounts, and obligations under the existing payment services law. Third, the obligation to maintain banking confidentiality for BKPM account holders and their exceptions. Fourth, tax reporting/withholding obligations are invoked under this CBDC design.

III.B.4. Interest Bearing CBDC Accounts

The IMF is also considering the legal status of CBDCs if tokenised currencies are subject to The IMF is also considering the legal status of CBDCs if tokenised currencies are subject to interest bearing requirements.⁶⁸ The problem is there needs to be a loan to have interest payments, legally. In addition, to be a means of payment such as cash, the payment amount must be at face value. Once a token bears interest, like a bond, its value is determined by the interest rate, not just the face value. This creates problems with convertibility. In other words, one-dollar interest on a CBDC is unlikely to be exchanged one-on-one for a one-dollar bill. Another thing to note is the legal challenges related to the possibility of negative interest rates with tokens’ function as a store of value.⁶⁹

⁶⁷ Bank of Japan, “Summary of the Report of the Study Group on Legal Issues Regarding Central Bank Digital Currency.”

⁶⁸ Ledger Insight, “IMF Outlines Legal Issues for Central Bank Digital Currencies.”

⁶⁹ Papaschalas, “Retail Central Bank Digital Currency: A (Legal) Novelty?": 210.

IV. RESEARCH RELATED TO CBDC INDONESIA

Bank Indonesia has announced that sooner or later, Indonesia is planning to have a digital currency. There are several considerations for the issuance of the CBDC.⁷⁰ First, Bank Indonesia has the authority to issue digital currency based on the mandate of the 1945 Constitution, which is also spelt out through the Currency Law and Bank Indonesia Regulations. Second, the proliferation of digital currencies and the use of non-cash payments currently pose challenges to the central bank's duties and functions. Accordingly, CBDC is expected to support the task of Bank Indonesia in implementing monetary, macroprudential and payment systems policies. Third, technology application in the use of CBDCs plays a significant role in security and ease of use, so BI needs to prepare the technology or platform that can meet this demand.

CBDC is still a recent phenomenon, so much information about CBDC is needed. Bank Indonesia itself conducted various studies and discussion forums to prepare for the issuance of the CBDC. In addition, information derived from research is no less important to supporting the CDCB roll out in Indonesia. The limited research on CBDC can be seen from the researchers' findings, where only a few studies have tried to analyse the application of CBDC in Indonesia. The summary of the research can be seen below in Table 1.

Table 1. Summary of CBDC Research in Indonesia

Author(s)	Objectives	Methodology	Findings
Research on CBDC design selection			
Sasongko dan Yazid (2020)	To determine how to expand CBDC tokens from wholesale to retail transactions and how to circulate them	Literature review of CBDC, DLT, and currently existing payments in Indonesia	Preferred CBDC Model: 1. Tier 1 and tier 2 indirect retail CBDC models (through commercial banks) 2. Tier 1 (between a central bank and commercial banks) using DLT; Tier 2 (between commercial and individual/retail banks) uses non-DLT/centralised managed by commercial banks.
Zams et al (2020)	To analyse and propose a CBDC model for Indonesia	1. Using primary data obtained from in-depth interviews, Focus Group Discussions (FGD) and questionnaires 2. Using the Delphi - ANP method	Preferred Model: 1. CBDC cash-like (the most): general purpose (retail), token-based, non-interest-bearing 2. CBDC (second best): general purpose (retail), direct, interest-bearing

⁷⁰ Kompas, "Bakal Terbitkan Mata Uang Digital, Ini 3 Pertimbangan BI," 2021.

Table 1. Summary of CBDC Research in Indonesia (Continued)

Author(s)	Objectives	Methodology	Findings
Chen et al (2022) and a short note by Bank Indonesia	To explore CBDC designs in emerging market economies	Study using 26 Central Bank survey questionnaires	Indonesia: 1. Bank Indonesia will develop wholesale CBDC and retail CBDC 2. CBDC to make cash digital 3. CBDC problem: disintermediating banks 4. Architecture is not direct 5. Interest: undetermined
Purnawan & Riyanti (2019)	To determine the impact of CBDC on the design of the central bank's monetary policy	Review literature from secondary sources in several countries and review it as a CBDC benchmark	CBDC can facilitate a systematic and transparent monetary policy with a non-exclusive design CBDC access (retail) and interest-bearing CBDC. With CBDC, the central bank can target and achieve true price stability and implement new monetary instruments with a zero lower limit. CBDCs can also help increase financial inclusion.
Research on CBDC legal provisions			
Nurullia (2021)	To know the policy governance in implementing CBDC in the <i>ius constituendum</i> framework	The study uses a normative juridical based on a literature review	The implementation of CBDC requires updating legal regulations to allow it to become a legally valid currency and be used in the payment system. This is because CBDC has not been recognised by Indonesian law as a legal currency. The changes that need to be made are Law no. 7 of 2011 concerning currency, Bank Indonesia Regulation (PBI) No. 20/6/PBI/2018 on Electronic Money.
Vanani (2018)	To examine the urgency, legality, and underlying value of CBDC	The study used a descriptive qualitative analysis based on a literature study	The urgency of CBDC is related to the declining use of cash, limited access to banking, and the emergence of other types of private non-cash currencies. Regarding legality, the CBDC legal tender is expected to solve the problem of the legality of circulating private currencies. CBDCs have values and underlying like other types of money issued by central banks.

Table 1. Summary of CBDC Research in Indonesia (Continued)

Author(s)	Objectives	Methodology	Findings
Research on the characteristics, urgency, and benefits of CBDC			
Emanuella (2021)	To examines: 1. Characteristics of CBDC 2. Responsibilities of the central bank as the operator of CBDC	Normative/doctrinal legal research: statutory approach, comparative approach, and conceptual approach	<p>Characteristics of CBDC:</p> <ol style="list-style-type: none"> 1. Issued by the central bank in digital form by considering the design of instruments, ledgers, and incentives; 2. Can be owned by everyone; 3. Have the same conversion rate as banknotes; 4. Can be used as a means of payment in retail payments; and 5. No third parties necessary to verify or make payments <p>Responsibilities of the central bank as the operator of CBDC:</p> <ol style="list-style-type: none"> 1. Bank Indonesia is responsible for all risks arising from the issuance of CBDC 2. The central bank is also responsible for establishing a cyber resilience framework related to the plan to draft the Cyber Security and Resilience Bill 3. It is necessary to carry out a more comprehensive regulatory framework regarding Bank Indonesia in its oversight capacity so that the function of the central bank as a monetary supervisor can be more accomplished
Firdiansyah & Samsuri (2021)	To examine the urgency of CBDC using the <i>maqashid</i> sharia point of view	The study uses a descriptive qualitative method with a normative approach to analysis on <i>maslahah</i> and <i>mafsadah</i> contained in <i>Maqashid</i> sharia.	Issuance of CBDC has become urgent because of the increasing number of cryptocurrencies. CBDC is expected to be a substitute for cryptocurrencies considered haram in the view of <i>maqashid</i> sharia.
Fairi et al. (2021)	To analyse the impact of implementing CBDC on the economy and security	The study used a qualitative descriptive analysis with data collection from interviews and literature studies.	CBDC qualifies as a currency with the functions of a medium of exchange, a unit of account, and a store of value. The benefits of implementing CBDC are that it can reflect the country's sovereignty in facing the threat of private digital currency and streamline the printing of physical currency. The risks that arise from CBDC are the security risks of individual property and privacy risks.

Based on the research results in Indonesia, the proposed CBDC design can be explained as follows. Based on access restrictions, retail CBDC was proposed by Purnawan & Riyanti, Sasongko and Yazid, and Zams et al.⁷¹ Furthermore, based on the identity model, token based CBDC was proposed by Zams et al.⁷² Accordingly, based on the transfer mechanism, DLT on tier 1 and non-DLT on tier 2 were proposed by Sasongko and Yazid.⁷³ Furthermore, based on claims and transaction records, direct CBDC was proposed by Zams et al. and hybrid CBDC by Sasongko and Yazid.⁷⁴ Finally, based on the imposition of interest, a non-interest-bearing CBDC was proposed by Zams et al.; while an interest-bearing design was proposed by Purnawan & Riyanti and Zams et al.⁷⁵

Moreover, previous literature explores CBDC designs in emerging market economies (EMEs) based on a BIS EMDG survey 2022.⁷⁶ That survey was participated by 26 central banks of EMEs, including Indonesia. In that literature, the author explains the motivations of each central bank for issuing CBDC, several problems with CBDC issuance, and a design plan for that CBDC. According to the number of central banks that select the top three of their choices, the issuance of CBDC is mostly driven by the need of providing cash in digital form. It is in line with the decline in cash transactions. Second, CBDC can also increase financial inclusion by reducing some of the market imperfections that hinder inclusion. Furthermore, CBDC can increase competitiveness between existing payments due to its newest innovations.

Nevertheless, those CBDC has several problems that need authorities' attention. First, CBDC consists of many complex financial programs which connect to the internet, so it is risky to the cyber securities. A cyber-attack will cause big damage, it will need a long time of recovery and high cost to normalise the system. Another serious problem in issuing CBDC is it can also cause bank disintermediation. CBDC is considered a safe haven asset due to its

⁷¹ Muhammad Edhie Purnawan and Retno Riyanti, "Significant Effect of the Central Bank Digital Currency on the Design of Monetary Policy," *Jurnal Ekonomi Indonesia* 8, no. 1 (2019): 125–51, <https://doi.org/10.52813/jei.v8i1.15>; Danarto Tri Sasongko and Setiadi Yazid, "Integrated DLT and Non-DLT System Design for Central Bank Digital Currency," in *ACM International Conference Proceeding Series*, 2020, 171–76, <https://doi.org/10.1145/3427423.3427447>; Zams et al., "Designing Central Bank Digital Currency for Indonesia: The Delphi-Analytic Network Process," 23:1–29.

⁷² Zams et al., "Designing Central Bank Digital Currency for Indonesia: The Delphi-Analytic Network Process."

⁷³ Sasongko and Yazid, "Integrated DLT and Non-DLT System Design for Central Bank Digital Currency": 171–176.

⁷⁴ Zams et al., "Designing Central Bank Digital Currency for Indonesia: The Delphi-Analytic Network Process," 23:411–38; Sasongko and Yazid, "Integrated DLT and Non-DLT System Design for Central Bank Digital Currency," 171–76.

⁷⁵ *Ibid.*, 125–51

⁷⁶ Sally Chen et al., "CBDCs in Emerging Market Economies," *SSRN Electronic Journal*, no. 123 (2022): 1–21. <https://doi.org/10.2139/ssrn.4085690>.

claim on the central bank. Moreover, an interest-bearing CBDC will increase deposit flight from commercial banks to the CBDC system which decreases credit provision and raise loan rates.

Following the positive and negative impacts on CBDC issuance, a country must choose a CBDC design that fits its objectives and characteristics. In general, they need CBDC that can transact with the other existing domestic payment systems (for instance, with e-money). Based on direct/indirect transactions, most countries have chosen the two-tier or indirect system and are developing both DLT and CLT systems. Most of them also choose non-interest bearing CBDC. It will avoid bank disintermediation as discussed above. Meanwhile, most countries are uncertain about the limited transaction and data governance aspects.

From Indonesia's perspective, Bank Indonesia as one of the samples of the BIS EMDG survey 2022 has taken note.⁷⁷ Bank Indonesia is motivated on providing a cash-like form of money. It also emphasises the role of the central bank to provide currency as sovereign public goods, its central bank mandate. Based on the probable problems in the CBDC issuance, Bank Indonesia expects that CBDC will support the current payments system and should not be the cause of such bank disintermediation. A final CBDC design is still being researched, Bank Indonesia will develop both wholesale and retail CBDC to support intra-bank or institution transactions as well as individual or retail transactions. Bank Indonesia will also develop the indirect system with DLT and CLT. However, they have not decided on the interest charge on the CBDC ownership.

V. LEGAL ASPECTS OF CBDC IN INDONESIA

Generally, the rules required in Indonesia are to establish a CBDC as a legal tender for sovereign currency and can be issued by Bank Indonesia. It is closely related to Article 2(1) of Law No 7 of 2011 on Currency (hereinafter Law 7/2011), which states "The currency of the Unitary State of the Republic of Indonesia is Rupiah."⁷⁸ The currency is needed as a legal tender in the activities of the national economy. Then, in article 2(2), it is more specifically described as "Types of Rupiah consisting of paper Rupiah and metal Rupiah."⁷⁹ In this context, the rupiah is limited in physical form while the digital currency has not been recognised. Furthermore, article 11(2) states that "Planning, Printing, and Destruction of the Rupiah shall be carried out by Bank Indonesia in

⁷⁷ Chen et al.: 1-21.

⁷⁸ Indonesia, "Law No. 7 of 2011 on Currency" (2011).

⁷⁹ *Ibid.*

coordination with the Government.”⁸⁰ It shows that Bank Indonesia has the power to issue certain types of currency.

Under Law 7/2011, it can be concluded that although Bank Indonesia has the power to issue currency, CBDC cannot currently be issued by Bank Indonesia and cannot be legally recognised as a legal tender due to the narrow definition of currency limited to physical form. It is due to the narrow definition of currency limited to physical form. It causes the need for revised law by adding digital currency to the use of currency in Indonesia. The Bahamas is an example of a revision of the legal framework. The Central Bank of Bahamas Act in 2020 added “electronic money” to the definition of currency issued by the central bank.⁸¹ Revisions were also made to strengthen the central bank’s power related to CBDC by adding “the framework under which electronic money issued by the Central Bank... may be held or used by the public”.⁸²

Regarding designs that can be implemented in Indonesia based on identity, Zams et al., Chen et al., and a short memorandum by Bank Indonesia proposed token based CBDC.⁸³ Indonesia’s government could consider adopting the token based CBDC because Indonesia has a large area and lack of public access to banking in Indonesia. In addition, token-based CBDC can also facilitate easy cross-border transactions and accomplish financial inclusion goals.⁸⁴ However, with the breadth of access to this CBDC, the regulations or laws require more attention and will be related to the security of privacy and user wealth. In addition, CBDC in the form of tokens must also comply with the law of property.⁸⁵ Reflecting on the use case in China, the central bank there prepared a draft for the People’s Bank of China Law on Article 22 regarding tokens, which states that “No unit or individual may produce or sell tokens, coupons and digital tokens to replace RMB in circulation in the market.”⁸⁶ It is useful for maintaining financial system stability and trust in the CBDC.

Another thing that needs to be considered is the regulation regarding DLT licensing for selected CBDC designs which necessitate the use of DLT in the

⁸⁰ *Ibid.*

⁸¹ Gabriel. Soderberg, *Behind the Scenes of Central Bank Digital Currency Emerging Trends, Insights, and Policy Lessons*, 2022: 18.

⁸² Soderberg: 18.

⁸³ Chen et al., “CBDCs in Emerging Market Economies”; Zams et al., “Designing Central Bank Digital Currency for Indonesia: The Delphi-Analytic Network Process.”

⁸⁴ Discosure, “Should Central Banks Offer the Public Token-Based Digital Currencies?,” 2021.

⁸⁵ P L Athanassiou, “Wholesale Central Bank Digital Currencies: An Overview of Recent Central Bank Initiatives and Lessons Learned,” in *ESCB Legal Conference 2020*, vol. 1, 2021, 191–201.

⁸⁶ Forbes, “People’s Bank Of China Draft Law Provides A Legal Basis For Digital Currency Electronic Payments (DC/EP) And Bans All Stablecoins Backed By Renminbi Reserves,” 2020.

transfer mechanism.⁸⁷ Regulations requiring the accounting procedures may need to be changed to use DLT to record government transactions.⁸⁸ Another issue could be related to insolvency laws, as doing so would necessitate having custody of assets (CBDC) under insolvency laws. Yet, the design of the ledgers might only allow the account or token holder access to the private keys required to transfer the CBDC. Furthermore, selecting an interest-bearing CBCB will indeed increase public interest in using CBDC and improve the efficiency of the monetary policy transmission mechanism. However, the risk that needs to be faced is the possibility of a bank run. It is due to the transfer of public wealth from bank deposits to CBDC, which are classified as risk-free.⁸⁹ This leads to the need to review the regulations to balance the competition between CBDC and bank deposits.

VI. CONCLUDING REMARKS

There are several CBDC designs based on their characteristics. First, based on access restrictions, CBDC designs are divided into wholesale and retail CBDC, then based on an identity consisting of account-based and token-based CBDC, then based on a transfer mechanism consisting of centralised CBDC to decentralised CBDC. The following characteristic is based on claims and transaction records divided into direct, hybrid, intermediate, and indirect CBDC. The final design is based on the imposition of interest consisting of interest-bearing and non-interest-bearing CBDCs. The difference in the design of the CBDC makes the need for different legal regulations.

Based on the results of the research reveal that the law that needs to be reviewed is the definition of currency used by a country, whether the definition is broad or narrow or specifically mentions digital currency. If the definition of currency is narrow that is limited to banknotes and coins, then it is necessary to revise the legal rules. In addition, other rules that need to be considered are access to payment systems and the opening of cash current accounts, whether only the government and bank financial institutions have access, or the general public also has access.

The legality of CBDC can also be seen based on its design because these two things are interrelated in the drafting process. Regarding wholesale and retail CBDC designs, the regulation or law that needs to be considered is the legality of digital currency issuance and its use as a payment system

⁸⁷ Athanassiou, "Wholesale Central Bank Digital Currencies: An Overview of Recent Central Bank Initiatives and Lessons Learned": 191-201.

⁸⁸ Auer et al., *Central Bank Digital Currencies: A New Tool in the Financial Inclusion Toolkit?*: 1-36.

⁸⁹ Deloitte, "Central Bank Digital Currencies: Building Block of the Future of Value Transfer," 2021.

and securities settlement. Furthermore, the regulation or law with token-based CBDCs has higher challenges than account-based CBDCs. Apart from explaining specifically the legality of digital tokens, token based CBDC can also be accessed by foreign residents, so caution is needed in the regulation that is applied. Meanwhile, choosing an account based CBDC design, it is necessary to pay attention to the legal power to open a cash checking account by the general public. The direct and indirect CBDC designs also provide different legal considerations, where indirect CBDC needs to examine the legal relevance of intermediaries in CBDC payment services. Finally, if an interest-bearing CBDC design is chosen, the legal challenge focuses on the possibility of negative interest rates with their function as a store of value. In Indonesia, the main regulation that needs to be revised is Law 7/2011. Under this law, the type of Rupiah must be added in digital form.

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