

Reconstruction of Law Central Bank Digital Currency (CBDC) in Indonesia

Ridho Bawana Jati, Wardah Yuspin, Arief Budiono
r100220016@student.ums.ac.id, wy204@ums.ac.id, ab368@ums.ac.id

Faculty of Law, Universitas Muhammadiyah Surakarta, Indonesia

Article Info

Received: 2024-10-12

Revised: 2024-12-19

Accepted: 2024-12-21

Keywords:

Implementation; Bank
Indonesia; CBDCs;
Garuda Project

Abstract

The current era of digitalization has made everything digital, including currency. Other countries' currencies have implemented a Central Bank Digital Currency (CBDC) or an official digital currency issued by a central bank, such as El Salvador, Bahamas, China and Nigeria. The background to this research is that until now, there has been no precise legal regulation for using this digital currency in implementing CBDC use in Indonesia, even though the digital currency has been implemented in several countries, as mentioned above. This research uses qualitative research methods by implementing the use of CBDC in Indonesia and examining relevant legislation using it. The next stage uses comparative techniques with several countries, namely Bahamas, China, and Nigeria. The results of this research found that CBDC in Indonesia still needs to have legal regulations or laws that clearly regulate the implementation of CBDC. Rules regarding this use Law Number 7 of 2011 concerning Currency. However, the issuance of Law Number 4 of 2023 concerning the Development and Strengthening of the Financial Sector (UU P2SK) opens up opportunities for the issuance of CBDC. Apart from that, Bank Indonesia also launched a project called White Paper "Garuda Project". According to the project, CBDC will be issued in 2025, which increases the chances of CBDC being issued in Indonesia.

I. Introduction

Developments in the digitalization era have transformed money into electronic money,¹ the function of which is increasingly efficient, resulting in a continued decline in the use of cash.² Based on data from Bank Indonesia (BI), in 2016, there were transactions with a total cash transaction of 3,511.34 trillion Rupiah, decreasing to 2,410.71 trillion Rupiah (down 31.35%) in 2021. In this era of digitalization, electronic money has experienced a significant increase in 2018. In 2021, electronic money was recorded at IDR 786,347 billion obtained from Go-Pay, OVO and Dana, so there was an increase of up to 57.74% compared to 2020. According to a Statista survey, payments e-commerce was dominated by digital wallets in 2020, accounting for 38% of payments from e-commerce and followed by bank transfers at 23%, cash on delivery (COD) at 15%, credit cards at 14%, and debit cards at 10%.³

However, the development of electronic money opens up opportunities for this to happen: shadow banking, shadow currency and shadow central banking. Statistical data report about digital currency mentions that non-bank financial institutions (private digital currency) have appeared in many places in Indonesia, such as Gopay, OVO, DANA, and ShopeePay are four types of applications that are electronic money because they are money stored in the application, which is helpful for transactions. Increasing private digital currency (crypto assets and stablecoins) creates a threat to state sovereignty because the state will not have control over monetary policy. This situation puts governments under pressure to adopt CBDC. CBDC in Indonesia and its implementation, the state (central bank) will have a central role by having digital payment services offered as an alternative to the payment market. This can increase the ease of transactions for certain groups, as well as increase competitiveness and stability in the payment system.⁴

¹ Septarina Budiwati, Muhammed Junaidi, and Wisnu Tri Nugroho, "The Principle of Pacta Sunt Servanda in Fintech Transactions Is Reviewed Through The Perspective of Ushul Fiqh," *Al-Iktisab: Journal of Islamic Economic Law* 4, no. 1 (May 12, 2020): 47, <https://doi.org/10.21111/al-iktisab.v4i1.4350>.

² Decky Hendarsyah, "Penggunaan Uang Elektronik Dan Uang Virtual Sebagai Pengganti Uang Tunai Di Indonesia," *IQTISHADUNA: Jurnal Ilmiah Ekonomi Kita* 5, no. 1 (2016): 1-15, <https://doi.org/10.46367/iqtishaduna.v5i1.74>.

³ Kharisma Dwi Widodo, Bambang Juanda, and Dedi Budiman Hakim, "Faktor-Faktor Yang Memengaruhi Persepsi Penggunaan Central Bank Digital Currency Di Indonesia.," *Jurnal Ekonomi Dan Kebijakan Pembangunan* 12, no. 1 (2023): 23-40, <http://ezproxy2.utwente.nl/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=169857856&site=ehost-live>.

⁴ Mei Dong and Sylvia Xiaolin Xiao, "Idle Liquidity, CBDC and Banking," *European Economic Review* 164, no. January (2024): 104700, <https://doi.org/10.1016/j.eurocorev.2024.104700>.

However, the feasibility and desirability of central banks issuing digital currencies have been a growing debate in recent years. According to Boar, the implementation of CBDC depends on the economic structure and payment system of each. In other words, 'there's no one-size-fits-all'. In accordance with the system at the People's Bank of China, it is one of the first central banks to develop e-CNY (Digital Yuan). The digital Yuan was implemented in 2014 in the form of the Digital Currency Institute (DCI). In October 2020, we launched a prototype of the first CBDC in Shenzhen's Luohu District, followed by a second pilot program in early 2021 in Suzhou. However, until now, the People's Bank of China has not issued e-CNY because there are many problems, such as Chinese people who are too comfortable using Alipay and Tenpay and efficiency in e-CNY transactions is still low in Alipay and Tenpay transactions.⁵

In CBDC, there are risks in its application and implementation, namely aspects of privacy and security. In the opinion of Glen Ardi, Managing Director of Coindesk Indonesia, it is said that in terms of privacy itself, CBDC allows it to be authoritarian in the sense that the government, for specific reasons or reasons, can freeze an individual's bank account without the individual's consent. Meanwhile, in terms of security, even though CBDC already uses blockchain in its application, it is an entity that is centralized, which makes it possible to have a single point of failure or failure at one point due to centralization. Suppose some hackers can control the CBDC system, which is considered easier than mastering a decentralized system like Bitcoin. It can have fatal consequences because it can control assets on a country scale. This is different from the current banking system, where if a commercial bank is hacked, only the bank concerned is at risk.⁶

Based on the experience of the People's Bank of China, issuing a CBDC is a challenging matter for the central bank. The central bank formulates and navigates the CBDC design in a measurable and balanced manner between principles and benefits and managing the impact of risks. Success in implementing CBDC can be achieved by designing an Electronic Rupiah that is simple and easy to use. This success must also have a belief in its perceptions of economic actors regarding CBDC designs that are safe, reliable, and easy to use to increase efficiency in payment transactions. Apart from that, publicity regarding CBDC is a critical point before implementing CBDC in Indonesia. Massive publicity was carried out so that Indonesian citizens could understand

⁵ Steffen Vollmar and Fabian Wening, "The Impact of CBDC on a Deposit-Dependent Banking System," *Journal of Financial Stability* 73, no. August 2022 (2024): 101283, <https://doi.org/10.1016/j.jfs.2024.101283>.

⁶ Samuele Bibi and Rosa Canelli, "The Interpretation of CBDC within an Endogenous Money Framework," *Research in International Business and Finance* 65, no. May 2022 (2023): 101970, <https://doi.org/10.1016/j.ribaf.2023.101970>.

the use of CBDC.⁷

Based on data that has been quoted from the website cbdctracker.org, the use of digital rupiah currency as a CBDC in Indonesia is still in its infancy white paper by Bank Indonesia; previous research regarding the determinants of CBDC use has not been found. Therefore, the approach that can be used is to refer to studies related to the determinants of the use of electronic money as a proxy for CBDC. The implementation of CBDC in Indonesia is still in the RnD (Research and Development) stages, so it must undergo in-depth research and detailed development before being introduced to the broader Indonesian public. The use of this electronic money proxy refers to the design of the Digital Yuan (e-CNY) as a CBDC that has been issued by the People's Bank of China (Central Bank of China), where e-CNY is the same as the electronic money used in Indonesia. This is different from research in Indonesia, as found in Juanda et al., which analyses the factors that influence the use of electronic money in terms of demographic aspects, accessibility aspects, and supporting aspects.⁸

Furthermore, the usage of electronic money/electronic currency (not an electronic money context recognized by the Indonesian government) and cryptocurrency leave aside problems regarding limitations, which become obstacles in its implementation worldwide. The pros and cons must be considered, as well as the increasing emergence of innovative virtual currency. One of these obstacles is the need for a central authority role from the banks of each country to exercise control and intervention. In its development, studies have been carried out on the possibility of implementing CBDC with Distributed Ledger Technology (DLT) and published by the Central Banking Authority.⁹

Bank Indonesia, as the Central Bank of Indonesia, is regulated by the 1945 Constitution of the Republic of Indonesia. The Bank Indonesia Law stipulated the meaning of a payment system, which defined money and explained the duties of the central bank. However, this still needs to cover related developments in virtual currency and CBDC. The provisions of Article 1 Number 6 of the Bank Indonesia Law determine:

"A payment system is a system that includes a set of rules, institutions and

⁷ Raúl Morales-Resendiz et al., "Implementing a Retail CBDC: Lessons Learned and Key Insights," *Latin American Journal of Central Banking* 2, no. 1 (2021): 100022, <https://doi.org/10.1016/j.latcb.2021.100022>.

⁸ Hiep Ngoc Luu, Canh Phuc Nguyen, and Muhammad Ali Nasir, "Implications of Central Bank Digital Currency for Financial Stability: Evidence from the Global Banking Sector," *Journal of International Financial Markets, Institutions and Money* 89, no. October (2023): 101864, <https://doi.org/10.1016/j.intfin.2023.101864>.

⁹ Silvana Prodan et al., "The Rise in Popularity of Central Bank Digital Currencies. A Systematic Review," *Heliyon* 10, no. 9 (2024), <https://doi.org/10.1016/j.heliyon.2024.e30561>.

mechanisms, which are used to carry out the transfer of funds arising from an economic activity."

According to the statement, elements in the payment system include:

- 1) The existence of a system.
- 2) It includes a set of rules, institutions, and mechanisms.
- 3) Used to carry out fund transfers.
- 4) To fulfil an obligation arising from an economic activity.

Problems related to cryptocurrency are still debatable, as well as related to the existence of CBDC. It must have an in-depth study. Regarding this matter, Bank Indonesia is conducting an assessment of the good and bad impacts if central bank cryptocurrencies are applied.

2. Research Method

This writing uses qualitative research methods with the aim of explaining an in-depth phenomenon by collecting in-depth data.¹⁰ Qualitative and comparative law methods prioritize a phenomenon that examines the substance of the meaning of the CBDC phenomenon and compares a CBDC phenomenon that has been implemented in various countries such as El Salvador, Bahamas, China and Nigeria with the implementation of CBDC in Indonesia.¹¹ Meanwhile, the interpretative descriptive research type is a type of research that tries to describe or explain the opinions or views contained in the research object, namely reconstructing the use of CBDC in Indonesia. The data required for this research was collected through a literature study.¹²

3. Results and Discussion

Noor Faisal Achmad (Director of State Cash Management, Ministry of Finance

¹⁰ Wuryaningsih Dwi Letari, Damatika Purnama Suci, and Muhammad Sholahuddin, "Beberapa Faktor Yang Mempengaruhi Profitabilitas Perbankan Di Indonesia," *Benefit: Jurnal Manajemen Dan Bisnis* 5, no. 1 (2020): 1–19, <https://journals.ums.ac.id/index.php/benefit/index>.

¹¹ King Yoong Lim, Chunping Liu, and Shuonan Zhang, "Optimal Central Banking Policies: Envisioning the Post-Digital Yuan Economy with Loan Prime Rate-Setting," *Emerging Markets Review* 59 (2024): 101108, <https://doi.org/10.1016/j.ememar.2024.101108>.

¹² Heppy Purbasari and Dewita Puspawati, "Exploration Study of Sharia Corporate Exploration Study of Sharia Corporate Governance Disclosure on Bank Annual Governance Disclosure on Bank Annual Report of Sharia Business Unit Report of Sharia Business Unit," *Riset Akuntansi Dan Keuangan Indonesia* 6, no. 1 (2021): 50–61, <http://journals.ums.ac.id/index.php/reaksi/index>.

of the Republic of Indonesia), CBDC is a digital currency issued and whose circulation is controlled by the central bank. It is used as a legal means of payment to replace currency. Bank Indonesia (BI), CBDC is a digital currency from the central bank which is issued and supervised by the central bank of a country. Erwin Haryono (Head of the Communications Department of Bank Indonesia), CBDC, is a representation of digital currency, which is a symbol of state sovereignty (sovereign currency). In the CBDC, the central bank is in charge of issuing the currency, which is also its monetary obligation.

Difference between CBDC and Crypto Currency

Money is a crucial instrument in life, and an item can become money, including the following: scarcity (scarcity), durability (durability), and high value (high value). In Indonesia, the rupiah currency is recognized for carrying out economic activities. Legally, the Rupiah is the official currency that can be accepted in Indonesia. The forms of rupiah currency are paper money and coins. However, due to developments in technology and information.¹³

There are increasingly various forms of money that can be used to carry out transactions, one of which is electronic money and has even become digital money. In development, many people need help to differentiate between electronic money and digital money. One of the legal regulations that can be used as a reference regarding electronic money is Bank BI Regulation Number 20/6/PBI/2018. Referring to these regulations, it is stated that the components of electronic money are: 1. Issued based on the nominal value of the money given to the issuer; 2. The nominal value is stored in electronic form; 3. The nominal value is stored in the form of a server or chip; 4. The electronic nominal value held by the issuer is not for savings in accordance with the provisions of the Banking Law.¹⁴

Meanwhile, digital money is a form of money that stands alone, including crypto money and digital currency that has been issued by the central bank (CBDC). CBDC is also an electronic currency backed by a central bank, which is intended for households and businesses to be valid for payments and stores of value. Electronic money is basically currency (paper and metal) that is deposited or stored in an electronic wallet or bank account that has received electronic transactions using cards (for example, Go-Pay, OVO, and Dana).¹⁵ Even though

¹³ Mutiara Shifa et al., "Penggunaan Mata Uang Dinar Dan Dirham Sebagai Solusi Prediksi Krisis Moneter Di Indonesia," *Fair Value: Jurnal Ilmiah Akuntansi Dan Keuangan* 4, no. 6 (2022): 2321–38, <https://doi.org/10.32670/fairvalue.v4i6.992>.

¹⁴ Lambis Dionysopoulos, Miriam Marra, and Andrew Urquhart, "Central Bank Digital Currencies: A Critical Review," *International Review of Financial Analysis* 91, no. October 2023 (2024): 103031, <https://doi.org/10.1016/j.irfa.2023.103031>.

¹⁵ Claudia Saymindo Emanuella, "Central Bank Digital Currency (CBDC) Sebagai Alat Pembayaran Di

transactions using electronic money are carried out online cashless, they are still based on representations of actual currency. Meanwhile, digital currency is a form of independent currency, such as crypto and digital currency issued by central banks (CBDC). Even though CBDC and cryptocurrencies are digital money, there are differences between the two, in this case, related to the technology blockchain, which is used, and the publishing side.¹⁶

Blockchain is a technology for storing data using cryptographic methods that are designed in a certain way so that data is stored on a computer and sent like email. Technology blockchain functions like a unique mathematical algorithm in creating and verifying data. Data cannot be deleted, and it can only be added, which will later form a series of series shaped like blocks. Furthermore, a series of blocks will be arranged sequentially and interconnected with other blocks that have a chain, and this is what causes the technology to be called technology blockchain, namely a series of blocks connected by a chain (chain).¹⁷

In terms of technology, CBDC uses technology such as private blockchain, while cryptocurrencies, such as bitcoin, use public blockchain. In general, the difference between private and public blockchain depends on the involvement of a third party. In the third private blockchain, viewing transaction history requires permission from the network owner to join the network or view transaction history. In this case, access can only be granted by the Central Bank, in this case, Bank Indonesia, regarding the use of technology.¹⁸ Private blockchain CBDC, meanwhile, has a public blockchain nature in that there are no third parties, and it is transparent because transaction information can be accessed directly without requiring permission from a third party.¹⁹

The positive or negative impact of using private blockchain or public blockchain depends on the purpose of CBDC using private blockchain because it is considered safer and can track where the money issue goes. In this case, it can also help prevent or deal with rampant money laundering crimes, and the

Indonesia," *Jurist-Diction* 4, no. 6 (2021): 2243, <https://doi.org/10.20473/jd.v4i6.31845>.

¹⁶ Sergio Luis Nández Alonso, Javier Jorge-Vazquez, and Ricardo Francisco Reier Forradellas, "Central Banks Digital Currency: Detection of Optimal Countries for the Implementation of a CBDC and the Implication for Payment Industry Open Innovation," *Journal of Open Innovation: Technology, Market, and Complexity* 7, no. 1 (2021): 1–23, <https://doi.org/10.3390/joitmc7010072>.

¹⁷ Muhammad Naufal Hasani, "Jurnal Ilmiah Ekonomi Bisnis Analisis Cryptocurrency Sebagai Alat Alternatif Dalam Berinvestasi Di Indonesia Pada Mata Uang Digital Bitcoin," *Jurnal Ilmiah Ekonomi Bisnis* 8, no. 2 (2022): 329–44, <http://ejournal.stiepancasetia.ac.id/index.php/jiebJilid>.

¹⁸ Chandra Ardiano and Nur Rochaeti, "Analisis Yuridis Kriminologis Penggunaan Mata Uang Elektronik Bitcoin Sebagai Sarana Tindak Pidana Pencucian Uang," *Diponegoro Law Journal* 11, no. 1 (2022): 1–15, <https://jom.unri.ac.id/index.php/JOMFHUKUM/article/view/26397>.

¹⁹ Fitri Handayani, "Design and Legal Aspect of Central Bank Digital Currency: A Literature Review," *Journal of Central Banking Law and Institutions* 1, no. 3 (2022): 509–36, <https://doi.org/10.21098/jcli.v1i3.35>.

Central Bank, in this case, Bank Indonesia, can intervene if undesirable things happen. In terms of issuing rupiah digital currency or CBDC, the central bank, in this case, Bank Indonesia, is the sole authority authorized to issue it. In contrast, crypto money can be issued by private parties whose prices fluctuate sharply, referring to supply and demand, for example, bitcoin cryptocurrency.²⁰ CBDC itself also has three criteria based on its objectives, namely as follows: First, CBDC systems can be classified into single ledger-based systems and distributed single-ledger-based systems, according to the number of entities to manage the ledger. Second, CBDC systems can be classified into permissioned systems and permissionless systems depending on whether authorized entities can access the ledger or not. Permissioned CBDC systems are based on distributed ledgers that are not accessible to the public. Third, depending on whether the central bank provides financial services to users, all transaction records are maintained with the central bank. On the other hand, the system in CBDC is indirect; the central bank delegates financial system management authority to intermediaries, and the central bank only manages intermediaries.²¹

From the economic field, prices that can fluctuate sharply are also one of the risks of using digital cryptocurrencies as a means of payment. Prices that fluctuate sharply will, of course, also affect purchasing power itself and have the potential to have a positive impact on the economy at large, primarily digital currencies. Crypto is not an official currency, and the Rupiah is an official currency in accordance with Indonesian regulations. On the other hand, the use of central bank digital currency is considered safer because the money issued is the official rupiah currency, which is regulated by law but only in digital form. Apart from that, Bank Indonesia also plays a role in issuing digital currency.²² The role of Bank Indonesia is considered necessary in issuing digital Rupiah because, in its issuance, Bank Indonesia can estimate the impact on monetary stability, inflation, exchange rates and matters relating to macro and microeconomics, in contrast to crypto digital currencies whose circulation, including the price, is left to market mechanisms which are of course very vulnerable if used as a means of payment. Even though crypto money can be categorized as a digital currency by definition, according to regulations in Indonesia, crypto digital currency cannot be classified as a digital currency but rather a commodity futures asset, which is stated in the Minister of Trade Regulation (Permendag) Number 99 of 2018. To

²⁰ Syafira Nurullia, "Menggagas Pengaturan Dan Penerapan Central Bank Digital Currency Di Indonesia: Bingkai Ius Constituendum," *Journal of Judicial Review* 23, no. 2 (2021): 275, <https://doi.org/10.37253/jjr.v23i2.5014>.

²¹ Yeonouk Chu et al., "Review of Offline Payment Function of CBDC Considering Security Requirements," *Applied Sciences (Switzerland)* 12, no. 9 (2022), <https://doi.org/10.3390/app12094488>.

²² Wardah Yuspin et al., "Personal Data Protection Law in Digital Banking Governance in Indonesia," *Studia Iuridica Lublinensia* 32, no. 1 (March 28, 2023): 99–130, <https://doi.org/10.17951/sil.2023.32.1.99-130>.

date, 500 crypto assets can be sold and purchased in Indonesia, as stated in the attachment to CoFTRA Regulation Number 4 of 2023.

Use of CBDC in some countries: Lessons Learned

Bank Indonesia (BI) plans to develop CBDC in Indonesia. Several countries in the world have already issued or used digital currency, either in the form of crypto or CBDC. The applications in various countries already have a robust legal basis, so the use of crypto or CBDC runs optimally without any legal interference. These countries are El Salvador, Bahamas, China, and Nigeria.

1. CBDC implementation in El Salvador

The Country of El Salvador depends on remittances sent by its citizens or those living abroad, the amount of which is around 20% of the country's gross domestic product. When sending conventional money as an intermediary with Western Union or other intermediaries in money transfers, there are several regulations and many fees. These fees make it very difficult for El Salvadorans to send money compared to the cryptosystem. The cryptosystem is considered more accessible because it can be used by anyone and anywhere.²³

June 8 2021, is the start of its ratification of cryptocurrency as a legal medium of exchange for carrying out transactions in the Country of El Salvador. This became legal after the El Salvador House of Representatives determined Bitcoin Law. The reason for implementing cryptocurrency in the Country of El Salvador as a means of payment is because the people of El Salvador do not have bank accounts, which is quite large, 70% of the total population of the people of El Salvador. In Article 1, Bitcoin Law mentioned that cryptocurrency is recognized as a legal crypto digital currency and can be used for transactions in El Salvador.²⁴

The people of El Salvador or foreign tourists can use this. The other article is found in Article 7, Bitcoin Law, which states that the seller must receive payment by cryptocurrency if it is offered to consumers. However, this can be excluded in Article 12 of Bitcoin Law, which states that if the seller does not have a system for payment with cryptocurrency, then the seller can refuse payment using cryptocurrency. Bitcoin Law or Digital Asset

²³ Lirih Hayyu Maghfiroh, Sri Yuniati, and Adhiningasih Prabhawati, "Analysis of Bitcoin Legalization As an Official Transaction Tool in El Salvador," *Sosioedukasi Jurnal Ilmiah Ilmu Pendidikan Dan Sosial* 12, no. 1 (2023): 128–33, <https://doi.org/10.36526/sosioedukasi.v12i1.2701>.

²⁴ Aditya Rafi Fauzan and Rianda Dirkareshza, "Lex Crypto: Perbandingan Landasan Hukum Terhadap Dampak Keberadaan Bitcoin Antara Indonesia Dengan El Salvador," *Pandecta: Research Law Journal* 16, no. 2 (2021): 320–35.

Publishing Law (Digital Asset Issuance Law) is against currency enforcement cryptocurrency in the Country of El Salvador, which President Nayib Bukele has ratified. After being validated by Bitcoin Law, then money cryptocurrency can be used for transactions, starting from paying for coffee or paying taxes. Even though the currency has implemented cryptocurrency, currently in El Salvador, many people are sceptical of El Salvador's steps and doubt the country's economic benefits from adopting the cryptocurrency currency. However, there are still people who can predict the use of currency cryptocurrency towards the transaction being the beginning. This is a broader trend, considering that the world is currently experiencing significant changes, namely the era of digitalization, which is moving very quickly.²⁵

2. CBDC implementation in the Bahamas

The following country is the Bahamas, a country located in the Caribbean Islands, a country that has implemented CBDC. On October 20, 2020, the Central Bank of the Bahamas introduced the CBDC Sand Dollar. Sand Dollar is the central bank of the Bahamas, which has a centralized system regulated by the central bank. Arrangements from the implementation of Sand Dollar contained in the Central Bank of the Bahamas Act. One of the critical reasons that prompted its publication, Sand Dollar, is a geographical factor, considering that the Bahamas is an island country. The main advantage of using digital currency, the Sand Dollar, is a more straightforward distribution process, especially since the Bahamas is an archipelagic country where geographical factors often hinder the distribution process; the payment system is more efficient, preventing criminal acts of money laundering and counterfeiting.²⁶

Before being released Sand Dollar from the Bahamian Government, the Bahamian Government conducted an initial survey conducted on one of the islands called Exuma. The results showed that around 93% of the population had access to a basic bank account, as many as 66% of them received salaries via bank transfer, and around 15% received pension payments. Apart from this, the survey illustrates the level of use of digital devices and online banking services, where around 96% of Exuma residents have mobile phones and around 40% of respondents regularly pay online.

²⁵ Kadek Dyah Pramitha Widyarani, Ida Ayu Putu Widiati, and Ni Made Puspasutari Ujianti, "Kajian Yuridis Penggunaan Koin Kripto Sebagai Alat Pembayaran Di Indonesia," *Jurnal Preferensi Hukum* 3, no. 2 (2022): 300–305, <https://doi.org/10.55637/jph.3.2.4934.300-305>.

²⁶ Kilian Wenker, "Retail Central Bank Digital Currencies (CBDC), Disintermediation and Financial Privacy: The Case of the Bahamian Sand Dollar," *FinTech* 1, no. 4 (2022): 345–61, <https://doi.org/10.3390/fintech1040026>.

From a regulatory perspective, the Central Bank of the Bahamas has the authority to issue banknotes, coins and digital money, which refers to Article 12 Paragraph 5 of the Bahamas Central Bank Law. This clause in the law indirectly becomes the legal basis for the Bahamas to issue various types of currency, including digital currency.

3. CBDC implementation in China

The following Country is China, and the renminbi is China's official currency, which means "currency for the people" in Mandarin. The Yuan is a subset of the renminbi, and the two are often used interchangeably in China. Technically, the renminbi is a currency, while the Yuan is part of the renminbi. The analogy between the renminbi and the Yuan is the dollar and cents. The dollar is the widely known currency of the US (United States), while the cent is a more specific currency part of the dollar. For example, if you buy an item for 50 dollars, you can pay for it using 50 dollars or 5000 cents but still call it 50 dollars.²⁷

Regarding the emergence of CBDC in China, China has issued a digital currency called Digital Currency Electronic Payment (DCEP). DCEP is a digital currency issued by the Central Bank. In China, the digital renminbi has asset reserves like currency, and the only difference is that it is digital. The draft confirms that digital currency can be used as a legal instrument for carrying out transactions or payments. It is contained in Article 19 of the Draft Law.²⁸

PBOC Act (People's Bank of China) emphasizes that the renminbi (RMB) includes physical form (Kartal) and digital form. Article 22 explains that no person or company can create a digital currency that can be used to replace the renminbi circulating on the market with the stated intention of replacing the renminbi's role as the legal currency in China. Violation of Article 22 of the PBOC Draft Law (People's Bank of China) will result in the confiscation of all profits, the destruction of all tokens, and the imposition of a fine of less than five times the illegal amount of money, according to Article 65 of the Draft Law (People's Bank of China), if it is serious for both, it will be punished in accordance with the second paragraph of Article 61 of the PBOC Draft Law, namely criminal prosecution and possible prison sentences. The revision to the implementation of the digital renminbi was

²⁷ Rafli Fadilah Muhammad and Rianda Dirkareshza, "Legalitas Penerapan Central Bank Digital Currency (CBDC) Di Indonesia," *Jurnal Usm Law Review* 6, no. 3 (2023): 913, <https://doi.org/10.26623/julr.v6i3.7370>.

²⁸ Vijak Sethaput and Supachate Innet, "Blockchain Application for Central Bank Digital Currencies (CBDC)," *Cluster Computing* 26, no. 4 (2023): 2183–97, <https://doi.org/10.1007/s10586-022-03962-z>.

carried out in order to provide legal certainty and to support the implementation of CBDC or DCEP by the Central Bank of China. Initially, the law was to be enacted in 2021; this writing was written but has yet to be ratified. Although the revised law has yet to be passed, in practice, the Chinese state has carried out a limited trial of DCEP in cities such as Shenzhen, Chengdu and Xunan, involving large state-owned banks. Such as the Agricultural Bank of China, the Bank of Industry and Commerce of China, the Bank of China and the Construction Bank of China.

4. Implementation of CBDC in Nigeria

The last country is Nigeria, which implements digital currency. Nigeria is a country that fully implements digital currency. One of the focuses of the Central Bank of Nigeria is to encourage the use of digital technology in financial transactions and increase access to financial services for all Nigerians, regardless of whether they all have an account or not. This is very important, considering that the level of bank account ownership in Nigeria is still relatively low compared to many other countries around the world. On October 25, 2021, the Country of Nigeria issued its first digital currency, namely e-naira.²⁹

Currency e-naira has the aim not to replace the physical naira currency but to replace the naira in physical form, aiming to accelerate financial inclusion in Nigeria. Private companies in Nigeria are taking part in the use of e-naira. For example, mobile payment company Paga waives fees for merchants who accept electronic payments from customers through its platform. Use of digital currency e-naira This will have a good impact on the economy if implemented in Nigeria. Advantages of e-naira is that it can carry out direct transfers of money globally in a fast, decentralized manner that guarantees security. The form guarantees security, and the form is digital, which can have the advantage of having become a government policy towards digital currency e-naira becoming more efficient.³⁰

Regarding legal rules or regulations, the Central Bank of Nigeria has the authority to implement digital currency e-naira, or CBDC, which refers to the Central Bank of Nigeria (CBN) Act 2007, the Nigerian Securities and Exchange Act 2007 and the Bank of Financial Institutions Act (BOFIA) 2020. Section 19 of the Central Bank of Nigeria (CBN) Act explains that e-naira is

²⁹ T. A. Adegbite and M. A. Aremu, "The Effects of Digital Currency (Enaira) Adoption on Nigeria Economy," *Farabi Journal of Social Sciences* 8, no. 1 (2022): 61–72, <https://doi.org/10.26577/fjss.2022.v8.i2.07>.

³⁰ Uduak Michael Ekong and Christopher Nyong Ekong, "Digital Currency and Financial Inclusion in Nigeria: Lessons for Development," *Journal of Internet and Digital Economics* 2, no. 1 (2022): 46–67, <https://doi.org/10.1108/jide-11-2021-0018>.

a digital currency form of the naira currency. Ways of working e-naira in Nigeria is designed, issued and deposited by the Central Bank of Nigeria (CBN), then the Central Bank of Nigeria (CBN) for distribution e-naira to financial institutions such as commercial banks and companies providing money transfer services, which these banks and companies will then distribute e-naira to individuals or retailers.³¹

However, according to the description above, those who have implemented and implemented CBDC are third-world countries or developing countries (Developed countries). Why have developed countries such as the United States, England, France, and other developed countries yet to implement this CBDC thoroughly? These developed countries are not in a hurry to launch this CBDC in their countries. The reason is First legal rules or legal regulations that clearly regulate the existence of this CBDC first so that there is a legal basis for implementing CBDC in the country; second, minimize or reduce the risks arising from this CBDC because every new policy such as this CBDC can definitely create new risks for the country, so developed countries are just making a policy or preventive action to minimize or reduce the risk from the CBDC if implemented in his country. Meanwhile, in Indonesia, if you look at the four countries that have advantages of CBDC from its implementation, Indonesia should start to think about implementing CBDC because of the many benefits of CBDC, such as being more efficient, an easy process and controlled by the government itself here. The controller is Bank Indonesia.

CBDC Legality After the Issuance of Law Number 4 of 2023 concerning Development and Strengthening of the Financial Sector (UU P2SK)

In the modern era, with the very rapid development of science and technology, many changes have indeed occurred, including money as a means of payment. Along with technological advances, many people are increasingly hearing about the concept of digitalization.³² Digitalization itself is the process of changing activities in physical form into digital form by utilizing technology. The positive or significant impacts of using digital currency are increasing efficiency, a high level of security, and ease of accessing information. One of the government's supports in supporting CBDC is enacting Law Number 4 of 2023 concerning the Development and Strengthening of the Financial Sector.

In Budiarto Kustoro's opinion, an adjustment is needed to the regulations that

³¹ Lars Beckmann et al., "CBDC and the Shadow of Bank Disintermediation: US Stock Market Insights on Threats and Remedies," *SSRN Electronic Journal*, July 2023, 105868, <https://doi.org/10.2139/ssrn.4572335>.

³² Wardah Yuspin and Ata Fauzie, "Good Corporate Governance In Sharia Fintech: Challenges and Opportunities In The Digital Era," article, *Quality - Access to Success* 24, no. 196 (August 1, 2023): 221-29, <https://doi.org/10.47750/QAS/24.196.28>.

have been made so that digital currency has a robust legal status as a means of payment recognized by the government when carrying out transactions. The characteristic of currency is its status as a means of payment that is recognized by law and accepted by many parties, giving rights to individuals, institutions, and other companies. CBDC issuance needs to have clear rules. With a clear legal basis, the central bank, as the issuer and manager of CBDC, has the potential to face challenges in the future, both from a legal and/or political perspective.³³

The implementation of the digital Rupiah as a legal currency will undoubtedly present new challenges and complexities in terms of legal regulations and legal issues. Requires more comprehensive rules to overcome this. The operation of the digital Rupiah throughout Indonesia can undoubtedly cause difficulties in ensuring compliance with various applicable regulations. From a legal perspective, referring to Article 2 Paragraph (2) of the Currency Law, it is stated that "the types of rupiah are paper rupiah and metal rupiah", which, if referring to the Law on Currency does not mention the issuance of digital Rupiah. However, after the issuance of Law Number 4 of 2023 concerning Development and Strengthening of the Financial Sector (UU P2SK), the types of Rupiah are no longer metal rupiah and paper rupiah plus digital Rupiah.

The P2SK Law as a whole does not actually change the Currency Law, but only partially. The P2SK Law gives Bank Indonesia attribution authority, namely authority that comes from the clearly stated mandate of the law. In this case, Bank Indonesia is the recipient of the attribution. Bank Indonesia can expand the scope of authority and obtain new authority as long as it does not exceed the limits given in this case to issuing digital Rupiah. The application of the attribution principle shows that public legal entities such as central banks can only carry out or be involved in tasks within their authority in accordance with the law. With the issuance of the P2SK Law, digital Rupiah can be recognized as one type or type of Rupiah as a means of payment. However, more is needed because Bank Indonesia needs to further regulate its implementation, especially regarding technical matters.³⁴

According to the P2SK Law itself, there are differences in the stages of managing digital money and currency (paper and metal). In managing currency, the stages include the planning stage, printing stage, issuance stage, circulation stage, revocation and withdrawal stage and destruction stage. Meanwhile, the stages of managing digital Rupiah include the planning stage, publishing stage,

³³ Alvin Baharudin Vanani and Dedi Suselo, "Analisis Legal Tender Uang Digital Bank Sentral Indonesia," *Jae (Jurnal Akuntansi Dan Ekonomi)* 6, no. 3 (2021): 74-83, <https://doi.org/10.29407/jae.v6i3.16225>.

³⁴ Moh Gandara, "Kewenangan Atribusi, Delegasi Dan Mandat," *Khazanah Hukum* 2, no. 3 (2020): 92-99, <https://doi.org/10.15575/kh.v2i3.8187>.

distribution stage and administration stage. Furthermore, Article 14A Paragraph (3) of the Law P2SK stated that Bank Indonesia must pay attention to several aspects in managing the digital Rupiah, namely availability, stability, inclusion, development, and security.

The management of rupiah currency is contained in Article 11 Paragraph (2) of the P2SK Law. During the planning, printing and destruction stages, Bank Indonesia is obliged to coordinate with the government, especially for the printing stage of state-owned enterprises, which can contribute as implementers of rupiah printing as stated in Article 14 paragraph (2) Currency Law. Bank Indonesia is the sole institution authorized to carry out the issuance stage, distribution stage, revocation stage, and withdrawal stage. Meanwhile, further arrangements are currently needed for the management of the digital Rupiah during the planning stage for currency and then for the issuance, circulation, and administration stages.

Legal regulations regarding the granting of authority to Bank Indonesia to issue digital Rupiah (CBDC) in Indonesia already exist, namely after the issuance and ratification of the P2SK Law. However, more than these regulations are needed to implement CBDC as a whole because several technical matters require special attention, especially in the management of digital Rupiah. So that the implementation of CBDC can run optimally and have solid legal regulations, Bank Indonesia, in the process of developing CBDC, also needs to pay attention and create rules to regulate technical matters in the implementation of CBDC, such as how to issue digital Rupiah, then how to circulate it so all Indonesian people can use that, and how to manage the digital Rupiah so that it does not disrupt the stability of the value of the Rupiah and the stability of the Indonesian financial system itself. These further regulations are essential for the digital Rupiah so that it can be used for transactions without reducing its function to store value, as a medium of exchange, and to measure the value of goods and services.

Adjustments need to be made to each country's needs and economic characteristics in implementing CBDC. Each country has different challenges, whether regarding human resources, infrastructure, or geography. Another challenge that Bank Indonesia must pay attention to in the currency digitization process is related to cyber security risks.³⁵

The Garuda Project from Bank Indonesia first appeared in a white paper. A white paper is a document that contains an explanation of a problem that can be solved

³⁵ Cindy Cintania Amarta and Fitri Nur Latifah, "The Influence of Understanding Financial Literacy and Community Readiness on the Use of Central Bank Digital Currency (CBDC)," *JESI (Jurnal Ekonomi Syariah Indonesia)* 13, no. 1 (2023): 45, [https://doi.org/10.21927/jesi.2023.13\(1\).45-53](https://doi.org/10.21927/jesi.2023.13(1).45-53).

in a project, the solution to the problem, and an explanation of the details of the project, its creation, and its interaction with users.

According to the Deputy Governor of Bank Indonesia, there are also requirements for the issuance of the Digital Rupiah, namely as follows: First, the design of CBDC does not disrupt monetary and financial stability; Second, CBDC design must include 3i (integrated, interconnected, interoperable) with FMI-Payment System; Third, the importance of the technology used with the level experiments to understand how CBDC can be implemented (DLT Blockchain and non-DLT).

In the publication of Digital Rupiah, according to Bank Indonesia's White Paper, there are two (2) types, namely Digital Rupiah wholesale (w-Digital Rupiah) and retail Digital Rupiah (r-Digital Rupiah), which will be developed with an end-to-end integrated approach from wholesale to retail. The development will start with w-Digital Rupiah in the initial stage, which will be the foundation of the overall Digital Rupiah development stage (r-Digital Rupiah and w-Digital Rupiah). With this integrated approach, Digital Rupiah is directed at being able to carry out transactions, both in the market wholesale and retail goods and services, while increasing the effectiveness of their adoption. The use of w-Digital Rupiah on a wholesale basis is expected to support the development of financial markets and EKD (economic and financial) integration nationally.

In the regulations for the Digital Rupiah, regulations have actually been issued in Law Number 23 of 1999 concerning Bank Indonesia, as most recently amended by Law Number 6 of 2009. These regulations are considered adequate to become the basis for Bank Indonesia in issuing Digital Rupiah. The same legal basis is used for the issuance of checking accounts by Bank Indonesia. However, existing law-level regulations still need to be a reason for Digital Rupiah to have legal tender status. This status is used for digital Rupiah to become an anchor in various Web 3.0 ecosystem use cases, including DeFi and Metaverse. Meanwhile, the status of legal tender According to Law Number 7 of 2011 concerning Currency, there are only paper currency and metal currency, which basically cannot be used in Web 3.0.

At this time, considering that the most significant countries that implement the use of virtual currency have a sizeable economic relationship with Indonesia, we need to be wary of the condition of the virtual currency plummeting because this has the potential to affect the domestic economy. Countries that use the most significant virtual currencies include Japan and Korea. If they experience a crisis in their currency due to digital currency, Indonesia will also be affected.

Bank Indonesia (BI) reminds digital currency users to stop using or investing in digital currency. The Head of BI's Payment System Policy Department said that

the increasingly high circulation and volatility of digital currency exchange rates would endanger monetary stability, the financial system and the payment system in Indonesia. The transmission of the impact of the crisis caused by digital currency is indeed long and still quite far away. The most important thing to pay attention to when using digital currency is its function as both a means of payment and also as a commodity. Financial system stability, Bank Indonesia (BI) is a concern in terms of digital currency volatility.³⁶

This is the same as the theory of gravitational force; if the ball is lifted very high, then when it falls, it will hurt a lot. We don't want a crisis to return because there was a bubble. When it falls suddenly, if there is a crisis, it is society that is affected. Regulatory arbitrage risk because transactions can be carried out from other countries with more accommodating terms. In more detail, the most dangerous factor is the process of creating digital currency or transaction tools that are considered excessive, both in nominal terms and agreed price values, especially in the context of an economic crisis. Blockchain technology, as a tool used to create digital currency, has become a way for governments to compete with other countries in terms of technological innovation. We need to catch up on the internet. Take advantage of the next one. Adopting digital technology means that all digital currency activities are carried out digitally; in the era of societal revolution, the growth of science and technology is developing rapidly.³⁷

Based on the description above, the implementation of the use of CBDC in Indonesia is still receiving special attention from the Indonesian Government because CBDCs in the world have begun to be implemented, for example, in large countries such as El Salvador, the Bahamas, China and Nigeria. In China, CBDC has been implemented by issuing e-CNY (Digital Yuan) which is managed by the People's Bank of China (Central Bank of China). El Salvador has legalized the digital currency contained in Bitcoin Law or Digital Asset Publishing Law (Digital Asset Issuance Law). The Country of the Bahamas inaugurated a digital currency called the Sand Dollar. The Sand Dollar is regulated by the Bahamas Central Bank Law, which, in essence, allows the Bahamas Central Bank to issue banknotes, coins, and digital money. Countries that legalized digital currency (cryptocurrency) is the Nigerian country by name e-naira, which has been regulated in the Central Bank of Nigeria (CBN) Law of 2007, which Article 19 explains that e-naira is a digital form of the naira currency in Nigeria. Of the various countries mentioned that have legalized digital currency (cryptocurrency), the Indonesian state has begun to form legal regulations regarding the existence of digital currency or CBDC with the

³⁶ Ahamad Rifa'i, Mulono Apriyanto, and Widyawati, "Dampak Cryptocurrency Terhadap Perekonomian Masyarakat," *Jurnal Cakrawala Hukum* 1, no. 4 (2021): 441–48.

³⁷ Ahmad et al., "Student Responses during Online Learning in the Covid-19 Pandemic Period," *Journal of Physics: Conference Series* 1764, no. 1 (2021), <https://doi.org/10.1088/1742-6596/1764/1/012125>.

issuance of Law Number 4 of 2023 concerning the Development and Strengthening of the Financial Sector (UU P2SK) and Law Number 23 of 1999 concerning Bank Indonesia as amended most recently with Law Number 6 of 2009 which created a legal umbrella for the implementation of CBDC in Indonesia. However, referring to Law Number 7 of 2011 concerning Currency, it is stated in this regulation that the currency in Indonesia applies, namely paper currency and metal currency.

4. Conclusion

Based on the results and discussion that the author has outlined, it can be concluded that reconstructing the use of CBDC in Indonesia is currently still unable to be used in accordance with Law Number 7 of 2011 concerning Currency which states that The official currency of Indonesia is paper currency and metal currency. Law Number 23 of 1999 concerning Bank Indonesia was last amended by Law Number 6 of 2009, which gives CBDC a legal regulation even though it is still said to be grey because what applies is still Law Number 7 of 2011 concerning Currency. In 2023, a project from Bank Indonesia called the White Paper "Garuda Project" was launched. This indicates that there is hope for Bank Indonesia, as the central bank in Indonesia, to issue and create a digital currency, namely the Digital Rupiah, for the people of Indonesia because in the White Paper "Garuda Project" " there are essential things about CBDC as well as plans for the issuance and creation of the Digital Rupiah. This also indicates that the central Government and Bank Indonesia will soon legalize CBDC in Indonesia as has been implemented by countries abroad. Bearing in mind that other countries such as the four countries mentioned above have started to legalize digital currency or CBDC where many advantages are really needed by the Indonesian people, such as transactions being safe because they are always controlled by Bank Indonesia, more efficient because they only use device You can carry out transactions anywhere and anytime. Transactions are faster because they use satellite signals. Even though it has advantages, this CBDC also has disadvantages or risks, such as a lack of freedom in transactions because it is supervised and regulated by the central bank. The security of CBDC also has risks because CBDC uses a blockchain system; if a hacker hacks the blockchain system, it is possible that the hacker could take the personal data and money stored. Therefore, Indonesia must have competent human resources to avoid hacking CBDC customers' data. Regardless of the advantages and disadvantages of this CBDC, it is still crucial if it has to be implemented in Indonesia because apart from being a necessity, all transactions are mainly carried out digitally, and it also makes Indonesia a more advanced country compared to other countries that have not implemented this CBDC.

References

- Adegbite, T. A., and M. A. Aremu. "The Effects of Digital Currency (Enaira) Adoption on Nigeria Economy." *Farabi Journal of Social Sciences* 8, no. 1 (2022): 61–72. <https://doi.org/10.26577/fjss.2022.v8.i2.07>.
- Ahmad, Hasnawati, Mulyadi, M. Apriyanto, A. Oklianda, D. D. Putra, and A. Warmi. "Student Responses during Online Learning in the Covid-19 Pandemic Period." *Journal of Physics: Conference Series* 1764, no. 1 (2021). <https://doi.org/10.1088/1742-6596/1764/1/012125>.
- Alonso, Sergio Luis Nández, Javier Jorge-Vazquez, and Ricardo Francisco Reier Forradellas. "Central Banks Digital Currency: Detection of Optimal Countries for the Implementation of a CBDC and the Implication for Payment Industry Open Innovation." *Journal of Open Innovation: Technology, Market, and Complexity* 7, no. 1 (2021): 1–23. <https://doi.org/10.3390/joitmc7010072>.
- Amarta, Cindy Cintania, and Fitri Nur Latifah. "The Influence of Understanding Financial Literacy and Community Readiness on the Use of Central Bank Digital Currency (CBDC)." *JESI (Jurnal Ekonomi Syariah Indonesia)* 13, no. 1 (2023): 45. [https://doi.org/10.21927/jesi.2023.13\(1\).45-53](https://doi.org/10.21927/jesi.2023.13(1).45-53).
- Ardiano, Chandra, and Nur Rochaeti. "Analisis Yuridis Kriminologis Penggunaan Mata Uang Elektronik Bitcoin Sebagai Sarana Tindak Pidana Pencucian Uang." *Diponegoro Law Journal* 11, no. 1 (2022): 1–15. <https://jom.unri.ac.id/index.php/JOMFHUKUM/article/view/26397>.
- Baharudin Vanani, Alvin, and Dedi Suselo. "Analisis Legal Tender Uang Digital Bank Sentral Indonesia." *Jae (Jurnal Akuntansi Dan Ekonomi)* 6, no. 3 (2021): 74–83. <https://doi.org/10.29407/jae.v6i3.16225>.
- Beckmann, Lars, Jörn Debener, Paul Hark, and Andreas Pfingsten. "CBDC and the Shadow of Bank Disintermediation: US Stock Market Insights on Threats and Remedies." *SSRN Electronic Journal*, July 2023, 105868. <https://doi.org/10.2139/ssrn.4572335>.
- Bibi, Samuele, and Rosa Canelli. "The Interpretation of CBDC within an Endogenous Money Framework." *Research in International Business and Finance* 65, no. May 2022 (2023): 101970. <https://doi.org/10.1016/j.ribaf.2023.101970>.
- Budiwati, Septarina, Muhammed Junaidi, and Wisnu Tri Nugroho. "The Principle of Pacta Sunt Servanda in Fintech Transactions Is Reviewed Through The Perspective of Ushul Fiqh." *Al-Iktisab: Journal of Islamic Economic Law* 4, no. 1 (May 12, 2020): 47. <https://doi.org/10.21111/al-iktisab.v4i1.4350>.
- Chu, Yeonouk, Jaeho Lee, Sungjoong Kim, Hyunjoong Kim, Yongtae Yoon, and Hyeyoung Chung. "Review of Offline Payment Function of CBDC Considering Security Requirements." *Applied Sciences (Switzerland)* 12, no. 9 (2022). <https://doi.org/10.3390/app12094488>.
- Dionysopoulos, Lambis, Miriam Marra, and Andrew Urquhart. "Central Bank Digital Currencies: A Critical Review." *International Review of Financial Analysis* 91, no. October 2023 (2024): 103031. <https://doi.org/10.1016/j.irfa.2023.103031>.
- Dong, Mei, and Sylvia Xiaolin Xiao. "Idle Liquidity, CBDC and Banking." *European Economic Review* 164, no. January (2024): 104700. <https://doi.org/10.1016/j.euroecorev.2024.104700>.
- Dwi Letari, Wuryaningsih, Damatika Purnama Suci, and Muhammad Sholahuddin. "Beberapa Faktor Yang Mempengaruhi Profitabilitas Perbankan Di Indonesia." *Benefit: Jurnal Manajemen Dan Bisnis* 5, no. 1 (2020): 1–19. <https://journals.ums.ac.id/index.php/benefit/index>.
- Ekong, Uduak Michael, and Christopher Nyong Ekong. "Digital Currency and Financial Inclusion in Nigeria: Lessons for Development." *Journal of Internet and Digital Economics* 2, no. 1 (2022): 46–67. <https://doi.org/10.1108/jide-11-2021-0018>.
- Emanuella, Claudia Saymindo. "Central Bank Digital Currency (CBDC) Sebagai Alat Pembayaran Di Indonesia." *Jurist-Diction* 4, no. 6 (2021): 2243. <https://doi.org/10.20473/jd.v4i6.31845>.
- Fauzan, Aditya Rafi, and Rianda Dirkareshza. "Lex Crypto: Perbandingan Landasan Hukum Terhadap Dampak Keberadaan Bitcoin Antara Indonesia Dengan El Salvador." *Pandecta: Research Law Journal* 16, no. 2 (2021): 320–35.
- Gandara, Moh. "Kewenangan Atribusi, Delegasi Dan Mandat." *Khazanah Hukum* 2, no. 3 (2020): 92–99. <https://doi.org/10.15575/kh.v2i3.8187>.
- Handayani, Fitri. "Design and Legal Aspect of Central Bank Digital Currency: A Literature Review." *Journal of Central Banking Law and Institutions* 1, no. 3 (2022): 509–36.

- <https://doi.org/10.21098/jcli.v1i3.35>.
- Hendarsyah, Decky. "Penggunaan Uang Elektronik Dan Uang Virtual Sebagai Pengganti Uang Tunai Di Indonesia." *IQTISHADUNA: Jurnal Ilmiah Ekonomi Kita* 5, no. 1 (2016): 1–15. <https://doi.org/10.46367/iqtishaduna.v5i1.74>.
- Kadek Dyah Pramitha Widyarani, Ida Ayu Putu Widiati, and Ni Made Puspasutari Ujianti. "Kajian Yuridis Penggunaan Koin Kripto Sebagai Alat Pembayaran Di Indonesia." *Jurnal Preferensi Hukum* 3, no. 2 (2022): 300–305. <https://doi.org/10.55637/jph.3.2.4934.300-305>.
- Lim, King Yoong, Chunping Liu, and Shuonan Zhang. "Optimal Central Banking Policies: Envisioning the Post-Digital Yuan Economy with Loan Prime Rate-Setting." *Emerging Markets Review* 59 (2024): 101108. <https://doi.org/10.1016/j.ememar.2024.101108>.
- Lirih Hayyu Maghfiroh, Sri Yuniati, and Adhiningasih Prabhawati. "Analysis of Bitcoin Legalization As an Official Transaction Tool in El Salvador." *Sosioedukasi Jurnal Ilmiah Ilmu Pendidikan Dan Sosial* 12, no. 1 (2023): 128–33. <https://doi.org/10.36526/sosioedukasi.v12i1.2701>.
- Luu, Hiep Ngoc, Canh Phuc Nguyen, and Muhammad Ali Nasir. "Implications of Central Bank Digital Currency for Financial Stability: Evidence from the Global Banking Sector." *Journal of International Financial Markets, Institutions and Money* 89, no. October (2023): 101864. <https://doi.org/10.1016/j.intfin.2023.101864>.
- Morales-Resendiz, Raúl, Jorge Ponce, Pablo Picardo, Andrés Velasco, Bobby Chen, León Sanz, Gabriela Guiborg, et al. "Implementing a Retail CBDC: Lessons Learned and Key Insights." *Latin American Journal of Central Banking* 2, no. 1 (2021): 100022. <https://doi.org/10.1016/j.latcb.2021.100022>.
- Muhammad, Rafli Fadilah, and Rianda Dirkareshza. "Legalitas Penerapan Central Bank Digital Currency (CBDC) Di Indonesia." *Jurnal Usm Law Review* 6, no. 3 (2023): 913. <https://doi.org/10.26623/julr.v6i3.7370>.
- Naufal Hasani, Muhammad. "Jurnal Ilmiah Ekonomi Bisnis Analisis Cryptocurrency Sebagai Alat Alternatif Dalam Berinvestasi Di Indonesia Pada Mata Uang Digital Bitcoin." *Jurnal Ilmiah Ekonomi Bisnis* 8, no. 2 (2022): 329–44. <http://ejournal.stiepancasetia.ac.id/index.php/jieb/Jilid>.
- Nurullia, Syafira. "Menggagas Pengaturan Dan Penerapan Central Bank Digital Currency Di Indonesia: Bingkai Ius Constituendum." *Journal of Judicial Review* 23, no. 2 (2021): 275. <https://doi.org/10.37253/jjr.v23i2.5014>.
- Prodan, Silvana, Peter Konhäuser, Dan Cristian Dabija, George Lazaroiu, and Leonardo Marincean. "The Rise in Popularity of Central Bank Digital Currencies. A Systematic Review." *Heliyon* 10, no. 9 (2024). <https://doi.org/10.1016/j.heliyon.2024.e30561>.
- Purbasari, Heppy, and Dewita Puspawati. "Exploration Study of Sharia Corporate Exploration Study of Sharia Corporate Governance Disclosure on Bank Annual Governance Disclosure on Bank Annual Report of Sharia Business Unit Report of Sharia Business Unit." *Riset Akuntansi Dan Keuangan Indonesia* 6, no. 1 (2021): 50–61. <http://journals.ums.ac.id/index.php/reaksi/index>.
- Rifa'i, Ahamad, Mulono Apriyanto, and Widyawati. "Dampak Cryptocurrency Terhadap Perekonomian Masyarakat." *Jurnal Cakrawala Hukum* 1, no. 4 (2021): 441–48.
- Sethaput, Vijak, and Supachate Innet. "Blockchain Application for Central Bank Digital Currencies (CBDC)." *Cluster Computing* 26, no. 4 (2023): 2183–97. <https://doi.org/10.1007/s10586-022-03962-z>.
- Shifa, Mutiara, Alfi Amalia, M.Shabri Abd.Majid, and Marliyah Marliyah. "Penggunaan Mata Uang Dinar Dan Dirham Sebagai Solusi Prediksi Krisis Moneter Di Indonesia." *Fair Value: Jurnal Ilmiah Akuntansi Dan Keuangan* 4, no. 6 (2022): 2321–38. <https://doi.org/10.32670/fairvalue.v4i6.992>.
- Vollmar, Steffen, and Fabian Wening. "The Impact of CBDC on a Deposit-Dependent Banking System." *Journal of Financial Stability* 73, no. August 2022 (2024): 101283. <https://doi.org/10.1016/j.jfs.2024.101283>.
- Wenker, Kilian. "Retail Central Bank Digital Currencies (CBDC), Disintermediation and Financial Privacy: The Case of the Bahamian Sand Dollar." *FinTech* 1, no. 4 (2022): 345–61. <https://doi.org/10.3390/fintech1040026>.
- Widodo, Kharisma Dwi, Bambang Juanda, and Dedi Budiman Hakim. "Faktor-Faktor Yang Memengaruhi Persepsi Penggunaan Central Bank Digital Currency Di Indonesia." *Jurnal*

Ekonomi Dan Kebijakan Pembangunan 12, no. 1 (2023): 23–40. <http://ezproxy2.utwente.nl/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=169857856&site=ehost-live>.

Yuspin, Wardah, and Ata Fauzie. "Good Corporate Governance In Sharia Fintech: Challenges and Opportunities In The Digital Era." Article. Quality - Access to Success 24, no. 196 (August 1, 2023): 221–29. <https://doi.org/10.47750/QAS/24.196.28>.

Yuspin, Wardah, Kelik Wardiono, Aditya Nurrahman, and Arief Budiono. "Personal Data Protection Law in Digital Banking Governance in Indonesia." *Studia Iuridica Lublinensia* 32, no. 1 (March 28, 2023): 99–130. <https://doi.org/10.17951/sil.2023.32.1.99-130>.