



Digital Rupiah as An Alternative Digital Transaction in Indonesia

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Abstract

Digitalization in the financial industry revolutionized the transaction system with the emergence of Cryptography-based Digital Currencies. It has recently evolved into digital currencies issued by central banks, known as Central Bank Digital Currency (CBDC). Bank Indonesia responds by developing a plan to release Digital Rupiah as part of the digital transformation initiative in the national payment system. This study aims to determine the authors' interest in discussing Indonesia's CBDC as seen through article publication trends. This research uses the systematic literature review (SLR) method. The results show that there is an increasing trend in the publication of articles on Digital Rupiah. The published articles discuss Digital Rupiah from various sides such as legality, implementation mechanism, challenges opportunities and impacts, to its potential implementation.

Keywords: *Digital Rupiah; CBDC; Garuda Project*

Introduction

The usage of physical money in financial transactions is being replaced by digital money (Paul, 2022) and electronic payment systems based on encryption (Sabry, 2021). This change is a response to the public's mistrust of traditional finance organizations that contributed to the recent economic disaster. Electronic payment systems based on cryptography facilitate direct and computational transactions between two parties (Nakamoto, 2008), hence lowering the possibility that financial fraud will be perpetrated by traditional banking establishments (Ashfaq et al., 2022). One of the latest forms of digital money is cryptocurrency (Sabry, 2021) which is characterized by the emergence of bitcoin as the first blockchain-based digital currency (Sharma et al., 2023). The emergence of bitcoin became the basis for the development of other digital currencies such as Ripple, Ethereum, and Litecoin (Bruijl, 2017).

The rapid development of digital currencies is followed by three risks, namely security, value instability, and theft (Muchran et al., 2023) and legal risks that potentially threaten a country's monetary sovereignty (Brunnermeier et al., 2019). Therefore, some countries have started to establish Central Bank Digital Currency (CBDC) to solve these three risks (Bank Indonesia, 2022). CBDC is a form of government supervision and control over the legality of digital currencies (Muchran et al., 2023).

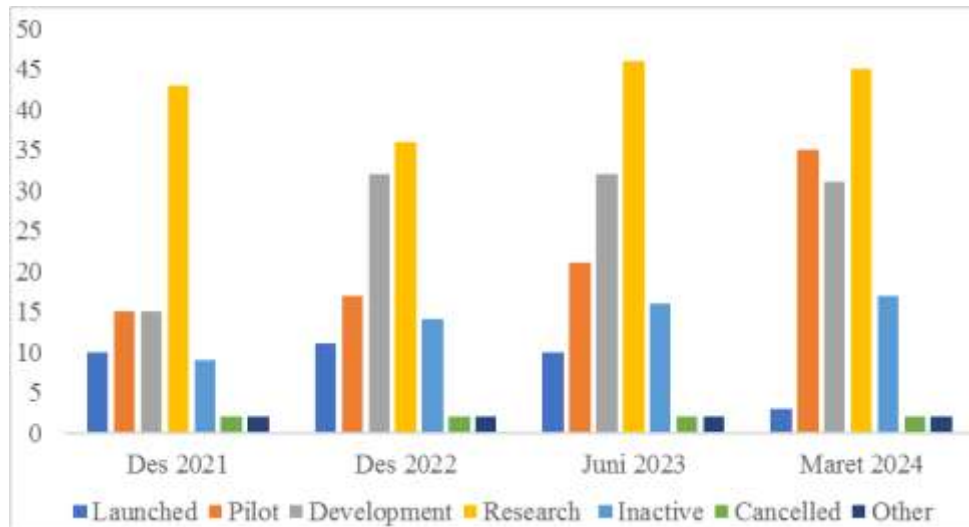


Figure 1 Timeline Race for The Future of Money
Source: Atlantic Council (2024)

Figure 1 shows the accelerated stages of CBDC development in several countries in the period 2020-2024. As of May 2020, 35 countries were developing CBDCs (Atlantic Council, 2024). According to the latest survey shows that there are 135 countries that have developed CBDC (Atlantic Council, 2024). Of these 135 countries, the Bahamas, Jamaica, and Nigeria are the three that have released CBDCs. 35 countries have tested CBDCs including Brazil, Australia, South Africa, Saudi Arabia, Japan, Russia. 31 countries are still in the development stage, namely the United States, Canada, Colombia, Switzerland. While the rest are still at the research stage. One of the countries that is still in the development stage is Indonesia. CBDC in Indonesia was first discussed at the Annual Meeting of Bank Indonesia in 2022 under the name Digital Rupiah under the auspices of the Garuda Project (Purnamawati et al., 2024). Digital Rupiah is expected to be officially released in 2024 after the election of the new Indonesian president (Linnan, 2023).

There are several previous studies on Digital Rupiah with different thematic focuses, namely the development, benefits, challenges, service improvement, and potential of digital rupiah. Mutiara et al. (2024) conducted research on the development, benefits, and challenges of implementing Digital Rupiah. Meanwhile Alam et al. (2022) conducted research related to the improvement of financial services as an impact of the adoption of Digital Rupiah as CBDC. In line with other research, Tiara et al. (2022) conducted research related to the potential of Digital Rupiah as a solution to eradicate corruption in the Indonesian government. Some previous studies discuss the effect of Digital Rupiah implementation as a CBDC, but there is no research that addresses the issue of CBDC comprehensively.

In addition, there has been no research related to Digital Rupiah in Indonesia using a systematic literature review (SLR) approach. Therefore, this research will discuss the existence of Digital Rupiah as an alternative to digital transactions in Indonesia using a systematic literature review approach. This research is conducted to determine the trend of literature publications related to Digital Rupiah, the concept of using Digital Rupiah and its various implications that have been reviewed in several previous related studies. Based on the phenomenon that has been presented, the title of this research is Digital Rupiah as an Alternative Digital Transaction in Indonesia. This research has several objectives, including publication trends, discussion topics on the results of literature publications, and the implementation mechanism of Digital Rupiah in Indonesia.

Research Method

The method used in this research is a qualitative method with the Systematic Literature Review (SLR) technique. The research stages in the SLR approach include searching for literature data, classifying data, analysing data, and drawing conclusions (Wini, 2021).

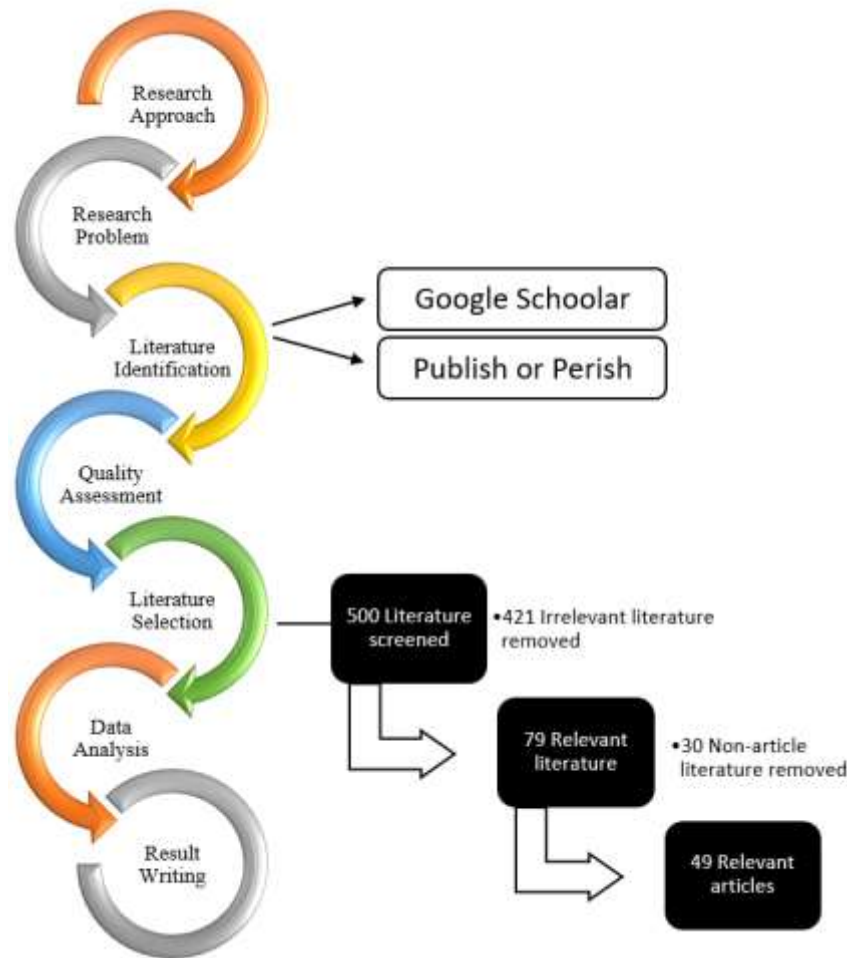


Figure 1 Review Methodology

Quality Assessment Criteria

The sampling criteria in this study are as follows:

1. The article discusses CBDC Indonesia or Digital Rupiah.
2. Articles are published within the period 2020-2024.
3. Articles can be accessed through Google Scholar (<https://scholar.google.com>).

Based on these criteria, 49 literature samples were obtained that discussed Digital Rupiah and were published in the period 2020-2024. The literature obtained was then evaluated and analysed in accordance with the quality assessment, what is the literature on Digital Rupiah in Indonesia, and will literature be published in the period 2020 – 2024.

Result and Discussion

Research on Digital Rupiah as a form of CBDC in Indonesia shows great potential for change in Indonesia's financial system. A number of studies have indicated that the implementation of CBDC can yield significant benefits, including increased efficiency in the payment system, reduced transaction costs, and expanded financial inclusion. However, the implementation of Digital Rupiah is also not free from various implementation challenges discussed by several researchers. Based on the data collection process that has been carried out, 49 articles were obtained that discuss Digital Rupiah as a CBDC in Indonesia. The results of the literature study are listed in the figure below:

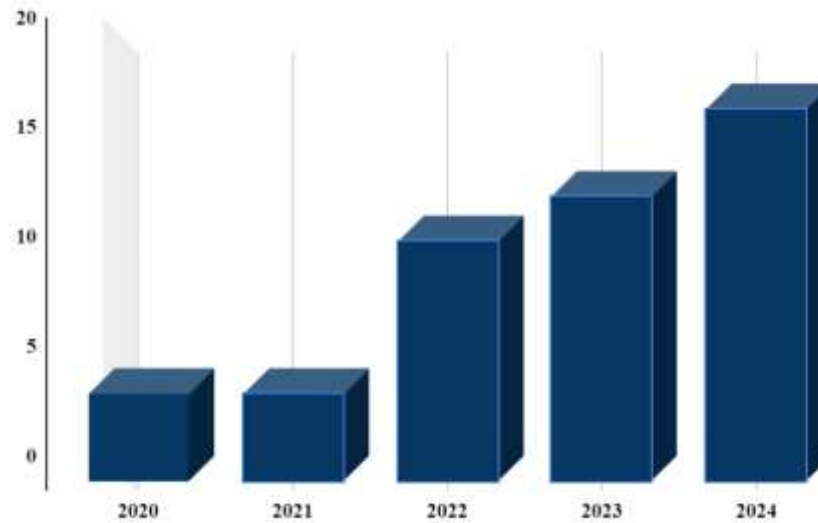


Figure 2 Article Publication Trend

In 2020-2024 there were 49 articles that examined Digital Rupiah as a CBDC in Indonesia. In 2020 there were 4 articles published with the theme of CBDC Indonesia. In 2021 the number of publications is still the same as the previous year, namely 4 articles. The increase in the publication of articles about CBDC Indonesia has increased to 11 articles in 2022 which is the year the discussion of Digital Rupiah began. In 2023 the publication of articles about Digital Rupiah increased to 13 articles in a year. The highest number occurred in 2024 with 17 articles published. Based on the data obtained, there is an upward trend in article publications from 2020 to 2024.

Articles on Digital Rupiah are published in various journals with various indexes such as journals with Garuda, Sinta, Copernicus, and Scopus indexes. The majority of Digital Rupiah articles have a Sinta index which is divided into several levels with a total of 23 articles. Of these 23 articles, 3 of them have Sinta index 1, 6 articles with Sinta index 2, 6 articles with Sinta index 3, 6 articles with Sinta index 4, and 2 articles with Sinta index 5. In second place, 12 Digital Rupiah articles have Garuda index. Some articles also have international indexes such as the Copernicus index for 6 articles and the Scopus index for 5 articles.

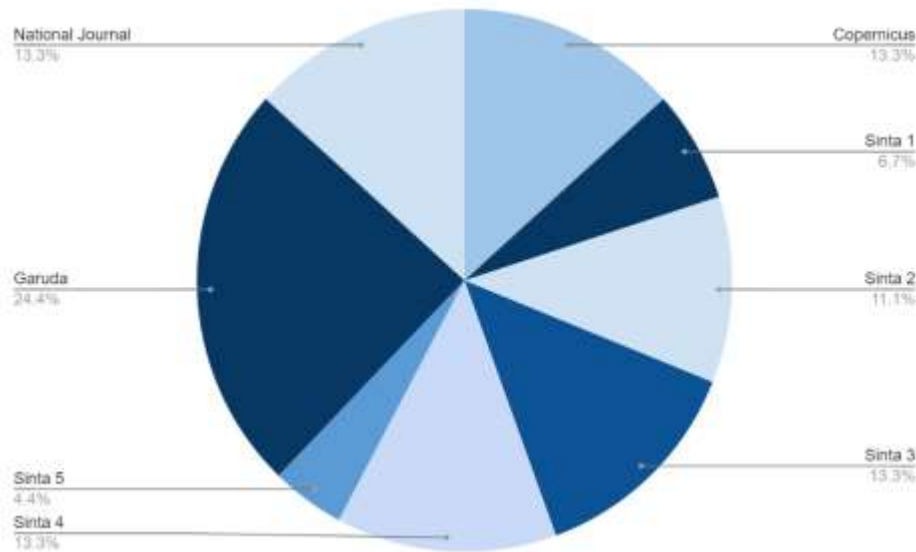


Figure 4 Index of Published Articles

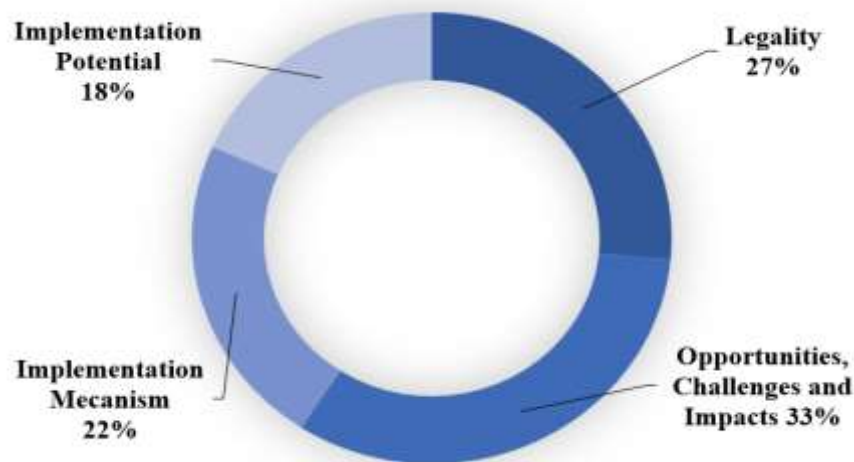


Figure 5 Classification of Discussion Themes Articles

The results of research related to Digital Rupiah as a CBDC in Indonesia show the diversity of discussions in the article. There are 13 articles that discuss the legality of the Digital Rupiah. The discussion about Digital Rupiah is inseparable from the opportunities, challenges, and also the impact of the existence of Digital Rupiah as Indonesia's CBDC. There are several articles that focus on challenges, opportunities or the impact of Digital Rupiah implementation. Some articles also simultaneously discuss the opportunities, challenges, and impacts of Digital Rupiah implementation.

The discourse on the issuance of Digital Rupiah in 2024 has made several researchers interested in studying the potential implementation of Digital Rupiah. Some articles focus on discussing the factors that influence the implementation of Digital Rupiah in Indonesia. Meanwhile, there are also articles that discuss potential applications with specific details such as considering Gen Z as the target of Digital Rupiah implementation and analysing the implementation using the Technology Acceptance Model.

The discussion also involved research on the Digital Rupiah's implementation mechanism. There are five main aspects in the design of the Indonesian CBDC, namely the issuance aspect, the distribution and recording aspect, the access aspect, the use and connection aspect, and the infrastructure and technology aspect (Bank Indonesia, 2022).

Issuance Mechanism

Basically, the issuance of Digital Rupiah does not replace the existence of fiat money but is used side by side and becomes an alternative payment for the community (Widodo et al., 2023). Digital Rupiah will be issued in 2 forms, namely w-Digital Rupiah and r-Digital Rupiah (Bank Indonesia, 2022). The issuance of w-Digital Rupiah is intended for wholesale transactions and will be used by authorized institutions appointed by Bank Indonesia by converting current accounts at Bank Indonesia. Basically, w-CBDC is intended for interbank transactions with large transaction values (Santoso et al., 2023). The second form is r-Digital Rupiah which is used for retail transactions by the general public by exchanging physical money or electronic balances through the intermediary of w-Digital Rupiah institutions called wholesalers (Bank Indonesia, 2022). In simple terms, the issuance of w-CBDC focuses on improving the payment system by reducing the risk of failure while r-CBDC aims to increase the financial inclusion of the public (Juanda et al., 2022).

Distribution and Recording Mechanism

The Digital Rupiah distribution scheme is divided into 2, namely direct distribution (one tier) and through intermediaries (two-tier). The direct distribution scheme allows wholesalers to obtain w-Digital Rupiah directly from Bank Indonesia. When the wholesaler redistributes to retail in the form of r-Digital Rupiah, this process is referred to as distribution through intermediaries (two-tier) (Bank Indonesia, 2022). Based on this scheme, it is known that the wholesaler has two roles, namely as the owner of Digital Rupiah access as well as the role of distribution to retail or users (Kusuma et al., 2022). The scheme is then referred to as a hybrid recordkeeping model. This model allows Bank Indonesia to supervise the financial system as well as protect users' personal data (Bank Indonesia, 2022).

Access

Digital Rupiah can be accessed through two methods, namely through accounts and tokens (Paul, 2022). R-Digital Rupiah can be accessed through account-based and/or token-based verification, organized by segmentation. Meanwhile, W-Digital Rupiah can be accessed through token-based verification to facilitate more complex transactions (Bank Indonesia, 2022). Account-based Digital Rupiah allows people to use Digital Rupiah on smartphones like using an e-wallet. Meanwhile, token-based Digital Rupiah can be used for Real-Time Gross Settlement (RTGS) transactions conducted by banks and other wholesalers (Widodo et al., 2023).

Usage and Connectivity

Digital Rupiah will be equipped with various features that are expected to provide added value to the economy. These features include programmability, composability, and tokenization based on smart contracts (Bank Indonesia, 2022). These features allow for a program integration process by combining several transactions in one operation. Digital Rupiah, which is equipped with various features, is expected to be able to change the role of Financial Market Infrastructure (FMI) and improve the efficiency of the payment system (Maulana, 2023).

Infrastructure and Technology

Digital Rupiah has a technology that is built on the principles of fast, secure, resilient, interoperable, extensible, and flexible using blockchain technology (Paul, 2022). Blockchain uses Distributed Ledger Technology (DLT), Smart Contracts, and Cryptography transactions that are recorded securely and automatically in a decentralized network. CBDC infrastructure and technology platforms can use a combination of DLT and centralized infrastructure (Juanda et al., 2022). DLT ensures that data cannot be altered, while smart contracts and cryptography maintain the integrity and security of transactions (Mariyanti et al., 2024). With these technologies, it is expected that the Digital Rupiah can

have the characteristics of being decentralized but still regulated, not intervened by third parties, and safe for its users.

Conclusion

The discussion of the Digital Rupiah as a CBDC in Indonesia shows an increase in the interest of researchers in researching the Digital Rupiah. This result can be seen from the increasing trend in article publications on Digital Rupiah in 2020- 2024. Article publications continue to increase from 4 articles in 2020 to 17 in 2024, with 49 articles. This increase reflects the need to explore various aspects related to the implementation of the Digital Rupiah as a digital payment instrument in Indonesia.

The 49 published articles examine various themes ranging from the legal aspects, opportunities, challenges, and impacts of implementation and potential implementation to the implementation mechanism of Digital Rupiah. This increase reflects the need to explore various aspects related to the implementation of the Digital Rupiah as an alternative digital payment instrument in Indonesia. The results of this research reflect an increase in the scientific literature on Indonesian CBDC, which is expected to make a real contribution to the development of future financial technology policies.

Research Limitations and Future Research Directions

The limitation of this research is that the research was only conducted on literature published in 2020-2024. Future research can use a broader period of years. Future research can also examine more deeply the implementation of the Digital Rupiah as Indonesia's CBDC.

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