

The Development of Research on Digital Currency in Indonesia: A Bibliometric Analysis

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ABSTRACT

Research on the development of digital currency research in Indonesia from 2013 to 2023 continues to be conducted. Various topics emerge from a social phenomenon in society. This research was conducted with the aim of knowing the number of developments in publications, literacy, and national and international scientific references related to the development of digital currency in Indonesia and the development map of national and international publications on digital currency in Indonesia. This research uses a descriptive qualitative approach with secondary data sourced from articles, books or documents, as reference materials, which can be updated. Data used is sourced from Google Scholar and Scopus, with restrictions from 2013-2023. This research uses analytical tools such as Publish or Perish and Vos Viewer to map the development of research on digital currency in Indonesia. The results showed that there were at least more than 800 research documents on the topic. Among them are dominated by articles and other source documents. From year to year, publications or documents have always increased but in the last few decades the topic has begun to be less discussed by researchers. In every source of reading about digital currency, we will find several related topics such as cryptocurrency, Central Bank Digital Currency (CBDC), blockchain, economy, bitcoin, financial technology, to digital assets. In Indonesia itself, research on the development of digital currency focuses more on topics or discussions such as digital currency, cryptocurrency, transactions, effects, and areas of digital currency development.

Keywords: Bibliometric, CBDC, Cryptocurrency, Digital Currency, Vos Viewer.

1. Introduction

The development of technology gave birth to various disruptive innovations, such as mobile phones/smartphones that replaced conventional telephones, electric cars that began to replace oil-fueled cars, digital media that replaced print media and now cryptocurrencies or digital currencies that are trying to replace conventional currencies. Cryptocurrency was introduced as the latest technological innovation that is currently growing rapidly in various countries. The underlying blockchain technology has the potential to transform various industries, including finance, logistics, healthcare, and others. This has prompted many people to discuss and pay

attention to the development of cryptocurrencies. Cryptocurrencies have shown significant fluctuations in value in a short period of time. The high exchange rates and volatility levels have attracted investors and speculators looking to profit from rapid price movements. In addition, various businesses and platforms have started accepting cryptocurrencies as a means of payment. Therefore, cryptocurrencies have attracted the attention of the media and government institutions regarding legal implications, regulations, and potential economic impacts (Glaser et al., 2014).

Bitcoin as the world's first decentralized cryptocurrency was created by someone under the pseudonym Satoshi Nakamoto in 2009. After the successful launch of bitcoin, thousands of new cryptocurrencies, namely altcoins and crypto-tokens emerged as competitors of the cryptocurrency. Bitcoin is a digital currency that resides in a P2P (peer-to-peer) open-source payment network system. P2P is a computer network model consisting of two or more computers. Each computer in the network environment can share with each other. This network allows users to transact directly without requiring the services of a third party such as a bank. The transactions are verified by the network nodes through the use of cryptography and recorded in a publicly distributed ledger called blockchain, so there is no need for a third party (Brito & Castillo, 2013).

Cryptocurrency has advantages over conventional currencies, including the ease of transferring funds between two parties. The transaction is facilitated through the use of public and private keys so that the user's confidentiality can be maintained. This is different from using a credit card, where user information will be known if making a transaction. In addition, transactions that occur in cryptocurrency do not require a third party to verify the transactions that occur, but rather use algorithms to verify transactions without passing through financial institutions (Nakamoto, 2008).

Various countries have accepted bitcoin as a legal currency, especially countries that want to replace the use of cash (Bunjaku et al., 2017), such as Estonia, the United States, Denmark, Sweden, South Korea, the Netherlands, Finland, Canada, the United Kingdom, and Australia (Scott, 2016). Many shops and hotels accept bitcoin payments in these countries. Bitcoin has been used as a means of payment on the island of Bali, ranging from payments for cafes, to property purchases. In Indonesia, cryptocurrency has been traded since 2013, but only received serious attention in 2017 where in that year, the increase in the price of bitcoin reached around 1,300% and ethereum reached 13,000%. Indodax is the largest cryptocurrency exchange in Indonesia with a total of 1,349,462 members at the beginning of August 2018. and the number of transactions ranges from tens to hundreds of billions of rupiah per day (Ramadhan & Putri, 2018).

In 2013 and 2017, interest in cryptocurrencies, especially Bitcoin, began to rise in Indonesia. Many laypeople and investors started trying to get involved in the crypto ecosystem. During this period, besides Indodax, other crypto exchanges also started operating in Indonesia, such as Tokenomy and Luno. In addition, there were also payment services that started to accept Bitcoin as a means of payment. In addition to interest in Bitcoin, attention also began to turn to blockchain technology in various sectors, including logistics, banking, and others. Some Indonesian companies are also starting to develop blockchain-based solutions. As the interest and use of cryptocurrencies in Indonesia grows, the government is beginning to see the need for regulations to govern the crypto space. However, clear and comprehensive regulations are yet to take shape, resulting in some legal challenges and confusion regarding the legal status of cryptocurrencies. Over time, cryptocurrencies spread in Indonesia include various types (Ramadhan & Putri, 2018).

At least 21 types of cryptocurrencies have begun to be traded in Indonesia. The number of cryptocurrencies traded on Indonesian exchanges is still inferior when compared to foreign exchanges, such as Binance which trades around 144 cryptocurrencies and HitBTC 324 cryptocurrencies (coinmarketcap.com, 2018). According to Nuraliati & Azwari, (2019) bitcoin can be a legal tender in Indonesia because it meets all the requirements to become a means of payment, but currently bitcoin is only used as an investment tool for domestic use by Indonesians due to the issuance of a ban from BI that bitcoin is not a legal tender so it is prohibited from being used as a means of payment in Indonesia. This ban is not only done because the government considers that bitcoin is difficult to control, but also to prevent crimes using cryptocurrencies, such as buying and selling drugs, funding terrorism, tax evasion, money laundering, and tax evasion. money laundering, tax evasion, and so on (Sianipar, 2021). Cryptocurrencies' higher level of privacy than conventional payment systems only make transactions on cryptocurrencies harder to trace. When tracing illegal transactions (drugs, money laundering, tax evasion) law enforcement can match the data stored on the blockchain with the IP (Internet Protocol) addresses of the perpetrators of the transactions, so that the perpetrators of the transactions can be traced (Saefullah, 2018). In addition, various companies have developed software that aims to identify cryptocurrency wallets related to criminal activities and track the perpetrators of these activities (Ivaschenko, 2016). Although cryptocurrency is not allowed to be used as a transaction tool in Indonesia, it is still used as a long-term investment tool, trading tool, and overseas transaction tool. Many large companies have accepted cryptocurrency as a means of payment. Companies such as Microsoft, Whole Food, Rakutan, Bloomberg.com, Newegg.com, are just a few of the hundreds of companies that allow the purchase of their online products using cryptocurrency (Mulyanto, 2015).

Several central banks in the world, including Bank Indonesia (BI) are studying to develop Digital Rupiah or often known as Central Bank Digital Currency (CBDC). Based on this, BI launched the Garuda Project that oversees various initiatives to explore various design options for Indonesia's CBDC architecture, named Rupiah Digital. Digital Rupiah is Rupiah money that has a digital format and can be used as well as physical money (banknotes and metals), electronic money (chip and server based), and money in Payment Using Cards (APMK) (debit and credit cards) that we use today. Digital Rupiah itself is only issued by Bank Indonesia as the Central Bank of the Republic of Indonesia. Rupiah Digital is also not included in crypto assets or stable coins (Linnan, 2023). The first step in the development of BI Digital Rupiah through the Garuda Project is to publish a White Paper as a communication to the public on the Digital Rupiah development plan. In addition, the White Paper aims to obtain input from various related parties. Following the publication of the White Paper, BI will undertake a series of interactive and gradual developments, starting with soliciting public views on the design of the Digital Rupiah, starting with public consultations (Consultative Paper and Focus Group Discussion), technology experimentation (proof of concept, prototyping, and piloting/sandboxing), and finally a review of the policy stance. This iterative series aims to open up a wide space of flexibility for stakeholders and industries to prepare themselves and conduct trials together before Rupiah Digital is implemented (Yunita & Permono, 2023).

This has led to the need for research into the use of cryptocurrency in Indonesia. The importance of supporting literacy can be an input in setting policies related to the use of cryptocurrency as a whole, not just for domestic transactions. However, research on cryptocurrency acceptance in Indonesia is still very limited. The researchers have only examined the acceptance of bitcoin and

not cryptocurrency as a whole, while the dominance of bitcoin continues to decrease every year due to the emergence of new cryptocurrencies. The development of research and literacy on digital currency in Indonesia is done by mapping which contains various studies on similar topics. This makes it possible to see the development of digital currency in Indonesia by paying attention to the previous empirical studies. various empirical studies of previous research.

2. Literature Review

2.1 Financial Technology

According to (Harahap et al., 2017), the Secretary General of the International Association of Insurance Supervisors, a member of the financial stability board, mentions FinTech as a technology that gives rise to financial innovation. It provides new business models, applications, processes and products as well as material effects on markets and financial institutions and the provision of financial services. FinTech is also having an impact not only in developed markets but also in emerging markets. In fact, some emerging markets have benefited from FinTech more than developed markets have because traditional financial institutions are less developed in emerging markets. FinTech has also facilitated significant cross-border financial transactions. Technology is accelerating the trend towards a borderless economy. According to The National Digital Research Center (NDRC), fintech is an innovation in the financial sector. Of course, this financial innovation gets modern technology. According to Scott, (2016), financial technology is a combination of technology and financial features or it can also be interpreted as innovation in the financial sector with a touch of modern technology. Financial technology itself is the result of a combination of financial services with existing technology and can ultimately change the business model scheme which can be analogous to what was originally if we wanted to pay or transact by having to meet face to face with a certain amount of money, in the end we can now make these transactions remotely with payments or transactions to be carried out can be completed in a relatively very short period of time.

2.2 Digital Currency

Digital Currency is a form of currency that is created and stored electronically, but not all digital currencies are referred to as cryptocurrencies (Bunjaku et al., 2017). (Mulyanto, 2015) explains that virtual currency is divided into 2 forms, namely E-money such as Flazz BCA and also Cryptocurrency such as Bitcoin. According to Amin, (2018) digital currency is electronic money issued by parties other than monetary institutions. It can be obtained due to the process of purchasing, giving gifts or mining.

2.3 Cryptocurrency

The word cryptocurrency consists of two words, namely "crypto" and "currency". Crypto is defined as a system that allows cryptocurrencies to be based on cryptography and currency. According to Bunjaku et al., (2017), cryptocurrencies are digital assets designed as a medium of exchange using cryptography to secure transactions and to control the creation of additional currency units. However, not all cryptocurrencies are considered a currency like bitcoin, as bitcoin is the most popular currency with the BTC currency code. This can be attributed to high

volatility, slow commercial acceptance as well as regulatory uncertainty. Sukamulja & Sikora, (2018) in their research "The New Era of Financial Innovation: The Determinants of Bitcoin's Price" stated that cryptocurrency has no administrative costs and is considered safe because it uses cryptography. Cryptocurrency is part of digital currency, using cryptography for security so this makes it very difficult to counterfeit or duplicate. Dourado & Brito, (2014) explain that cryptocurrency is a digital currency formed from blockchain technology using cryptography to process digital data transmission securely and dispersed. But it has problem, namely the double spending problem.

3. Research Methodology

This research adopts a descriptive qualitative research method with a literature study. The descriptive method used in this research is to describe the direction or process of research development according to the appearance of the research object used (Sugiyono, 2017). The data used in this research is secondary data obtained indirectly, data or information obtained from articles, books or documents, as reference materials, which can be updated (Nasution & Aswad, 2021). In this study the authors used data sources from Google Scholar and Scopus, with restrictions from 2013-2023 using the keywords "digital currency development in Indonesia". The results of the data obtained are in the form of scientific articles or national scientific journals. The data was collected using the help of Publish or Perish (POP) software on the Google Scholar publication database with restrictions from 2013-2023 based on the keyword "digital currency development in Indonesia". The data obtained is then stored in RIS (Research Information System) format and then analyzed using VOS Viewer software.

4. Results

4.1 Description of Research Data

The development of research and publications on digital currency in Indonesia, which began in 2013 until now, shows the existence of social phenomena related to digital currency in Indonesia. Previous researchers revealed various findings regarding digital currency in Indonesia which can be used as a reference and insight into this matter. Therefore, this research was conducted to justify the various research findings and see the development of scientific literacy, journals, publications, and others related to the development of digital currency in Indonesia. The research conducted refers to literature studies (secondary data) processed with the help of publish or perish software. The data obtained from publish or perish was inputted with the keywords: "digital currency Indonesia". The keyword was chosen because it has characteristics and can represent the topic discussed. Based on the results of publish or perish processing with search sources on Google Scholar and Scopus in 2013-2023. Scholar and Scopus in 2013-2023.

4.2 Data Analysis

4.2.1 The development of research on digital currency in Indonesia

Analysis of 845 publication documents obtained the distribution of documents based on document type. Based on the analysis, it is known that publication documents consist of conference papers, articles, book chapters, and reviews. Most publications are done through

articles followed by book chapters, reviews, and book chapters. Journal articles are one of the most valued forms of scientific communication in the academic world. Publishing articles in reputable scientific journals can enhance the academic reputation of the author, expand recognition in the scientific community, and contribute to the development of knowledge in a particular field (Dewi, 2013). Journal articles play an important role in disseminating new knowledge and research findings to researchers, professionals, and the general public (Nasution & Aswad, 2021). It can be understood why the publication of research results in articles is more than other publications. Article is the result of research that has been completed and published through a review process from experts in their fields. Publications in the form of journal articles, are primary or secondary research results that are different from proceedings articles. In its publication, journal articles go through a rigorous and lengthy process, so that the writing contained has been validated as a reference that can be trusted by everyone. Research on the development of digital currency in Indonesia from 2013-2023 has increased. The attractiveness of the research is getting bigger and more diverse topics are discussed. Table 1 below shows the number of publications over a period of 11 years. For more details, it can be presented in Table 1 below

Table 1. Number of Publications on Digital Currency Development in Indonesia

No.	Year of Publication	Number of Publications	Percentage
1.	2013	8	0.95
2.	2014	11	1.30
3.	2015	24	2.84
4.	2016	31	3.67
5.	2017	70	8.28
6.	2018	73	8.64
7.	2019	129	15.27
8.	2020	161	19.05
9.	2021	155	18.34
10.	2022	124	14.67
11.	2023*	59	6.98
Total		845	100.00

*continues

Source: Publish or perish, (2013-2023)

Table 1 shows the development of digital currency in Indonesia. From 2013 to 2020 there was a significant increase in publications about digital currency in Indonesia. Digital currency at that time became a hot issue in the development of digital currency that entered Indonesia, so that a lot of research on the topic was carried out. But in the year 2020 to 2023 began to experience a decline

4.2.2 Publication by Source Document

As discussed earlier, publications on digital currency development in Indonesia consist of conference papers, articles, book chapters, and reviews. In addition, there are other publications that contain reports, working papers, and information through the website. In this study, publications are dominated by nationally indexed journal articles (SINTA), internationally indexed journals (SCOPUS), and journals not yet indexed on Google Scholar. The number of publications in the journal article document type with a distribution based on the source of the document includes the Journal of Asian Finance, Economics, and Business, Journal of Science

and Technology Policy, and Journal of Business and Investment Research. For more details can be seen in Table 2 below.

Table 2. Number of Publications on Digital Currency Development in Indonesia

No.	Document Source	Number of Documents	Percentage (%)
1.	Conference Paper	9	1.06
2.	Article	304	35.98
3.	Book Chapter	242	28.64
4.	Review	21	2.49
5.	Other Publication	269	31.83
Total		845	100

Source: Publish or perish, (2013-2023)

Table 2 shows the source of documents screened from searches on the topic of digital currency development in Indonesia. Journal articles are the most common with 304 publications and a percentage of 35.98%.

4.2.3 Publications by Author Productivity

Table 3 shows the ranking of ten researchers who have the most article documents in the Google Scholar database, and SCOPUS. Ilham RN is the most author of the topic of digital currency development in Indonesia, which has 8 documents. Followed by Hidayanto AN and Rahardja U with 7 documents, Taskinsoy J and Yulianto F with 5 documents, Nurmandi A and Sulaeman S with 3 documents. For more details can be seen in Table 3 below.

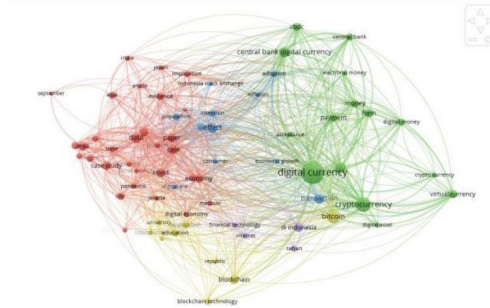
Table 3. Productivity of Digital Currency Writers in Indonesia

No.	Author's Name	Number of Documents
1.	Ilham R N	8
2.	Hidayanto A N	7
3.	Rahardja U	7
4.	Taskinsoy J	5
5.	Yulianto F	5
6.	Nurmandi A	4
7.	Sulaeman S	4
8.	Lutfiani N	3
9.	Marliyah M	3
10.	Sari R F	3

Source: Publish or perish, (2013-2023)

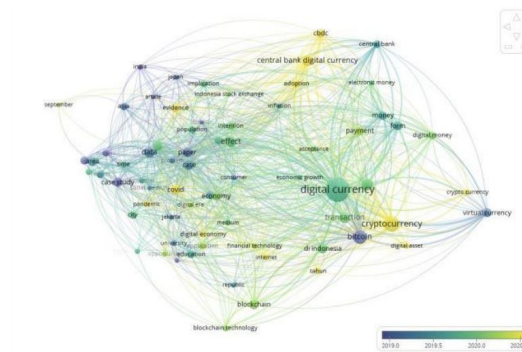
4.2.4 Publication Mapping by Keyword

Keywords represent topics or areas of research. Based on the keyword analysis made by the author, it is then analyzed using VOS viewer. VOS viewer is used by researchers to find out the trends of research that have been done and also to see possible opportunities that can be researched Nasution & Aswad, (2021), Kalia et al., (2022), Pattah & Husaebah, (2013), Nicola & Mallig, (2010). This application aims to map large bibliometrics. In this study, the authors used the keywords of digital currency development in Indonesia with Google Scholar and SCOPUS search engines. In addition, researchers limit the number of searches to 1000 documents from 2013 to 2023. Based on the screening, 845 documents were found consisting of various document sources and various authors. The results of mapping using VOS viewer can be presented with the following figures the following.



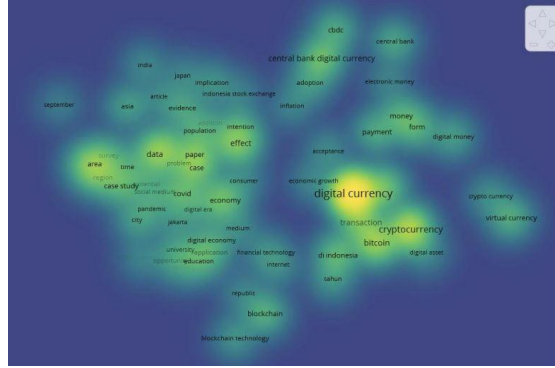
Source: VOS Viewer, 2023
Figure 1. Network Visualization

Figure 1 shows that the most discussed topics or fields are digital currency, cryptocurrency, bitcoin, blockchain, covid, economy and Central Bank Digital Currency (CBDC). However, these topics are in different clusters shown with different colors such as digital currency, cryptocurrency, and Central Bank Digital Currency (CBDC) (green), bitcoin and blockchain (yellow), economy and covid (red). Furthermore, the development of the research year is discussed shown in Figure 2.



Source: VOS Viewer, 2023
Figure 2. Overlay Visualization

Figure 2 shows the development of research on digital currency in Indonesia. 2019 was dominated by research with topics or fields of virtual currency, bitcoin, data, and case studies. In 2020 onwards, the topics or fields discussed are more complex including cryptocurrency, Central Bank Digital Currency (CBDC), financial technology, and digital assets. In addition, the depth of research on digital currency in Indonesia is also discussed, which is presented in Figure 3 below.



Source: VOS Viewer, 2023

Figure 3. Density Visualization

Based on Figure 3. research on the development of digital currency in Indonesia focuses more on topics or topics such as digital currency, cryptocurrency, transaction, effect, and area.

5. Discussion

Research and publications on digital currency in Indonesia started in 2013 until now describe a series of social phenomena that are directly and indirectly related to the topic of digital currency in Indonesia. In the last ten years, there are more than eight hundred publications with various types of documents. The most publications were in 2020 with 161 documents and the least in the initial year of the launch of digital currency, 2013. Document sources mostly use articles indexed nationally or internationally. Writing indexed articles in addition to increasing academic reputation, the writing it contains has a strong tendency as an article to be read.

Then based on the use of digital currency keywords in Indonesia, various forms of depiction of topics or phenomena that are important to discuss are obtained. Such as the most discussed topics or fields are digital currency, cryptocurrency, bitcoin, blockchain, covid, economy, and Central Bank Digital Currency (CBDC). In addition, in 2019 the topics discussed were virtual currency, bitcoin, and case studies. The year after there was a change in topics discussed to be more complex such as cryptocurrency, Central Bank Digital Currency (CBDC), financial technology, and digital assets. Research on the development of digital currency in Indonesia focuses more on topics or discussions such as digital currency, cryptocurrency, transaction, effect, and area of interest.

6. Conclusion

Looking at the development of the number of journals written each year, we can conclude that the number of publications related to the development of digital currency in Indonesia from 2013 to 2020 has increased significantly where from 2008 the number of publications was 8 to 2020 as many as 161 publications, but in 2020 to 2023 it decreased where from 2020 which was 161 down to 59 publications only in 2023. It can also be concluded that until 2023, the most documents about digital currency can be found from articles. In each source of reading about digital currency, we will find several related topics such as cryptocurrency, Central Bank Digital Currency (CBDC), blockchain, economy, bitcoin, financial technology, to digital assets. In Indonesia itself, research on the development of digital currency focuses more on topics or topics

such as digital currency, cryptocurrency, transaction, bitcoin, financial technology, and digital assets. topics or discussions such as digital currency, cryptocurrency, transaction, effect, and area.

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