



Digital Currency: The Future of Money

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ABSTRACT

Digital currency is any currency that is available exclusively in electronic form. It has the potential to completely change how society thinks about money. It can reduce operating costs, increase efficiency, and enable a wide range of new applications. Digital currencies have become popular due to their convenient nature and for the fact that they allow users to transfer money quicker and in a simpler manner. However, many existing digital currencies have not yet seen widespread usage and banks generally do not accept or offer services for them. This paper provides an introduction to digital currencies.

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INTRODUCTION

Money serves three core functions: a unit of account, a medium of exchange, and a store of value. It can be public money—primarily a liability of the central bank—or private money—a liability of a private intermediary. Payment systems transfer money [1].

Governments have never had a monopoly on the provision of money. Currency can be exchanged electronically using debit cards and credit cards using electronic funds transfer at point of sale. A variety of recent digital disruptions, including the emergence of cryptocurrencies and blockchain technology, have made waves in the financial-services sector. Digital currency, based on blockchain technology, is part of that story, and central banks have started to take note. It is an unparalleled technological advancement that has received increasing attention from researchers, investors, financial institutions, and regulators. Digital assets and cryptocurrencies can support new services and create more competition in financial services,

Throughout history, humans have developed sophisticated forms of currency, evolving from stones and metal coins to paper money and then credit and debit cards. Digital currencies are the latest step in this evolution. Origins of digital currencies date back to the 1990s Dot-com bubble. Since 2001, the European Union has implemented the E-Money Directive. Over the last few years, the development of blockchain technology brought us new types of digital assets such as stablecoins and cryptocurrencies. Today, most US consumer payments are made via credit cards. As people shift away from cash, many are increasingly turning to digital currency.

DIGITAL TECHNOLOGY AND DIGITALIZATION

Digital technology is the reality of the world we live inhabit. It touches every aspect of our lives. It has dramatically transformed our society and every aspect of our lives. It is a significant driver for growth, productivity, competitiveness, and innovative capacity.

The term "digital" in digital technologies refers to the intensive and extensive use of information and communication technologies (ICTs). Digitized information is recorded in binary code using digits 0 and 1, representing words, images, and videos. Digital technologies are electronic tools, devices, and systems that generate store, or process data. Examples include mobile phones, social media, online games, 3D printing, wearable technology, cloud computing, and multimedia. Some examples of digital technologies are shown in Figure 1 [2].

Digitalization is the process of using digital technologies to simplify your work, enhance customer experience, ensure employee efficiency, create new solutions, and revamp the business models. It comprises phenomena and technologies such as artificial intelligence, machine learning, big data, the Internet of things, cloud computing, augmented reality, robotics, sensors, 3D printing, system integration, ubiquitous connectivity, digital twins, nanotechnology, and blockchain. It has become integral to organizations' responses and future plans. Digitalization is changing the world. The world is gradually being transformed into a place where everything will be controlled, monitored, and analyzed digitally. Humans have set an environment using digital technologies to bring ease and comfort into their daily lives. Digitalization is the most widely used tool in human life. The most significant impact of digitalization on the world will be universal access of all human beings to digital technologies such as the Internet. This technology will significantly impact digital literacy and lead to a more informed, educated world [3]. The digital age is reshaping the modern financial services in inescapable ways.

WHAT IS DIGITAL CURRENCY?

Blockchain technology provides the foundation for cryptocurrency. Blockchain (BC) technology is a permanent record of online transactions. It is a distributed tamper-proof database, shared, and maintained by multiple parties. It is a new enabling technology that is expected to revolutionize many industries, including business. It has the potential for addressing significant business issues. The BC technology allows participants to move data in real-time, without exposing the channels to theft, forgery, and malice. The term “blockchain” refers to the way BC stores transaction data – in “blocks” that are linked together to form a “chain.” The chain grows as the number of transactions increases. Since every entry is stored as a block on a chain, the care you receive is added to your personal ledger. The first Blockchain was conceived in 2008 by an anonymous person or group known as Satoshi Nakamoto, who published a white paper introducing the concept of a peer-to-peer electronic cash system he called Bitcoin [4]. Blockchain is emerging rapidly as an ideal technology for various industries, especially financial services.

Digital currencies do not have physical attributes and only exist in digital form.

Transactions involving digital currencies are made using computers or electronic wallets connected to computer networks such as the Internet. They have utility similar to physical currencies. They can be used to purchase goods and pay for services. They enable instant transactions that can be seamlessly executed across borders.

Digital currency is a payment method which exists only virtually. Blockchain-powered cryptocurrencies represent an alternative to traditional systems of money like fiat. By removing the influence of governments and central banks, digital currency can potentially take control of money away from institutions and hand it back to the people. Digital currency promises a frictionless way for people to transfer and use funds.

TYPES OF DIGITAL CURRENCY

Digital currency is an umbrella term used in describing different types of currencies that exist in the electronic realm. There are three types of digital currency: cryptocurrency, stablecoins, and central bank digital currency (CBDC). They are explained as follows [5]:

1. *Cryptocurrency*: Cryptocurrency, also known as crypto-currency or crypto, is the most popular digital currencies, like Bitcoin or Ethereum. Cryptocurrency received its name because it uses encryption to verify transactions. Cryptocurrencies are digital tokens. It is a form of decentralized digital currency that is not pegged to any fiat currency. It uses cryptography to secure and verify transactions in a network. When you use crypto as a form of payment, you also create a taxable event, which means you may owe capital gains taxes each time you purchase something with Bitcoin or Ethereum. Cryptocurrencies are regarded as virtual currencies because they are unregulated and exist only in digital form. There are thousands of cryptocurrencies. Some of these are shown in Figure 2 [6]. The two most popular cryptos are Bitcoin and Ethereum. The first cryptocurrency was Bitcoin, which was founded in 2009 and remains the best known today. Ethereum was developed in 2015 and is a blockchain platform with its own cryptocurrency, called Ether (ETH) or Ethereum.

2. *Stablecoins*: Many companies have tried to reduce volatility by introducing stablecoins, whose value is fixed to the price of fiat currency. Stablecoins are new digital assets, which are a type of crypto-asset or token specifically designed to minimize price volatility. This is to make them more money-like and attractive as a store of value or method of payment. One way their promoters seek to maintain a stable

value is by holding assets that back the coins on issue. The assets backing these coins might conceivably be deposits at central banks. Popular stablecoins include Tether, Binance, and Diem. For example, Tether is tied to the US dollar and one Tether equals one US dollar.

3. *Central Bank Digital Currency (CBDC)*: The development of cryptocurrencies in recent years has triggered a debate on whether central banks may attempt to issue cash in digital format. CBDC is an alternative to cash that is also peer-to-peer (P2P). CBDC can serve as a practically costless medium of exchange, secure store of value, and stable unit of account. CBDCs are regulated digital currencies issued by the central bank of a country and are a liability of the central bank. To ensure financial stability, central banks need to create their own digital currencies, offering the same attractive features but with the added benefit of a government backstop. Central banks around the world are investigating whether they should launch digital currencies. More than 100 countries are exploring CBDCs at one level or another. The relationship between CBDC and other forms of payments is displayed in Figure 3 [7] The central banks of China and the United Arab Emirates are working on a project to use blockchain and CBDC for regional payments between nations. CBDCs have already been deployed in pilot form by China (DCEP or the e-CNY), Sweden (the e-Krona), the Eastern Caribbean Central Bank (DXCD), and the Central Bank Bahamas (Sand Dollar).

Some major central banks around the world have begun looking issuing their own digital currencies. Notable examples include the following countries [8]:

- *China*: Since 2020, the People's Bank of China (PBOC) has been testing the digital yuan, also known as e-CNY, in a number of Chinese localities. The digital yuan is intended to be used for retail transactions and is used by millions of Chinese. It is only available to Chinese living in 23 major cities. It aims to replace cash payments and can be accessed through a government-backed mobile app as well as Tencent's WeChat.
- *Sweden*: Since 2020, Sweden's Riksbank has been testing the e-krona digital currency. The e-krona is being created to complement Sweden's diminishing use of currency and to give the general public access to a safe and effective payment system.
- *European Union*: A digital euro that may be issued by the European Central Bank (ECB) and used for retail transactions within the Eurozone is being investigated. A digital euro would provide an anchor of stability for their money in the digital age. It would offer an electronic means of payment that anyone could use in the euro area. It would be secure and user-friendly.
- *England*: The chief economist of Bank of England proposed the abolition of paper currency. The bank is looking into the prospect of launching the "Bitcoin" cryptocurrency. This could reduce the nation's dependence on cash. UK is looking at the case for issuing a digital pound, as a central bank digital currency (CBDC). Although the digital pound would not replace cash, it would be a new type of money issued by the Bank of England for everyone to use for day-to-day spending.
- *Canada*: The Bank of Canada has been conducting research and consultations on the idea of creating a CBDC as a version of its currency on the blockchain.
- *Nigeria*: This is the first African nation to roll out a CBDC. It launched eNaira in October 2021. Commercial banks are responsible for onboarding customers; and the current onboarding requirements require an email that includes a Bank Verification Number. This has made it difficult for citizens without access to email or without an existing bank account to access eNaira and has

possibly slowed adoption. In October 2021, Nigeria's central bank joined those of the Bahamas and the Eastern Caribbean region in launching the world's first digital versions of cash.

- *El Salvador*: On June 9, 2021, El Salvador became the first country in the world to officially classify Bitcoin as legal currency.
- *Singapore*: Many Singaporeans already pay, receive and transfer money digitally via apps like GrabPay. Although Singapore government's approach to CBDCs is wait-and-see, Singapore appears to be a prime candidate for CBDCs.
- *India*: The e-rupee will simply be a digital form of the Indian rupee that is already in use. Introducing CBDCs in India raises many important questions. India's timeline seems a little rushed to understand the various nuances of introducing CBDC.
- *Venezuela*: This is the first federal government to introduce a digital currency in 2018: the petro. The petro has since alleviated the country's economic woes. It is acquired through the website of the treasury of cryptoactives of Venezuela. This currency is supported by oil, gold, diamonds, among others. The primary goal of the government is to eradicate the American currency (dollar), and ensure that citizens do not use it as a method of payment. Many Venezuelans are relying on cryptocurrencies to hedge against fiat inflation.
- *United States*: The US Federal Reserve appears much less convinced of the case for a retail CBDC. It regards CBDC as a solution in search of a problem. Although the Federal Reserve acknowledges the significant benefits of digital currencies, it raises concerns around privacy, operational, cybersecurity, and financial stability risks. For the US Congress to authorize, the issuance of a CBDC, there must be robust privacy and security infrastructures put in place.

CBDC is bound to play a growing role in the global economic system. Figure 4 shows CBDC symbols for some nations [9]. Figure 5 shows national central banks are at varying stages of developing digital currencies [10].

BENEFITS

Digital money has many advantages linked with it like easy and timely payments and smaller transaction costs. It helps companies in the financial industry to eliminate the risk of exposure since they are highly secure. Digital currency may be the most effective way the world has ever seen to increase economic freedom. . It could lift many countries out of poverty, improve the lives of billions of people, and accelerate the pace of innovation in the world. Other benefits of digital currency include the following [11,12]:

- *Increase in efficiency*: The use of digital currency will upsurge the effectiveness of the financial industry by making payments faster, easier, and most prominently more secure.
- *Alternative for cash*: CBDC would function similarly to actual cash. Even though digital currency has not been accepted extensively, its use in countries like Venezuela where Bitcoin looked to be more stable than its national currency at the time of high inflation, shows that it can be an effective substitute for hard cash in the future.
- *Faster payments*: Using digital currency, you can complete payments much faster than current means like wire transfers.
- *Cheaper international transfers*: Payments and settlements can be faster and cheaper, particularly across border. International currency transactions are very expensive. Individuals are charged high

fees to move funds from one country to another. Digital assets could disrupt this market by making it faster and less costly.

- *24/7 global access:* Existing money transfers often take more time during weekends and outside normal business hours because banks are closed. With digital currency, transactions work at the same speed 24/7. Anyone with an Internet connection can utilize digital currencies from anywhere in the globe.
- *Efficient government payments:* If the government developed a CBDC, it could send payments like tax refunds, child benefits, and food stamps to people instantly, rather than trying to mail them a check.
- *Financial inclusion:* One of virtual currency's most promising uses for sustainable development is *financial* inclusion. Financial inclusion exists when individuals and businesses have access to useful and affordable financial products and services that meet their needs. Digital money can also foster greater financial inclusion, as people can transact in it without needing to rely on an intermediary like a bank. That could represent an advantage for households that do not have bank accounts and depend on check cashing, money orders, and cash.
- *No Manufacturing:* Many requirements for physical currencies, such as the establishment of physical manufacturing facilities, are absent for digital currencies. Such currencies are also immune to physical defects or soiling that are present in physical currency.
- *Privacy:* Due to the fact that transactions with digital currencies are not linked to personal data, users are given a high level of privacy and anonymity. They are therefore very helpful for those who want to protect the confidentiality of their financial dealings.
- *Heightened security.* Deploying a regulated digital currency accessible via mobile devices could *potentially* enhance payment security by ensuring that a transaction is finalized and unalterable, reducing the chances of fraud. Payments cannot go wrong, crash, be subject to cyberattacks, or be used by criminals to launder money or finance terrorism.

CHALLENGES

The disadvantages of cryptocurrency include the possibility of anonymity increasing the risk of illegal activity using cryptocurrencies, high energy-consumption and environmental costs, high volatility, the risk of losses, and regulations being implemented to potentially ban or restrict the usage of cryptocurrencies. Virtual currencies pose challenges for central banks, financial regulators, departments or ministries of finance. At the moment, there is a very small number of users who prefer digital currency. The outline for its regulation and the tax structure to control digital currency is still developing. Other challenges include the following [7,12,13]:

- *Too many options:* There are currently many digital currencies being created across different blockchains that all have their own limitations.
- *Steep learning curve.* Digital currencies require work on the part of the user to learn how to perform fundamental tasks. The system needs to get simpler for digital currencies to be more widely adopted.
- *Expensive transaction:* Cryptocurrencies use blockchain, where computers must solve complex equations to verify and record transactions. This takes considerable electricity and gets more expensive as there are more transactions.

- *Price volatility:* Cryptocurrency's inherent volatility makes it an unsuitable medium of exchange. Digital currencies used for trading can have wild price swings. Cryptocurrency (like Bitcoin) prices and values can change suddenly. This is why businesses are reluctant to use it as a medium of exchange.
- *Slow progress:* A US CBDC is still hypothetical, and if the government decides to create one, there will be costs associated with its development. In spite of these benefits of digital currencies, central banks are proceeding cautiously.
- *Risky transaction:* When transactions move outside of the highly regulated financial system and onto alternative platforms, they enter regulatory and legal grey areas where normal standards of consumer protection do not apply. The US Federal Reserve has launched a review of the potential benefits and risks of issuing a Central Bank Digital Currency (CBDC). Cryptocurrencies are highly volatile and it is not advisable to risk going into debt. One major risk with any CBDC is the potential for domestic government surveillance and financial censorship.
- *Hacking Potential:* Virtual currencies are targets for highly sophisticated hackers, who have been able to breach advanced security systems. Digital provenance makes digital currencies susceptible to hacking. Hackers can steal digital currencies from online wallets or change the protocol for digital currencies, making them unusable.
- *Scams:* Fraudsters are taking advantage of the hype surrounding virtual currencies to cheat people with fake opportunities. There may be no recourse if your digital currency is stolen. So before you get involved, it is important to know what can go wrong. Do not invest in products you do not understand.
- *Limited acceptance:* Digital currencies are still not commonly used as a means of payment by retailers and other enterprises. Though digital currencies have gained in popularity, there are still limited functionalities in everyday transactions in many places.
- *Irreversibility:* On a digital currency network, transactions are irreversible. This means that once a transaction has been completed, it cannot be undone. In circumstances where a mistake or fraud has taken place, this may be a disadvantage.
- *Complexity:* The high volatility and complexity of digital currencies make them impractical for most daily applications.
- *Anonymity:* Because Bitcoin is public, everyone can see everything. As a result, it lacks true anonymity. Instead, it provides pseudonymity.
- *Cost:* Virtual currencies can cost consumers much more to use than credit cards or even regular cash.

CONCLUSION

Digital currencies are assets that are only used for electronic transactions. There is a significant role for cryptocurrencies as investments. Cryptocurrencies may significantly alter financial structures as they exist today and transform the next generation of money and payments. Transactions including bonds, stocks, and other financial assets could eventually be traded using the technology. Digital payment systems are bringing millions of unbanked and underbanked online and rapidly revolutionizing global finance. The rise of the digital dollar, yuan, ruble, and rial will have a variety of far-reaching effects within the global cryptocurrency market.

Today, digital currency is still in early stages. Blockchain experts are optimistic about the future use of digital currencies. Traditional digital and physical currencies will likely coexist alongside CBDCs, stablecoins, and cryptocurrencies in the future. More information about digital currency can be obtained from the books in [14-21].

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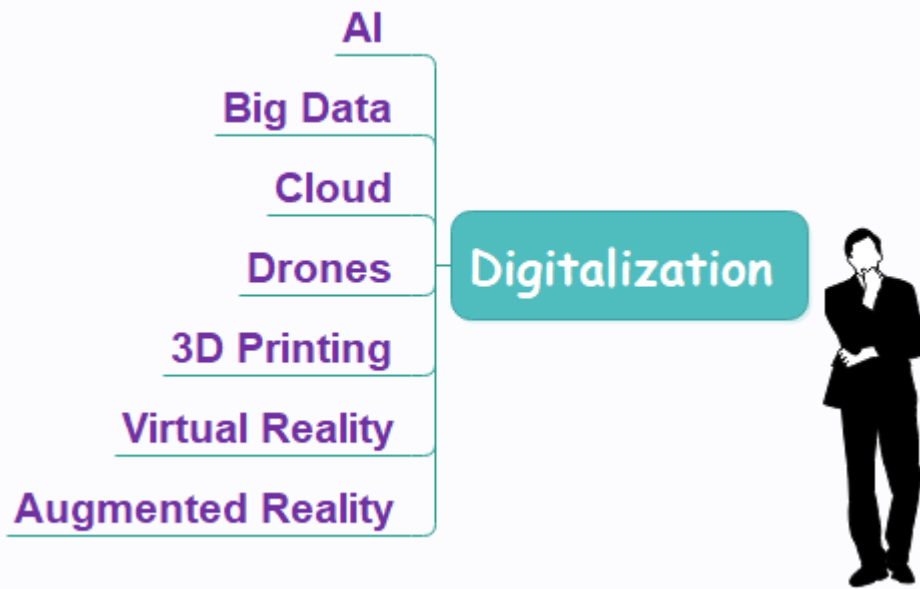


Figure 1 Some examples of digital technologies [2].



Figure 2 Some cryptocurrencies [6].

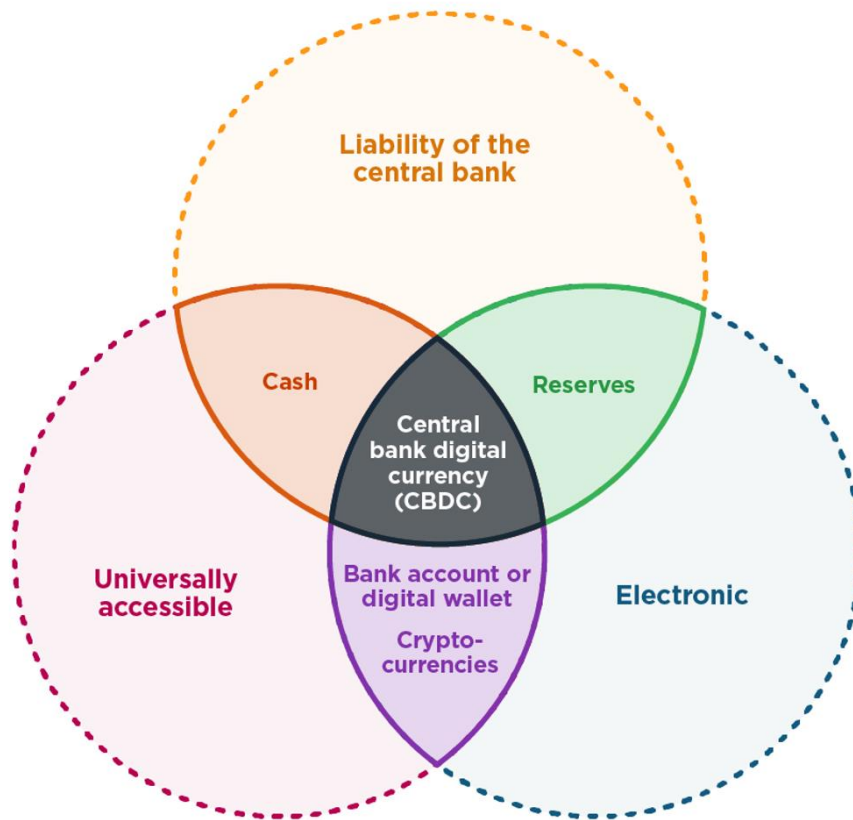


Figure 3 The relationship between CBDC and other forms of payments [7].

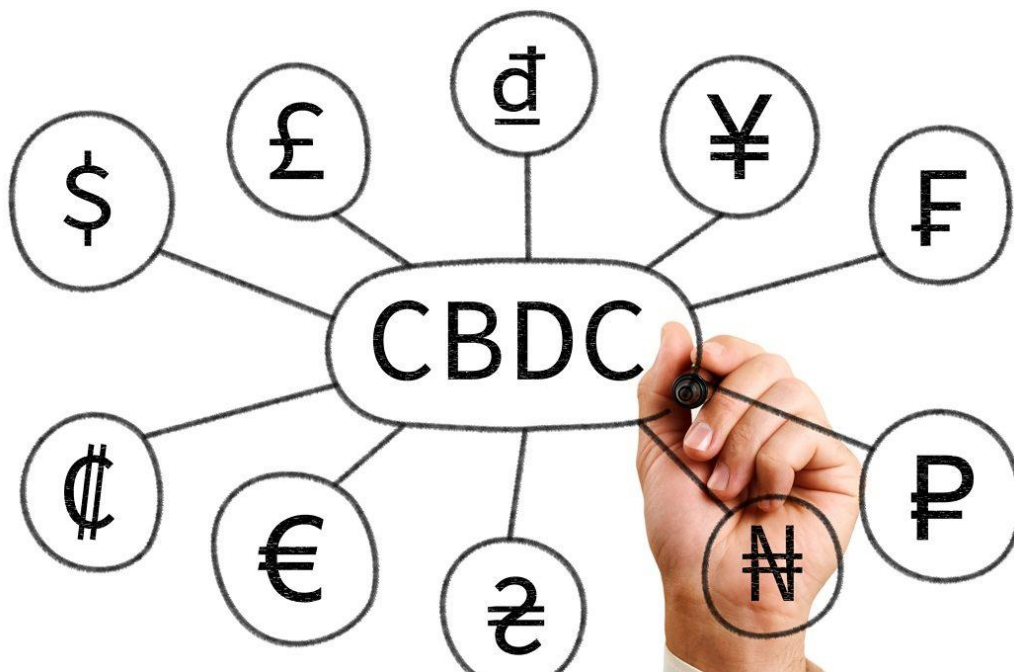


Figure 4 CBDC for some nations [9].

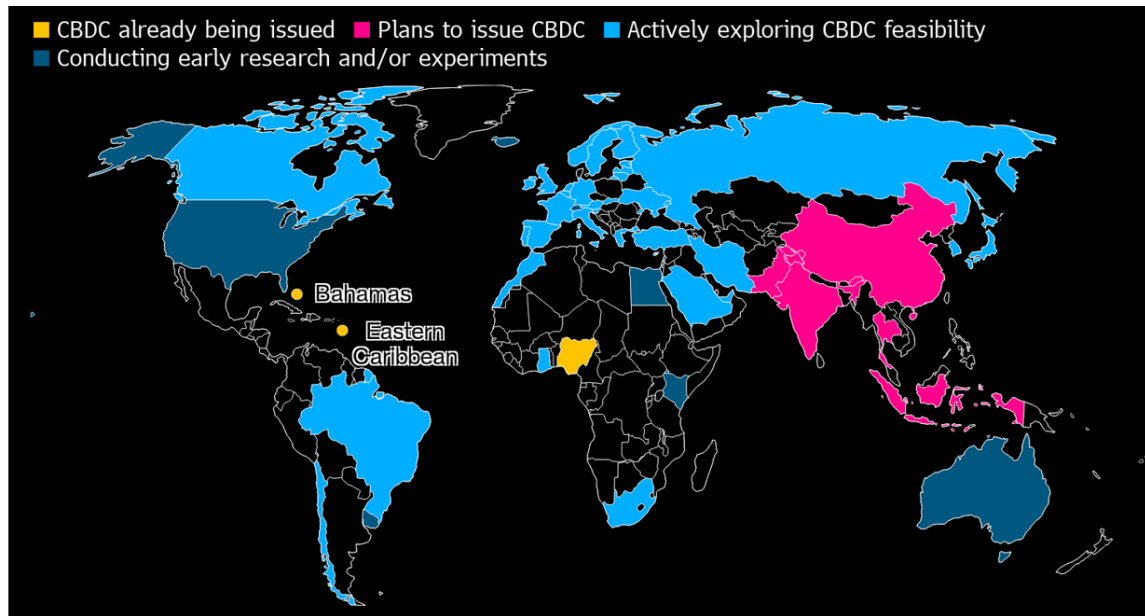


Figure 5 Central banks are at varying stages of developing digital currencies [10].