

Navigating the Challenges of CBDCs: Trust, Privacy, and Financial Stability in Nigeria's e-Naira Implementation" a block chain technology approach

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ABSTRACT: *The emergence of digital currencies and blockchain technology has radically transformed global payment systems, providing novel, expedited, and more economical transaction alternatives. Central Bank Digital Currencies (CBDCs), exemplified by the e-Naira launched by the Central Bank of Nigeria (CBN), are developing as formidable alternatives to conventional payment systems, offering potential advantages in payment settlements, financial inclusion, and the efficacy of monetary policy. The e-Naira, intended to augment Nigeria's real currency, signifies a significant advancement in the nation's financial evolution. This paper investigates the fundamental function of blockchain technology in cryptocurrencies, analyzes contemporary trends in monetary policy, studies worldwide factors contributing to the emergence of CBDCs, and evaluates the future possibilities of the e-Naira. Critical policy questions are examined, encompassing the risks and opportunities linked to CBDC implementation. This research synthesizes ideas from global trends and Nigeria's distinct financial ecosystem to offer a thorough knowledge of CBDCs, emphasizing the e-Naira, its problems, and recommendations for fostering widespread use. This study seeks to guide policy decisions and enhance the ongoing discussion around digital currency growth in emerging economies.*

KEYWORDS: CBDC, cryptocurrency, Blockchain, e-Naira, CBN.

I. INTRODUCTION

The current monetary system consists of central bank money, such as banknotes (cash), known as fiat currency, and emitted by central banks, and legitimized by the government, and money of the private sector, such as bank deposits, emitted by the private money system [1]. The role of central banks in this system is to issue money so as to ensure price stability. The advent of fintech and the formation of the payment system, however, has

altered the very concept of money to a great extent [2]. This digital revolution through the introduction of digital ledger, blockchain, and other innovations, and the introduction of central banks by privately issued virtual currencies, have led central banks to consider the benefits that can be achieved under the issuance of Central Bank Digital Currencies (CBDCs) [3]. The digital currencies are growing rapidly across the globe, with approximately ten thousand various types of digital currencies already in existence as of the first quarter of 2022, and with a predicted amount of more than US\$1.90 trillion[4]. Such growth is reflected in the increasing amounts of transactions. Cryptocurrencies, in particular, can be considered a viable system of digital payment and investment, and the trend towards using it as a means of exchange is becoming more and more popular in the world and in Nigeria.

A cryptocurrency is a digital/electronic currency that can be used in real-time via a peer-to-peer computer network or by a mobile application. It is an intangible resource which is supposed to act as a medium of exchange and which involves the use of encryption to ensure exchange, control the creation of more units and also to authenticate change of ownership [5]. Cryptocurrencies do not have a central bank to carry out monetary policy and stabilize purchasing power as opposed to fiat currencies, and thus are susceptible to price volatility due to changes in demand. Cryptocurrencies operate as any other currency that is intended to be exchanged, yet they take advantage of the decentralized technology, where a user can obtain payments and save value without banks and anonymously. Parties that engage in bitcoin transactions do not have to know each other as stated in [6] by Dierksmeier and Seele, and as such, it is anonymous. The miners produce cryptocurrencies after a process known as mining,

which entails complex computer problems solutions [7].

A number of international events have contributed to central banks interest and accelerated their creation of digital currencies [8]. They are the rise in interest in Bitcoin and other cryptocurrencies, competition with traditional forms of money, the development of stablecoins issued by the private sector, the COVID-19 epidemic, and the role of big tech companies. The development of cryptocurrencies has raised concerns in Nigeria, compelling the government and the Central Bank of Nigeria (CBN) to encourage people not to use privately issued cryptocurrencies. The CBN has remained sceptical of the economic benefits of cryptocurrency. Some of the most popular globally used cryptocurrencies include Bitcoin, Ethereum, and Ripple. Unlike the traditional mode of payment in Nigeria where the Naira is the primary unit of operation in the country, cryptocurrencies have other units of value and do not use physical money. This presents a predicament to central banks as it questions their monopoly to issue money and regulate the supply of money by use of monetary policy. Because of the rising demand of cryptocurrencies, it establishes a parallel financial system, which is tearing down the bigger financial system, posing a threat to financial stability. The resultant chaos, coupled with the possible financial and consumer risks in the cryptocurrency market, has made the government consider regulatory alternatives. An immediate ban on cryptocurrency transactions and exchanges was imposed on the country by the CBN on February 5, 2021. Subsequently on October 25, 2021, CBN unveiled its digital currency, the e-Naira, a digital currency of the local paper Naira [9].

This paper aims to address the evolution, adoption and future of central bank-issued digital currencies (CBDCs) based on e-Naira in Nigeria as a case study. The study will look at the blockchain technology, which has made it possible to create cryptocurrency, evaluate the recent trends in monetary policy, review the factors all over the world, which led to the creation of CBDCs, identify the e-Naira, analyze its functionality, risks, and advantages, discuss its future and policy-related concerns, and suggest policies that can be adopted to facilitate its usage.

1.1 The Blockchain Technology

Blockchain is an open source system and a distributed, decentralized database that allows anyone to modify the code of its framework and see what the conditions of the activities are. It is a peer-

to-peer network and a tremendous global database which is hosted by a number of computers. This solution removes the need to have middlemen to verify transactions [10]. The decentralization and dispersion of information is known as blockchain and it is usually used to archive the entries of financial ledgership or any other kind of transactions [11]. A ledger and the transactions of a ledger are highly reliable as each transaction is digitally signed to provide authenticity and integrity. The registry is digital and the transactions are stored in a number of computers with the records being unable to be altered retrospectively without change in all the following blocks [8]. Blockchain has been used to support different cryptocurrencies since its introduction in 2008. CBN [12] reports that block chain has proven beneficial in various sectors such as governance, cybersecurity, industrial processes, banking, entertainment, education and others [13] suggest that blockchain could be the backbone of global recording systems. The promise of its ability to record systematically data between the start and the finish is that it can resolve the main hindrances to efficiency, commitment and growth. Additionally, blockchain is also adopted in settlement systems, which have enabled real-time trillions of dollar transactions in the banking industry [10].

1.2 The Crypto-Currency

Cryptocurrency is a decentralized electronic payment system, which involves the usage of cryptography to secure and provide anti-counterfeiting and in the majority of cases privacy of the user is maintained [5]. It is a financial instrument usually raised by an organization or businesses to capitalize a future venture or asset capitalization [14]; [15]. Cryptocurrencies are utilized as an instrument to verify the identity of their holders and to make issuers responsible to their holders [16],[17] and it is what makes cryptocurrencies private, de-nationalized, unreserved, floating and convertible money.

Cryptocurrencies started to be circulated publicly in 2009 when an unknown developer created Bitcoin, which is based on the model of the pseudonymous Satoshi Nakamoto[4]. Bitcoin presented a decentralized digital currency which is operated on a peer-to-peer basis with blockchain technology and does not need intermediaries [18]. As the first and the most popular cryptocurrency, Bitcoin preconditioned the appearance of other digital currencies, such as Ethereum, Ripple, Dash, Monero, Classic, and Litecoin. Digital currency or

cryptocurrencies, digital cash, virtual money and electronic currency can be both a medium of exchange and a store of value.

Unlike traditional currencies, the cryptocurrencies do not require the central bank or a single administrator and can be used to make peer-to-peer transactions via the blockchain network without an intermediary [7]. Mishkin [19] discovered numerous traits of fiat money that can be applied to cryptocurrencies: they are simple to standardize, and are generally accepted, can be broken down, travel with ease, and are not damaged. All cryptocurrencies have the following characteristics: they are portable, hard to fake and extremely safe. They are also scarce and scarce in quantity, can be traded with local currencies irrespective of physical location or time and are liquid since to their exchangeability with big currencies like the Naira or the Dollar [8].

1.3 However, the widespread use of cryptocurrencies can lead to counterfeiting and its safety. Despite the advantages of cryptocurrencies, they are posing a significant threat to global financial institutions and governments[10]., cryptocurrencies present a major temptation to non-state actors and criminal organizations with the intention of evading taxes, government restrictions and international sanctions thanks to their pseudonymity and ease of carrying out transactions. In contrast to the usual currency transactions, whereby third parties like banks and credit card companies involved are trusted and recorded any transactions linked to criminal or terror activities, cryptocurrencies Global trend that resulted in CBN cryptocurrency.

Cryptocurrency transactions in Nigeria reached a value of over US\$400 million in 2020, but dropped to US\$316.90 million in 2021 [4]. However, there is an increase in the number of Nigerians who are using cryptocurrencies. This increase can be attributed to a number of factors such as the continuous devaluation of the naira, inflation, and introduction of new opportunities. However, the terrible experiences that Nigerians had with Ponzi schemes have resulted in an authoritative attitude towards cryptocurrencies, often connecting them with fraudulent schemes[6]. Consequently, the Nigerian government via the agencies such as the Central Bank of Nigeria (CBN) and the Securities and Exchange Commission (SEC) has tried to ban the use of cryptocurrencies. Contrary to other countries like Morocco or Algeria, which explicitly banned Bitcoin trading with severe repercussions, the legal aspects of cryptocurrencies in Nigeria are

unclear [5]-[6]. A potential way the introduction of a central bank digital currency (CBDC) may eventually result in the demise of digital currencies, such as cryptocurrencies and Bitcoin. The monetary capability of the central banks with the confidence of the populace in money supported by the government would have extensive motivation to pioneer a CBDC. A CBDC could reduce the cost of using cash and enhance the safety of payment services and consumer protection.

A CBDC would overcome this problem of issuing and implementing a CBDC by circumventing the zero lower bound on interest rates [9] would enable a central bank to reduce interest rates in deflationary economy and potentially negative interest rates, when necessary. A CBDC may also reduce fraud and money laundering [3][1], provide a sovereign payment option to digital payments [2], enhance local payment innovations [3], expand upon existing financial services [4], and enhance monetary policy transmission efficiencies [5].

There are four major factors around the world that have compelled central banks to research the concept of introducing digital currencies. Firstly, real cash is being increasingly used to conduct transactions and make payments. The South Koreans were found to favor cashless payment over the Philippines (77 percent to 33 percent respectively) in a poll by a Global Web Index. The issue of banknotes in Nigeria has decreased to 2.5 billion as compared to 3.3 billion in 2021 [6]-[7].

Secondly, electronic and digital payments are more accepted worldwide. The worth of digital payments in Nigeria has increased to US\$2.60 trillion in 2021 as compared to approximately US\$324 billion in 2017[19].

Third, there is a lack of rapid and effective answers to the growing desire for cashless payments, compounded by misguided suspicions that central banks are causing Hyperinflation generated chances for non-government entities to launch new types of “private currencies,” which gained popularity and recognition worldwide, including in Nigeria.

The fourth trend is the increasing expectation that the central banks will introduce state-owned digital currencies as a response to the emergence of the private digital currencies. It is seen that close to 85% of the central banks are deliberating the prospects of digital currencies[8]-[9] according to a survey of over 1,600 financial professionals in 22 countries, 85% of the central banks of the financial institutions in the world expect their central bank to issue a digital currency within less than four years.

The most recurrent arguments against the issue and introduction of a CBDC are the argument of interference with traditional payment and banking infrastructure [4][1] and the fact that it would deprive people of their privacy [2][3], there is the increased risk of cybersecurity problems [4] and the threat of bank disintermediation becomes even more common [5]. Despite these problems, Nigeria has proceeded to develop digital currencies, aware that digital currencies would enable the implementation of monetary policy more efficiently than cash, as long as the costs of using digital currencies do not become prohibitively high [6].

1.4 The e-Naira

A central bank digital currency (CBDC) is the digital version of the paper money and is a liability of the issuing central bank [7]. It is an electronic substitute of real cash and can play all the functions of traditional money. First, in January 2017, Central Bank of Nigeria (CBN) banned regulated bodies to execute any activities using the virtual currencies [8][19]. This stand was solidified on February 5, 2021, when it was completely banned to deal with cryptocurrencies and facilitate their exchange on the grounds of anonymity, absence of Know-Your-Customer (KYC) checks, and the possibility of criminal activity [9]. CBN pointed out that there is need to protect Nigerians against fraud, investment risks, money laundering, and funding of terror activities and other types of criminal activities involved with unregulated companies.

In 2022, the CBN fined six commercial banks a total of 1.314 billion Nairas because of their non-compliance with the cryptocurrency ban and regulations on account closures of those engaging in cryptocurrency trading [9]. This ban has raised a significant controversy and frustration among Nigerians, and most of them perceive cryptocurrency as a safe haven in a crashing economy. With more than half a billion dollars of Bitcoin trade in the past years, Nigeria has become the second-largest Bitcoin market in the world, after the United States [5]. Following the introduction of the cryptocurrency ban, a few months later, the CBN announced its own online currency, the e-Naira, on October 25, 2021[19]. The e-Naira is the electronic currency, which is legally provided under the sovereignty of Nigeria, the electronic form of fiat money [2]. e-Naira is expected to be a secure and efficient digital payment that will replace the actual cash. It is bought by the population, just like

digital renminbi in China or e-krona in Sweden, and transferred to the e-wallets of users, retaining the same value as the traditional naira notes [1].going around these protection mechanisms, which makes it difficult to stop illegal activity [12]. Consequently, regulation of cryptocurrencies is a challenge to several countries.

II. METHODOLOGY

The Operation, Risks, and Benefits of Nigeria's Digital Currency (e-Naira)

Cryptocurrency is a decentralized, encrypted online currency, founded on blockchain technology, and the e-Naira is a government-regulated online currency, which is supposed to be a replica of the official currency in Nigeria. The e-Naira is similar to the actual coins or money, it is a liability of the Central Bank of Nigeria (CBN). Although it also relies on the same blockchain technology as such cryptocurrencies as Bitcoin or Ethereum, the e-Naira is not similar as there are strict access control requirements imposed by the central bank. The e-Naira is not a decentralized cryptocurrency as it is not a financial instrument independent of physical currency, but a digital representation of the national currency with its value being anchored to the physical naira.

In order to use the e-Naira, people have to create an e-Naira wallet, a virtual storage system relying on blockchain technology. Speed Wallet is offered by the government only initially, although in the end, the financial institutions will come up with their own versions. The e-Naira app can be downloaded in the Google Play Store or the Apple Store where individuals are provided with an opportunity to register it. USSD codes can be used to register in feature phones. Upon installation, users are able to add money in their e-Naira wallets either through bank accounts or credit cards and use the electronic currency to send and receive money[7].

e-Naira seeks to encourage financial inclusion by initiating millions of Nigerians, who are not banked, into the financial system. Over 58 million adults in Nigeria had not been banked as of 2020 and 35 million of them had mobile phones, which might be used to access them via mobile money. Furthermore, the CBN study [2] indicates that printing physical currency is often expensive, and the high price of printing physical currency (N307 billion) amounted to N307 billion in 2014-2019 could be down with the use of digital currency. The e-Naira is an equivalent of real money stored in the e-wallets of the users in contrast to digital banking where money is stored in a bank and transactions are carried out using the money[19]. This will help individuals to transact using the e-

Naira as actual money that does not involve intermediaries, thus cutting cost and time of transaction. It also allows the Nigerians without bank accounts to conduct business without necessarily having to have personal bank accounts [1].

CBN has highlighted a number of key advantages of the e-Naira to Nigeria and its citizens, such as making financial inclusion faster, lowering the cost of cash handling, direct welfare disbursements, the informal economy, tax collection, cross-border trade and remittances, efficiency in payments, economic growth, building credit histories, and supporting the cashless policy of the Central Bank by eliminating multiple clearing and settlement steps in domestic digital transactions [

However, the advent of e-Naira is also threatening. These are operational risks, cybersecurity risks, probable disruptions because of internet connectivity issues, and inadequate digital literacy. Internet penetration in Africa is at 43.1 percent, as opposed to the global average of 66.2% in 2021, with the internet penetration of Nigeria being 55.4 percent in 2023. Also, approximately 92 million Nigerians cannot access electricity, which makes it one of the least electricity access countries in the world, as of the Tracking SDG 7: Energy Progress Report 2022. The other danger is an increase in macroeconomic instability since the digital currencies will make the economy more susceptible to volatility [5]-[6]. Risks of a non-viable legal tender. Besides, the benefits and difficulties of a digital currency issued by the central bank vary depending on the particular work of the central bank[18].

2.1 The Future of e-Naira

The introduction of alternative payment methods as digital currencies is one of the milestones in the realm of payments owing to the creation of blockchain technology. This has been observed in the creation of eNaira by the CBN as a digital version of naira. It sets an example to other central banks to contemplate the launch of their own central bank digital currencies (CBDCs). The adoption of the eNaira in Nigeria has shown that it can be a potent tool of supporting successful monetary policies, improving the payment system, and promoting financial inclusion, among an endless list of benefits. As CBN continues to strive to build consumer confidence in digital money, it is hoped that in the near future, it will lead to a gradual shift

in the utilization of cash and digital money. It is projected that the amount of eNaira wallets and transactions will grow exponentially in the coming five years. CBN estimates that eNaira wallets will be downloaded over 20 million and transactions will be 300 million by 2026 [6]. This change provides a number of investment and innovation opportunities, such as the establishment of positions to onboard agents and the design of wallet designs and hardware tokens. These opportunities are urged to be taken by foreign investors, as they will stimulate innovation and enhance competition in the digital arena in Nigeria. Although a few governments have been experimenting with digital currencies, the eNaira issued by CBN is unique due to its scalability, interoperability, flexibility, and adaptability. The eNaira is supposed to facilitate the opportunity of future development, interact with innovations in the field of payments with digital banks in the private sector, promote multi-digital currency projects by central banks, and adapt to the changing governmental policy. With the second and third phases of implementation of the eNaira, which will involve massive publicity campaigns, the economic gains that the eNaira will bring about will be colossal as the CBN anticipates more people using the eNaira.

2.2 Nigerian Policy Concern

The solution is central bank digital currencies (CBDCs), according to some of the most important officials, there is no problem with this solution. Even though central bankers are increasingly convinced that CBDCs may be a viable alternative [3], the question remains whether the same can be accomplished with alternative approaches. The current policies do not exhaustively take care of the problems of transitioning to a digital world, especially with the limitations of physical money. The efforts to maintain the utilization of cash in the broad form may result in gigantic economic expenses with minimal apparent rewards, and the implementation of CBDCs seems instrumental in maintaining the financial system stable. Monetary sovereignty is also being challenged, especially with the rise of the BigTech and cryptocurrencies, in conjunction with the significant network effects of digital services and payments. Lack of action against regulatory issues may put the CBDCs at financial stability risk akin to that of banknotes in the open banking era and money-market mutual funds prior to the 2008 financial crisis. In Nigeria, the successful distribution of the e-Naira hinges on essential aspects such as stable internet connectivity and

regular access to power. However, a lack of trust in digital currencies is one of the impediments. International evaluation has pointed out that internationally, Nigeria is known to have a high risk profile with regards to money laundering and terrorism funding. As an example, in February 2023, Nigeria was added to the greylist of the Financial Action Task Force (FATF) because of the lack of efforts to curb these problems. In addition in 2022, the Basel Institute of Governance placed Nigeria number 17 out of 128 countries in terms of its money laundering and financing of terrorism concerns,[1]-[3].

The architecture of the CBDC in Nigeria, the e-Naira, allows the Central Bank of Nigeria (CBN) to monitor all the transactions and this can help in identification and preventing money laundering and terrorist financing and thus enhancing the global risk rating of the country. However, the Nigerians have been concerned with such a high level of surveillance. Some believe that the e-Naira was also supposed to be monitored by the government on financial operations, which may jeopardize the privacy aspect and result in state control. This mistrust impacts a lot on the use of the CBDC.

2.3 Policies to Encourage the Adoption of eNaira

Solving the various challenges facing the penetration of the eNaira is a complicated problem that cannot be achieved in the near future. Lack of power and internet connectivity is one of the main infrastructure issues that need to be renovated as the priority. One of the options is to make the eNaira platform available offline, which the Central Bank of Nigeria (CBN) is already working on by introducing the Unstructured Supplementary Service Data (USSD) coding. The program enables Nigerians that do not have internet-enabled phones to make transactions using the eNaira. The CBN ought to make eNaira accessible to everyone with a mobile phone to boost its utilization. Also, incentives like rebates on payment of income taxes or discounts on using eNaira to pay services such as transportation (as in October 2022)[19][7] may help stimulate widespread use.

The central banks are usually faced with difficult decisions in terms of prioritizing the policy objectives, devising strategies to be adopted, and choosing the design that would reduce the adverse economic effects. The CBDCs are an indication of a close partnership between the public and the private sectors as both the sectors can enjoy the innovation

of the private sector and the responsibility of the respective sectors is well defined. This could include adopting "Intermediated" or "Hybrid" CBDC designs. An effective and widely adopted CBDCs could be used as a supplementary payment system, with many applications, addressing market failures, and encouraging the further development and competition of payments, finance, and trade.

The risks eNaira might present to commercial banks, including increased volatility of funding sources, bank runs, and disintermediation, may be mitigated by putting limits on eNaira holdings or making interest rates on eNaira positions variable to deter large holdings. The International Monetary Fund [1]-[4] suggests that a fast liquidity injection might be beneficial to commercial banks should depositors empty bank accounts to join the eNaira in case of a financial crisis. Also, CBDCs may be interest-bearing, at interest rates lower than policy rates, not just to help effective monetary policy, but also to enhance their attractiveness as value repositories.

At the international level, CBDCs such as the eNaira have the potential to compete with foreign currencies. It is even predicted that the introduction of international CBDCs might lead to the implementation of other alternative digital currencies. Although some have predicted that the digital currency of China may overtake the US dollar as a world reserve currency [19], [4], reserve currency leadership is determined by macroeconomic factors, including low inflation, sufficient supply of safe assets and credibility of economic and legal systems. Consequently, the positioning of the US dollar as the leading reserve currency in the world will persist because of its extensive and effective capital markets and lack of capital restrictions- elements that are crucial in maintaining confidence in the world[16].

III. DISCUSSION

With the world moving towards digital currencies, the eNaira hopes to enhance the effectiveness of monetary policies and reduce reliance on hard cash by facilitating effective and safe digital transactions. Although there were early issues concerning trust and regulatory frameworks, the eNaira has achieved significant progress since its inception. The eNaira exemplifies the proactive stance taken by Nigeria towards digital innovations on improving economic growth and bolstering financial security. The success of the results in the initial year of the eNaira launch are encouraging, which means that it is a good step toward success

and a proactive action of central banks to the growing role played by cryptocurrencies.

IV. CONCLUSION

preparation, and constant innovation to fully harness the eNaira's potential in altering Nigeria's financial landscape. Acknowledging the concerns, proactive measures have been put in place to manage vulnerabilities and avert any setbacks. Above all, the lessons gained demonstrate the crucial role of raising awareness and establishing trust within Insights during its implementation in practice. As this paper demonstrates, block chain technology and the incorporation of Cryptocurrency in the shape of e-Naira are a necessity. The CBDC upon adoption has the potential to create a large scale adoption and address the pointed out challenges and will be used to inform policy decision on digital currency adoption in Nigerian economy and other developing economies.

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