

THE IMPACT OF CENTRAL BANK DIGITAL CURRENCY ON DIGITAL FINANCIAL INCLUSION: EVIDENCE FROM NIGERIA

Omoniyi Yemi OGUNRINDE, PhD Candidate*

Abstract

Financial inclusion continues to be a significant challenge in Nigeria since many Nigerians are excluded from the financial ecosystem. This article investigates the impact of the Central Bank Digital Currency (CBDC) on digital financial inclusion using a quantitative research design and data collected from Nigerians. This was a correlational quantitative research study using a survey questionnaire distributed to 500 members of the Nigerian public using the eNaira. The results indicate that CBDC has a positive impact on digital financial inclusion; it facilitates improved access to financial services, reduces transaction costs, increases the number of banked members of the population, and enhances the efficiency of digital payments. This study concludes that CBDC is essential to improving financial inclusion in Nigeria. Based on these findings, it is recommended that policymakers in Nigeria continue to promote and prioritize the adoption of CBDC. Therefore, future research could explore the impact of CBDC on other aspects of financial inclusion beyond those explored in this study. For example, the research could be conducted to examine how CBDC impacts access to credit or explore the potential impact of CBDC on financial stability and monetary policy.

Keywords: financial technology, financial access, monetary policy, technological innovation

JEL Classification: E58; G38

* Programme Policy Officer, United Nations Nigeria, Abuja, Nigeria.

1. Introduction

Technological advancements in the financial sector have led to digital breakthroughs, such as mobile money, FinTechs, stablecoins, cryptocurrencies, and Central Bank Digital Currency (CBDC) (Ozili, 2022a). The rise in digital payment innovations has accelerated the cashless movement, particularly in developing and emerging economies (Ozili, 2023). The increasing volume of CBDCs is attributed to the growth in blockchain-enabled distributed ledger technology and the dominance of cryptocurrency (Alliance for Financial Inclusion, 2022; Ozili, 2022a). CBDCs offer several benefits, including enhancing the effectiveness of monetary policies, promoting a cashless society, and enabling financial inclusion (Banet & Lebeau, 2022; Cooper et al., 2019; Ozili, 2023). Central banks worldwide recognize the potential of CBDCs to boost national economies through financial inclusion (Auer et al., 2021). Therefore, CBDCs represent a powerful tool for financial inclusion demonstrating the evolution of digital technology. Financial inclusion is the distribution of financial services by numerous providers, the majority of which are in the private sector, to reach everyone who can utilise them (Kama & Adigun, 2013)

Financial inclusion remains a major challenge in Nigeria. In this developing nation, the bulk of the money in the economy stays outside the banking system due to a lack of financial inclusion (Kama & Adigun, 2013). Many adults in Nigeria remain excluded from digital payment ecosystems thus solely depending on cash for their financial needs. Most of the citizens in Nigeria are comfortable living their lives with no relationship with the banking system. Nigeria is one of the countries in Sub-Saharan Africa with many unbanked population (Ekong & Ekong, 2022). Approximately 60% of the Nigerian population is not part of the banking system (Global Finance, 2021). All these demonstrate the need to establish solutions that will foster financial inclusion in the country.

The purpose of this research study was to investigate the impact of CBDCs on digital financial inclusion in Nigeria. Particularly, to explore the extent to which CBDC can serve as a solution promoting financial inclusion in this emerging economy. This means that understanding the role played by CBDC towards financial improvement in Nigeria encompasses exploring its impact on financial inclusion. This is even more significant because there remain many gaps in the literature towards financial inclusion in Nigeria (Ekong & Ekong, 2022;

Ozili, 2022b). For instance, it is essential to investigate the role of digital finances regarding the promotion of financial inclusion. This is because there is a lack of adequate recent literature on the role of digital financing in combatting financial exclusion in Nigeria. Additionally, empirical investigation regarding the impact of digital currency on financial inclusion remains scanty concerning developing economies such as Nigeria. For this reason, this research paper aimed at making several contributions to the literature in this field. The first contribution is to the literature on financial inclusion in developing nations. This study utilized Nigeria to illustrate the severity of the problem of a lack of financial inclusion in developing nations and its impact on the economy. The second contribution is the use of digital currency in promoting financial inclusion. The study achieves this by exploring the role of CBDC as a digital currency applied to promote financial inclusion. Accordingly, the research question that was addressed in this study was, what is the impact of CBDC on digital financial inclusion in Nigeria?

The structure of the remainder of this research paper is as follows. The second section of the paper is the literature review which conducted a critical evaluation of the existing research on CBDC and its role in promoting financial inclusion in Nigeria. The study's research methodology is highlighted in the third section illustrating the key methods used to conduct this study. The next section is results which entailed the presentation of quantitative data gathered to test the research hypotheses. This section also includes a discussion of the research findings. The study's primary findings and important suggestions based on its findings are summarized in the conclusion section of the research paper.

2. Literature review

2.1 Theoretical underpinnings

The dissatisfaction theory of financial inclusion forms the foundation of this research study. This theory advances that financial exclusion takes place the moment that people show dissatisfaction with the actions of financial institutions toward them as customers. When customers experience frustration, they may opt to exit the financial system altogether. As a result, they may be more likely to trust the central bank than financial institutions, as the former offers an alternative to accessing the financial system without having to interact

directly with financial institutions. This is because the central bank provides people with the opportunity to access the financial system without the need to deal directly with financial institutions. Thus, the issuance of CBDC is one of the ways that the central bank can provide this alternative. However, careful consideration must be given to the potential risks and challenges associated with CBDCs to ensure that their benefits are maximized while minimizing any potential harm. In the case of Nigeria, the central bank has recently issued the eNaira as a means of providing Nigerians with an alternative way of accessing the financial system. According to Ozili (2023), the eNaira represents a significant step forward in the quest for financial inclusion in Nigeria. Thus, the dissatisfaction theory of financial inclusion offers a useful framework for understanding the challenges facing financial institutions in their efforts to reach underserved populations. The issuance of CBDCs like the eNaira represents a promising way forward in the quest for greater financial inclusion.

2.2 CBDC, definition, and implementation in Nigeria

There are several different CBDC definitions illustrated in the literature. (Auer et al., 2021; Bitter, 2020; Bordo & Levin, 2017; Cooper et al. 2019; Ozili, 2022b). According to Auer et al. (2021), CBDC is a form of digital money usually dominated by the national unit of account having a direct liability to the central bank. On the other hand, Ozili (2022a) defines CBDC as digital currency issued by a central bank and is a liability of the central bank that issued it. Further, Bitter (2020) defines CBDC as an interest-bearing issued centrally and existing as an account-based digital format of the liability of the central bank accessed by the general public. Bordo and Levin (2017) define CBDC as the monetary value stored electronically representing a liability to the central bank. Contrariwise, Ekong and Ekong (2022) define CBDC as government-backed cryptocurrencies issued by central banks and accepted for financial settlements. In further reviewing the definitions of CBDC, this also includes that of Kumhof and Noone (2018) as electronic central bank money with more access than reserves demonstrating greater functionality for retail transactions compared to cash with a separate operational structure in comparison to other forms of central bank money.

While the above definitions of CBDC lack consistency, there are several common emerging characteristics. For instance, the above CBDC definitions demonstrate it to be a digital currency that is a liability

to the central bank. Auer et al. (2021) indicate that CBDC as the digital liability of the central bank can become a new instrument for settlement between financial institutions. At the same time, CBDCs can become a central bank liability by serving as digital cash accessible to all. Additionally, CBDC as a liability to the central bank tends to differ from cash in terms of physical attributes despite having the same function as cash towards making payments. This is because CBDC is a currency issued by a central bank. Further, these definitions show that CBDC is an emerging regulated alternative offered by central banks to private cryptocurrencies and stablecoins. Cooper et al. (2019) explain that based on this aspect of the use of CBDC it serves as a tool for signalling national digitalizing efforts in tandem with peers. Thus, CBDC is a currency that is created and regulated by a national monetary authority. The definitions also demonstrate that CBDC serves as a store of value that transfers purchase power from the present day into the future. Further, the above definitions indicate that CBDC is a unit of account that can be utilized to value goods and foster price comparisons between items (Alliance for Financial Inclusion, 2022). To add, the definitions indicate that CBDC is exchangeable as a payment instrument.

The digital nature of CBDC reveals some of its key characteristics. One of these characteristics is that CBDC is programmable thus unlocking automation (Banet & Lebeau, 2022). Another digital trait of CBDC is it is electronic therefore allowing for transparency as its electronic nature makes it traceable (Alliance for Financial Inclusion, 2022). Another trait of CBDC is it is an essential digital component of the central bank. This is according to Auer et al. (2021) who perceive CBDCs as digital extensions of the existing form of central bank money and central bank settlement account. CBDCs offer the digital means for legally tended financial transactions and they alleviate the volatility risk linked to other untended cryptos (Ekong & Ekong, 2022).

The literature further delves into the nature of CBDC by reviewing its categories and nature. For instance, Auer et al. (2021) explain that CBDCs exist as account-based or token-based. The account-based CBDC refer to those relying on some element of identification while the token-based mean that the CBDC enable anonymity in payments. Further, CBDCs can exist in the form of DLT or as conventional technological infrastructures (Ozili, 2022a). The application of CBDC can be for wholesale purposes by financial

institutions or retail use by households and businesses (Alliance for Financial Inclusion, 2022).

A historical analysis of CBDC reveals that the idea of extending central bank money as digital currency available to the public is not something new. Auer et al. (2021) opine that a proposal was made in 1987 on deposited currency meant to improve payments and reduce the considerable reliance on deposit insurance. Over the past few years, several central banks worked on internal projects to gain a better understanding of the technology of cryptocurrencies and the potential use of DLT on government-issued digital currencies. A trace of this reveals the central banks of Canada, Netherlands, Singapore, and the UK. However, the findings of the internal projects were not conclusive because they demonstrated that DLT lacked maturity for use as a major central bank payment system. Restored faith in digital currency took place in 2016 following several central banks launching related research projects to be utilized for while reasons (Auer et al., 2021).

A review of CBDC technologies reveals the centralized nature of CBDC. According to Auer et al (2021), CBDCs have decentralization enabled through DLT. DLT entails permissionless technology such as Bitcoin and other forms of cryptocurrencies (Alliance for Financial Inclusion, 2022). This includes the permissioned variant encompassing a network of known and vetted validators that are jointly augmented into a ledger.

There is some literature developed concerning CBDC implementation in Nigeria (Ekong & Ekong, 2022; Ozili, 2023). Ozili (2023) reveals that Nigeria launched its first CBDC commonly referred to as the eNaira on the 25th of September 2021. eNaira has similar features to the paper Naira. However, this digital currency provides additional payment possibilities for citizens. For this reason, the eNaira CBDC serves as an efficient payment tool. According to Ekong and Ekong (2022) launching the eNaira has enabled Nigeria to gain international recognition. Additionally, eNaira provides users with several other benefits including increased financial inclusion. Other benefits of this CBDC include enhanced efficiency of payments, improved monetary policy effectiveness, implemented targeted social interventions, improved tax collection, and fostering cheaper and faster remittance inflows (Auer et al., 2021; Ozili, 2023). The study by Ozili (2023) explores the use of eNaira in the country and makes findings that it is most popular in the northern states of Nigeria compared to the southern states.

2.3 Financial inclusion and the situation in Nigeria

The review of the literature reveals that there are several definitions of financial inclusion (Allen et al., 2022; Auer et al. 2021; Demirgüç-Kunt et al. 2015; Ozili, 2018). For instance, Demirgüç-Kunt et al (2015) define financial inclusion as access to and application of formal financial services to improve the welfare of citizens in a country. Allen et al. (2022) define financial inclusion as the application of formal financial services. The definition of financial inclusion by Ozili (2018) is the provision of affordable financial services to people. Conversely, Auer et al. (2021) define financial inclusion as how individuals and businesses can access useful and affordable financial products and services to meet their needs such as payments, transactions, savings, credit, and insurance. Based on the above definitions, financial inclusion is the ability of people to have access to transactions that serve as the initial step towards financial inclusion. This is because such a transaction allows them to store and send money and receive payments.

Extant literature explores the benefits of financial inclusion (Kama & Adigun, 2013; Ozili, 2023). Thus, financial inclusion through improved access to financial services brings about considerable benefits such as the creation of a large depository of savings, investment, and investable funds, and the establishment of global wealth generation. Kama and Adigun (2013) elucidate that access to financial services by low-income earners enables considerable capital accumulation, credit development, and a rise in investment. One key reason for this growth is, low-income earners tend to constitute the largest proportion of the population and for this reason, they control a large section of the idle funds in the economy. Ozili (2023) finds that financial inclusion is beneficial because it enables persons and businesses to have access to affordable formal and financial services which results in the improvement of their welfare. According to Ozili et al. (2021), financial inclusion is beneficial to Nigeria because it can result in economic advantages because of the access to formal financial services which enables Nigerians to invest in education and entrepreneurial services. Adeola and Evans (2017) reiterate this by explaining, financial inclusion in Nigeria can fasten economic diversification, bringing about economic gains, and facilitating considerable prosperity in the country. Consequently, financial inclusion has the benefits of reducing poverty and increasing income. Kama and Adigun (2013) indicate that financial inclusion is essential in

providing access to people around the population excluded from financial services.

However, the benefits of financial inclusion are only achievable when it is done correctly. This is according to Ozili (2022b) who explains that any improper implementation of financial inclusion can expose the poor to risk within the formal financial system. For instance, the risks regarding the utilization of financial products and services. Thus, these are risks that worsen the well-being of the poorest while increasing income inequality. Therefore, despite the benefits provided by financial inclusion, there remain challenges to its attainment. Ozil (2022b) indicates that on the demand side, the challenges of financial inclusion include the lack of awareness concerning present financial services, superstitious and religious beliefs regarding banking, increasing financial illiteracy, and high transaction costs. Conversely, the challenges on the supply side are such as the unwillingness of banks to facilitate financial inclusion programs, minimum bank penetration, and the unwillingness of banks to incur the social cost of the bank-led financial inclusion program.

In Nigeria, financial inclusion is a major challenge (Ozili, 2023; Ozili, 2021). Ozili (2021) explains that financial inclusion is a growing concern in Nigeria. This is because the country demonstrates less inclusion when compared to more developed African countries such as South Africa. Most Nigerians live outside of the financial system. According to the Central Bank of Nigeria (2021), the currency outside of the banking system in Nigeria has grown considerably between 2015 and 2020 increasing from 1.46 trillion to 2.3 trillion Naira respectively. The absence of financial inclusion in Nigeria is worse in certain regions of the economy and the rural areas in comparison to the urban areas. Kama and Adigun (2013) point out, rural Nigeria shows disproportionate exclusion from financial services. Further, the North region demonstrates the highest percentage of the unbanked population (Kama & Adigun, 2013). At the same time, this region also shows the least number of bank branches.

Several challenges have contributed to the high rate of financial exclusion in Nigeria. One of these challenges is the lack of financial sophistication among rural dwellers because of limited financial literacy. According to Kama and Adigun (2013) most of the approximately 40 million financially excluded Nigerians lack knowledge regarding the services and benefits of financial services. The high rate of poverty is also a challenge towards financial inclusion. Additionally,

the uncompetitive wage levels, especially within the public sector, continue to be a hindrance to financial inclusion in Nigeria. The inability of many Nigerians to save because of inflation is yet a challenge undermining financial inclusion. Ozili (2021) explain that political interference is also a challenge to financial inclusion in Nigeria. For instance, lawmakers have blocked some attempts by the financial system regulator, the Central Bank of Nigeria to implement certain financial inclusion policies. The outcome is a country that cannot attain its financial inclusion goals. The high cost of doing business is also a challenge towards the attainment of financial inclusion in Nigeria. Some of the reasons for this high cost of doing business are high energy costs, lack of a national database with customers' financial history, and insufficient credit bureaus. Thus, this is a development that causes a rise in the interest rates on loans and transaction costs. Additionally, corruption exists as a major challenge to financial inclusion in Nigeria. For instance, there have been cases of misappropriation of the public funds allocated for financial inclusion programs and activities. This is a development that took place in the 1990s a time when Nigeria was facing the banking crisis which significantly eroded the confidence of the populace in banks (Kama & Adigun, 2013). Excessive spending by the political class aggravated this issue resulting in a high level of currency that was not within the banking system.

Thus, this review of the literature reveals past efforts for financial inclusion in Nigeria (Kama & Adigun, 2013). Before the recent efforts towards the promotion of financial inclusion, the Nigerian economy was mainly a cash-based one with a substantial proportion of the narrow money stock existing in the form of current that circulated outside of the banking system. According to Kama and Adigun (2013), an estimated 54 million Nigerians lack financial services and tend to receive services via informal institutions, or they are completely unbanked. For those who are formally banked majority use the products and services of the deposit money banks as salaried workers or as businesspeople while the remainder of the formally served to utilize the services of other formal financial institutions such as microfinance institutions and finance houses. Over the years, the Nigerian government and several monetary authorities have implemented various policies to deepen financial inclusion in the economy. These policies have encompassed the involvement of several institutions including the establishment of community and

microfinance banks (Kama & Adigun, 2013). The significance of these goals is to improve access for the financially excluded to formal financial services. However, the Nigerian government's recent attempt at financial inclusion is the use of CBDC. According to Ozili (2023), the central bank of Nigeria believes that the eNaira is the digital currency that will broaden financial inclusion benefiting Nigerians.

The adoption of modern electronic payment channels and cashless policy played an integral role towards Nigeria's development of its CBDC, eNaira. The basis of the development of this policy is the following three key objectives (Kama & Adigun, 2013). The first objective is to develop and modernize the payment system. The second objective is reducing banking costs to drive financial inclusion. The final objective is to improve the effectiveness of the monetary policy. Thus, the expectation was that the policy would drive financial inclusion through the implicit assumption that reducing banking costs and developing a more efficient payment system would encourage more people and businesses to adopt formal financial services and platforms.

2.4 CBDC facilitates financial inclusion

Financial inclusion is one of the main drivers and advantages of issuing CBDC. Thus, several studies in CBDC literature predict a relationship between CBDC and financial inclusion (Auer et al., 2021; Foster et al., 2021; Ozili, 2021). Auer et al. (2021) observe that central banks continue to show interest in CBDCs as a new form of innovation towards financial inclusion. Ozili (2021) demonstrates that the use of CBDC in the promotion of financial inclusion has grown considerably. This promotion encompasses the digitalization of value chains within the economy, therefore, improving the efficiency of digital payments while reducing the related transaction cost and enhancing access to digital financial services. The study conducted by Foster et al. (2021) also demonstrates the role played by CBDC towards financial inclusion. According to the findings of this study, CBDC is essential in accelerating financial inclusion among members of the excluded populations. This is by providing these people access to central bank currency enabling the very poorest to avoid high costs charged by banks. Ozili (2023) opines that CBDC increases financial inclusion in Nigeria because it provides low transaction costs for users.

In further reviewing the impact of CBDC towards financial inclusion, the literature demonstrates that the quest for digital currency

serves as a drive towards the redesign of the financial system that is citizen-friendly and inclusive. For instance, Yuhelson et al. (2020) elucidate that the use of digital currency via authorized e-cash works to widen the entrance and capacity for persons in financially included activities. The findings of Foster et al. (2021) opine that a CBDC accelerates financial inclusion in the excluded populations by providing people with access to central bank currency. This enables the poorest to avoid the high costs charged by banks and mobile money providers. Engert and Fung (2017) postulate that financial inclusion is essential for adopting CBDC as it regards emerging economies. Thus, most emerging countries are interested in CBDC because of the financial inclusion benefit. Barontini and Holden (2019), indicate that central banks are issuing CBDCs as a way of broadening financial inclusion goals. Maniff (2020) indicate that CBDC results in financial inclusion by modernizing payment systems via new and increasingly efficient technologies serving as additional functionality. Further, Maniff (2020) opine that an increase in financial inclusion can occur by providing a viable solution to the frictions experienced in cross-border payments.

Additionally, the findings of Murakami et al. (2022) opine that CBDC has the advantage of financial inclusion for underserved adults and the unbanked population, improving cross-border payments, and fostering fiscal transfers. Armas et al. (2022) reiterate the CBDCs' contribution to making financial services more accessible to the unbanked population. According to this study, CBDC helps the unbanked to access digital payment instruments through the following ways: payment in public transport, payment of wages within the informal sector, fund transfers without reliance on the banking system, and extending the accessibility of digital payments to the government. Barr et al. (2020) affirm that the CBDC enables financial inclusion through the expansion of access to financial services. The findings of Allen et al. (2022) reveal that CBDC facilitates financial inclusion by reducing transaction fees and the cost related to financial services. Similar findings are made by Zuluaga (2021) who opines that CBDCs are instrumental in the reduction of high fees, therefore, becoming appealing to the unbanked persons. Negrea and Scarlat (2022) confirm these results by indicating that CBDC is instrumental in serving unbanked adults in instances where there is a lack of traditional infrastructure. This is instrumental in enhancing the population's access to capital. The study by Banet and Lebeau (2022) further confirms the relationship between financial inclusion and CBDC.

Didenko and Buckley (2021) in their study indicate that a well-developed CBDC provides a viable solution to the challenges of financial inclusion. Despite this, more research should be conducted to develop specific knowledge towards a well-designed CBDC.

As a result, central banks recognise the significance of digital payments towards financial inclusion this has led them to engage more in the expansion of their regulatory toolbox in a bid to address the outstanding payment needs of people through leveraging digital payment innovation. Banet and Lebeau (2022) opine, CBDC fosters financial inclusion if the condition on its fixed use cost and its interest rate remains high enough. This increase in financial inclusion occurs in two ways. The first is when the CBDC fixed cost remains low resulting in the currency becoming attractive to agents in the middle of the income distribution. This includes agents that have uniquely held paper money. The second way is when the fixed cost is high and wealthier agents adopt CBDC (Banet & Lebeau, 2022). Therefore, this results in financial inclusion by poaching deposits away from banks to increase the deposit rate. Consequently, this makes deposits to become attractive to the wealthiest paper money holders.

The study conducted by Ozili (2023) provides better insight into the impact of CBDC on financial inclusion within the context of Nigeria. Thus, this study illustrates that eNaira has contributed to financial inclusion in Nigeria in several ways. One of these ways is providing an easy process for account opening. The eNaira contributes to financial inclusion by offering lower costs for financial products and services. Additionally, the eNaira illustrates the role of CBDC towards financial inclusion in Nigeria because it eliminates any unexplained bank charges that result in financial exclusion. Further eNaira enables financial inclusion because it allows for digital access to several financial services within the financial system. Ozili (2022), also explores the impact of CBDC on the increase in financial inclusion in Nigeria. The scholar makes the argument that CBDC will cause the digitalization of the value chains in Nigeria which will improve access to vital digital financial services. Thus, this will cause the growth of the digital economy in the country. At the same time, this has the impact of enhancing the efficiency of digital payments while providing low transaction costs for those using CBDC. However, attaining financial inclusion using CBDC should be done following careful design. Maniff (2020) opines that CBDC can experience challenges in increasing financial inclusion in case the design of the currency conflicts with other

objectives for creating it. Additionally, CBDC, which is created for financial inclusion needs to complement cash.

2.5 Hypothesis development and conceptual framework

Based on the research objectives of this study and the discussion in the reviewed literature the following research hypotheses were developed as possible answers to the research questions of this study as shown below. The independent variable in this case is CBDC while the dependent variables are access to financial services, reduced transaction costs, increased number of banked people, and improved efficiency of digital payments. These dependent variables illustrate the key elements of financial inclusion enabled through CBDC.

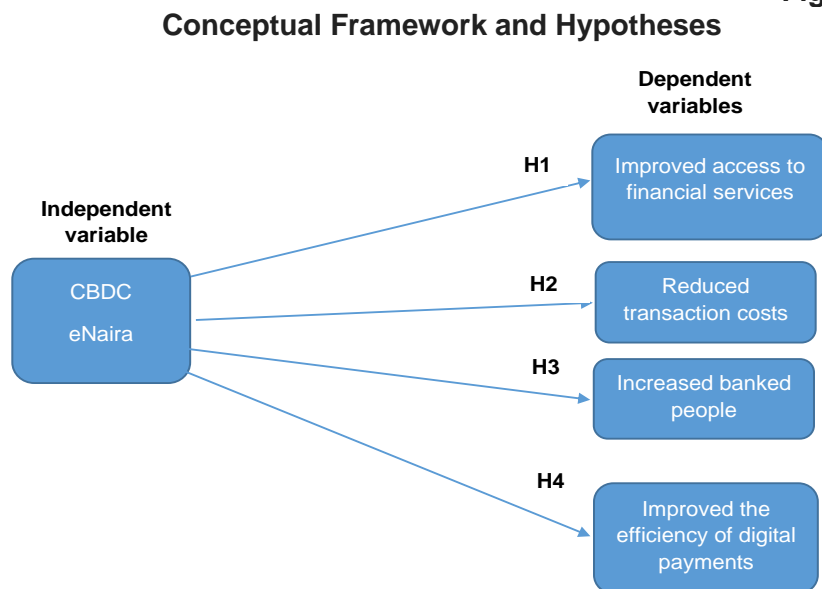
H1: CBDC facilitates digital financial inclusion by improving access to financial services.

H2: CBDC facilitates digital financial inclusion by reducing transaction costs.

H3: CBDC facilitates digital financial inclusion by increasing the number of banked members of the population.

H4: CBDC facilitates financial inclusion by improving the efficiency of digital payments.

Figure 1



Source: Author's

3. Methodology

3.1 Research design

The study utilized quantitative research design. Apuke (2017) explains that a quantitative research design entails the quantification and analysis of variables to obtain results. It entails the use of numerical data and statistical techniques to analyse that data to answer questions like *who, how much, what, where, when, and how many*. This research study applied the correlational research design. Correlational research attempts to determine the extent of a relationship between two or more variables using statistical data (Curtis et al. 2016). In this type of design, relationships between and among several facts are sought and interpreted. For this study, this meant that every variable that was presented in the individual hypotheses was observed by testing the causal relationship of the independent and dependent variables. Mohajan (2020) explains that the quantitative research design consists of systematic observation and description of the key characteristics of events or objects to discover the relationships between an independent variable and the dependent variable in a given population.

3.2 Sample and sampling

A research sample is a finite part or subset of participants drawn from the target population Martínez-Mesa et al. (2016). The sample of this research study was users of the eNaira in Nigeria. This included 500 members of the public in Nigeria using the eNaira. The sample comprised individual Nigerians as well as small and medium enterprises owners who used eNaira for their personal and business transactions.

Stratified sampling was utilized for the selection of the research participants. This is a sampling technique involving the division of a population into subpopulations followed by the application of random sampling methods to each of them (Singh & Masuku, 2014). Some of the subpopulations that were formed during this study were based on age, gender, monthly income, employment status, and geographic location. Each stratum formed was then sampled via simple random sampling resulting in an estimated statistical measure. This is a probabilistic sampling technique which entailed relying on the sample's willingness to participate in the study (Martínez-Mesa et al., 2016). One of the reasons justifying using stratified sampling for this study is it enabled a process of obtaining a sample population that best

represented the Nigerian population using the eNaira by dividing it into strata. Another reason for using this sampling technique is that it accurately reflects the population under study. Thus, stratified sampling was instrumental in facilitating the generalization of the findings of the study.

3.3 Data collection

Survey questionnaires were used to gather data for this study. According to Kabir (2016), a questionnaire refers to a series of questions and other prompts that facilitate the gathering of information from respondents. Closed-ended and semi-closed-ended questions were included in the survey. The questions were prepared to capture the demographic data of the participants and the key elements of the variables of this research study based on the developed research hypotheses. The phrases used in the questionnaire were common and easy to grasp, making it easier for the participants to participate. The significance of creating a questionnaire in this manner is it increases its extent of validity by allowing for a higher degree of probability, among other things. The adoption of the questionnaire approach for data gathering was justified for several reasons. One of them is that the questionnaire method makes data collecting easier and less expensive (Young, 2015). This method of data collecting was chosen in part because it allows the target group to be standardised.

3.4 Data analysis

In quantitative research numerical data are collected and analysed via statistical methods. Particularly, the collected data was coded to SPSS 20.0 software as obtained from the questionnaires. The specific analytical method employed in this study is regression. Rahman and Muktadi (2021) explain that regression analysis is used to examine the relationships between the variables. Typically, using regression analysis encompasses determining the relationship between two variables, determining their causal relationship, and evaluating the statistical significance of the relationship (Stockemer, 2019). Thus, the data was focused on describing the role of the CBDC towards financial inclusion in Nigeria.

3.5 Validity and reliability

The research instrument used for this study was the survey questionnaire. Therefore, ensuring its validity and reliability was significant. Validity refers to the degree to which a given concept

becomes accurately measured in a quantitative study (Haradhan, 2017). For this study, validity was maintained by conducting a theoretical review to gain an understanding of the different elements of the possible relationship between CBDC and financial inclusion. Thus, this entailed developing the survey questionnaire in a way that ensured the consistency of the findings. Additionally, a pilot study was conducted on 10 persons to facilitate the detection of potential errors improving the quality of the questionnaire. Sürücü and Maslakci (2020) explain that reliability specifies the extent to which the research instrument lacks bias ensuring consistency in its measurement across time and several items on the instrument. The reliability of the questionnaire was attained by collecting the data individually and anonymously. This was instrumental in enhancing the objectivity of the study, therefore, resulting in reliability. Further, calculating Cronbach's coefficient was instrumental in demonstrating the reliability of the research instrument. The rule of thumb is a reliability coefficient of 0.7 or over was assumed to reflect the internal reliability of the instruments (Haradhan, 2017). The Cronbach's coefficient was 0.86 demonstrating the reliability of the research instrument.

3.6 Ethical considerations

Because this study involved the use of human subjects, there were several ethical considerations taken. One of these ethical considerations relates to informed consent. Fleming and Zegwaard (2018) explain that participants must be fully informed of what will be asked of them, how data will be used, and if any consequences there will be. Therefore, permission was obtained from the research participants. This was done following a briefing on the study with no coercion or deception. Gajjar (2013) argues that an essential component of informed consent includes participants' right to withdraw or decline the research after it has started. Confidentiality further illustrates the ethical consideration taken regarding this research study. Therefore, the identity of the research participants was protected through the use of pseudonyms in place of their real names. Care was taken to ensure the protection of any participants' identifiers. Thus, the researcher's data did not record names or other personal identifiers. Do no harm was another ethical consideration taken regarding this research. Fleming and Zegwaard (2018) assert that there should be a consideration for the potential harm to participants during research. For this reason, it was essential to ensure that no harm came to the

participants while taking part in the study whether emotional, psychological, reputational, resource loss or physical.

4. Results and discussion

4.1. Demographic characteristics

The demographic results show the distribution of participants based on age group, gender, monthly income, employment status, and eNaira wallet type. These results are summarized in Table 1.

Table 1

Demographic results

Demographic Group (n=542)	Frequency	Percent	Valid Percent	Cumulative Percent
Age group				
18 - 30 years	1	0.2	0.2	0.2
31 - 40 years	520	95.9	95.9	96.1
41 - 50 years	21	3.9	3.9	100.0
Total	542	100.0	100.0	
Gender				
Female	97	17.9	17.9	17.9
Male	444	81.9	81.9	99.8
Total	542	100.0	100.0	
Monthly Income				
Below 30	1	0.2	0.2	0.2
201 - 300	56	10.3	10.3	10.3
301 and above	485	89.5	89.5	99.8
Total	542	100.0	100.0	
Employment status				
Employed	1	0.2	0.2	0.2
Self-employed	540	99.6	99.6	99.8
Unemployed	1	0.2	0.2	100.0
Total	542	100.0	100.0	
eNaira Wallet Type				
Business wallet	540	99.6	99.6	99.6
Edu wallet	1	0.2	0.2	99.8
Individual wallet	1	0.2	0.2	100.0
Total	542	100.0	100.0	

Source: Author's

In terms of age group, most participants (95.9%) fell within the 31-40 years range, while a small percentage were between 18-30 years (0.2%) and 41-50 years (3.9%). The gender distribution revealed

that most participants were male (81.9%). Regarding monthly income, most participants (89.5%) reported earning 301 and above, while a smaller percentage reported earning between 201 and 300 (10.3%) or below 30 (0.2%). In terms of employment status, most participants were self-employed (99.6%), while a very small percentage were either employed (0.2%) or unemployed (0.2%). Finally, the eNaira wallet type was mostly the business wallet (99.6%), with a small percentage using either the edu wallet (0.2%) or individual wallet (0.2%). These demographic results indicate that the participants consisted of mostly middle-aged, self-employed individuals with high monthly incomes, predominantly male, and using the eNaira business wallet.

The demographic results provide some insights into the state of financial inclusion in Nigeria, as they reveal the characteristics of the participants who use the eNaira wallet. The fact that most participants reported earning 301 and above suggests that the eNaira wallet is primarily being used by individuals with higher incomes. This may indicate that financial inclusion efforts in Nigeria have yet to reach individuals with lower incomes (Ozili, 2023). Many Nigerians do not have access to the digital infrastructure necessary to use mobile wallets. The predominance of self-employed individuals also suggests that the eNaira wallet may be most accessible to those who can use it for business purposes, such as making payments and receiving money from clients. However, this could be because of limiting financial inclusion efforts to entrepreneurs and business owners, rather than addressing the needs of individuals who work in the informal sector or are employed in low-paying jobs (Banet & Lebeau, 2022; Negrea & Scarlat, 2022). In terms of age, the fact that the majority of participants were between 31-40 years old suggests that younger generations may be more likely to adopt mobile wallet technology, compared to older age groups who may be more accustomed to traditional banking methods. The gender distribution reveals that the majority of eNaira wallet users are male, which may reflect broader gender inequalities in access to financial services in Nigeria. Women may face greater barriers to accessing financial services due to cultural and social norms, lack of financial education, and limited economic opportunities (Alliance for Financial Inclusion, 2022). Therefore, these demographic results suggest that while efforts to promote financial inclusion in Nigeria are underway, more work needs to be done to ensure that mobile wallet technology is accessible to individuals across different income groups, genders, and employment statuses.

4.2. Statistical analysis

4.2.1 CBDC, financial inclusion, and access to financial services

The results presented in Table 2 suggest that CBDC has a significant role in enabling financial inclusion by increasing access to financial services in the Nigerian population.

Table 2
Results of financial inclusion via access to financial services

Elements	Statistics
R	0.894
R Square	0.800
Adjusted R Square	0.799
Std. Error of the Estimate	0.043
Sum of Squares	
Regression	3.985
Residual	0.998
df	1
Population	N=540
Mean Square	
Regression	3.985
Residual	0.002
F	2156.017
Sig.	0.000
Unstandardized Coefficients	
Constant	0.001
Does eNaira enable you to access formal financial services?	0.999
Std. Error	
Constant	0.064
Does eNaira enable you to access formal financial services?	0.022
Standardized Coefficients	
Constant	
Does eNaira enable you to access formal financial services?	0.894
t	
Constant	0.014
Does eNaira enable you to access formal financial services?	46.433
Sig.	0.989

Source: Author's

The data presented in Table 2 suggests that CBDC fosters digital financial inclusion by improving people's access to financial services. As per the table, the regression analysis results indicated a

standardized co-efficient of a beta of .894 and an R-value of .894^a which accounts for 89.4% of the influence of CBDC in enabling digital financial inclusion through improved access to financial services. The p-value obtained from the analysis was 0.000, which is less than the significance value of 0.05, indicating that H1 (*CBDC facilitates digital financial inclusion by improving access to financial services*) was supported. That is, the relationship between CBDC and digital financial inclusion through access to financial services is statistically significant. Furthermore, the correlation analysis revealed an R² value of 0.800, signifying a strong fit relationship between community preparedness and the implementation of CBPs. The results are consistent with previous research that has shown that CBDC can improve financial inclusion by increasing financial access for the unbanked population. Central banks issue CBDCs as a way of broadening financial inclusion goals and expanding access to financial services. Overall, these results suggest that CBDC can play a significant role in promoting financial inclusion by improving access to financial services. An illustration of this is the findings of Foster et al. (2021) which indicate that CBDC enhanced access to financial services. Barr makes similar findings et al. (2020) who revealed that CBDC enables financial inclusion by expanding access to financial services.

These results offer concrete evidence to political decision-makers of the essential role that CBDCs play in achieving financial inclusion goals. With an overwhelming 89.4% influence on digital financial inclusion, as well as robust statistical support, CBDCs emerge as a clear policy tool for expanding access to financial services. Central banks considering the adoption of CBDCs can take these findings as strong support for their potential to make a tangible difference in the lives of unbanked and underserved populations.

These insights not only affirm the relevance of CBDCs but also provide a compelling basis for informed policy decisions aimed at facilitating financial inclusion not only in Nigeria but also on a global scale.

4.2.2 CBDC, digital financial inclusion, and reduced transaction costs

The results presented in Table 3 suggest that CBDC has a significant role in reducing transaction costs in Nigeria, thus fostering digital financial inclusion.

Table 3
Results of digital financial inclusion through reduced transaction costs

Elements	Statistics
R	0.603
R Square	0.363
Adjusted R Square	0.362
Std. Error of the Estimate	0.113
ANOVA	
Regression	3.941
Residual	6.909
Total	10.851
df	1
Population	N=540
Mean Square	
Regression	3.941
Residual	0.013
F	308.015
Sig.	0.000
Coefficients	
Unstandardized Coefficients	
Constant	0.006
Will you be using the eNaira more if it reduces the cost of financial transactions?	0.994
Std. Error	
Constant	0.170
Does eNaira enable you to access formal financial services?	0.057
Standardized Coefficients	
Constant	
Will you be using the eNaira more if it reduces the cost of financial transactions?	0.603
t	
Constant	0.038
Will you be using the eNaira more if it reduces the cost of fin. transactions?	17.550
Sig.	
Constant	0.970
Will you be using the eNaira more if it reduces the cost of fin. transactions?	0.000

Source: Author's

According to Table 3, the data suggests that CBDC enables digital financial inclusion through the reduction of transaction costs. Regression analysis showed that the standardized co-efficient of beta was .603 and the R-value was .603^a, indicating that CBDC accounts for 60.3% of the influence of digital financial inclusion by reducing transaction costs. The p-value obtained from the analysis was 0.000,

which is less than the significance value of 0.05, indicating that H2 (*CBDC facilitates digital financial inclusion by reducing transaction costs*) was supported. This means that there was a significant relationship between CBDC use and reduced transaction costs and thus attainment of digital financial inclusion. Additionally, the correlation analysis showed a strong fit relationship between CBDC and digital financial inclusion via reduced transaction costs with an R² value of 0.363.

The regression analysis shows a modest positive relationship between CBDCs and digital financial inclusion, with a high standardized coefficient of beta and R-value, which indicates that CBDCs account for a significant portion of the influence on digital financial inclusion by reducing transaction costs. These results are similar to previous research. For instance, Ozili (2021) found that CBDC digitalized value chains while improving digital payments and reducing the related transaction cost improving access to digital financial services. Similar findings were made by Ozili (2023) who noted that CBDC fostered financial inclusion as a result of providing lower transaction costs for users. Allen makes similar findings et al. (2022) who observed that CBDC fostered financial inclusion by reducing transaction fees and costs relating to financial services. The findings by Zuluaga (2021) further align with those of the current study as they show that CBDCs are needed for the reduction of high fees.

These findings provide political decision-makers with solid evidence concerning the significant influence that CBDCs can have on lowering transaction costs and advancing digital financial inclusion. With a solid 60.3% influence on digital financial inclusion, coupled with robust statistical support, CBDCs emerge as a compelling policy tool for making digital financial services more affordable and accessible. Policymakers contemplating the adoption of CBDCs can take these findings as a strong endorsement of their potential to drive tangible improvements in the digital financial landscape. These insights not only reaffirm the relevance of CBDCs but also provide a compelling basis for informed policy decisions aimed at reducing financial exclusion and fostering financial inclusion, not only in Nigeria but also on a global scale.

4.2.3 CBDC, digital financial inclusion, and increased banked people

The results presented in Table 4 suggest that CBDC has a significant role in increasing the number of persons that are banked in the Nigerian population, thus fostering digital financial inclusion.

Table 4
Results of financial inclusion via increased banked people

Elements	Statistics
R	0.446
R Square	0.199
Adjusted R Square	0.197
Std. Error of the Estimate	0.086
ANOVA	
Sum of Squares	
Regression	0.991
Residual	3.993
df	1
Population	N=540
Mean Square	
Regression	0.991
Residual	0.007
F	134.004
Sig.	0.000
Coefficients	
Unstandardized Coefficients	
Constant	1.502
Does eNaira enable you to access formal financial services?	0.498
Std. Error	
Constant	0.129
What aspects of eNaira have influenced your decision to become banked?	0.043
Standardized Coefficients	
Constant	
What aspects of eNaira have influenced your decision to become banked?	0.446
t	
Constant	11.643
What aspects of eNaira have influenced your decision to become banked?	11.576
Sig.	
Constant	0.000
Does eNaira enable you to access formal financial services?	0.000

Source: Author's

Table 4 presents data suggesting that CBDC plays a crucial role in fostering digital financial inclusion by increasing the number of persons that are banked in the Nigerian population. Regression analysis results indicated that CBDC has a standardized co-efficient of a beta of .446 and an R-value of .446^a, accounting for 44.6% of the influence towards digital financial inclusion via an increased number of banked persons. Furthermore, the p-value obtained from the analysis was 0.000, indicating support for H3 (*CBDC facilitates digital financial inclusion by increasing the number of banked members of the population*) as it was less than the significance value of 0.05. Correlation analysis showed a modest fit relationship between community preparedness and the implementation of CBPs with an R² value of 0.199.

Therefore, CBDC has the advantage of financial inclusion for underserved adults and the unbanked population, improving cross-border payments, and fostering fiscal transfers. Similar findings have been presented in previous research. For instance, The study conducted by Armas et al. (2022) found that CBDC contributed to providing financial services to unbanked persons. By using CBDC many unbanked people received access to digital payment tools such as payment of wages in the informal sector, payment of public transport, funding transfers, and experiencing extended accessibility to digital payments to the government. Negrea and Scarlat (2022) make similar findings by revealing that CBDC enables unbanked adults to access financial services in instances where there is no traditional infrastructure to facilitate such access.

These results provide concrete proof of the significant influence that CBDCs can have on expanding digital financial inclusion and the number of people who have bank accounts for political decision-makers. With a solid 44.6% influence on digital financial inclusion, combined with robust statistical support, CBDCs emerge as a compelling policy tool for addressing financial exclusion and fostering financial inclusion, particularly among underserved adults and the unbanked population. These insights not only reaffirm the relevance of CBDCs but also provide a persuasive basis for informed policy decisions aimed at promoting financial inclusion, not only in Nigeria but also as a potential model for regions facing similar challenges.

4.2.4 CBDC, digital financial inclusion, improved efficiency of digital payments

The results presented in Table 5 indicate that CBDC has a significant role in improving the efficiency of digital payments in Nigeria, therefore facilitating digital financial inclusion.

Table 5

Results of financial inclusion through improved efficiency of digital payments

Elements	Statistics
R	0.706
R Square	0.499
Adjusted R Square	0.498
Std. Error of the Estimate	0.043
Sum of Squares	
Regression	0.994
Residual	0.998
df	1
Population	N=540
Mean Square	
Regression	0.994
Residual	0.002
F	538.007
Sig.	0.000
Unstandardized Coefficients	
Constant	1.501
Does eNaira enable you to access formal financial services?	0.499
Std. Error	
Constant	0.064
Why do you use eNaira for digital payments?	0.022
Standardized Coefficients	
Constant	
Why do you use eNaira for digital payments?	0.706
t	
Constant	23.271
Why do you use eNaira for digital payments?	23.195
Sig.	
Constant	0.000
Why do you use eNaira for digital payments?	0.000

Source: Author's

Based on the data presented in Table 5, it can be inferred that CBDC has a significant impact on digital financial inclusion by improving the efficiency of digital payments. Regression analysis revealed that CBDC has a standardized co-efficient of a beta of .706 and an R-value of .706^a, indicating that it accounts for 70.6% of the influence towards digital financial inclusion. The p-value obtained from the analysis was 0.000, which is less than the significance value of 0.05, suggesting that H4 (*CBDC facilitates financial inclusion by improving the efficiency of digital payments*) was supported. Additionally, correlation analysis showed a moderate fit relationship between CBDC and increased financial inclusion via improved efficiency of digital payments with an R² value of 0.499. Overall, these results suggest that CBDC can significantly improve digital financial inclusion by enhancing the efficiency of digital payments. These findings are in tandem with those presented in previous literature on the role of CBDC in facilitating financial inclusion. For example, these findings are similar to those by Auer et al. (2021) who reveal that CBDC can be used to improve payments while reducing reliance on deposit insurance. The same findings are made by Ozili (2023) who noted that eNaira a form of CBDC provided additional payment possibilities for users. This was useful in enhancing the efficiency of payments. By enhancing the effectiveness of digital payment systems, these findings provide political decision-makers with hard data demonstrating the significant influence that CBDCs can have on promoting digital financial inclusion. With a resounding 70.6% influence on digital financial inclusion and robust statistical support, CBDCs emerge as a compelling policy tool for streamlining digital financial services and fostering financial inclusion. Policymakers contemplating the adoption of CBDCs can draw upon these findings as a strong endorsement of their potential to drive tangible improvements in digital payment systems and, by extension, financial inclusion efforts. These insights not only affirm the relevance of CBDCs but also provide a persuasive basis for informed policy decisions aimed at promoting financial inclusion, not only in Nigeria but also as a model for regions facing similar challenges.

5. Conclusion

This article investigated the impact of CBDC in facilitating financial inclusion in Nigeria. The results of this research suggest that

CBDC has a significant role to play in fostering digital financial inclusion in Nigeria. This is because the regression analysis conducted on each of the hypotheses demonstrated a strong positive relationship between the use of CBDC and digital financial inclusion. Specifically, CBDC was found to improve access to financial services, reduce transaction costs, increase the number of banked individuals, and improve the efficiency of digital payments, therefore, fostering financial inclusion. Therefore, the findings of this research provide compelling evidence for the potential of CBDC to drive financial inclusion in Nigeria.

This study makes a significant contribution to understanding the crucial role CBDCs play in promoting digital financial inclusion. The research findings not only affirm the beneficial impact of CBDCs on diverse facets of financial inclusion but also reinforce the existing knowledge base in this domain. As governments and central banks across the world deliberate on the potential adoption of CBDCs, this study's insights provide invaluable guidance. These insights pertain to the anticipated benefits of CBDCs in promoting financial inclusion and improving access to financial services, especially for disadvantaged and underserved populations, not only in Nigeria but also in other parts of the world.

Based on these findings, it is recommended that policymakers in Nigeria continue to promote and prioritize the adoption of CBDC. This could involve creating awareness campaigns and education programs to increase public understanding and acceptance of CBDC. Furthermore, policymakers could consider implementing policies that incentivize financial institutions to use CBDC, as this could further drive its adoption and increase financial inclusion.

Further research efforts are needed to fully realize the potential of CBDC in promoting financial inclusion in Nigeria. For instance, future research could explore the impact of CBDC on other aspects of financial inclusion beyond those explored in this study. For example, the researchers could examine how CBDC affects access to credit or the ability to save. Additionally, the research could explore the potential impact of CBDC on financial stability and monetary policy.

References

1. Adeola, O., & Evans, O. (2017). Financial inclusion, financial development, and economic diversification in Nigeria. *Journal of Developing Areas*, 51(3), 1-15.

2. Allen, F., Gu, X., & Jagtiani, J. (2022). Fintech, cryptocurrencies, and CBDC: Financial structural transformation in China. *Journal of International Money and Finance*, 124.
3. Alliance for Financial Inclusion. (2022). Central bank digital currency – An opportunity for financial inclusion in developing and emerging economies. Digital Financial Services (DFS) Working Group. Retrieved from https://www.afi-global.org/wp-content/uploads/2022/09/Central-Bank-Digital-Currency-Special-Report_isbn.pdf
4. Apuke, O. D. (2017). Quantitative research methods : A synopsis approach. *Kuwait Chapter of Arabian Journal of Business and Management Review*, 6(11), 40-47. doi:10.12816/0040336
5. Armas, A., Ruiz, L., & Vásquez, L. (2022). Assessing CBDC potential for developing payment systems and promoting financial inclusion in Peru. *BIS Papers Chapters*, 123, 131-151.
6. Auer, R., Frost, J., Gambacorta, L., Monnet, C., Rice, T., & S, S. H. (2021). Central bank digital currencies: motives, economic implications and the research frontier. *Annual Review of Economics*, 14, 697-721. doi:10.1146/annurev-economics-051420-020324
7. Banet, J., & Lebeau, L. (2022). Central bank digital currency: Financial inclusion vs. disintermediation. Federal Reserve Bank of Dallas.
8. Barontini, C., & Holden, H. (2019). Proceeding with caution – a survey on central bank digital currency. *Proceeding with caution-a survey on central bank digital currency*. Basel, Switzerland: BIS Paper.
9. Barr, M. S., Harris, A., Menand, L., & Xu, W. M. (2020). Building the payment system of the future: How central banks can improve payments to enhance financial inclusion. U of Michigan Law & Econ Research Paper.
10. Bitter, L. (2020). Banking crises under a central bank digital currency (CBDC).
11. Bordo, M. D., & Levin, A. T. (2017). Central bank digital currency and the future of monetary policy (No. w23711). National Bureau of Economic Research.
12. Central Bank of Nigeria. (2021). CBN Selects Technical Partner For Digital Currency Project. Central Bank of Nigeria.
13. Cooper, B., Esser, A., & Allen, M. (2019). The use cases of central bank digital currency for financial inclusion: A case for mobile money. Bellville, South Africa: Cenfri. Retrieved from https://cenfri.org/wp-content/uploads/2019/06/CBDC-and-financial-inclusion_A-case-for-mobile-money.pdf

14. Curtis, E. A., Comiskey, C., & Dempsey, O. (2016). Importance and use of correlational research. *Nurse Researcher*, 23(6), 20-25. doi:10.7748/nr.2016.e1382
15. Demirgüç-Kunt, A., Klapper, L., Singer, D., & Van Oudheusden, P. (2015). *The Global Findex Database 2014. Measuring Financial Inclusion Around the World*. Washington, DC: The World Bank.
16. Didenko, A. N., & Buckely, R. P. (2021). Central bank digital currencies: a potential response to the financial inclusion challenges of the pacific issues in pacific development. Mandaluyong: Asian Development Bank.
17. Ekong, U. M., & Ekong, C. N. (2022). Digital currency and financial inclusion in Nigeria: lessons for development. *Journal of Internet and Digital Economics*, 2(1), 46-67. doi:10.1108/JIDE-11-2021-0018
18. Engert, W., & Fung, B. S. (2017). Central bank digital currency: motivations and implications.
19. Fleming, J., & Zegwaard, K. E. (2018). Methodologies, methods and ethical considerations for conducting research in work-integrated learning. *International Journal of Work-Integrated Learning*, 19(3), 205-213.
20. Foster, K., Blakstad, S., Gazi, S., & Bos, M. (2021). "Digital currencies and CBDC impacts on least developed countries (LDCs). Dialogue on global digital finance governance. New York, NY: United Nations Development Programme.
21. Gajjar, N. B. (2013). Ethical consideration in research. *International Journal for Research in Education*, 2(7), 8-15.
22. Global Finance. (2021). World's most unbanked countries 2021. Retrieved from <https://www.gfmag.com/global-data/economic-data/>
23. Haradhan, M. (2017). Two criteria for good measurements in research: Validity and reliability. *Annals of Spiru Haret University*, 17(3), 58-82.
24. Kabir, S. M. (2016). Chapter 9: Methods of data collection. In *Basic Guidelines for Research: An Introductory Approach for All Disciplines* (pp. 201-275). Chittagong-4203, Bangladesh: Book Zone Publication.
25. Kama, U., & Adigun, M. (2013). *Financial inclusion in Nigeria: Issues and challenges*. Abuja, Nigeria: Central Bank of Nigeria. Retrieved from <https://www.cbn.gov.ng/out/2014/rsd/occasional%20paper%20no.%2045%20issues%20and%20challenges.pdf>
26. Kumhof, M., & Noone, C. (2018). Central bank digital currencies-design principles and balance sheet. Bank of England Working Paper.
27. Maniff, J. L. (2020). *Motives matter: Examining potential tension in central bank digital currency designs*. Omaha, NE, USA: Federal Reserve Bank of Kansas City.

28. Martínez-Mesa, J., González-Chica, D. A., Duquia, R. P., Bonamigo, R. R., & Bastos, J. L. (2016). Sampling: how to select participants in my research study? *Anais Brasileiros de Dermatologia*, 91(3), 326-330. doi:10.1590/abd1806-4841.20165254
29. Mohajan, H. K. (2020). Quantitative research: A successful investigation in natural and social sciences. *Journal of Economic Development, Environment, and People*, 9(4), 52-79.
30. Negrea, C. I., & Scarlat, E. M. (2022). The Digital Leu Challenges and Possible Areas of Implementation. *Ovidius" University Annals, Economic Sciences Series*, 22(1).
31. Ozili, P. K. (2018). Impact of digital finance on financial inclusion and stability. *Borsa Istanbul Review*, 329-340.
32. Ozili, P. K. (2021). Financial inclusion in Nigeria: Determinants, challenges, and achievements. In *New Challenges for Future Sustainability and Wellbeing* (pp. 377-395). doi:10.1108/978-1-80043-968-920211020
33. Ozili, P. K. (2022a). Can central bank digital currency increase financial inclusion? Arguments for and against. *SSRN Electronic Journal*, 1-13. doi:10.2139/ssrn.3963041
34. Ozili, P. K. (2022b). Financial inclusion in Nigeria: An overview. *International Journal of Banking and Finance*, 17(2), 1-24. doi:10.32890/ijbf2022.17.2.1
35. Ozili, P. K. (2023). eNaira central bank digital currency (CBDC) for financial inclusion in Nigeria. In *Digital Economy, Energy and Sustainability: Opportunities and Challenges*. Springer.
36. Rahman, A., & Muktadi, G. (2021). SPSS: An imperative quantitative data analysis tool for social science research. *International Journal of Research and Innovation in Social Science*, V(X), 300-302.
37. Singh, A. S., & Masuku, M. B. (2014). Sampling techniques and determination of sample size in applied statistics research: An overview. *International Journal of Economics, Commerce and Management*, 2(11), 1-22.
38. Stockemer, D. (2019). *Quantitative methods for the social sciences: A practical introduction with examples in SPSS and Stata*. Cham, Switzerland: Springer International Publishing AG.
39. Sürücü, L., & Maslakci, A. (2020). Validity and reliability in quantitative research. *Business And Management Studies An International Journal*, 2694-2726. doi:10.15295/bmij.v8i3.1540
40. Young, T. J. (2015). Chapter 11 Questionnaires and surveys. In H. Zhu, *Research methods in intercultural communication: A practical guide* (pp. 163-180). Oxford: Wiley. doi:10.1002/9781119166283.ch11

41. Yuhelson, D. A., Ernawati, F. S., & Sri, P. D. (2020). Digital economy and financial inclusion. *Journal of Environmental Treatment Techniques*, 8(1), 241-243.
42. Zuluaga, D. (2021). Which Type of Digital Currency for Financial Inclusion? *Cato Journal*, 41(413).