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The Role of Central Banks Digital Currencies (CBDCs) in Promoting Financial Inclusion in the Economies of Developing Countries

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بسم الله الرحمن الرحيم والصلاة والسلام على أشرف المرسلين، سيدنا محمد وعلى آله وصحبه أجمعين.

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Dedication:

*I dedicate this work, First and foremost, To **Mother**, you who encompassed me with your prayers before life embraced me. **Father**, you who were always the role model and the example, thank you for your trust that carried me high.*

*To my elder brother**, Imad**, You, who have strong stances and silent support, have always been and continue to be a help and support at all times.*

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Abstract:

This thesis aims to highlight the role of Central Bank Digital Currencies (CBDCs) in enhancing financial inclusion in the economies of developing countries, through examining the reality and analyzing the impact of adopting these currencies on the unbanked segments. It focuses on The Bahamas and Nigeria. The study relied on a descriptive and analytical approach, reviewing relevant theoretical frameworks and analyzing empirical data related to financial inclusion indicators after the implementation of digital currencies in both countries. The study recommends that developing countries view Central Bank Digital Currencies as a strategic tool to achieve inclusive growth, emphasizing the importance of regulatory readiness and promoting digital culture. And developing the infrastructure to ensure the success of the integration process.

Keywords: Digital Currencies, CBDCs, Financial inclusion, Developping Countries, Nigeria, The Bahamas.

الملخص:

تتناول هذه الدراسة دور العملات الرقمية الصادرة عن البنوك المركزية في تعزيز الشمول المالي في الدول النامية وذلك من خلال تحليل تجربتي نيجيريا وجزر الباهامس. وتهدف إلى تقييم مدى مساهمة هذه العملات في تمكين الفئات غير المتعاملة مع البنوك من الوصول إلى الخدمات المالية الرسمي.

حيث اعتمدت الدراسة على منهج وصفي وتحليلي، وبيّنت النتائج أن العملات الرقمية مثل "الإينيرا" و"الدولار الرملي" أسهمت في توسيع قاعدة الشمول المالي، وخفض تكاليف المعاملات، وزيادة الثقة في الأنظمة المالية. كما توصي الدراسة بضرورة تبني هذه العملات كأداة استراتيجية للنمو الشامل، مع تعزيز الجاهزية التنظيمية والبنية التحتية.

الكلمات المفتاحية: الشمول المالي، العملات الرقمية، العملات الرقمية للبنوك المركزية، الدول النامية، نيجيريا، البهاماس.

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Introduction:

The emergence of digital technology has caused significant changes in the worldwide environment and the structure of the global economic system. New ideas that are in line with the needs of the digital era have emerged because of this growth, most notably digital currencies and financial inclusion. Due to its ability to provide equitable access to formal financial services for both individuals and organizations, financial inclusion has emerged as a key component of sustainable development. This kind of access is essential for lowering poverty and boosting the economy. In this regard, digital currencies have grown in significance as potentially useful technical instruments for expanding financial access, particularly in developing nations with weak banking systems and high rates of informal economic activity, Digital technologies provide useful substitutes for conventional obstacles in these situations.

Rather than being a technological solution to an already-existing demand, the advent of digital currencies into the financial sector was a part of a larger wave of changes that forced a new reality on social norms and economic policy. Although digital currencies could first seem to be catalysts for financial innovation, there are a number of complications associated with their incorporation into delicate economic systems. Regulatory frameworks, digital infrastructure, public trust, and institutional preparedness are some of the factors that influence their stability and efficacy. As a result, their relationship to financial inclusion takes on a dynamic and changing nature-one that varies based on the unique circumstances and circumstances in each nation rather than following a straight line or producing consistent results.

1. Problem Statement:

Despite the increasing interest in Central Bank Digital Currencies (CBDCs), there remains limited empirical evidence on their actual effectiveness in addressing financial inclusion, particularly in developing Nations.

One specific question arose that requires answer:

Were the results of CBDC applications sufficient to improve financial inclusion in developing countries?

Under this question, the following sub-questions can be extended:

- Is there a relationship between digital currencies and financial inclusion in developing economies?

- Have the CBDCs helped more people get access to financial services?

- How does financial inclusion fundamentally contribute to reducing the number of individuals financially excluded?

- What specific financial inclusion challenges do Nigeria and The Bahamas face?

- How do the experiences of Nigeria and The Bahamas differ in terms of CBDC adoption and public acceptance?

2. Hypotheses of the Study:

Based on the research problem and sub-questions, the following hypotheses are formulated:

Hypothesis 1: Digital currencies have a positive impact on financial inclusion by providing alternative access to financial services in underserved regions.

Hypothesis 2: The introduction of CBDCs has enhanced access to financial services, particularly among unbanked populations in developing countries.

Hypothesis 3: Financial inclusion reduces the number of financially excluded individuals by integrating marginalized groups into the formal financial system.

Hypothesis 4: Nigeria and the Bahamas face unique challenges in achieving financial inclusion, including digital illiteracy, weak infrastructure, and low public trust.

Hypothesis 5: The Bahamas adopted CBDC more easily than Nigeria, where people still have low trust and awareness.

. Objective of the Study:

The primary objective of this study is to analysis the role of Central Bank Digital Currencies (CBDCs) in promoting financial inclusion in the economies of developing countries. Specifically, it aims to identify the key obstacles to financial inclusion faced by The Bahamas and Nigeria, and to assess the extent to which CBDCs have improved

access to financial services in these nations. Additionally, this study seeks to assess the role of CBDCs in advancing financial inclusion for unbanked and underserved populations, review the experiences and strategies employed in the implementation of CBDCs in both countries, and examine the underlying motivations for their adoption in these two developing markets.

4. Importance of the Study:

The significance of this study aims to analyze the role of central bank digital currency as a strategic tool for enhancing access to financial services in developing economies, by focusing on the experience of the Bahamas and Nigeria, the study contributes to Enriching the scientific literature and expanding the research horizon of research in the Areas of financial inclusion and the digital transformation of central banking systems.

5. Research Methodology:

In order to address this research and cover its various aspects, we relied on the descriptive approach to analyze the theoretical framework of both digital currencies and financial inclusion, and to clarify the key concepts related to them. Additionally, we applied the analytical approach in the practical aspect through a case study both The Bahamas and Nigeria, by analyzing quantitative and qualitative data related to financial inclusion, as well as the challenges and opportunities identified in the available data.

6. Rationale of the Study:

The choice of this research topic was motivated by several key factors:

- The increasing importance of digital currencies in reshaping the nature of financial services globally.
- The desire to analyze the experiences of The Bahamas and Nigeria in employing CBDCs to promote financial inclusion.
- The necessity to understand how digital currencies contribute to promoting the efficiency and quality of financial services.
- The topic's direct relevance to our academic specialization "Monetary and Financial Economics" and its suitability to the ongoing transformations in the financial and economics sector.

6. Difficulties of the Study:

Through researching this topic, we faced several difficulties, including:

- Difficulty in finding some information as it is not available for review since paying fees is required to download certain reports that contain various statistics related to the Bahamas and Nigeria.
- The difficulty of this topic and the complexity of Comprehending all its aspects, especially in the theoretical part.
- Language and academic translation barriers were also a challenge, as the research was conducted in English while the academic background and instruction were primarily in Arabic.

7. Structure of the Study:

In addition to this introductory chapter, the thesis is structured as follows:

The first chapter, entitled Theoretical Framework discusses the theoretical background of digital currencies and its economic implications. This is done through two sections, the first section addresses the theoretical framework of digital currencies, and the second section is dedicated to the CBDC.

The second chapter is an introduction to financial inclusion with two sections, the first one is about essence of financial inclusion and the second discussed its key pillars.

Chapter 3 is dedicated to the practical framework of the study, which also contains two sections; the first section discusses the experience of The Bahamas in launching CBDCs, while the second section analyzes the experience of Nigeria.

8.Previous Studies:

Academic interest in the connection between digital currencies and financial inclusion is expanding, especially in developing nations where access to financial services is still restricted. The majority of current research indicates that digital currencies, particularly those issued by central banks, can be a significant factor in removing geographical, financial, and infrastructure-related obstacles.

Ozili (2023), for example, looked into how central bank digital currencies (CBDCs) may increase unbanked people' access to financial services. His research revealed that, especially in places with limited banking access, CBDCs provide a

safe and effective substitute for those shut out of the regular banking industry. Similar to this, Banerjee & Agarwal (2023) and Sinha (2023) emphasised the significance of well designed digital currencies backed by financial technology (FinTech) tools via case studies in India and the Bahamas.

In addition, Chung et al. (2023) investigated how cryptocurrencies might enhancel financial inclusion for refugees and underserved populations. The study addressed concerns around internet access inequalities and the digital skills needed to take use of new technologies, even as it recognised the potential of digital assets to alleviate access difficulties.

Ozili (2022, 2023) carried out extensive study on Nigeria's digital currency, the eNaira, which was introduced by the Central Bank of Nigeria. According to the research, the eNaira had a number of structural issues that hindered its usefulness, especially in low-income and rural regions, despite its promise. These include poor public awareness, inadequate digital infrastructure, and a lack of confidence in financial advances spearheaded by the government.

In a related study, Pantin (2023) looked at minority and low-income communities in the United States, especially African American populations, and highlighted similar challenges in accessing financial services. His research argued for the need to design digital financial tools that are inclusive and culturally adapted to the needs of underserved groups. Although these studies present varying viewpoints and conclusions, they all support the idea that digital currencies can promote financial inclusion—so long as their implementation is backed by more comprehensive policies that address infrastructure, education, and trust. Hoffmann (2021) assessed the impact of the Bahamas' official digital currency, the Sand Dollar, and found that it helped increase access to financial services, particularly in remote islands. However, the study also highlighted the significance of enhancing financial literacy to ensure long-term adoption and efficient use of the currency).

Chapter one:

Theoritical framework of CBDCs

Foreword:

The global financial system has seen transformation in recent decades, primarily due to advancements in digital technologies. Central Bank Digital Currency or CBDC. While the world is moving into digital finance, CBDC acts as a means to bridge the gap between key issues in finance, namely, inclusion, economic stability, and safe payment processing.

This section focuses on exploring the theoretical foundations for understanding CBDC by examining its origins, key concepts and all the concepts related to them, it also presents an overview of digital currencies, crypto currencies, and stable coins. The possible advantages thereof to buttress access to the financial infrastructure are detailed, with special attention to the challenges and risks associated with setting up the systems, especially in developing countries.

1. Fundamental concepts of digital currencies:

One of the most significant developments in financial Technology has been the emergence of digital currencies, presently a disruptive force of the world's monetary system. The first part is designed to construct the theoretical basis for digital currencies by investigating several key aspects of their definition, nomenclature, and defining characteristics:

1.1 Concept, History and Background of Digital Currencies:

This section gives a brief definition of digital currencies, examines types of digital currencies, and how digital currencies fit into the modern economy:

1.1.1 What is a digital currency ?

Several definitions have been proposed for digital currency, the most prominent of which include the following:

- Digital currency is in digital or electronic form. It is also called digital money, electronic money, electronic currency, or Cybercash. This means that it has no physical form and cannot be handled, stored, or manipulated. Consumers and businesses can use digital currencies to

execute transactions and trades. However, the adoption of digital currencies varies significantly across countries or communities.[1]

The Financial Action Task Force (FATF, 2014), which was founded by the G7 Summit in Paris and made up of state actors, defines digital currency as:

- "A digital representation of value that is digitally traded, as a medium of exchange, as a unit of account, and as a store of value but does not have the status of legal tender. It is used based upon the consensus of the members of a particular user community."

The European Banking Authority (EBA, 2014) defines virtual currency as:

- "A digital representation of value that is not issued by a central bank or a public authority, and does not necessarily have to be attached to a fiat currency, but is accepted by natural or legal persons as a means of payment and that can be electronically traded, stored or transferred."[2]

Since the emergence of the Internet revolution in the 1990s, the definition of digital currency has evolved considerably, reflecting the rapid development of financial technologies and the growing importance of electronic payment systems: [3]

- The first formal definition of digital currency was introduced in 1998 by the Basel Committee on Banking Supervision (BCBS). According to the BCBS, digital currency was seen as a type of prepaid payment instrument that allowed monetary value to be stored on a device and transferred electronically via internet-connected systems (BCBS, 1998). At this stage, digital currency was essentially viewed as an electronic extension of physical money.

In 2000, both the European Central Bank (ECB) and the Bank for International Settlements (BIS) offered expanded definitions. They described digital currency as:

- "An electronic store of monetary value on a technical device, which may be widely used for making payments to entities other than the issuer, without necessarily involving bank accounts in the transaction."

[1] Investopedia ,2024 ,digital currencies: Types ,characteristics ,pro and cons , future uses ,retrieved from http:// www.investopedia.com

[2] Ally, M, Gardiner, M., & Lane, M. (2016). The potential impact of digital currencies on the Australian economy. ArXiv preprint arXiv: 1606.02462.

[3] Qianru Xiang ,(n .d).The impacts of digital currency on china Monetary system ,Master thesis ,Leeds University Business School ,Retrieved from https://business.leeds.ac .uk

This marked a shift toward recognizing digital currency as a more independent and versatile financial tool, not necessarily tied to traditional banking systems or intermediaries.

By 2008, the International Monetary Fund (IMF) echoed the ECB's definition but offered a more concise and modern interpretation. The IMF defined digital currency as:

- "An internet-based medium of exchange."

According to the definitions given above: a digital currency is a representation of value that can be electronically traded or stored as a medium of exchange without the need for a physical form or conventional middlemen.

1.1.2 Historical evolution of digital currencies:

In this section, we have addressed the historical development of digital Currencies:

- **History of digital currencies:** Since the late 1970s, digital currency has progressed from a niche technological concept to an essential component of the digital economy. After years of continuous invention, failed experiments, and incomplete discoveries, it rose to prominence in global political and economic debates. Its roots are in mathematics and cryptography research. The potential of digital currencies to transform payment and exchange systems was demonstrated as their applications spread across many industries, transforming them from a theoretical concept to a thriving global market with increasing influence in the business and financial sectors.
- **Background of digital currencies:** This part presents the major historical milestones that shaped the development of digital currencies:

1977: Introduction of the RSA algorithm by Adleman, Shamir, and Rivest at MIT, enabling secure digital payments through encryption.

1993: Launch of "Cash" by David Chaum and the DigiCash Company as the first encrypted electronic currency; it failed due to weak e-commerce infrastructure.

1996: Creation of the E-gold platform for digital gold trading (reaching 3.5 million users), later shut down due to money laundering accusations.

1997: Adam Back developed the Hashcash protocol to fight spam, later forming the basis of Bit coin's proof-of-work mechanism.

1998: Wei Dai proposed "b-money" as a prototype for decentralized digital currency.

2008: Satoshi Nakamoto published the Bit coin white paper and introduced block chain during the global financial crisis.

2009: The first 50-bit coins were mined, and the first transaction occurred between Nakamoto and Hal Finney.

2011: Bit coin reached $1 according to Mt. Gox, marking the beginning of its value rise and the emergence of competitors.

2012–2015: Ripple (XRP), Lit coin, and Ethereal (featuring smart contracts) emerged, along with the expansion of global crypto trading platforms[4].Benefits and Risks of Using Digital Currencies:

The following subsection explores the advantages and disadvantages of the utilization of digital currencies, bringing a balanced perspective on their potential effects on the global financial system:

1.1.3 Benefits of digital currencies:

The advantages of digital currency are highlighted in this section:

1. **Lower transaction costs:** Transaction expenses for digital currencies are lower than those for FRNs. This is due to the decentralized nature of digital currencies, which eliminates the need for middlemen in transactions. On the other hand, FRNs are centralized, and banks and other middlemen are involved in transactions. Which charges fees for its services.
2. **Instantaneous transactions:** Because digital currency transactions are completed instantly, cash transfers may take place in a matter of seconds. Because traditional methods typically take days to complete, this will be especially advantageous for businesses that need to make payments worldwide.

[4] ماهية العملات الرقمية والافتراضية وكيف يتم التعامل معها؟ (febr13 ,2020) (May6, 2025)

3. **Enhanced security**: Digital currencies are safer than traditional ones as they utilize encryption to safeguard transactions. Transactions are, therefore, almost impossible to hack or falsify.
4. **Increased privacy**: Compared to traditional payment systems, digital currencies provide more anonymity. Even when a transaction is recorded on a public ledger, the parties' names are kept anonymous.
5. **Global Reach**: Digital currency transactions do not require a local bank account and may be carried out from anywhere in the world. This might result in more efficient cross-border money transfers and receipts.
6. **Transparency:** Because digital currencies are visible, transactions can be tracked, reducing the likelihood of fraud and corruption. This transparency is extremely advantageous to many underdeveloped countries. Furthermore, block chain networks cannot alter FRN data, making it easier to detect and prevent fraudulent activity.
7. **Accessibility:** People who do not conduct business with banks can use digital currency. Approximately 1.7 billion individuals globally do not engage with financial services, according to the World Bank. Digital currencies are widely accessible, even in rural locations, thanks to people's cell phone connectivity.
8. **International Currency:** Unlike national currencies linked with specific countries, digital currencies are regarded to be equivalent to international currencies. For example, without the need for intermediaries, digital currencies such as Bit coin enable speedy and inexpensive cross-border transactions. This allows money to be transferred between nations in a matter of minutes.

The use of digital currency has various advantages over traditional currencies. Digital currencies are changing our perceptions of money in a variety of ways, including improved security and lower transaction costs. As more people utilize digital money, there will most likely be additional benefits in the future[5].

1.1.4 Risks and downsides of digital currencies:

This part will cover the primary risks of digital currencies, outlining their pitfalls for consumers and regulators as well**:**

- **Effect on the Economy:** Influence on Economic Change. Many questions are still unclear regarding the effect of digital currencies on financial, economic, and

[5] "Exploring the benefits of digital currency: 7 Key Reasons" (July 9, 2024)، (febr 21, 2025)، at5:45 am http://www.transfi.com

environmental stability. A report from the Atlantic Council indicates that they expect interoperability problems within financial systems as the use of central bank digital currencies (CBDCs) spreads. Customers withdrawing substantial amounts of money from banks looking to exchange it for CBDCs may create a liquidity crisis that hampers the banks' lending possibilities, generates shocks in the markets, and alters interest rates. It is also a given that this is a major risk for countries with fragile economic structures. Cybercriminals are also major actors in this, and CBDCs face operational risks from these as well. Therefore, strong counter-offensive measures will also need to be in place to guard against cybercriminals. Concerns have also been made about privately issued cryptocurrencies possessing the capacity to destroy global economies, especially in emerging markets, where they will reduce foreign dependence on financial neo-bank intermediaries. The volatility of cryptocurrencies and the lack of regulation are valid concerns that can lead to economic catastrophe, for instance, the Bank of Russia overextending its monetary policy.

- **Lack of Regulation:** While digital currencies have expanded exponentially, transparent regulatory frameworks through which to verify or oversee the transactions associated with these currencies are yet to exist. The type of this obstacle is exacerbated by the high heterogeneity in digital currency use and regulation across many nations, including a majority that still has yet to develop coherent regulatory strategies. For example, "while certain nations, like China, are against the use of digital currencies owing to their speculative character, some nations have embraced Bitcoin and other similar cryptocurrencies as valid means of payment".

Most proponents of cryptocurrency express opposition to the application of additional regulation, arguing that interventions of this kind can stifle innovation and compromise the decentralization that is at the core of the cryptocurrency model. Others argue that a lack of legal framework is an obstacle to the growth of cryptocurrencies, as investors will be discouraged by the prevailing regulatory uncertainty. Moreover, the unique features of cryptocurrencies like decentralization and anonymity create avenues for money laundering and other illicit activities, as the decentralized nature of blockchain technology complicates the process of tracking and monitoring illegal activities for the authorities.

A fundamental problem at the core of the regulation of cryptocurrencies concerns the accounting treatment of the assets. The provision of an open and verifiable regulatory framework would go a great distance in allowing for the development of accounting standards that can be applied to digital currencies. Digital currencies need a comprehensive

regulatory framework that takes into account central issues like privacy, consumer protection, and anti-money laundering regulation compliance. These aspects have to be reinforced to effectively counter emerging challenges, safeguard investors, foster confidence, and ensure greater financial stability in the volatile cryptocurrency market.

- **Taxation Issues and Digital Currencies:** The advent of digital currencies inevitably gives rise to questions of taxation. The most significant issue is the impact of gains and losses of digital currencies on cash taxes and book taxes of enterprises. Another issue is determining the appropriate taxation regime for cryptocurrencies, where there is little or no specific information on the parties to the transactions. While the movement of accounting standard-setters toward developing guidelines has been a step-by-step approach, tax regulators in many countries have taken active steps to bring out regulations about the taxation of digital currency. In the United States specifically, the Internal Revenue Service (IRS) considers cryptocurrencies as "property" rather than currency, which means taxation of digital currencies follows the handling of assets like stocks or gold. On the contrary, Italian tax authorities recognize cryptocurrencies as foreign currency and impose a flat 26% substitute rate of taxation on gains generated from their exchange to fiat currencies.Taxing authorities have provided some leeway in the categorization of digital currencies, which can facilitate the process of taxation as well as induce greater compliance by companies. Yet, this leeway can also bring an unwieldy number of varied taxation and accounting methods to cryptocurrencies in diverse jurisdictions. Individuals may possess numerous accounts on various exchanges situated in multiple tax jurisdictions, and even a single account might generate revenue streams traversing several international tax regimes. Thus, reliable information about capital gains from digital currencies is scarce, as it may not capture the entirety of an individual's worldwide assets because of variations in taxation policies. Besides, it has been explicitly argued that blockchain technology, the same technology that underlies cryptocurrencies, can be utilized to enhance tax systems. Block chain technology is most appropriate for tax administration due to its transparency, traceability, and extensive information on transactions, which might minimize administrative costs and close the tax gap. Demirhan also supports the use of blockchain technology to improve the efficiency of tax collection with more transparency and accountability, since all the actors in a blockchain network have access to a full ledger of all transactions.

1.2 Classification of Digital Currencies:

1.2.1 Types of Digital Currencies:

Some of the most prominent digital currencies include the following:

- **Crypto currencies:** These are digital currencies that safeguard and validate network transactions using encryption. The generation of such currencies is likewise managed and controlled. Through the use of cryptography. Cryptocurrencies include, for example, Bitcoin and Ethereum. Cryptocurrencies may or may not be regulated in a given country.
- **Virtual currencies:** Virtual currencies are unregulated digital currencies governed by developers or a founding organization comprising multiple stakeholders engaged in the process. A specified network protocol can likewise be used to algorithmically govern virtual currencies. A gaming network token, whose economics are established and managed by developers, is an example of virtual money.
- **Central Bank Digital Currencies:** Digital currencies issued by a nation's central bank that are subject to regulations are known as central bank digital currencies or CBDCs. A CBDC can be used in place of or in addition to conventional fiat money. A CBDC only exists in digital form, as opposed to fiat currency, which is available in both physical and digital forms. Several countries, including Uruguay, Sweden, and England, are considering introducing digital versions of their national fiat currencies. The usage of CBDCs has been proposed as a way to improve centralized payment systems' speed and security, reduce the risks and expenses associated with handling cash, and encourage greater financial inclusion for individuals and businesses without access to traditional banking services. They might also reduce the need for foreign exchange and facilitate cross-border payments. The introduction of a U.S. CBDC presents certain difficulties. For instance, for Congress to authorize the issuance of CBDCs there must be robust privacy and security infrastructures put in place. The government must also weigh the possible impacts on monetary policy and the operational management of the switch from conventional money to a CBDC[6].

[6] Investopedia ,2024 ,digital currencies :Types ,characteristics ,pro and cons , future uses ,(febr12, 2025) at 5:24 Am, retrieved from
https:// www.investopedia.com

1.2.2 Trend of digital currencies:

This invention, which gave the established financial system a new foundation appears obsolete now. The introduction of blockchain technology, the basis for digital currencies, marks a dramatic shift in the evolution of monetary systems. Block chain technology has made it possible to develop cryptocurrencies that are not controlled by governments or central banks. Notwithstanding their enormous potential, digital currencies have faced several challenges in the first 10 years of their existence, including institutional mistrust, financial impropriety, and rampant speculation. However, this was just the beginning of a new phase in their growth.

In recent years, opinions on digital currencies have shifted throughout the

World and they are increasingly viewed as viable solutions to the main issues facing the established monetary system, as well as investment vehicles. Digital currencies have demonstrated success in addressing several problems, including lowering the volatility of fiat currencies, enhancing the efficiency of cross-border payments, and offering banking services to those without access to traditional banks. Additionally, the shift to digital transformation, especially in the aftermath of the COVID-19 pandemic, has raised the emphasis on using digital currency in everyday transactions. Furthermore, the extensive usage of digital currency issued by central banks.

Which will be spurred by these developments, will radically alter the financial landscape of the world in the ensuing decades. The significance of this change has been recognized by governments worldwide, and several big countries have already started creating their digital currencies. China has previously experimented with the digital Yuan, the European Union is working on the digital euro, and the United States is now developing ideas for a digital dollar. Countries' ongoing economic and geopolitical conflicts have a significant impact. Compared to the manufacture of physical cash, the generation of digital currency. It is more cost-effective and provides governments with more financial benefits. Given its increasing significance in international financial institutions, the future of digital money appears bright. Digital money has the potential to permeate every aspect of daily life as governments and large corporations engage with technology more, serving as a store of value and a method of accounting. A financial revolution is occurring in modern society, and digital currencies are expected to play

a big role in the global financial system. It is anticipated that this revolution will significantly affect how money and economic transactions are managed in the years to come[7].

2. Overview of central bank digital currencies:

Technological advancements are swiftly transforming the global economy, with financial institutions leading the charge in a rapidly evolving digital transformation. One of the innovations that is emerging in the digital financial landscape is Central Bank Digital Currencies (CBDCs), as a strategic response to the needs of the digital age and concerns for financial stability.

This paper will explore the nature of a CBDC, the drivers of its development, its economic implications, and the challenges regarding implementation.

1.3 General Concept of central CBDC:

To better comprehend central bank digital currencies (CBDCs), we shall examine their concept and evolution in further detail in this section.

1.3.1 Concept of central CBDC:

Depending on the issuing entities, whether governments or central banks

There are several notions of Central Bank Digital Currencies (CBDCs), each of which reflects distinct viewpoints and methodologies. Among these ideas are:

The following is the definition of central bank digital currency provided by the International Monetary Fund:

- "A central bank digital currency (CBDC) is a digital representation of central bank money that can be used as a medium of exchange or a store of value، designed to be a legal equivalent to physical currency.[8]"

[7] Abdulla Aljallaf, HERE IS HAW digital currency Outlook Woujd Turun Out TO Be In The Future" (nov19, 2020), Febr21, 2025
http://www.linkedin.com

[8] International Monetary Fund (IMF), the RISE of central bank digital Currencies, (2020), (Mar7, 2025).
https://www.bis.org

- Central bank digital currencies (CBDCs) are defined as follows by the Bank for International Settlements (BIS):
- "A central bank digital currency (CBDC) is a digital form of central bank money that can be used directly by individuals، businesses, and financial institutions. It shares characteristics with physical cash but operates in electronic systems.[9]"

The following is how Investopedia defines digital currencies issued by central banks:

- "A central bank digital currency (CBDC) is the digital form of a country's fiat currency، issued by a country's central bank. It is similar to cryptocurrencies, except that its value is fixed by the central bank and is equivalent to the country's fiat currency. [10]"

Blockchain technology specialist Kyle Schlapkohl provided the following definition of central bank digital currency (CBDCs):

- "A central bank digital currency (CBDC) is a digital extension of a central bank's medium of exchange able to permanently settle transactions between parties. The central bank can remove credit risk and ensure stability by guaranteeing the value of the CBDC, exactly like paper money.[11]"

1.3.2 Emergence of central banks' digital currencies:

The development of central banking began with payment services. Payment innovation has since been an integral central banking Function. Modern examples are establishing the infrastructure allowing Instant interbank gross settlement and, more recently, the greater Emphasis on faster retail payment systems. Central bank digital Currencies (CBDCs) are another potential innovation. This is the Committee on Payments and Market Infrastructures and Markets. The committee's joint report offers an initial assessment of CBDCs. It offers a Big-picture overview of their payment implications, monetary policy, and financial stability. Analysis by the committees is a manifestation of Preliminary thought in such rapidly

[9] Bank for International settlements (BIS),Central Bank Digital Currency (CBDC) (2021), (Mar6,2025) http://www.imf.org

[10] Investopedia, what is a central Bank Digital Currency (CBDC)? (2023), (March3, 2025) https://www.investopedia.com

developing areas is a starting point for additional discussion and research. It also notes that issuance of A CBDC should be taken very seriously[12].

The monetary base was primarily composed of the accumulated balance-of-payments (BOP) surpluses and US currency in circulation. These Bops Oil revenues and remittances mainly drove surpluses. However, the oil crisis in 2008 led to a BOP deficit and a lack of physical cash. Starting in 2008, the BCE implemented three strategies to limit the use of the dollar, aiming to alleviate pressure on that currency. The first initiative involved the government issuing low-denomination electronic Securities or T-bills, which were designed to function as currency for Payments. While the government attempted to use these securities to pay contractors, they did not amend the regulations to allow taxes or other government obligations to be paid with them, resulting in their Failure as a currency. These securities were seldom traded in the secondary market, and when they were, sellers often needed to hire brokers and sold them at significant discounts (nearly 20 percentage points below the Nominal value). However, beginning in January 2016, the Ecuadorian Internal Revenue Service accepted T-bills for tax payments, leading to their success as a form of money, as indicated by trading volume and a Low discount rate of around 2.3%. This experience highlighted the Importance of issuing liabilities usable for tax payments and the Significance of ease of transactions for liquidity. The second initiative was FactoRepo, a B2B invoice-clearing system introduced in 2009, which was to lessen liquidity constraints for small Producers and entrepreneurs to settle accounts on a net basis. The System combined invoices between buyers and sellers, issuing a "bond Points" to the net creditor equivalent of their surplus. Consequently, the bond receiver had immediate liquidity that could be accessed before the actual payment of the invoice. A simulated evaluation of the FactoRepo prototype using a tax transaction dataset revealed three important characteristics of the Ecuadorian Economy. First, it demonstrated significant liquidity concentration among a limited number of firms. Second, it indicated that supply chains quickly reach importers. Finally, it showed that numerous formal businesses do not use invoices to pay for their agricultural raw materials. These three Observations put pressure on net creditors, thus necessitating a Contingency fund from the BCE to back up the system by converting Surplus points into cash. However, legal issues regarding the backstop Function led to the cancellation of the project after the prototype stage. The third initiative involved a central bank mobile money program. Initially called "Mobile Payment Systems," regulations for mobile payments were introduced. the money system was

[12] Seven Bank for International Settlements. (2018). Central bank digital currencies. Committee on Payments and Market Infrastructures & Markets Committee, (feb26, 2025) at 12:44 Am, Retrieved from www.bis.org

introduced in January 2011. This legislation mandated that these mobile money accounts be managed by the Central Bank and made accessible to all citizens aged 18 and older, irrespective of whether they held a commercial bank account. The first launch of DE Occurred in 2012, but it was retracted due to opposition from private Banks against a central bank-dominated structure. The platform name Was subsequently changed to Sistema de Pago Móvil, and a new Regulations established a system that permitted transfers or payments Only from previously created current deposit or basic accounts at financial institutions participating in the Sistema Red de Reads Meanwhile, a framework for non-bank correspondent banks, spearheaded by Ecuador's two largest private banks, it was under Development at the Bank Superintendence. This initiative, known as, enabled the issuance of private electronic money by Ecuador's largest private bank to circulate exclusively with one of the telephone operators. The System of mobile payment and Money was a mobile platform designed for transferring commercial bank deposits, similar to various Mobile payment options offered by financial institutions worldwide, without creating mobile money issued by a central bank. On February 28, 2014, the original legislation regarding DE was restored. These

Modifications reverted the DE initiative to a mobile money program issued by the central bank. The updated system, which included enhancements like payment system integration, was in operation until 2018[13].

1.4 Advantages and disadvantages of

1.4.1 Advantages:

Let us take a closer look at the different advantages of Central bank digital currency currencies:

- **More efficient and safer payments and settlement systems:**

In recent years, there has been a great emphasis on developing more Efficient and secure payment and settlement systems. Historically, banks have controlled retail payment systems in Europe and most of the Western world. However, the emergence of Fitch firms has shaken this widespread dominance, altered consumer behaviour and prompted Regulatory reactions. The growing participation of non-bank participants in the financial industry, together with a

[13] Kumhof, M. and Noone , C (2021) Central bank digital currencies – Design principles for financial stability , Economic Analysis and policy, 71, PP .553-572. https://doi.org/10.1016/j.latcb.2021.100030, (march 10, 2025) at 9:33pm

growing number of transactions being performed by third parties who might not be directly controlled by Central banks, presents some risk. They incorporate reduced regulatory Supervision and concerns regarding the security of transactions since financial regulation is presently taking place at various levels, if at all. This shift has been partially driven by the demands of consumers for Quicker and less expensive payment options. As a response to this, the implementation of central bank digital currencies (CBDCs) can provide the underlying infrastructure to address these demands in the current financial landscape. Still, whereas the introduction of a general-purpose or wholesale-only CBDC could bring many benefits to payment, clearing, and settlement systems, it could also introduce several risks and Challenges. The risks mentioned above comprise the possible disruption of incumbent payment service providers, along with the establishment of Asymmetric incentives. Alternatively, a central bank-operated framework can improve the payment system resilience by adding a further Solid foundation for basic payment services.

- **Better visibility and transparency of monetary policy:** The introduction of Central Bank Digital Currencies (CBDCs) presents an opportunity to promote transparency and efficiency in monetary policy frameworks, providing central banks with real-time data on transactions. This feature would allow for more precise tracking of critical financial indicators, thus resulting in better-informed policy. Interventions. Moreover, CBDCs provide a significant chance to make the monetary policy framework of the central bank more transparent, it is Nominal anchor, operating instruments, and general policy approach, and thus foster a deeper understanding of policy choices. Yet, some critics contend that existing payment systems already enable mass data collection concerning economic transactions. While CBDCs may be able to offer improved real-time perspectives, the Incremental benefits may be marginal to what is already achievable. A stronger case for CBDCs is that they can maintain a direct Connection between citizens and central banks, particularly in settings where the use of physical currency is on the decline. The presence of this direct connection may significantly contribute to improving the Public' s understanding of the roles of central banks, as well as strengthening the necessity for their autonomy in the implementation of monetary policy.
- **Additional tools for monetary policy:** Central Bank Digital Currencies (CBDCs) can be developed with sophisticated functionalities intended to sway short-term demand from Consumers and businesses, allowing them to be utilized as Countercyclical measures to encourage or temper spending and Investment. For example, a digital currency might be time-sensitive, compelling users to utilize it by a certain deadline before it returns to the issuer. The People's Bank of China explored this idea in 2021 through its DCEP red

envelopes. Furthermore, digital currencies can feature embedded interest rates, which could either be positive or negative, and might differ from the current policy rate. Importantly, an interest-bearing CBDC linked to accounts can help mitigate the zero lower bound limitation on monetary policy, improving its effectiveness during severe recessions or deflationary periods. This versatility positions CBDCs as a significant instrument for enhancing monetary policy in difficult economic conditions. Harder for the black economy, money laundering, and tax evasion:

The United Nations estimates that between 2% and 5% of the global GDP, which amounts to $800 billion to $2 trillion each year, is laundered. Through illicit financial activities. A significant portion of these operations relies on the anonymity provided by cash transactions. The Bank for International Settlements (BIS) points out that a Central Bank Digital Currency (CBDC), by enabling digital documentation and transaction Traceability, could strengthen the enforcement of anti-money laundering (AML) and counter-terrorism financing (CFT) laws, potentially reducing informal economic activities. Even with the introduction of token-based CBDCs alongside account-based systems to maintain a degree of privacy, imposing limits on wallet transfer amounts could effectively hinder their use in extensive illegal operations. Nevertheless, the BIS warns that the overall effectiveness in reducing illegal activities may not be substantial, as traceable CBDCs might not become the main vehicle for these transactions. The ongoing cat-and-mouse dynamic between Regulators and money launderers is expected to continue with little change, irrespective of the CBDC framework.

- **Improved Financial Inclusion for the Unbanked and under banked:** One of the main motivations for the establishment of CBDCs is to promote financial inclusion, as acknowledged by central banks. The Bank of England has pointed out that offering basic accounts and creating a central bank-operated electronic payment system could significantly enhance financial inclusion, particularly in developing nations where banking and payment infrastructures are lacking. This issue is also evident in developed countries, particularly among at-risk groups during crises. For example, in May 2020, around 14 million adults in the U.S. did not have bank accounts, leading to prolonged delays of weeks or even months in receiving COVID-19 stimulus payments, with some individuals losing anywhere from 1% to 10% of their checks to cashing fees. The rollout of CBDC digital wallets could improve the efficiency and fairness of distributing relief funds. However, the BIS has noted that certain demographics may face significant challenges in adopting digital currencies. A study examining CBDC acceptance in a region of Spain, considering a range of sociodemographic factors, further highlights these difficulties. Positive overall

macroeconomic impact: The widespread adoption of Central Bank Digital Currencies (CBDCs) is poised to provide significant macroeconomic benefits. By reducing the expense of the payment system operation, particularly those related to cash storage, transportation, and upkeep, CBDCs can enhance the efficiency of the financial transaction process. Additionally, they enhance the resilience of the system through the diminishment of risks emanating from cyber-attacks, operational failures, and hardware errors. CBDCs also yield greater transparency, which allows tax evasion to be minimized, corruption, together with other illegal dealings, to be contained. They can contribute to greater financial stability by minimizing costs associated with private monopoly ownership, especially since the use of cash generally reduces. CBDCs can also improve financial inclusion significantly, particularly in under-banked economies, by providing access to digital finance services. Moreover, CBDCs can reduce the regulatory expenses of the banking sector. The sector by eliminating the need for a fractional reserve system. This would exert more discipline over commercial banks, reduce their risk exposure, and decrease the political and economic rationales for governments to bail out too-big-to-fail entities. In summary, a CBDC rollout has the power to deliver beneficial spillover Effects on the entire economy and generates enormous growth in GDP. The net impact, however, will depend upon the pace of uptake by the Public[14].

1.4.2 Risks of central bank digital currencies:

Despite the numerous advantages that Central Bank Digital Currencies

(CBDCs) provide, they also present a range of risks that need to be addressed before widespread implementation. Some of the most significant threats include:

- **Privacy Issues Concerning Central Bank Digital Currencies (CBDCs):** While CBDCs bring many advantages; they also raise serious privacy concerns. In a digital financial ecosystem, governments can closely scrutinize financial activities, which could endanger individual privacy. Transparency, often regarded as a primary benefit of digital financial systems, may have detrimental effects if misused. Heightened scrutiny can lead to apprehensions around financial freedom and privacy rights, as excessive transparency may

[14] Cunha, P. R., Melo, P., & Sebastião, H. (2021). From Bitcoin to Central Bank Digital Currencies: Making Sense of the Digital Money Revolution. Future Internet, 13(7), 165, march 11, 2025,at 8:11 Pm https://doi.org/10.3390/fi13070165

allow authorities to monitor even minor financial transactions. The risk that governments might employ transaction-tracking technologies to impose stringent financial regulations or impose punitive measures on those who violate policies is particularly concerning. Protecting personal financial privacy becomes more difficult in this scenario, potentially triggering widespread public unease about the extent of governmental oversight over private finances.

- **Technological Obstacles and Cyber security Threats:** One of the primary challenges that CBDCs face is the multitude of technological difficulties related to their implementation and maintenance. Digital currencies depend entirely on intricate electronic systems, making them inherently vulnerable to cyber-attacks. Malicious actors like hackers and cybercriminals may seek to exploit these networks to steal funds or disrupt financial systems. Such threats pose a serious risk to the financial stability of individual users as well as government entities.
- **Consequences for Traditional Banking Institutions:** To ensure the safety and resilience of digital financial systems, significant investment in robust cyber security measures is crucial. Governments must allocate substantial resources to safeguard these systems against cyber threats and ensure their capacity to withstand potential security breaches in the future. Additionally, it is vital to develop sophisticated technological frameworks for managing CBDCs infrastructure, which requires ongoing innovation and meticulous attention to identify and address vulnerabilities that cyber attackers may exploit. Should CBDCs gain widespread acceptance, traditional banking institutions could experience considerable strain. The demand for conventional banking services, such as checking accounts and deposit holdings, might decline if individuals can easily conduct transactions through government-operated digital currency platforms. This shift could significantly alter traditional banks' roles within the financial ecosystem, potentially diminishing their profitability and overall relevance. Traditional banks may need to rethink their roles and leverage new technologies to adapt to the evolving financial landscape. This could include embracing block chain technologies, incorporating innovative financial services, or developing new strategies to maintain their market relevance. Despite the adaptability of financial institutions, the transition from traditional banking to a landscape focused on digital currencies may present considerable challenges, requiring extensive planning and regulatory modifications[15].
- **Theft and Loss of Credentials:** To access CBDCs accounts, secure credentials like passphrases or hardware tokens that contain private keys are essential; however, they are

[15] هل تصبح مستقبل النقد": " العملة الرقمية للبنوك المركزية (mar12,2025) at. 9 :05 pm
https://europeanprotour.com

susceptible to theft and loss, which might expose account funds and sensitive information. Both physical and digital credential theft is possible, particularly concerning passphrases, which can be acquired through advanced cyber-attacks such as malware, social engineering, and side-channel attacks. Furthermore, credentials may be rendered unusable due to loss or damage caused by environmental hazards such as fire or water; block chain-based systems might employ multi-signature (multi-sig) wallets, where multiple trusted entities, like the central bank or designated contacts, control credentials tied to a single account. While this enhances security, it may inadvertently reduce user security. Conversely, centralized systems with privileged authority can utilize database modifications to facilitate easier credential recovery.

- **Risks Linked to Privileged User Roles:** Certain entities, such as central banks, law enforcement, or government officials, may have special permissions within CBDCs frameworks to freeze or withdraw funds without user consent. These powers could potentially be exploited by malicious insiders, even if they comply with existing regulatory frameworks in financial systems. Therefore, it is imperative to implement strong cyber security risk management strategies to prevent abuse of these privileges. System integrity can be strengthened with security measures such as governance controls and multi-party authentication. Validator nodes operated by non-central bank entities may introduce additional risks to block chain-based CBDCs by exercising unilateral transaction acceptance or rejection, which could undermine monetary policy goals. To alleviate these risks, the central bank should retain sole authority over transaction validation unless necessary.
- **Risks to System Integrity and Double Spending:** A reliable transaction validation mechanism is critical to maintain the integrity of a CBDCs system. Granting validation authority to non-central bank nodes may lead them to deliberately reject valid transactions, which could trigger denial-of-service attacks or selective censorship of transactions. Additionally, collaboration among validator nodes could facilitate double-spending attacks, where the same CBDCs units are fraudulently spent multiple times. Malicious actors might also fork the transaction ledger, creating an alternative record that diverges from the official system. The risk of double spending is notably high in offline transactions, where standard security validation practices are temporarily bypassed. To mitigate these threats, CBDCs systems should implement spending limits and transaction frequency constraints for offline transactions. Furthermore, compliance software should reconcile and verify all transactions made while a device is connected to the network.
- **Dangers from Quantum Computing**: Quantum computing presents a significant long-term threat to financial institutions, especially CBDCs, as it has the potential to break

widely-used cryptographic algorithms. As quantum technology evolves, current encryption methods protecting access, confidentiality, and transaction integrity may become obsolete, increasing the vulnerability of digital currencies to cyber threats. To address this risk, central banks need to proactively evaluate cryptographic vulnerabilities and transition to quantum-resistant encryption techniques. Advances in quantum technology might enable undetected breaches if such protections are not in place, endangering the stability and security of CBDC systems. By adopting advanced security measures, implementing stringent governance protocols, and preparing for technological advancements, central banks can enhance the resilience of CBDCs and mitigate associated risks[16].

1.5 Reasons and factors behind their emergence:

1.5.1 Objectives:

This subsection discusses the main objectives of the Central Bank digital Currency Currencies:

- **Increasing the competitiveness and reliability of the payment System:** One of the main goals of any central bank is to maintain financial stability. CBDC can help create a robust payments infrastructure by creating a digital substitute that lessens an excessive dependence on a select group of payment companies. Countries currently have quite different payment infrastructures. A few players may control the majority of the market in some regions, such as Latin America, where credit card fees account for more than 1% of GDP.2 CBDC can reduce payment expenses and lessen the financial Risk of service interruptions from providers. It can also promote Innovation and opening the market.
- **Expanding access to financial services:** Even while real currency is still widely accepted in many nations, it is used to make payments rather than just as a worldwide store of value. Declining. For example, between 2014 and 2018, the percentage of Persons in Sweden who used cash decreased by 32.3%. The COVID-19 the pandemic has also hastened this trend. This is especially problematic for developing nations that lack reliable Electronic commercial banking and/or payment networks. A significant a section of the populace in many nations does not have access to a bank Account; hence, their only means of payment is actual cash. When combined with other national initiatives, a CBDC system's Identity management programs, for example, could increase financial inclusion. By mimicking

[16]" 4 key cyber security threats to new central bank digital currencies" (NOV20,2021) (mar14,2025) at 10:05pm Https://www.weforum.org

some of the advantages of actual currency, such as its Usability and offline transaction capabilities.

- **Meeting future payment needs in an increasingly:** Digital economy Adding functionality to a currency is one of the CBDC Biggest potential advantages. In this manner, it can facilitate micropayments and function as Programmed currency. Certain distributed ledger technologies (DLTs), like Ethereal, are made to allow a central bank to apply logic and automated transaction requirements to a CBDC system. Because these transactions are Depending on code execution, technology professionals occasionally refer to them as being based on smart contracts. The outcome may resemble an automatic escrow arrangement. The system completes the Transaction without additional human involvement whenever the Requirements are met (such as the delivery of goods or Services), making it programmable money. Programmable money has a Wide range of possible applications. It can facilitate an Internet of Things (IoT) approach in which microcomputers and sensors are connected to the Internet tracks the delivery and reception of micro services as they occur. Additionally, micropayments—very tiny transfers—can be supported by It. Although tokens and blockchain are frequently linked to Programmable money, alternative strategies offer comparable or Identical functionality. One completely managed ledger database service That you may use is the Amazon Quantum Ledger Database (Amazon QLDB). Can be used with tools for smart contracts. Payment service providers (PSPs) The commercial sector may also supply programmable money as an overlay service that is driven by a core ledger. Then, many PSPs running smart contract solutions can be connected. Using application-programming interfaces (API).
- Enhancing international payments: The Financial Stability Board outlined strategies to enhance cross--Border payments. Its suggestions included creating new platforms for Cross-border payments, upgrading current procedures, and implementing New international standards and even utilizing CBDC systems for cross---Border payments. The paper did not rule out central banks using general. The purpose of wholesale CBDCs is to serve as the foundation for a solution. CBDCs at Wholesale prices. The idea of extending the availability of the central bank Reserve accounts outside well-known commercial banks are somewhat Akin to the concept of a wholesale CBDC. This strategy is already being Used by commercial financial services organizations to innovate cross-- Border payments. One important factor for central banks to think about is how to handle the There is a possibility that CBDC will mimic the anonymity of actual currency. Although there are consequences for risk management and illegalActivity detection: This feature may be crucial for financial inclusion. At various stages of a CBDC

architecture, regulators influence the degree of privacy and anonymity. They could, for instance, create it so that no party identifies information. It is shared across transaction participants. This would resemble some of the anonymity features of actual currency. When consumers register a CBDC account, the same CBDC solution Would still need identity verification as part of anti-money laundering (AML) procedures. The identities of participants could then be recorded. By PSPs that facilitate transactions. If law enforcement suspects illicit Conduct, this would enable them to track transactions[17].

1.5.2 Challenges of Central Bank Digital Currencies (CBDCs):

There are numerous challenges of central bank digital currencies let' delve into these challenges:

- **Regulatory and Legal Restrictions**: One of the primary challenges in creating Central Bank Digital Currency (CBDC) is navigating the legal and regulatory landscape. In some regions, existing legislation may restrict or even prevent the issuance of CBDCs. Although many central banks assert, they have the authority to issue CBDCs, legislative amendments are often required to address specific legal issues related to CBDCs, such as programmability.
- **Disintermediation of Banks:** If not carefully designed, a CBDC could pose significant risks to financial stability, particularly due to the potential for disintermediation of banks. Such disruptions could greatly affect banks' core operations. Given the crucial role banks play in numerous economies and their interconnections with other financial sectors, these impacts could extend beyond banks and affect the broader economy and financial ecosystem.
- **Technical Difficulties:** The requisite technological infrastructure for CBDCs present another major challenge. Numerous technical issues could arise, such as ensuring compatibility with existing banking systems, mitigating cyber security threats like hacking, and addressing internet access disparities in remote areas.
- **Knowledge of Finances:** Public financial literacy is a critical challenge, especially for central banks aiming to utilize CBDCs to enhance financial inclusion. Despite the increased digital connectivity of financial services and daily life, it doesn't automatically lead to heightened financial understanding. If not addressed appropriately, certain

[17] Amazon Web Services. (2021). Central bank digital currency (part 1): Objectives and architectural Consideration, March 12, 2025, at 7:33pm https://aws.amazon.com/whitepapers.

demographic groups may struggle to adopt and utilize new digital financial technologies, potentially leading to financial exclusion.

- **Types and Designs of CBDC:** CBDCs can be designed in various ways depending on their intended purpose. The three primary categories are cross-border CBDC, wholesale CBDC, and retail CBDC (also known as general-purpose CBDC). Each model offers unique benefits and holds the potential to foster innovation and growth within the financial ecosystem.
- **Payments at Retail:** A retail CBDC facilitates real-time peer-to-peer transactions with instant settlement. This could create a more competitive and innovative digital payments environment, enhance financial inclusion, and provide a robust payment system for the future.
- **Payments in Bulk:** Wholesale CBDCs could enable settlements within digital financial market infrastructures and grant access to large-value payment systems for multiple financial institutions. Possible benefits of this model include support for delivery-versus-payment and payment-versus-payment mechanisms, greater availability of risk-free central bank funds for significant transactions, and the overall digitization of financial markets.
- **Payments across Borders:** A cross-border CBDC could enable direct financial transactions between different CBDC networks, overseen by central banks. This could simplify cross-border payment processes, lower costs, improve integration in financial markets, eliminate the need for correspondent banking intermediaries, and reduce related risks and delays. Central banks recognize the risks involved, despite seeing substantial Potential in the widespread adoption of stable coins and Central Bank Digital Currencies (CBDCs). If these digital currencies are not properly designed and regulated, the risks of fraud and misuse could extend beyond individuals, potentially impacting the entire payment system and monetary policy. Some of the significant challenges associated with CBDCs were highlighted in a recent survey conducted by the Bank for International Settlements (BIS):
- **Security Risks:** Given the complexity of CBDC technology, security vulnerabilities are a major concern. Cyber security measures need to be enhanced to keep pace with the scale and intricacy of these systems. Potential cyber threats include data breaches, risks associated with third-party service providers, and theft of private keys.
- **Technological Limitations:** Community banks, in particular, might struggle with the considerable data storage requirements associated with CBDCs. Moreover, problems with hardware, software, or network infrastructure may result in operational delays, data corruption, or interruptions in service.

- **Privacy concerns:** While block chain technology enhances the transparency of financial institutions, it raises privacy concerns among customers. A statement from the Independent Community Bankers of America (ICBA) indicated that one of the main factors keeping some unbanked households from entering the traditional banking sector is a desire for financial privacy. The public nature and high traceability of CBDC transactions may deter customers from utilizing them.
- **Wholesale versus Retail CBDC:** In the United States, wholesale CBDCs are designed for substantial institutional transactions that could streamline cross-border payments, strengthen enforcement of sanctions, maintain the US dollar's reputation as a stable international currency, and accelerate the distribution of foreign assistance. However, retail CBDCs present a different challenge, as they might lead to a shift of deposits from smaller community financial institutions to the central bank, thereby hindering their ability to support local economies. Security remains a crucial concern as central banks approach the implementation of stable coins and CBDCs. Even though users have shown a readiness to embrace digital currencies, widespread acceptance might be obstructed by worries regarding privacy and security. Central banks are aware of these issues and are taking steps to address them[18].

Chapter summary:

Through what we have addressed in this chapter by discussing various aspects of central bank digital currencies (CBDCs), we can say that this field represents one of the most prominent features of digital transformation in the global financial sector. Our research in this chapter has allowed us to extract a set of key insights, which we summarize in the following results:

- The digital currency landscape has changed considerably in shape and from early experiments in cryptographic value to sophisticated block chain-based infrastructures, fundamentally altering the financial landscape on a global scale.
- Digital currencies and especially CBDCs are a reaction to the limitations of more traditional fiat systems to improve efficiency, transparency, and financial inclusion.
- The historical trajectory of digital currencies demonstrates a model of experimentation, failures, triumphs, and success, with the pattern of Crypto currency

[18] BID Daily Newsletter, The promise and challengers of central bank digital currencies,Sep16, 2024, at Mar31,2025at 8:36pm
http://www.pcbb.com

recognition and legislation attesting to the emergence of block chain-based solutions as a baseline in monetary reform.

- A useful and tidy typology differentiating crypto currencies from virtual currencies and CBDC, each had a distinct corresponding regulatory, operational. In addition, technical reality.
- CBDC provides central banks with a tool for improving payment systems, reducing reliance on cash and safeguarding their monetary policy competency from the adoption of privately issued digital currencies.
- While digital currencies are useful tools for central banks, their introduction comes with risk, including cyber security, regulatory uncertainty, and a loss of the intermediary function of traditional banks.

Chapter Two:

Introduction to Financial inclusion

Foreword:

Financial inclusion has emerged as a significant issue that has garnered attention. Increasing attention at international and national levels, particularly in the aftermath of the 2008 global financial crisis. This crisis exposed the fragility of financial systems and highlighted the necessity of integrating broader segments of society into the formal financial framework. Financial inclusion has since been recognized as one of the effective solutions to the economic and social challenges confronting many communities, especially the most vulnerable and low-income populations.

The primary goal of financial inclusion is to ensure that all individuals, households and businesses, regardless of their income level, have access to the financial services they need to enhance their quality of life. Underprivileged populations often operate within what is known as the informal economy, lacking access to essential financial tools such as bank accounts or debit cards. Therefore, opening a transaction account signifies the first step towards broader financial integration.

1. The Essence of Financial Inclusion.

Financial inclusion is currently considered a fundamental tool for promoting economies of developing countries, strengthening their financial institutions in general, and improving individuals' living standards and conditions in particular. This highlights the importance of clarifying this concept, which we aim to do in this section. Here, we will explore the definition of financial inclusion, its key pillars, its significance, and the risks and obstacles it faces.

1.1 Concept of Financial inclusion :

1.1.1 Definition of Financial Inclusion.

Many definitions of financial inclusion have been cited, the most Important of which are:

- There are several terms used to refer to **financial inclusion**. Some call it financial integration, while others refer to it as financial deepening. Despite the variety of expressions, the underlying meaning remains the same: the development of financial

and banking institutions, and the increased effectiveness and diversification of monetary policy tools aimed at encouraging greater engagement from low-income individuals and integrating them into the financial system. This also involves making financial services accessible to all segments of society, in both remote and urban areas, whether directly through financial and banking institutions or indirectly through agents such as mobile wallet providers.

- The degree of **financial deepening** is measured by the ratio of broad money supply to gross domestic product (GDP) at current prices. The inverse of this ratio indicates the **velocity of money circulation**. As financial deepening increases, the velocity of money decreases. A low level of financial inclusion and a high velocity of money circulation may reflect a decline in financial intermediation, indicating that the banking system is struggling to attract more savings. Hence, financial
- The terms **financial inclusion** and **financial exclusion** are often used interchangeably to describe the extent to which the population can access and benefit from financial services. Financial exclusion, on the other hand, refers to the difficulties and barriers individuals face in accessing essential financial products and services that meet their needs, thereby hindering their ability to participate in normal economic life in the society they live.
- The **G20** and the **Alliance for Financial Inclusion (AFI)** define financial inclusion as the set of measures taken by regulatory authorities to promote access to and usage of financial services by all segments of society, including the underserved and affluent groups. These services should be offered in a fair, transparent, and affordable manner, and tailored to the users' needs.
- The **Organisation for Economic Co-operation and Development (OECD)** defines financial inclusion as the process of enhancing access to a wide range of official, regulated financial products and services at reasonable cost, in a timely and efficient manner. It also involves expanding the usage of these services by various segments of society through innovative approaches, including financial education and awareness, to improve financial well-being and promote social and economic inclusion.
- The expansion of financial inclusion and the broadening of its umbrella not only improve individuals' living standards but also significantly contribute to the stability of financial systems themselves. For instance, the **2008 global financial crisis** revealed the fragility of financial systems and underscored the importance of linking financial inclusion with stability, transparency, and the protection of consumers dealing with financial institutions and their products. Achieving financial inclusion requires the provision of a comprehensive range of financial services, including bank accounts,

savings, short- and long-term loans, financial leasing, mortgages, insurance, wages and payments, retirement plans, and both domestic and international money transfers. It also involves consumer protection and the enhancement of financial literacy[19].

Based on the previous definitions, financial inclusion can be defined as:

Providing and enabling access to all economic and banking products and services (such as bank accounts, loans, leasing, insurance, payments, and local and international money transfers, etc.) through official financial channels for all segments of society, both individuals and institutions. This should be done at the lowest possible cost while ensuring quality, protecting consumer rights, and promoting economic and banking awareness.

1.1.2 Pillars of Financial Inclusion:

Financial inclusion is based on certain key pillars for broadening all populations and segments of society into the formal financial system. These pillars work in unison to remove barriers and produce a continuum of access to financial services. The key pillars are:

- **Access to Banking Services:** Providing access to banking service facilities in remote and economically deprived areas and providing access online or virtually through a meaningful and dense network of branches, ATMs, mobile banking units, and bankers without borders for the low-income and excluded population.
- **Financial Literacy and Inclusion Programs:** Implementing a national strategy for public knowledge of finance and one's finances. Depending on demographic circumstances, different segments of the population will have enhanced financial knowledge through financial literacy programs. The learning process will focus on enhancing financial behaviour and helping individuals use financial services responsibly. Financial literacy programs are education-oriented and cover youth, women, and older persons.
- **Banking Services/Basic Bank Accounts:** Offering low- or no-frills banking products that allow account holders and clients to deposit, withdraw, or transfer cash from the banking account, with reasonable fees and eligibility, and become a customer source.

[19] محمد محروس سعدوني الشمول المالي واثره في تحقيق مستهدفات التنمية المستدامة " دراسة تحليلية لواقع الدول العربية" مدرس الاقتصاد والتشريعات الاقتصادية معهد الحقوق جامعة الزقازيق مدينة الزقازيق مصر

- **Accessibility to Microcredit:** Enhancing the availability of small loans customized to suit low-income individuals and microenterprises, with the least possible restrictions and collateral requirements on the loans. These loans enhance entrepreneurship and self-employment primarily in informal sectors.
- **Micro insurance Services:** Providing private sector insurance services offering financial protection against the financial risks that vulnerable groups face, such as health, life, and Agricultural insurance, which are customized to suit the needs and income levels of low-income communities.
- **Pensions for the Informal Sector**: Tailoring retirement and savings schemes for informal sector workers. The schemes provide long-term financial security for workers typically not included in traditional pension schemes.

1.2 Key Pillars for enhancing financial Inclusion:

1.2.1 Importance of Financial Inclusion:

- **Why is Financial Inclusion important?**

There are some very broad and simple reasons why financial inclusion is Important. Among the important reasons are:

- **Financial inclusion reduces poverty and inequity:** Financial inclusion provides access to formal financial services, including savings, credit, and insurance, for poor and marginalized people. Providing opportunities for management of their finances and investing in income-generating activities, financial inclusion can address poverty and inequity.
- **Financial inclusion fosters economic growth:** The common rationale is that when more people can access financial services, they can contribute in ways that benefit the economy. Improvements in financial inclusion led to households saving, investing, and becoming entrepreneurs, thereby growing economies and fostering stability in both local communities and national economies.
- **Financial inclusion bolsters small businesses:** Small businesses typically confront obstacles in obtaining financial support from traditional banks. Financial inclusion through new lending models and online platforms can provide entrepreneurs with the financial support to expand their companies.
- **Through financial inclusion, otherwise marginalized groups are empowered:** for instance, financial inclusion programs aimed at women can promote

gender equality and women's economic empowerment. By accessing financial services, women gain more control over their money, leading to better education, improved health, and greater influence in the household.

- **Financial inclusion promotes innovation:** Financial inclusion in the finance industry drives innovation and leads to technologies to meet the needs of underserved populations. These Innovations could also benefit the overall financial market and financial services.
- **Financial inclusion as a catalyst for Sustainable development:** Technology plays a crucial role in achieving financial inclusion. Therefore,

  Enhancing access to digital financial services further promotes Access to digital inclusion as more people can participate in a Digital economy[20].

1.2.2 Financial Inclusion as a Goal of Sustainable Development:

One of the main tenets of attaining sustainable development in its three Facets-economic, social, and environmental financial inclusion. Its importance stems from its ability to effectively empower people and communities, especially marginalized and vulnerable groups, by guaranteeing fair, secure, and reasonably priced access to formal financial services. As are crucial for bringing the unorganized sector into the formal sector Economy, improving accountability and transparency, and boosting domestic revenue collection through better taxation. As a crucial element in initiatives to end poverty, lessen disparities in the distribution of resources, and promote inclusive economic growth, the UN has focused a great deal of attention on increasing financial inclusion through the 2030 Agenda for Sustainable Development. Together with the Addis Ababa Action Agenda on Financing for Development, the 2030 Agenda lays out a comprehensive set of actions to provide a supportive legislative and policy environment. One of these actions is facilitating access to various financial services, including credit, insurance, savings, and remittance transfers. These services attract local investment and create job opportunities.

In this regard, the UN stresses that financial services access should be seen as a tool to accomplish more general goals about social justice, gender equality, and youth empowerment rather than as a goal in itself. The most advised approaches to lessen financial exclusion are national financial inclusion programs, particularly those that are

[20] 1 MITCHELL GRANT,(2024,March 12(, Financial inclusion : Definition, Examples, and Why It's Important ,
Investopedia , https://www.investopedia.com/terms/financial-inclusion.asp

gender-sensitive. Research indicates that nations that have used these tactics have seen their exclusion rates decline more quickly and dramatically than those that have not. The report also emphasizes how modern financial technologies, or Fintech, have a great deal of promise to broaden the reach of digital financial inclusion. Traditional access to financial services is hampered by institutional and geographic constraints that can be overcome with the use of mobile banking and electronic payment systems. However, the effectiveness of these tools is conditional on the promotion of financial Literacy and consumer protection, especially for the most vulnerable groups, including the poor, women, and rural populations. Furthermore, the General Assembly encourages Member States and all relevant stakeholders, including international financial institutions, regional and national development banks, credit unions, and the private sector, to continue and strengthen financial education programs. These programs should ensure that all individuals, especially women and girls, smallholder farmers, and entrepreneurs in micro, small, and medium-sized enterprises, acquire the knowledge and skills necessary to use financial services effectively and responsibly[21].

1.3 Challenges and Dimensions of Financial Inclusion

1.3.1 Current situation and challenges:

Millions of people throughout the world still do not have access to basic financial services, despite the tremendous advancements in recent years:

- **Lack of Infrastructure:** In many areas, a major obstacle to financial inclusion is the absence or insufficiency of infrastructure. The lack of physical bank branches and ATMs in rural areas makes it challenging residents to get financial services. In a similar vein, low mobile network coverage and restricted internet access impede digital financial inclusion by prohibiting users from using mobile banking or payment services. Consider a remote village where the closest bank is hours away, making it nearly impossible for the people living there to obtain credit or open a bank account.
- **Low Financial Literacy:** The unbanked population's low level of financial literacy is another major challenge. Many people lack the knowledge and abilities needed to successfully navigate the financial system. People who do not understand that this often become confused and distrustful, which discourages them from using official financial services. People might not know the advantages of keeping money in

[21] الجمعية العامة للأمم المتحدة القرار رقم(72 الشمول المالي من اجل تحقيق التنمية المستدامة الدورة الثانية والسبعون البند18 صفحة رقم (5)

a bank account as opposed to at home, or they might not of the consequences of taking out high-interest loans from unofficial lenders.

- **Informal Financial Systems:** The unbanked population frequently depends on informal financial systems, such as moneylenders or savings groups, because of their inability to access formal financial institutions. Although these systems offer a lifeline to numerous individuals, they are frequently accompanied by a lack of consumer protection, limited financial services, and increased costs. To facilitate the transition of individuals from informal to formal financial systems, it is necessary to address trust issues and offer customized services that are tailored to their unique requirements.
- **Accessibility and affordability** are essential components of financial Inclusion. Traditional banking services, including account maintenance fees and minimum balance requirements, are often unaffordable for many individuals due to financial constraints. Additionally, individuals residing in rural regions may find it difficult to access a bank due to the distance or the expense of transportation to a physical branch. By offering financial services that are both affordable and accessible, innovative solutions such as mobile banking and agent, banking can assist in overcoming these obstacles.
- **Regulatory Barriers:** Barriers arising from regulations can hinder initiatives aimed at financial inclusion. Overly stringent regulations or rigorous Know Your Customer (KYC) protocols might restrict individuals from obtaining bank accounts, especially for those lacking formal identification papers. Governments and regulatory organizations need to find a middle ground between maintaining financial integrity and creating a conducive atmosphere that advances inclusion. Streamlining KYC protocols and investigating alternative identification approaches, such as biometrics, can assist in surmounting these challenges.
- **Gender Gap:** Gender disparities represent another significant hurdle to attaining financial inclusion. Women frequently encounter more substantial obstacles, such as restricted access to education, societal biases, and legal limitations, which impede their engagement in the formal financial sector. Bridging the gender gap necessitates focused initiatives to enhance financial literacy, challenge cultural conventions, and offer customized financial products and services that cater to the unique requirements of women.
- **Technological Hurdles:** Although technology can promote financial inclusion, it may also pose obstacles for individuals with limited digital skills or technology access. Many people, particularly seniors and those residing in rural regions, might struggle to embrace and utilize digital financial services effectively. Guaranteeing fair

access to technology and offering intuitive interfaces will be vital for allowing everyone to take advantage of the digital shift in finance[22].

1.3.2 Dimensions of Financial Inclusion

Given the development of the concept of financial inclusion in recent years,

financial inclusion has been divided into three dimensions. Below is a description of each dimension:

- **Access to Financial Services:** This dimension refers to the ability to use financial services provided by financial institutions. Determining the levels of access to services and analysing potential gaps in opening up access to these services requires using data related to bank branches and ATMs. Indicators measuring access to financial services can also be utilized based on information published by financial institutions. Indicators of access to financial services include:
  - The number of bank branches per 100,000 people at the national level, broken down by administrative units.
  - The number of ATMs per 1,000 square meters.
  - The degree of connectivity between service delivery points.
  - The percentage of the total population living in an administrative unit with at least one access point.

Traditional approaches to measuring access to financial services have become unrealistic nowadays, as new technologies introduced into the banking sector have altered the development of traditional banking access. The spread of bank branches and ATMs has been replaced by new banking developments such as payment cards and the use of new financial services via the internet instead of formal financial services, which are surveyed in field studies at the local level to derive results. Payment cards also play an important role in improving the issue of access to banking services, as technology and banking transactions have greatly facilitated access to financial services.

- **Use of Financial Services:** This dimension refers to how much customers utilize the financial services offered by the banking sector. Measuring the extent of financial

[22] FasterCapital, Exploring the challenges of financial Inclusion , Retrieved April 18 , 2025 from , 2025 from https://fastercapital.com/topics/exploring-the-challenges-of-financial-inclusion.html at 20:10

service usage requires collecting data on the regularity and frequency of use over a specific period. Several key measurement indicators are proposed within this dimension, including:

- The percentage of adults who have at least one type of regular deposit account.
- The percentage of adults who have at least one type of regular credit account.
- The number of insurance policyholders per 1,000 adults.
- The number of non-cash loan transactions per individual.
- The number of mobile payment transactions.
- The percentage of adults who regularly and consistently use a bank account.
- The percentage of depositors with active bank accounts.
- The percentage of adults who have local or international money transfers.
- The percentage of small and medium-sized enterprises (SMEs) that have official financial accounts.
- The percentage of SMEs that have active loans.

- **Quality of Financial Services**: This is considered one of the important dimensions measured through the process of setting indicators to reflect the impact of quality in itself. In most studies that have addressed the measurement of financial inclusion in the agendas of developed and developing countries, it has become clear that the quality of financial services provided is no longer a minor issue but has become essential.

Many factors influence the quality and diversity of financial services, such as the cost of services, consumer awareness, alternative compensation mechanisms, consumer protection services, financial institutions, transaction transparency, in addition to intangible factors such as consumer trust. The financial inclusion alliance has established a set of indicators that follow the quality dimension, which is clarified as follows:

- **Transparency:** Access to information plays a crucial role in financial inclusion. Financial service providers must ensure that all clients receive relevant information about financial services to enable them to make sound decisions about using these services. It is essential to ensure the accuracy and clarity of this information so that it is easily understood and free from misinterpretation.
- **Convenience and Ease:** This indicator reflects clients' perceptions regarding the ease of access and comfort in using financial services.

- **Consumer Protection:** This indicator appears in the regulations and activities designed to ensure and protect consumer rights in all matters related to accessing financial services, such as pricing disclosure and protection from unfair practices.
- **Usage:** This measures the basic behaviours of clients and users, such as planning and budgeting their income.
- **Inclusiveness in Financial Inclusion:** This is a general characteristic of financial system activity, and it is essential to understand how vulnerable groups are affected by debt within specific categories and periods[23].

2. Barriers to Financial Inclusion in Developing Countries:

2.1 Economic Barriers:

Economic barriers are among the most prominent factors hindering the advancement of financial inclusion, especially in developing countries. Below is an overview of the main economic obstacles and how they affect the path toward achieving financial inclusion:

- **Inability to afford mobile phones and data plans:** Even when women own mobile phones, they often struggle to cover ongoing usage costs, especially when relying on limited financial support from family members. The high prices of internet bundles and voice calls create a significant economic barrier to utilizing digital financial services.
  - **Impacts of Inability to afford mobile phones and data plans:** Access to digital financial services is increasingly dependent on owning a mobile device and maintaining a stable internet connection. However, for many low-income individuals, the cost of smartphones and data subscriptions remains prohibitively high. This technological barrier prevents them from using mobile banking apps or digital wallets, which are often the most accessible forms of financial services in remote or underserved areas. As a result, their exclusion is

[23] -اكرام مالوسي، سنة مسعي، الشمول المالي كآلية لدفع وتيرة التنمية الاقتصادية دراسة حالة الجزائر، أطروحة لنيل شهادة ماستر ، المعهد العلوم الاقتصادية، المركز الجامعي عبد الحفيظ بوالصوف، ميلة، الجزائر2020-2021، ص8، 9 بحث منشور

not just financial but also digital, reinforcing a cycle of limited access and missed opportunities for inclusion.[24].

- **Low personal income:** Women who do not have an independent income often depend on others to pay for phone services, which reduces their autonomy and limits the use of these tools for financial purposes[25].
  - **Impacts of Low personal income:** consistently low income significantly undermines an individual's ability to participate in the formal financial system. People with minimal earnings often struggle to meet the basic requirements to open or maintain bank accounts, such as minimum balance thresholds or monthly fees. Furthermore, low income reduces the motivation and capacity to save, invest, or take on credit. Over time, this financial fragility limits their access to services that could otherwise help them build resilience and improve their quality of life, thus entrenching financial exclusion[26].
- **Impacts of High Costs:** Excessive fees for financial services, including account opening, ATM usage, and transaction charges. Minimum balance requirements for bank accounts often surpass what low-income individuals can afford. Financial products like loans and insurance are expensive and inaccessible to many, particularly in rural and marginalized communities.
  - **Impacts of High Costs:** The financial burden of accessing banking services, including fees for account maintenance, transactions, and loans, poses a substantial obstacle for those with limited financial means. These costs discourage many from even attempting to engage with formal institutions, particularly when the perceived benefits do not outweigh the expenses. Hidden charges and a lack of transparency further reduce trust in the system. Consequently, high costs contribute directly to the persistence of informal financial practices and weaken the overall effort to broaden financial inclusion[27].

[24] World Bank. (2022). The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19. Washington, DC: World Bank. Retrieved from https://www.worldbank.org/en/publication/globalfindex

[25] DIGITAL FINANCIAL INCLUSION BARRIERS , check it out (apri22, 2025) at 13:01 https://digitalfinance.wordbank.org

[26] Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution. World Bank. https://globalfindex.worldbank.org

[27] Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution. World Bank. https://globalfindex.worldbank.org

- **Weak Economic Incentives for Financial Institutions:** Financial institutions tend to avoid expanding services in sparsely populated rural areas due to high operational costs and low profitability.

Weak economic incentives are among the key barriers limiting the contribution of financial institutions to promoting financial inclusion.

- **Impacts of Weak Economic Incentives for Financial Institutions:** When financial institutions see little profit in serving low-income or rural clients, their willingness to invest in outreach or innovate inclusive products diminishes. Without clear financial incentives, such as tax breaks, risk-sharing mechanisms, or regulatory support, banks tend to focus on more profitable market segments. This results in a lack of tailored financial services for those most in need and slows down the spread of inclusive financial infrastructure. Ultimately, the absence of strong institutional motivation stifles progress toward universal financial access[28].

2.2 Social and Cultural Barriers:

Social and cultural barriers are among the most significant challenges to achieving financial inclusion in many countries, especially in traditionally oriented communities. In this section, we will address the main social and cultural obstacles that hinder financial inclusion and clarify their impacts:

- Many low-income individuals lack the knowledge of how to avail themselves of, or use, financial services[29]: Individuals who are not aware of how to access or when or how to use formal financial services are substantially less likely to have a bank account, use savings products, or have access to credit. In addition to restricting the affordability of the formal finance system, they then increase their reliance on informal finance mechanisms—often riskier ones—and deepening their financial vulnerability while excluding them from other economic opportunities[30].
- In certain communities, cultural norms discourage or limit the use of financial services, particularly for women and other marginalized groups[31]:

[28] Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution. World Bank.

[29]1 Reddy, G. R, (n.d.),Barriers to Financial Inclusion, In Financial Inclusion, (pp. 39–49) , KD Publications , Accessed April 23, 2025, at 5:45 PM

[30] World Bank. (2018). The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution. Washington, DC: International Bank for Reconstruction and Development / The World Bank. Available at: https://globalfindex.worldbank.org accessed May 03 , 2025 at 16 :19 PM

[31] Reddy, G. R, (n.d.), pp .39-49

The restrictions on women's mobility, their diminished decision-making authority within households, and their limited access to identification documents are just some of the gender norms that can restrict women's access to formal financial services, as all of which are required to be formal and utilize the financial services. With this imbalance in access to service, women are disproportionately excluded from the formal financial system, which decreases their independence and lack of financial service use, but this mismatch in access results in a broader economic slowdown through limiting financial access at the household and community level. Even to the extent that, according to the Centre for Financial Inclusion (2024), women's financial inclusion is unlikely to lead to real economic empowerment unless gender norms are transformed. Although women as an economic force can improve community well- being, social norms and gender norms limit women voice and power, which restricts their agency, civic and economic participation, and control over resources, which in turn restricts their access to financial services and the use of those services[32].

- Because of their gender, age, ethnicity, or socioeconomic status, People may be prevented from using or accessing financial services by Religious, social, and cultural factors[33]. These barriers can take on the form of systematic discrimination, social stigmas, or exclusionary practices that limit access to financial institutions and financial products that are appropriate or accessible for specific groups can exacerbate financial exclusion reduce possibilities for economic participation, and maintain the cycle of poverty and inequality. According to the Alliance for Financial Inclusion, identity-based discrimination, such as gender; Cultural; and religious practices continues to create some of the most Deeply entrenched structural obstacles to achieving financial inclusion for Prospective users in developing economies. Addressing this requires Inclusive policy frameworks and targeted efforts to create equitable financial ecosystems[34].
- Vulnerable groups may be excluded from the formal financial sector Because of social discrimination or unconscious bias[35]. These barriers They are contributing to access issues for credit, savings, and insurance. Particularly among women, ethnic

4 enter for Financial Inclusion. (2024). Normative Constraints to Women's Financial Inclusion: What We Know and What We Can Do. Retrieved from https://www.centerforfinancialinclusion.org/wp-content/uploads/2024/02/Normative-Constraints-to-Womens-Financial-Inclusion_FINAL.pdf accessed May 03 , 2025 at 16 :30[32]

[33] Reddy, G. R, (n.d.), pp .39-49

[34] Alliance for Financial Inclusion (AFI). (2020). Gender Inclusive Finance: Policy Frameworks and Tools. AFI Publication. Retrieved from: https://www.afi-global.org/publications/gender-inclusive-finance-policy-frameworks-and-tools accessed 02 May 2025 at 17 :00

[35] Reddy, G. R, (n.d.), pp .39-49

minorities, and rural populations. Implicit biases within financial institutions lead to distrust of the formal System, lack of representation in financial policies, and few appropriately Designed financial products. The World Bank found that structural and social barriers are still a significant obstacle to financial inclusion (and access to the formal financial system), particularly in developing Economies, where cultural and social factors are closely related to financial Behaviour[36].

- people are further discouraged from using financial services by a lack of trust in financial institutions and a feeling of cultural or social Alienation[37]: This disengagement can manifest as self-exclusion, whereby people voluntarily refrain from utilizing banking services because of a fear of being exploited, misunderstanding the banking system Products, or having past negative experiences. Many instead choose to utilize informal financial networks, which can be riskier and less regulated. A World Bank study indicates that approximately thirty percent of unbanked adults in Europe and Central Asia cite a lack of trust in banks as A barrier to not having an account. The UNDP reports that social mistrust and a lack of knowledge about financial systems inhibit women access to banking services, as they view banking as opaque and inaccessible. These types of user experiences can not only amplify financial exclusion but can also perpetuate cycles of poverty and inequality, especially in vulnerable communities[38].

2.3 Technological and Infrastructural Barriers:

Technological and infrastructural barriers are among the main factors that limit access to financial services, especially in remote or less developed areas. Accordingly, this section will address the key technological and infrastructural obstacles that hinder financial inclusion and explain their impact on it.

Lack of Financial Infrastructure:

A shortage of bank branches and ATMs in remote areas. Geographic distance from financial service centres makes access difficult for rural populations.

[36] world Bank. (2022). Financial Inclusion Overview. Retrieved from https://www.worldbank.org/en/topic/financialinclusion/overview accessed 02 May 2025 at 17 :15

[37] Reddy, G. R, (n.d.), pp .39-49

[38] inancial Inclusion in Europe and Central Asia – the Way Forward https://www.worldbank.org/en/news/opinion/2019/04/05/financial-inclusion-in-europe-and-central-asia-the-way-forward accessed 03 May 2025 at 18 :02

- Impacts of Lack of Financial Infrastructure on Financial Inclusion :
  - **Limited Access to Financial Services:** Without proper infrastructure, individuals and businesses—especially in rural or underserved areas—struggle to access basic services like savings accounts, credit, or insurance.
  - **Higher Transaction Costs:** Inadequate infrastructure often leads to increased costs in delivering financial services, discouraging both providers and users.
  - **Low Penetration of Digital Finance:** The absence of supportive technology and systems limits the expansion of mobile banking and digital financial services.
  - **Increased Informal Finance Dependence:** People resort to unregulated financial systems, which can be risky and costly.
  - **Financial Exclusion of Vulnerable Groups:** Women, youth, and marginalized communities are disproportionately affected due to physical, technological, or systemic barriers[39].
- **Limited Digital Infrastructure:** Poor internet and mobile network coverage hinders the use of mobile banking and financial applications. The digital divide particularly affects older adults, women, and the uneducated[40].

Impacts of limited digital infrastructure on financial inclusion:

- Restricted Access to Digital Financial Services: Limited internet and mobile network coverage hinder access to mobile banking, digital wallets, and online financial platforms.
- Digital Divide Between Urban and Rural Areas: Rural populations often lack reliable digital infrastructure, widening the gap in financial access and opportunities.
- Low Financial Literacy and Trust: Poor digital access contributes to low digital financial literacy and lack of trust in using online services.
- Increased Operational Costs for Providers: Financial service providers may find it unprofitable to operate in areas with weak digital infrastructure.

[39] "The lack of physical and digital financial infrastructure, such as bank branches, ATMs, internet connectivity, and mobile network coverage, especially in remote and rural areas, remains a significant barrier to financial inclusion." — World Bank. (2022). The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19.

[40] DIGITAL FINANCIAL INCLUSION BARRIERS , check it out (apri22, 2025) at 13:01 https://digitalfinance.wordbank.org

- Exclusion of Vulnerable Populations: Women, elderly people, and low-income groups are disproportionately excluded from digital financial systems[41].

- **Digital Illiteracy:** Many individuals lack the technical skills needed to use modern banking technology. Even where infrastructure exists, a lack of knowledge limits actual usage and benefits.
- Impacts of Digital Illiteracy on Financial Inclusion:
  - Limited Use of Digital Financial Services: lacking digital skills are less likely to use mobile banking, e-wallets, or online payment platforms.
  - Increased Risk of Fraud and Misuse: Digitally illiterate users may fall victim to scams or misuse digital tools due to lack of awareness and understanding.
  - Widening Inequality in Access: Populations with low digital literacy—especially the elderly, low-income groups, and rural residents—face exclusion from modern financial systems.
  - Low Confidence and Trust: A lack of digital knowledge reduces confidence in using financial technologies, leading to avoidance of such services.
  - Barrier to Government and Social Transfers: Digital illiteracy may prevent individuals from accessing benefits and subsidies delivered through digital platforms[42].

Limited access to technological devices:

- Many women either lack access to or do not own smartphones capable of supporting digital financial services. In rural areas, poor network quality further exacerbates the challenges women face in accessing such services.
  - Impacts of Limited Access to Technological Devices on Financial Inclusion:
  - **Inability to Use Digital Financial Services:** Without access to smartphones, computers, or tablets, individuals cannot engage with mobile banking, e-wallets, or online financial tools.

[41]"Digital infrastructure remains a challenge, especially in remote areas where internet access and mobile network coverage are limited, affecting the availability and use of digital financial services."
— International Monetary Fund (IMF). (2022). Financial Inclusion: Challenges and Opportunities in the Digital Age.

[42] "Digital financial literacy is essential to ensure individuals can safely and effectively use digital financial services. A lack of digital skills remains a key barrier to financial inclusion, particularly in developing economies."
— OECD (2023). Enhancing Financial Literacy through Digital Tools.

- **Exclusion from Digital Payment Systems:** Those lacking devices are unable to participate in cashless economies, particularly in areas shifting rapidly to digital payments.
- **Reinforcement of Existing Inequalities:** Vulnerable groups—such as low-income populations and people in rural areas—are further marginalized by their lack of access to technology.
- **Reduced Financial Literacy Opportunities:** Many financial education tools are digital; without devices, users miss out on these learning resources.
- **Barrier to Innovation Adoption:** Innovations like biometric authentication, app-based microloans, or digital IDs require compatible devices, limiting their reach among underserved populations[43].

Lack of adaptive digital services:

There is a shortage of applications or platforms that consider digital illiteracy or linguistic barriers many women faces, which limits their ability to use these services effectively.

- **Impacts of Lack of Adaptive Digital Services on Financial Inclusion:**
- **Exclusion of People with Disabilities:** Digital platforms that are not designed with accessibility features (like screen readers or simplified interfaces) exclude users with visual, hearing, or cognitive impairments.
- **Low Engagement from Elderly Populations:** Older adults often face challenges using non-intuitive or complex digital financial services that are not adapted to their needs.
- **Language and Literacy Barriers:** Services that are not available in local languages or are too text-heavy can alienate users with low literacy or non-dominant language backgrounds.
- **Undermined User Experience and Trust:** Poorly adapted services may lead to frustration, errors, and mistrust, discouraging users from engaging with digital finance platforms.

[43] Access to technological devices such as smartphones and computers is a prerequisite for engaging with digital financial services. Limited access continues to be a significant barrier for many people, especially in low-income and rural communities."

— World Bank Group. (2022). Digital Financial Services: Challenges and Opportunities in Expanding Access.

- **Reduced Adoption in Rural and Marginalized Areas:** Lack of locally relevant content or design that fits community needs contributes to low adoption of digital financial tools[44].

Lack of awareness and knowledge in using modern technological tools (such as smartphones and online banking services).

- Impacts of lack of awareness and knowledge in using modern technological tools on financial inclusion:
  - **Underutilization of Available Financial Services:** People do not take advantage of existing digital financial tools simply because they don't know how to use them.
  - **Increased Risk of Financial Errors or Fraud:** Without proper knowledge, users may make mistakes or fall victim to digital fraud schemes.
  - **Low Confidence in Technology Use:** Lack of awareness creates fear or hesitation, leading individuals to avoid digital banking and mobile finance platforms.
  - **Barrier to Financial Empowerment**: A lack of digital knowledge restricts individuals' ability to save, invest, or access credit digitally.
  - **Perpetuation of Financial Exclusion Among Marginalized Groups:** Women, older adults, and people in remote areas are disproportionately affected by this knowledge gap[45]
  - The spread of remote rural areas, where financial services are rare or non-existent.
- Impacts of the Spread of Remote Rural Areas (Where Financial Services Are Rare or Non-existent) on Financial Inclusion:

[44] "Digital financial services must be designed to meet the diverse needs of users, including those with low literacy, disabilities, and different languages. A lack of adaptive design limits accessibility and reinforces financial exclusion."
— Alliance for Financial Inclusion (AFI). (2021). Inclusive FinTech: Designing for the Margins.

[45] "Many individuals, particularly in developing countries, are not fully aware of how to use digital financial tools such as mobile banking apps or online payment platforms. This lack of awareness and knowledge presents a major barrier to financial inclusion."
— United Nations Capital Development Fund (UNCDF). (2022). The Role of Digital Financial Literacy in Promoting Inclusive Finance.

- **Physical Inaccessibility to Financial Institutions:** Residents in remote rural areas often live far from banks, ATMs, or microfinance institutions, making access to services costly and time-consuming.
- **Low Penetration of Mobile and Internet Networks:** Infrastructure gaps in these areas hinder the use of digital financial services like mobile banking or online transfers.
- **Limited Financial Literacy and Awareness:** Rural populations may lack exposure to financial education, reducing their understanding and trust in formal financial systems.
- **High Dependence on Informal Financial Systems:** In the absence of formal services, people turn to informal lending or saving practices, which can be unreliable or exploitative.
- **Barriers to Government Transfers and Subsidies:** Lack of access prevents rural residents from receiving digital payments such as social benefits or agricultural subsidies.
- Weak geographical coverage by traditional financial institutions (such as banks and post offices)[46].

• Impacts of Weak Geographical Coverage by Traditional Financial Institutions on Financial Inclusion:

- **Limited Access to Basic Financial Services:** People living in underserved or remote areas cannot easily access bank accounts, credit, or savings services.
- **Increased Travel Time and Costs:** Individuals must often travel long distances to reach the nearest branch, which is both time-consuming and expensive.
- **Low Incentive for Financial Engagement:** The inconvenience discourages people from opening or maintaining formal financial accounts.
- **Dependence on Informal Channels:** Lack of nearby institutions drives users toward informal and often unregulated financial providers.
- **Slow Financial Development in Rural Areas:** Economic activity may be constrained due to poor access to credit, insurance, and secure savings options[47].

[46]Dr. G. Raja Reddy, 5. Barriers to financial Inclusion, Principal, Kakatiya Government College, Hanamkonda, Telangana, page 46
https://www.Kdpublications.in

[47] "Limited physical presence of banks and post offices in remote and underserved areas hinders access to financial services, creating spatial disparities in financial inclusion."
— Organisation for Economic Co-operation and Development (OECD). (2023). Financial Inclusion and Access: Addressing Geographical Disparities.

2.4 Policy and regulatory Barriers:

The following policy-related obstacles are specifically covered in the paper:

- The term "National Financial Inclusion Strategies"(NFIS) describes Nations such as Botswana that have financial inclusion plans but continue to struggle with exorbitant costs that compromise the efficacy of these Measures.
- **Regulatory Quality:** The cost of financial services is found to be negatively correlated with regulatory quality, indicating that better regulation is linked to reduced costs and easier access.
- **Absence of data-driven policymaking:** It emphasizes how the Capacity to create successful, evidence-based interventions is hampered by the absence of comprehensive data on bank pricing.
- **Call for policy integration:** To improve cross-country Comparisons and assistance in policymaking, the paper suggests that central Banks incorporate pricing and cost data into official supply-side data.

However, despite being widely acknowledged obstacles to financial access, topics like identity documentation, proof of address, or KYC regulations are not thoroughly covered[48].

The following policy-related obstacles are specifically covered in the paper:

The term" National Financial Inclusion Strategies" (NFIS) describes

Nations such as Botswana that possess financial inclusion plans are still grappling with exorbitant costs that compromise the effectiveness of these initiatives. The World Bank has observed that the costs associated with extending financial services, particularly to rural and remote areas, hinder the implementation of a National Financial Inclusion Strategy (NFIS) and the capacity to achieve financial inclusion. Consequently, marginalized populations persist in utilizing informal financial channels that expose them to financial risks, inadequate consumer protection, and limited access to credit. Furthermore, barriers pertaining to affordability diminish public trust in formal financial institutions, curtail engagement through government-led initiatives,

[48] 2 International Monetary Fund. (2024), Understanding Barriers to Financial Access: Insights From Bank Pricing Data (Working Paper No. WP/24/150).,International Monetary Fund. Accessed April 24, 2025, at 6:20 PM.

and restrict progress towards Sustainable Development Goals (SDGs), particularly SDG 1 (No Poverty), SDG 8 (Decent Work and Economic Growth), and SDG 10 (Reduced Inequalities).

Regulatory Quality:

The cost of financial services is found to be negatively correlated with regulatory quality, indicating that better regulation is linked to reduced costs and easier access49. When there are weak or overlapping regulatory frameworks, the compliance costs of the financial institutions are increased, and typically, these extra costs are passed onto the consumer, resulting in additional fees incurred or reduced financial inclusion, such as for low-income groups or rural areas. Poor quality regulation also leads to market inefficiencies and reduces the opportunity for innovation (e.g., digital finance solutions) and causes financial exclusion if new service providers find it difficult to enter the market. Ultimately, poor regulatory quality reduces competition, increases operating costs and limits the outreach and provision of formal services[50].

Absence of data-driven policymaking:

It emphasizes how Policymakers ' capacity to create successful, evidence-based interventions is hampered by the absence of comprehensive data on bank pricing[51]. The unavailability of comprehensive data, required, for example, on bank pricing models, access barriers, and consumer behaviour, undermines the ability of policymakers to develop evidence-based policies, which also increases financial inclusion. Without dependable data, regulators and financial authorities cannot truly understand what costs consumers face, the inefficiencies of financial institutions, or the market gaps where gaps are located. A lack of data leads to inappropriate or generic policies, misallocation of public funds, and ultimately failing to reach unbanked populations. Additionally, without any data, there is little accountability for adopting policies; monitoring and evaluation are impossible; and it is impossible to implement policies that respond to changing financial services[52].

[49]International Monetary Fund. (2024) , Understanding Barriers to Financial Access: Insights From Bank Pricing Data (Working Paper No. WP/24/150).,International Monetary Fund. Accessed April 24, 2025, at 6:20 PM

[50] Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2022). The Global Findex Database 2021:
Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19 , Washington, DC: World Bank Group

[51]International Monetary Fund. (2024)

[52] nternational Monetary Fund (IMF). (2024). Understanding Barriers to Financial Access: Insights from Bank

Call for Policy Integration: To enhance cross-country comparisons and facilitate policymaking, the article posits that, in the significant:

Absence of detailed cost information regarding financial services, policymakers face challenges in identifying obstacles to financial access, formulating effective interventions aimed at addressing these barriers, or monitoring progress toward the objectives of financial inclusion. The absence of data creates misallocation of resources, poor policy decisions, difficulty benchmarking, and difficulty learning from international best practices. Integrated data is the key to improving transparency and ensuring competition to better provide access to affordable financial services for underserved population segments. Banks incorporate pricing and cost data into official supply-side data[53].

Chapter summary:

Several findings that demonstrate the multifaceted character of this subject have been drawn after elucidating the theoretical underpinnings and the real-world setting of financial inclusion. The following is a summary of these findings:

Since financial inclusion is crucial to reducing poverty and advancing sustainable development, it is seen as a foundational element for enhancing social and economic circumstances. Many people still do not have access to even the most basic financial services, especially those who live in rural or marginalised regions, despite the increased focus on financial inclusion.

Social, cultural, technological, and regulatory issues are some of the other factors that have contributed to the continuance of financial exclusion, in addition to economic ones.

The two most significant problems are inadequate financial literacy and a lack of confidence in financial institutions, which deter a significant portion of the populace from utilising official financial services.

Pricing Data. IMF Working Paper No. WP/24/150. Washington, DC: International Monetary Fund
[53]

Residents in areas with inadequate infrastructure and basic services constantly struggle to go to financial institutions or use banking services on a daily basis.

Although technology has made financial instruments more accessible, it has also created new kinds of exclusion, especially for those without cell phones, internet access, or the requisite technical skills.

Access to services should not be the only metric used to assess financial inclusion; people's ability to use these services successfully in ways that improve their everyday lives should also be taken into account.

The gender gap is still evident, as women face more obstacles than males when trying to obtain official financial services, particularly in low-income nations.

By increasing economic involvement and empowering marginalised communities to raise their standard of life, financial inclusion may promote sustainable development.

Lastly, rather than depending on generic solutions that ignore regional and socioeconomic inequities, it is imperative that well-designed national policies be adopted that take into account the unique needs and circumstances of vulnerable groups.

Chapter Three:

Analysing the Experience of Financial Inclusion and Digital Currencies"The Cases of the Bahamas and Nigeria.

Introduction:

This chapter aims to focusing on the role of Central Bank Digital Currencies (CBDCs) in promoting financial inclusion in the economies of developing countries. Particular attention is given to three case studies: China, The Bahamas and Nigeria is based on the diversity and significance of their experiences with Central Bank Digital Currencies (CBDCs) , The analysis centers on two selected case studies first of that The Bahamas, is notable for being the first country globally to officially launch CBDC, while Nigeria stands out as the first African country to introduced CBDC (e-Naira).

The chapter is structured into two principal sections:

- **The First Section:** The Experience of The Bahamas in Launching the CBDCs "Sand Dollar" and Promoting Financial Inclusion.
- **The Second Section:** The Implementation of the Digital Naira "eNaira" in Nigeria as a Tool to Promote Financial Inclusion in a Developing Economy.

1. The experience of the Bahamas in launching the CBDCs "Sand Dollar"and promoting financial inclusion:

The Bahamas is considered as the first country in the world to officially launch a central bank digital currency. This chapter explores the context, implementation, and outcomes of The Sand Dollar project, with focusing on its role in expanding access to financial services.

1.1 Financial Inclusion in the Bahamas.

This section examines the evolution of financial access, the obstacles faced, and the initiatives introduced to improve financial inclusion before the Sand Dollar implementation.

Status of Financial Inclusion before the CBDC-before 2020:

This part highlights the financial inclusion and the limited use of traditional financial products during that period.

Table 01: Selected indicators of Financial Access in Bahamas

Table 1
Bahamas—Selected Indicators of Financial Access
Surveyed Knowledge and Use of Products[18]

Product or service		% of respondent answering "yes"		
		Heard of	And own jointly or personally	Want to learn more
i.	Savings Account	93	80	30
ii.	Debit card	91	70	24
iii.	Checking Account	85	37	25
iv.	Insurance policy	87	59	34
v.	Pension Fund	82	33	36
vi.	Mortgage	88	31	29
vii.	Credit card	89	48	21
viii.	Mobile Phone banking	70	40	26
ix.	"Asue"	89	33	20
x.	"Numbers" Account	56	19	20
xi.	Bonds	60	13	35
xii.	Stocks and shares	71	24	39
xiii.	Investment Account	62	22	41
xiv.	Mutual Funds	60	15	35
xv.	Equity Funds	51	13	37

Select data from G20 countries

In comparison to The Bahamas, the G20/OECD INFE report on financial literacy in G20 countries indicates that, on average-

- 63% of persons own a savings or retirement product
- 52% have insurance
- 51% have a credit product

SOURCE: Central Bank of The Bahamas: https://www.centralbankbahamas.com/, Bahamas Financial Literacy Survey 2018

The table presents a set of financial access indicators in The Bahamas based on survey responses regarding the population's knowledge and use of various financial products. The data reveals important insights into the extent of financial inclusion in the country prior to the introduction of the Central Bank Digital Currency (CBDC), Sand Dollar, in 2020.

First, awareness and usage are quite high for traditional banking Products like savings accounts and debit cards. A striking 93% of respondents were aware of savings accounts, and 80% stated they had one jointly or as an individual. Additionally, 91% had heard of debit cards, of which, 70% stated they had used

them in practice. Overall, these results suggest a relatively high penetration of the basic financial services to the public.

However, the data also reveal a significant decline. in ownership of other financial products. For example, while an overwhelming 85% of respondents said they had heard of checking accounts, only 37% said they owned a checking account. The gap was even larger for investment and credit-related products. Credit card ownership was just 48% while the awareness was 89%, while for investment tools such as bonds (13%), mutual funds (15%) and equity funds (13%), there were some of the lowest levels of actual use.

These discrepancies between awareness and use might represent more than simply financial literacy; we might consider barriers of access, low-incomes or a lack of trust in formal financial systems, especially without the presence of large urban centers.

In addition, digital financial services, including mobile phone banking, display moderate levels of use: 70% awareness and 40% use. This is a good sign and shows promise for future digital uptake with extensive possibilities for innovations such as the Sand Dollar.

The “want to learn more” column indicates that there is continued interest in financial literacy among the population. Products like investment accounts (41%), equity funds (37%) and insurance (34%) showed strong demand for learning about these financial products indicating that the population may not have engagement with advanced financial instruments but they are willing (if policies and education were in place) to learn more about or adopt financial practices when delineated or marketed by their financial institution.

Lastly, with those figures in mind, using selected figures from G20 countries, the Bahamas compares favorably to G20 averages with the privileges of savings and credit ownership. To illustrate, 80% of Bahamians own a savings account, whereas, on average, 63% of G20 countries own a savings account. However, insurance is still not being used as much as the global average and people are not using credit as much as any benchmarks globally, which represents potential areas for policy development.

Table 02: Quantitative Analysis of Electronic Payment Infrastructure and Usage in the Bahamas (2013–2017)

Selected Payment Systems Data

	2013	2014	2015	2016	2017
A) ATM/ABMS (Number by Islands)					
New Providence	234	255	262	291	259
Grand Bahama	44	44	44	58	50
Family Islands	32	35	39	53	53
Total	310	334	345	402	362
B) Payments Volume by Card Type					
Debit Cards	1,352,857	1,196,012	2,013,084	2,771,071	3,221,699
Credit Cards	275,855	206,521	396,367	751,279	836,461
Stored Value Cards	15,355	23,524	64,597	60,957	105,010
Total	1,693,448	1,511,097	2,505,138	3,678,007	4,249,520
C) Direct Credits/Credit Transfers					
Volume of Transactions	347,235	396,229	452,947	550,389	564,302
Value of Transactions (B$'000)	1,610,093	1,947,990	1,656,074	3,336,894	3,210,946
D) Number of Merchant Terminal Accounts					
Total	5,377	4,908	8,853	9,146	11,306
E) Electronic Banking Users					
Residential Users	29,252	35077	63611	71740	86261
Business Users	NA	NA	2,613	2765	3074
Total	NA	NA	66,224	74,505	89,335
Memo: Cashless Instrument Transactions					
Volume	4,759,159	3,535,739	4,858,373	6,712,163	7,066,865
Value (B$'000)	4,971,567	4,625,916	5,191,732	7,424,147	7,687,696

Source: Central Bank of The Bahamas

SOURCE: Central Bank of The Bahama,2019, March 18, The Bahamian payment system modernization, Advancing financial inclusion initiative, presented at the Bahamians Seminar p. 7.

The Central Bank of The Bahamas' data for 2013-2017 shows a steady, multi-dimensional growth in the electronic payments ecosystem, which laid the foundation for the subsequent introduction of the Central Bank's digital currency. The number of automated teller machines (ATMs) and automated banking machines (ABMs) increased from 310 in 2013 to a peak of 402 in 2016, before declining to 362 in 2017, with a clear concentration in New Providence, reflecting the persistent

geographical disparities in the banking structure. Card payment volumes also grew significantly, with debit card increased by approximately 138% from 1.35 million to 3.22 million transactions. Credit card transactions surged by 203% from 275,855 to 836,461 transactions. In addition, stored value card usage doubling from 15,355 to 105,010 by 203. a near sevenfold increase. Direct bank transfers increased in volume from 347,235 to 564,302 around 62.5% and in value from B$1.6 billion to B$3.2 billion a rise of 99.4%. In parallel, the number of merchant accounts accepting electronic payments doubled from 5,377 to 11,306 an increase of over 110%, and the number of residential e-banking users increased significantly from 29,252 to 86,261 about 195%. The number of cashless transactions increased from 4.76 million to 7.07 million by 48%, while their total value increased from 4.97 billion to 7.69 billion Bahamian dollars with 54.7%. While these figures reflect a clear shift toward financial digitization, they also reveal structural disparities between urban centers and outlying islands, highlighting the need for inclusive digital policies. This rapid evolution in payment behavior is indicative of a structural shift in the economy towards digital solutions.

1.2 The CBDC of the Bahamas "Sand Dollar"

The following section outlines the background and objectives of this project to understand its underlying motivations and expected impact.

1.2.1 Background and objectives:

- What is a Sand dollar?

The Central Bank of The Bahamas launched Project Sand Dollar to introduce a digital representation of the Bahamian dollar (B$) in October 2020. It is a project to increase inclusive access to regulated payments and other financial services for the unbanked and underbanked populations and socioeconomic groups in the nation. Moreover, the Central Bank anticipates that the introduction of this retail central bank digital currency (CBDC) will lower the cost of providing services and improve the transactional efficiency of financial services throughout The Bahamas.

This initiative was given the name Project Sand Dollar as a result of an online competition, and the central bank digital currency (CBDC) was given the same name.

Unlike Bit coin, Sand Dollar is not a crypto currency. As a central bank digital currency (CBDC), Sand Dollar is a centralized, regulated, stable, private, and secure unit of account and medium of exchange. In the Bahamas, the foreign reserves support the digital B$, which is a direct obligation of the central bank. Crypto currencies are produced or issued by the private sector. Although they may be supported by other assets, such as central bank currencies, they might not reflect the liability of any government or central body. In other cases, crypto currencies may lack any underlying support. [54]

- Objectives of this project :

This project launched for some of principal objectives:

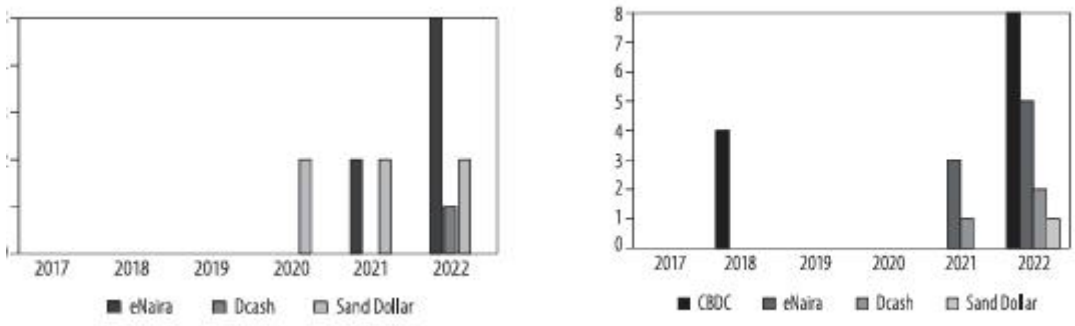
- Expanding access to individuals and communities with limited or no access to traditional banking services. Secondly, it's about offering a secure and effective payment system for individuals and businesses, particularly MSMEs.
- Modernize and streamline the country's financial system, reduce service delivery costs, increase transactional efficiency and improve financial inclusion. [55]
- Increase the efficiency and stability of payment systems by reducing dependency on actual cash and payments intermediaries, as well as to boost payment system resilience by providing a centralized alternative to traditional banking platforms.
- Reduce the danger of money laundering and terrorist financing through a more transparent digital financial system. [56]

[54] CentraBank of the Bahamas (n.d) ,About us, Sand Dollar , ,Retrieved May 7 ,2025 AT 11 :29 , from https://www.sanddollar.bs/about.

[55] Reuters, sand Dollar Overview, accessed May 10, 2025, from www.reuters.com

[56] Alliance for Financial Inclusion ,(2024 ,January3), Central bank digital currency :Lessons from The Bahamas, Retrieved May 08 , 2025 from https://www.afi-global.org/opinion/central-bank-digital-currency-lessons-from-the-bahamas/

Figure 01: Positive and negative media sentiment analysis of Sand Dollar and other currencies (trends in CBDCs, eNaira, DCash and Sand Dollar)



Source: Peterson K. Ozili *, Sergio Luis Náñez Alonso, Central Bank Digital Currency Adoption Challenges, Solutions, and a Sentiment Analysis, Journal of Central Banking Theory and Practice, 2024, 1, pp. 148-149 Received: 15 May 2025 at 13:01F from https://doi.org/10.2478/jcbtp-2024-0007.

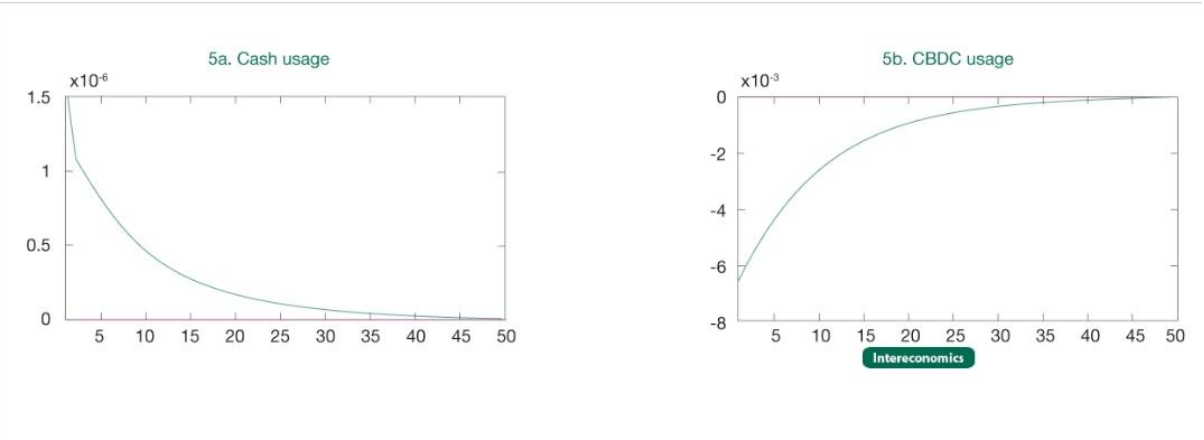
The analyses shows that between 2017 and 2022 a sharp increase in the number of central bank digital currencies (CBDCs) in some developing countries. The number of official digital currency projects grew by 100% (from 4 to 8) between 2021 and 2022, showing the number of projects doubled since the previous year. Dash increased by 66.6% (from 3 to 5) and the Bahamian Sand Dollar showed relatively stable growth (3 projects in 2020, and about a 33% increase to 4 in 2022).

These observations support the proposition of the shifting dynamics of the digital transformation in monetary systems, where the Sand Dollar has been at the helm of initiatives since 2020, while the eNaira and Dash trials slowly came online, and show the increasing level of interest in the use of these digital tools to enhance financial inclusion in economies that have difficulties accessing traditional banking schemes.

1.3 Analysis of the Impact and prospects of the sand dollar:

Here is behavioral response to the Sand Dollar_evidence from cash and CBDC usage trends:

Figure 02: Evolution of Cash and CBDC usage following a Positive Shock:



Source: The Evolution of sand dollar, Sharon Branch, Lyndsey Ward, Allan Wright, (2023),58(4),178-184

Two graphs presented in Figure 01 illustrate the contrast as to the dynamics between cash and digital currency, especially after a positive shock to a central bank digital currency.

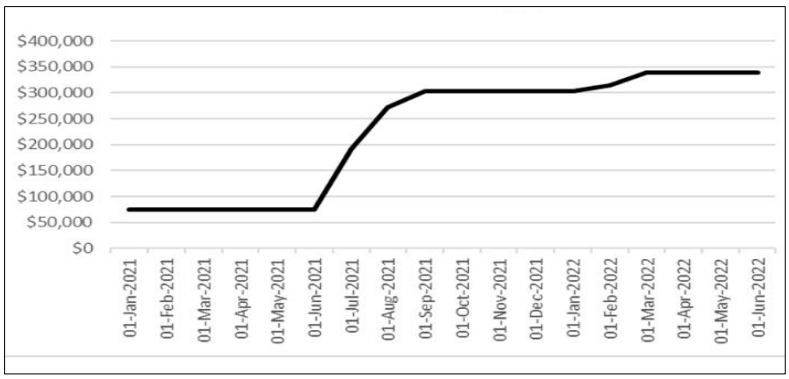
In Figure 5a, the declining cash usage is sharp and continuous once the shock occurs. This change in trend marks a clear behavioral adjustment of users away from physical cash, and suggests a reduced use of cash as consumers may have more trust in digital or are incentivized to use digital.

Meanwhile, Meanwhile, Figure 5b shows an initial rise in the usage of CBDCs after the shock. Although the curve initially starts below baseline, it rises progressively before stabilizing at a higher level. This trend indicates that users gradually adopt digital currency, and although the growth rate slows over time, the usage leveled off at a sustained level, indicating a lasting shift in preference.

The lines depicted in the Figure illustrate an inverse connection between the use of cash and CBDCs. This distinction points to a structural transformation in the financial ecosystem, where digital instruments are becoming more important. The analysis highlights that the introduction and promotion of CBDCs in the Bahamas can enhance financial inclusion and improve individuals' access to financial services.

*** After the central bank digital currency (2020)**

Figure 03: Sand Dollar circulation (2021_2022)



Source: https://www.centralbankbahamas.com/ accessed May 12 2025 at 20:22

The graph illustrates the evolution of the Central Bank Digital Currency (CBDC) circulation in The Bahamas— the Sand Dollar—from January 2021 to June 2022. This timeline occurred user adoption trends following the currency's official launch in late 2020.

The curve indicates three distinguishable phases:

Initial Stagnation (January – May 2021):

The Sand Dollar was circulating in five months at nearly $70,000; indicating that uptake was flat lining for five months. During this time, there may have been early infrastructure issues, low user awareness or market education, or some general reluctance on the part of users and merchants for adoption.

An Accelerated Growth (June _ September 2021):

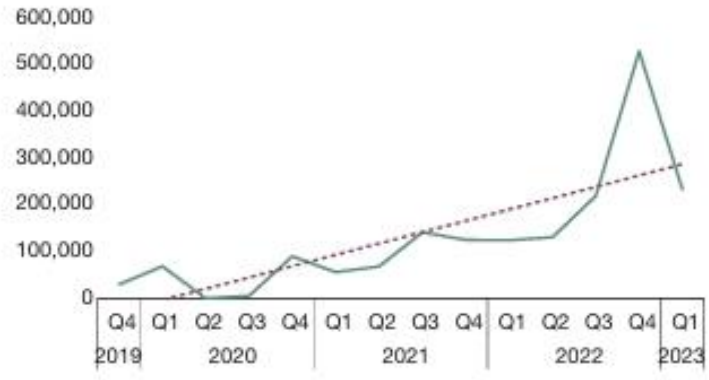
During this phase of the Sand Dollar's development ,the currency's circulation sharply increased to over $275.000 , This surge reflected a nationwide effort to scale adoption, driven by expanded mobile wallet access , onboarding of merchants and payment incentives to users.

A Stabilization (October 2021 – June 2022):

At the end of the accelerated growth phase levels of circulation were stable at approximately $300,000, and the level of use was stabilizing. The stagnation may be related to structural barriers to access digital platforms, gaps in trust from the users, or the limits of daily use cases with the currency.

In conclusion, Sand Dollar's growth is indicative of major steps toward a more digital and more inclusive financial platform, the leveling off trend suggests there is still more structural and behavioral changes that are required to reach full adoption across the to adoption across demographics.

Figure 04: Evolution of the number of Central bank digital currency users from 2019 to 2023



Source: The Central Bank of The Bahamas.

The graph illustrates the growth of Central Bank of the Bahamas Sand Dollar wallets from the fourth quarter of 2019 to the first quarter of 2023. This metric serve is a key indicator for measuring the population's adoption of the national digital currency and the success of the monetary authorities' efforts to promote financial inclusion.

- **Introductory Phase (2019 – 2020):**

During this period, there was a limited number of digital wallets; which was consistent with the project's novelty and its experimental launch. Slight fluctuations were observed, reflecting a slow initial interaction from users, possibly influenced by factors related to digital infrastructure and public awareness.

- **Gradual Growth Phase (2020 – 2021):**

The number of digital wallets gradually increased, indicating the effectiveness of efforts by monetary authorities, banks, and financial institutions to promote awareness and incentivize the use of the Sand Dollar through awareness initiatives and by expanding acceptance among merchants and service providers.

- **Rapid Expansion Phase (2022 – 2022):**

This stage was characterized by a significant leap in the number of wallets, peaking in the fourth quarter of 2022, where the number of wallets exceeded 500,000. This growth reflects multiple factors, including:

- Enhancing the integration of digital currency with electronic payment systems.

- Launching incentive campaigns for users and merchants.

- Facilitating the process of opening wallets and reducing regulatory barriers.

- **Corrective Decline Phase (2023):**

A significant decline in the number of wallets was recorded during the first quarter of 2023, which may be attributed to several factors:

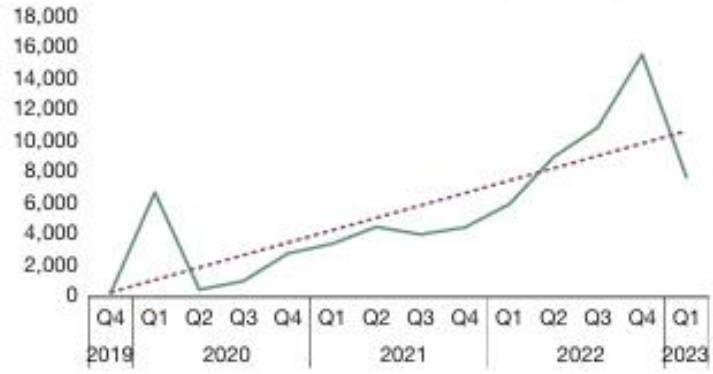
- Closing or freezing inactive or fake wallets.

- Decreasing promotional momentum after the peak period.

- Challenges related to user experience, or limited use of crypto currency in daily transactions.

Despite quarterly fluctuations, the general trend line shows a continued upward trajectory, reflecting relative success in expanding Sand Dollar's user base, albeit one that requires sustained strengthening through improved integration with the daily economy and increased

Figure 05: Quarterly movement of digital transactions via Sand Dollar in the Bahamas from 2019 To 2023



Source: The Central Bank of The Bahamas.

The chart illustrates the quarterly growth of transactional values of Bahamas Central Bank Digital Currency (Sand Dollar) transactions from Q4, 2019 to Q1, 2023. The measure of transactions is a truer reflection of the actual use of digital currency rather than the number of wallets and provides a clearer insight into the extent the digital currency is integrated into everyday economic and financial life.

- **A Foundational Phase (2019 – 2020):**

During this period, where by Q1, 2020, the transaction tally was consistently low while showing pronounced, with sharper and unstable variance at the level of measurement between points can be explained by characters of the project in the early phase that can be seen as experimental and, community awareness was low; and remits were affected by weak digital project infrastructure and very few stores and services were accepting the Sand Dollar payment method.

- **A Gradual Adoption Phase (2020 – 2021):**

This phase witnessed steady and gradual growth in the number of transactions, indicating the beginning of the integration of the digital currency into daily economic activities. This improvement is attributed to increased awareness campaigns, an expanded merchant acceptance network, improved user experience, and the supporting digital infrastructure.

- **An Acceleration Phase (2022 –2022):**

This phase was characterized by a significant increase in transaction volume, peaking in Q4 2022. This surge is attributed to several factors, most notably:

-Improved integration between the Sand Dollar platform and traditional electronic payment systems.

-An expansion in the user base of individuals and merchants as a result of incentives and promotions.

-Increased public confidence in digital currency، especially in light of the transition to a cashless economy following the COVID-19 pandemic.

- **Correction and Stabilization Phase (2023):**

− The first quarter of 2023 witnessed a sharp decline in the number of transactions, reflecting a natural correction after a period of rapid growth. This decline can be explained by the following:

- The cessation of some promotional campaigns and short-term incentives.
- The persistence of some technical challenges or a weak user experience
- The practical use of digital currency is limited in some sectors and daily services.

Despite this decline, the general trend line shows a continued upward trend over the long term, reflecting a solid foundation upon which to build in the future. The figure shows that digital transactions via Sand Dollar evolved from experimental use to a more mature and effective stage in 2022, before declining slightly in early 2023. This trajectory highlights the importance of enhancing the practical value of digital currency and improving integration with the traditional financial system to ensure its sustainable use and promote financial inclusion in the island nation.

2. 2. The Implementation of the Digital Naira "eNaira" in Nigeria as a Tool to Promote Financial Inclusion in a Developing Economy.

Nigeria is the second country in the world and the first country in Africa to officially adopt a central bank. Digital currency, specifically Central Bank Digital Currency (CBDC), presents a compelling case for the examination of the role of digital currencies in promoting financial inclusion. This section will define financial inclusion and investigate how the expansion of access to financial services is related to the potential of digital tools such as the eNaira. Additionally, the analysis will address significant challenges obstructing adoption in Nigeria, which include insufficient digital infrastructure, limited financial literacy, and socio-economic resistance.

Through this lens, this section will be offer insights into how digital currencies can function as effective instruments for promoting financial inclusion, while simultaneously assessing strategies for integrating such technologies into Nigeria's financial framework.

2.1 An Analytical Framework for Financial Inclusion in Nigeria.

2.1.1 Assessment of Financial Inclusion by the Nigerian bank.

Between 2015 and 2020, Nigeria experienced a significant transformation in incorporating extensive segments of its population, particularly low-income individuals and rural inhabitants, into the formal financial sector. The Central Bank and federal government undertook initiatives to eliminate barriers to formal account possession by launching digital financial service projects, expanding agent banking networks, adopting mobile money wallets, and optimizing Know Your Customer (KYC) protocols for the informal sector. By emphasizing "account ownership" as a pivotal indicator, the percentage of adults with formal accounts increased from approximately 45% to approximately 58%, while the number of account holders escalated from 35.4 million to 47.6 million, thus laying the groundwork for the subsequent introduction of the eNaira.

From 2015 to 2020, Nigeria's Central Bank and government executed

Three strategic frameworks (NFIS 1.0, the Digital Financial Services Project, and NFIS 2.0) aimed at eliminating barriers to formal account ownership, whether via banking institutions or mobile-money wallets, while simultaneously promoting their utilization. The proportion of adults possessing formal accounts increased from approximately 35% in 2015 to 58% in 2020, with the number of account holders escalating from 35.4 million to 47.6 million (+12.2 million new users, averaging an annual increment of about 2.4 million).

This was accompanied by a shift in delivery channels:

- Mobile-money accounts grew from 5% of all accounts in 2015 to 25% in 2020, directly bringing in about 9 million new digital users.
- Agent
- Banking networks expanded from 10,000 agents in 2015 to 120,000 agents in 2020, adding 000 service points and particularly benefiting rural areas.

To strengthen these developments, the CBN introduced regulatory incentives, allowing Non-bank institutions to run "financial service points." Furthermore, it set up an SME Development Fund and digital lending platforms, which boosted the proportion of accounts used for credit from 2% to 12%. Over 1,000 training workshops and about 50 media campaigns improved trust in formal institutions, raising it from 30% to 55%.

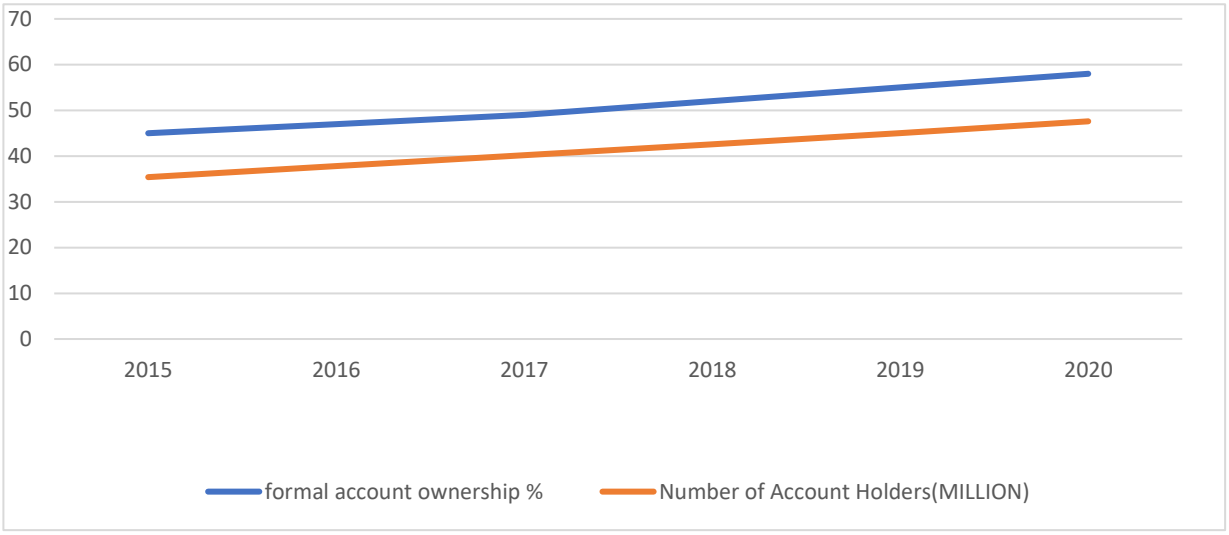
- This section underscores the importance of quantitative analysis in monitoring the progress of financial inclusion by presenting four line charts that depict key indicators from 2015 to 2020. The charts illustrate trends in formal account ownership, mobile account usage, the expansion of the agent banking network, and the variations in account usage for lending purposes. These visual representations are created to provide a clear and intuitive perspective on policy outcomes and to assess Nigeria's progress towards its financial inclusion objectives[57].

In this section, we present a series of charts illustrating the evolution of Financial inclusion in Nigeria from 2015 to 2020. These visualizations cover a set of key indicators—such as the rate of formal account ownership, mobile account penetration, the expansion of the agent

[57]Central Bank of Nigeria, Financial Inclusion Annual Report 2020 (Abuja: Central Bank of Nigeria, 2023), https://www.cbn.gov.ng/Out/2023/CCD/Final_2020%20Financial%20Inclusion%20Annual%20reportr%20(1).pdf (accessed May 11, 2025).

banking network, and shifts in account usage for lending and savings purposes. Their aim is to offer a clear, comprehensive view of how the policies enacted by the Central Bank of Nigeria have advanced access to financial services among target populations, while also drawing attention to the remaining gaps and challenges that call for further intervention:

Figure 06: Growth in Ownership of Formal Financial in Nigeria (2015-2020)

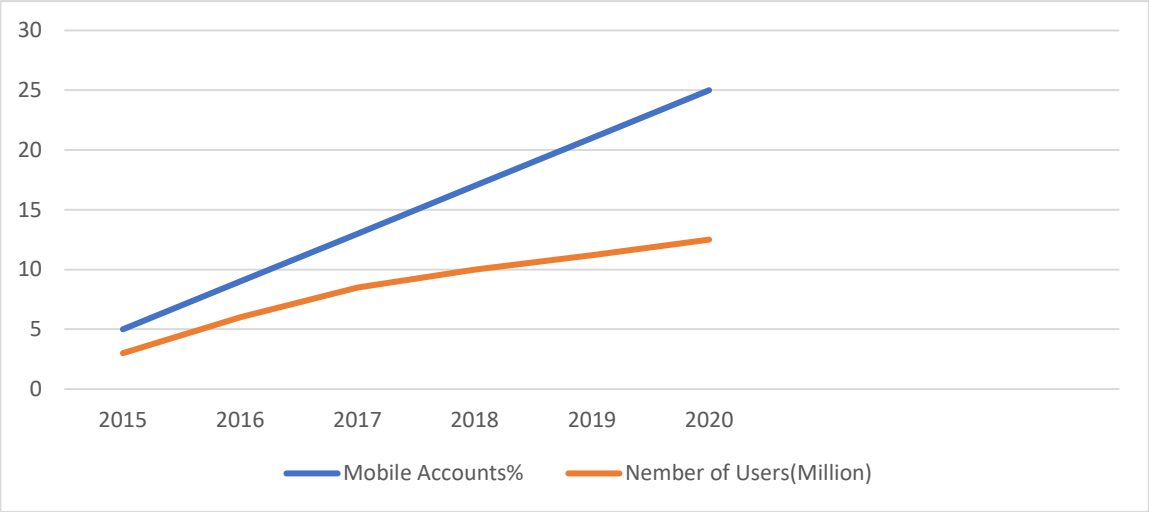


Source: Prepared by the tow students, based on Central Bank of Nigeria (CBN), National Financial Inclusion Strategy Progress Reports (2015–2020).

From this curve, we can conclude that:

- The proportion of adults with formal financial accounts rose by 13 percentage points over five years.
- The number of account holders increased from 35.4 million to 47.6 million, representing an average annual rise of 2.4 million users.
- This trend highlights the effectiveness of inclusive policies, including simplified KYC, expanded agent banking, and mobile wallet adoption.

Figure 07: Growth in Mobile Account Usage (2015-20202)

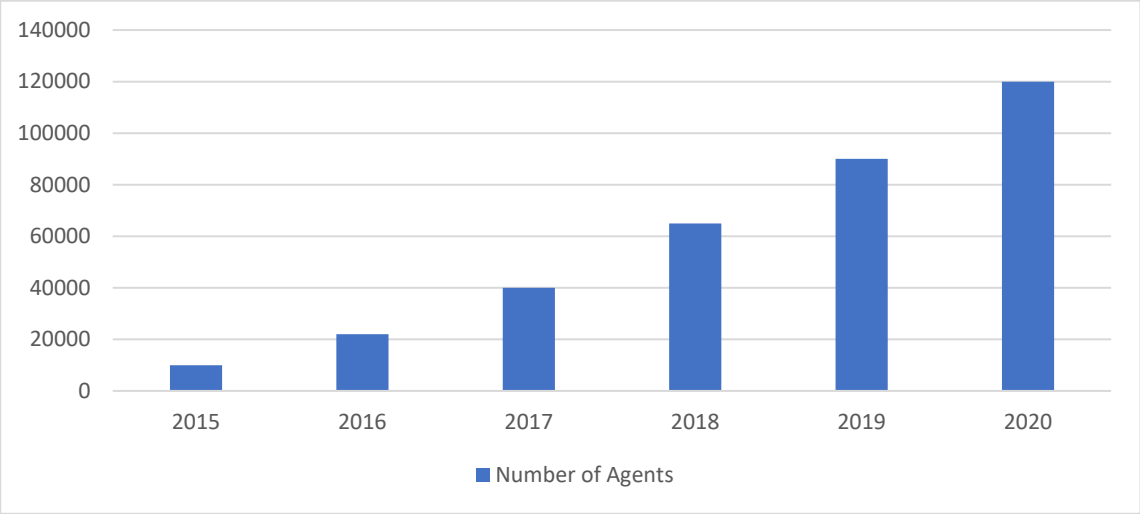


Source: Prepared by the tow students, based on Central Bank of Nigeria (CBN), National Financial Inclusion Strategy Progress Reports (2015–2020).

From this curve, we can conclude that:

- The proportion of adults possessing formal financial accounts rose by 13% over a span of five years.
- The number of account holders has risen from 35.4 million to 47.6 million, signifying an average annual increase of 2.4 million users.
- This trend illustrates the efficacy of inclusive policies, including the simplification of Know Your Customer (KYC) protocols, the expansion of agent banking services, and the adoption of mobile wallet technologies.

Figure 08: Growth of Agent Banking Network in Nigeria (2015-2020)



Source: Prepared by the tow students, based on Central Bank of Nigeria (CBN), National Financial Inclusion Strategy 2.0 (2018–2022).

From the bar charts, it can be observed that:

- The proportion of mobile accounts experienced a fivefold increase, rising from 5% to 25% over a period of five years.
- The number of users increased from approximately 1.8 million to 11.9 million, primarily because of collaborations between the Central Bank of Nigeria (CBN) and telecommunications providers.
- Mobile banking has played a pivotal role in enhancing financial accessibility for rural and low-income populations lacking access to bank branches.

2.2 Strategic and theoretical basis for "eNaira":

2.2.1 Conceptual Framework of Nigeria Digital Currency, "the eNaira".

The Nigerian digital currency "eNaira" is the official digital version of the National Naira (NGN), issued and regulated by the by the Nigerian bank. To maintain exact parity in legal value with its physical counterpart. Its name derived from combining the letter “e,” an abbreviation for “Electronic,” with “Naira” to denote its digital nature. **President**

Muhammad Buhari officially launched the eNaira on 25 October 2021 under the slogan "Same Naira, More Possibilities". The official symbol of the eNaira is ₹, which merges the electronic 'e' with the traditional Naira sign (₦) to reflect its digital nature[58].

2.2.2 Strategic Objectives Underpinning the Issuance of the eNaira.

In light of the rapid transformations in global payment systems and the growing need for secure, efficient digital financial solutions, Nigeria has launched its central bank digital currency, eNaira, as a means to strengthen financial infrastructure and reduce reliance on physical cash. The following section provides a concise overview of the primary objectives behind issuing this digital currency and how the Nigerian government and central bank aim to achieve broad-based economic growth and long-term financial stability through it:

- **Enhancing Financial Inclusion:** Nigeria faces a significant "unbanked" population—over 50 percent of its roughly 200 million citizens lack formal bank accounts. The eNaira was specifically designed to close this gap by offering a digital payment solution accessible even via USSD on basic mobile phones. To date, more than 3,000 USSD transactions have been completed, moving over NGN 3 million across previously underserved communities[59].
- **Improving Efficiency of Electronic Payment Systems:** The digital currency seeks to speed up and streamline payment and settlement processes between individuals and institutions, reduce reliance on physical cash, shorten transaction times, and lower the risks associated with paper-based operations[60].
- **Supporting Inclusive Economic Development:** By integrating the eNaira into the formal economy, it is expected to stimulate the informal sector's participation in the digital economy, positively impact GDP growth, and contribute to sustainable development[61].

[58] Central Bank of Nigeria. (2021). about eNaira. Retrieved May 14, 2025, at 10:43 AM from: https://www.enaira.gov.ng/about

International Monetary Fund (IMF). (2021, November 15). Five Observations on Nigeria's Central Bank Digital Currency. Retrieved on Sunday, May 12, 2024, at 09:30 AM, from https://www.imf.org/en/News/Articles/2021/11/15/na111621-five-observations-on-nigerias-central-bank-digital-currency[59]

[60] Central Bank of Nigeria. (2021, October 23). President Buhari to unveil eNaira on Monday, 25 October 2021. Retrieved on Sunday, May 12, 2024, at 09:45 AM, from https://www.cbn.gov.ng/out/2021/ccd/enaira%20launch%20press%20release%20%20231021.pdf

[61] International Monetary Fund (IMF). (2021, November 15). Five Observations on Nigeria's Central Bank Digital Currency. Retrieved on Sunday, May 12, 2024, at 09:30 AM, from https://www.imf.org/en/News/Articles/2021/11/15/na111621-five-observations-on-nigerias-central-bank-digital-currency

- **Strengthening Financial Stability and Accountability:** Its digital infrastructure allows for monitoring of funds within the informal sector, aiding in the fight against tax evasion and money laundering, and enhancing transparency in financial transactions[62].
- **Facilitating Cross-Border Remittances:** The eNaira reduces the cost of international transfers, especially those sent by expatriates, by linking the digital wallet directly to the official system, thereby accelerating remittances and cutting intermediary fees[63].
- **Enabling Targeted Government Social Support:** The digital currency allows the central bank and government to deliver cash assistance directly to beneficiaries through the eNaira wallet, ensuring efficient and transparent distribution of social aid.
- **Increasing revenue and enhancing tax collection:** can be achieved through the reduction of excessive cash usage and the fortification of digital tracking mechanisms. The eNaira plays a significant role in expanding the tax base and improving the collection of taxes and government fees.
- **COVID-19 Pandemic as a Catalyst for the Adoption of Digital Currency in Nigeria: A Study on Financial Digital Transformation:**

Nigeria, like many other countries worldwide, faced unprecedented economic and social challenges due to the outbreak of the COVID-19 pandemic. The implementation of strict restrictions on movement and gatherings directly affected traditional financial transaction methods. These circumstances accelerated the demand for digital financial solutions that could ensure the continuity of transactions safely and efficiently, minimizing health risks associated with physical cash handling.

In this framework, the national digital currency "eNaira" emerged as a strategic tool to address these challenges. It helped reduce reliance on tangible cash, which is considered a potential carrier of the virus, and provided a digital alternative accessible even amid imposed restrictions. The COVID-19 crisis prompted the Nigerian government and Central Bank to expedite the launch and promotion of eNaira, leveraging the situation that rendered digital services a necessary option for both citizens and institutions.

Moreover, the pandemic heightened user awareness regarding the importance of digital transformation in financial services, contributing to a substantial increase in registered users

[62] International Monetary Fund (IMF). (2021, November 15). Five Observations on Nigeria's Central Bank Digital Currency. Retrieved on Sunday, May 12, 2024, at 09:30 AM, from https://www.imf.org/en/News/Articles/2021/11/15/na111621-five-observations-on-nigerias-central-bank-digital-currency

[63] George, L. (2021, October 26). Nigeria launches eNaira amid hope, scepticism – and plenty of uncertainty. Reuters. Retrieved on Sunday, May 12, 2024, at 10:00 AM, from https://www.reuters.com/technology/nigeria-launches-enaira-amid-hope-scepticism-plenty-uncertainty-2021-10-25/

and active participants of the digital currency. Official reports recorded notable growth in transaction volumes and digital wallet registrations during lockdown periods, underscoring the critical role that COVID-19 played in accelerating the adoption of digital financial solutions in Nigeria[64].

2.2.3 Motivations Behind Nigeria's Adoption of the eNaira:

Nigeria's decision to adopt a central bank digital currency (CBDC), the

eNaira, was driven by several strategic, economic, and social motivations aimed at modernizing the country's financial landscape and enhancing financial inclusion:

- **Enhancing Financial Inclusion:** A primary motivation was to expand access to financial services among Nigeria's unbanked population, particularly in rural areas. As of 2020, over 36% of Nigerian adults remained outside the formal financial system. The eNaira was envisioned as a cost-effective digital tool that could facilitate access to basic financial services via mobile phones, without the need for traditional bank infrastructure[65].
- **Reducing Cash Dependency and Improving Payment Efficiency:** Nigeria faces high cash management costs, with over ₦200 billion (≈ $500 million) spent annually on printing, distributing, and securing physical currency. The eNaira was introduced to help reduce reliance on cash transactions and promote digital payments that are more efficient, traceable, and secure[66].
- **Boosting Government Revenue and Curbing Illicit Flows:** The adoption of the eNaira is also intended to help combat illicit financial flows and improve tax collection by enabling more transparent, traceable transactions within the formal economy. The Central

[64] Central Bank of Nigeria, "eNaira: Digital Currency and Financial Inclusion during COVID-19," accessed 18 May 2025, 14:30 https://www.cbn.gov.ng/eNaira/reports/covid19impact

[65] Central Bank of Nigeria. Design Paper for the eNaira, October 2021, p. 4. Accessed 11 May 2025, 10:00 (Africa/Algiers). https://www.cbn.gov.ng/enaira/

[66] International Monetary Fund. Nigeria: Article IV Consultation Report, IMF Country Report No. 22/172, July 2022, p. 26. Accessed 12 May 2025, 10:30 (Africa/Algiers).https://www.imf.org/en/Publications/CR/Issues/2022/07/27/Nigeria-2022-Article-IV-Consultation-Report-522287

Bank of Nigeria noted that digital currency adoption could reduce the shadow economy, which accounted for an estimated 52% of GDP in 2020[67].

- **Strengthening Monetary Policy Transmission:** A digital currency allows the Central Bank to implement monetary policies more directly and efficiently. Through the eNaira, interest rate changes or liquidity injections can be transmitted instantly to users and institutions, potentially increasing the responsiveness of the economy to policy changes[68].

2.3 eNaira's Development and Impact on Financial Inclusion (2020–2024).

The launch of Nigeria's digital currency, the eNaira, marks one of the most significant transformations in the country's digital financial infrastructure over the past decade. This process went through several institutional and technological phases, starting with the legal and regulatory framework that laid the foundation for the currency, and extending to the development of the technological platform and the implementation of distribution and registration mechanisms. This section will provide a chronological and analytical overview of these stages:

2.3.1 Institutional and Technical Phases of Launching the eNaira

- **Legal and Regulatory Framework (2020–2021):**

- During 2020 and 2021, Nigeria's regulatory authorities began establishing foundational policies to govern digital currencies amid their growing popularity. The Central Bank of Nigeria (CBN) took a cautious stance by restricting banks and financial institutions from facilitating crypto currency transactions in early 2021, citing concerns over risks such as fraud and volatility. Simultaneously, the government and CBN explored the development of a Central Bank Digital Currency (CBDC), initiating pilot programs aimed at creating a secure,

[67] Central Bank of Nigeria. eNaira Design Paper, October 2021, p. 7. Accessed 13 May 2025, 10:45 (Africa/Algiers). https://www.cbn.gov.ng/enaira/

[68] : Bank for International Settlements. CBDCs in Emerging Markets, BIS Paper No. 114, June 2021, Accessed 14 May 2025, 11:00 (Africa/Algiers).
https://www.bis.org/publ/bppdf/bispap114.pdf

regulated alternative. This period marked a transition towards balancing innovation with financial stability, laying the groundwork for the launch of the eNaira in late 2021[69].

- **Technical Architecture and Operational Platform (2021):**
- On 25 October 2021, the CBN launched a centralized distributed-ledger (DLT) system in partnership with an international fintech firm and a local technology accelerator.
- The platform was deployed on high-security cloud infrastructure with centralized servers in Abuja, supported by APIs connecting commercial banks and e-wallet providers.
- By December 2021, a network of 1,500 authorized agents had been established across all 36 states to enable user registration and bank account linkage[70].
- **Distribution and Registration Mechanisms (2021–2022):**
- In November 2021, the "Get eNaira" public-awareness campaign launched across television, radio, and transit hubs, targeting 1 million wallet registrations by year-end.
- By March 2022, wallet registrations reached 500 000 following streamlined KYC via national-ID scanning and mobile-app enrolment.
- By December 2022, registrations had surpassed 840 000 after conducting in-state training workshops in 12 states to instruct users on wallet operations[71].

2.3.2 Performance, Adoption, and Key Success Indicators of the eNaira.

The success of any digital currency in achieving its intended goals requires a thorough evaluation of its performance, an assessment of its adoption level among different segments of society, and the identification of key indicators that reflect its success and sustainability.

This section focuses on three fundamental aspects of the eNaira project: its performance since its launch, the level and patterns of adoption among individuals and institutions, and the key success indicators used to evaluate its overall impact and future prospects. By analysing these dimensions, we can gain a clearer understanding of the practical outcomes of the eNaira initiative and the challenges it faces in achieving wider adoption.

[69] Central Bank of Nigeria. "Draft Amendment to the Electronic Payments Act (2019)." accessed 14 May 2025, 09:15 (Africa/Algiers UTC+01:00). https://www.cbn.gov.ng/currency/enaira.html

[70]tral Bank of Nigeria. "eNaira Agent Network Report." December 2021; accessed 14 May 2025, 09:40 (Africa/Algiers UTC+01:00). https://www.cbn.gov.ng/currency/enaira.html

[71] Central Bank of Nigeria. "Q4 2022 eNaira Transaction Data." December 2022; accessed 14 May 2025, 10:20 (Africa/Algiers UTC+01:00). https://www.cbn.gov.ng/currency/enaira.html

1. Adoption and Performance Indicators:

- **Adoption and Performance Indicators**

– **Wallet Registration Growth (2021–2024):**

TABLE 03: Registered Wallets (2021–2024)

Date	Number of Wallets
Oct 2021	**0**
Dec 2022	**840000**
May 2023	**6000000**
May 2024	**13000000**

Source: Prepared by the tow students, based on Business Day NG. "Three years in, eNaira struggles as transactions crawl to N29bn." May 10, 2024. Accessed on: May 18, 2025, at 19:57

The Cable. "Three years after launch, eNaira battles for relevance in Nigeria's financial system." May 10, 2024. Accessed on: May 18, 2025, at 19:57

This table demonstrates rapid early growth in wallet registrations, particularly after Integration with government e-service platforms. However, the later slowdown in monthly registrations indicates saturation in urban areas and highlights the need for broader outreach in rural and underserved communities.

Transaction Volume and Value (2022–2024):

TABLE 04: Transaction Volume and Value (2022–2024)

Date	Number transactions	Cumulative Valu
Dec 20202	200000	4.4 billion
May 2023	450000	15.7billion
May 2024	854512	29.3 billion

Source: Prepared by the tow students, based on Business Day NG. "Three years in, eNaira struggles as transactions crawl to N29bn." May 10, 2024.Accessed on: May 18, 2025, at 19:57

The Cable. "Three years after launch, eNaira battles for relevance in Nigeria's financial system." May 10, 2024. Accessed on: May 18, 2025, at 19:57

This table highlights a significant rise in the use of the eNaira, with Transaction counts increasing from 200,000 in December 2022 to 854,512 by May 2024. The cumulative value rose proportionally, suggesting that digital currency usage expanded beyond trial phases and into active financial exchanges. The spike during incentive periods suggests that policy-driven adoption strategies can accelerate usage.

- **Active and Dormant Wallets (2023–2024):**

TABLE 05: Active and Dormant Wallets (2023–2024)

Date	Weekly Active Wallets	Dormant Wallets(%)
Janu 2023(IMF)	2.2%	-
Mid-2023	1.5%	98.5%
Mar 2024	1.5%	-

Source: Prepared by the tow students, based on Premium Times. "eNaira adoption 'disappointingly low' – IM." May 22, 2023. Accessed on: May 18, 2025, at 19:57

The data reveals a consistently low percentage of actively used wallets, stabilizing at only 1.5% despite increased registrations. This implies that while many users registered for eNaira wallets, a large majority did not integrate the digital currency into their regular financial routines. Such patterns suggest a need for deeper user engagement strategies and infrastructure adaptation.

- **Average Weekly Metrics (2022–2024):**

TABLE 06: Average Weekly Metrics (2022–2024)

Year / Month	Avgas Week Transaction	Avgas Weekly Value
2022	3800	150 million
2023	9500	480 million
May 2024	14000	923 million

Source: Prepared by the tow students, based on Business Day NG. "Three years in, eNaira struggles as transactions crawl to N29bn." May 10, 2024. Accessed on: May 18, 2025, at 19:57

The data reflects a clear upward trend in weekly eNaira transactions, both in volume and

Value, especially during key seasonal periods like holidays and agricultural cycles. This suggests the digital currency gained a degree of functional relevance during high-expenditure periods, though more efforts are needed for consistent year-round integration.

- **Key Success Indicators of the eNaira (2022–2024)**

Evaluating the performance of the eNaira in the years following its launch is essential for understanding its effectiveness in achieving monetary policy objectives and enhancing financial inclusion in Nigeria. The main success indicators include:

TABLE 07: Key Success Indicators of the eNaira

Success Indicator	Description	Observed Trends (2022-2024)	Interpretation
Wallet Registration Growth.	Primary metric reflecting overall adoption levels.	Rapid growth post-launch, spike in May 2023 due to government, 13million wallets by May 2024.	Indicates heightened early interest, but also eventual plateauing due to market saturation, especially urban areas.
Transaction Volume and Value.	Measures Actual use of eNaira in financial exchanges, reflecting trust and utility.	From 4.4(dec2022) to29.3B(May2024) number of transaction grew from 200000to over 854000	Signifies increased practical usage, especially during incentive periods; suggests moderate but growing trust in the system

Weekly Active Wallets Ratio	Assesse real user engagement versus total registrations.	Dropped from 2.2% (jan 2023) to 1.5% (March 2024) indicates high dormancy (98.5%)	Reflects limited sustained engagement, most users register but do you not regularly transact suggesting the need for improved user experience or incentives.
Geographic and Demographic Penetration	Evaluates usage across gender, rural, urban and age groups.	Limited rural and female participation, noted urban males dominate usage.	Shows challenges in inclusive outreach efforts needed to reach underserved populations to fulfill inclusive Financial goals.
Integration with Government & riveted Services	Captures the depth of ecosystem integration, payroll subsidies, and merchant payments.	Improved during 2023-2024, particularly via federal platforms and fintech.	Suggests growing ecosystem relevance, especially for formal payments, but private sector adoption still evolving.

Source: Prepared by the tow students, based on

The success of the eNaira can be assessed through several key performance indicators, including user adoption, transaction volume, institutional usage, and its impact on financial inclusion. By late 2023, over 13 million eNaira wallets had been registered, representing less than 6% of Nigeria's population—indicating limited adoption. Transaction volumes reached approximately ₦9 billion, yet remained modest compared to mobile money alternatives. Institutional engagement was also low, with only a few thousand merchants actively accepting

eNaira. While the platform showed moderate technical reliability, user satisfaction was mixed due to limited functionality and usability concerns. In terms of financial inclusion, the eNaira achieved only modest results, as access to smartphones and the internet remains a barrier for many unbanked citizens. Additionally, public awareness remains low, with fewer than half of Nigerians having a clear understanding of the currency's purpose. Government integration with eNaira—for services like social benefits or tax payments—remained in early stages. Overall, these indicators reflect a cautious start for the eNaira, highlighting the need for broader education, improved infrastructure, and stronger institutional incentives to enhance adoption and long-term impact[72].

2.3.3 The Role of Digital Currencies in Promoting Financial Inclusion and the Associated Challenges.

- **The Impact of Digital Currencies5(….) on Financial Inclusion.**

The Case of eNaira Digital currencies, particularly Central Bank Digital Currencies (CBDCs), have emerged as powerful tools to address long-standing financial exclusion, especially in developing economies. The eNaira initiative offers a concrete case study on how digital monetary instruments can reshape access to formal financial services in Nigeria. Between 2021 and 2024, three primary vectors of inclusion emerged: access expansion, marginalized empowerment, and institutional integration:

- **Expanding Access to Financial Services:** The eNaira facilitated a marked expansion in financial access. According to the World Bank's 2024 Global Finder, the share of Nigerian adults with a formal bank account rose from 40% in 2021 to 58% in 2024. This growth was not solely attributable to traditional banking initiatives but was significantly influenced by digital wallet penetration and simplified Know Your Customer (KYC) protocols. Rural outreach was especially notable. In 2022, only 5% of wallets were registered in rural areas, but this share climbed to 18% by 2024. This improvement stemmed from mobile registration drives executed in partnership with development agencies and telecom operators, leveraging Nigeria's extensive GSM infrastructure[73].

[72] BIS & IMF joint analysis, "eNaira Usage Trends Update," March 2024; accessed 14 May 2025, 11:00 (Africa/Algiers UTC+01:00). https://www.bis.org/

[73] ayo Tunyathon Koonprasert et al., Central Bank Digital Currency Adoption: Inclusive Strategies for Intermediaries and Users, International Monetary Fund, 20 September 2024; accessed 13 May 2025, 12:35 (Africa/Algiers UTC+01:00).

- **Empowering Marginalized and Underserved Groups**: CBDCs can democratize access to financial infrastructure. In Nigeria, eNaira transactions valued at ₦5,000 or less accounted for 42% of the total volume in 2023. These micropayments reflect the digital currency's utility in informal trade, particularly in economically fragile regions such as the North-East and South-West. Women also experienced increased participation. Female users constituted only 32% of wallet holders in 2022, but by 2024, this rose to 45%, largely due to
- To gender-targeted campaigns conducted by CBN and supported by UN Women Nigeria, these initiatives underscored the security, simplicity, and economic advantages of digital wallets for female entrepreneurs and informal sector workers.
- Integration with Government Transfers and MSMEs: CBDCs also present a cost-effective mechanism for direct government-to-person (G2P) transfers. In early 2023, the Nigerian federal government launched pilot disbursements of digital salaries for civil servants in Lagos and Kano, later expanding to five more states.[5] this pilot reduced intermediary banking costs and improved payment transparency[74].

Moreover, eNaira adoption among microfinance institutions introduced new

Pathways for credit inclusion have been established. By April 2024, a minimum of three microfinance providers commenced accepting eNaira wallet balances as collateral for Nano-loans, thereby enabling borrowers to circumvent conventional asset prerequisites.[6] Transaction costs associated with these loans diminished by approximately 25%, thereby enhancing access to capital for small-scale traders and farmers.

- **Challenges of Digital Currencies in Nigeria:**

- **Deficiency of Necessary Documentation:** The establishment of any financial account necessitates the possession of legal identification, a requisite that a considerable portion of Nigerians does not hold. According to a study conducted by Intermediary and the Bill & Melinda Gates Foundation, merely 79 percent of Nigerian adults possess the requisite documentation to register for mobile money or a bank account. This notable deficiency of necessary documentation may be regarded as one of the most significant obstacles hindering financial inclusion in Nigeria.

https://www.imf.org/en/Publications/fintech-notes/Issues/2024/09/21/Central-Bank-Digital-Currency-Adoption-Inclusive-Strategies-for-Intermediaries-and-Users-555118

[74] ScienceDirect, Central Bank Digital Currency and Financial Inclusion, 2024; accessed 13 May 2025, 12:50 (Africa/Algiers UTC+01:00).

https://www.sciencedirect.com/science/article/abs/pii/S0164070424000351

- **Limited Financial Literacy:** Individuals in Nigeria with access to financial services allegedly encounter a deficiency in essential resources and the requisite knowledge necessary to execute financial transactions. Merely 16% of Nigerian adults assert that they possess the financial literacy required to undertake routine tasks, such as account registration. The insufficient education surrounding financial services has likely contributed to the low levels of financial inclusion.
- **Lack of Proximity to Financial Service Points:** A prominent challenge hindering financial inclusion in Nigeria is that over fifty percent of Nigerian adults lack nearby access to financial services, including Automated Teller Machines (ATMs), banks, or service kiosks. Notably, a considerable segment of the Nigerian populace has been reported as unaware of any financial institutions located within a single bus ride from their residences. This situation has persisted for several years, with the access rate to formal financial services remaining stagnant at 42% in 2016. Furthermore, the integration of mobile money services into the Nigerian market has been notably slow. Although there has been an increase in awareness of mobile money, rising from 12 percent in 2015 to 20 percent in 2016, the majority of Nigerian adults continue to express a lack of knowledge regarding the presence of a mobile money service point in close proximity. Consequently, the limited availability of service points represents a significant barrier to financial inclusion.
- **Reduction in Bank Account Ownership:** A rather perplexing challenge confronting financial inclusion in Nigeria is the decline in bank account ownership that transpired in 2016. Experts attribute this decline to several factors:
  - The government mandates that bank account holders possess biometric bank verification numbers (BVNs), resulting in challenges and instances of non-compliance.
  - The increase in transaction costs.
  - The recession in Nigeria that occurred in 2016 resulted in an inflation rate of 18.5%[75].

High Service Fees: Adults in Nigeria exhibit a strong preference for cash transactions, and a considerable segment of the population is employed in the informal sector. As a result, this inclination has rendered the adoption of financial services relatively stagnant. A principal reason for the ongoing dominance of cash as the favoured payment method is that a majority of individuals who do not utilize formal financial services have indicated an inability to afford the associated service fees. Furthermore, regulatory modifications that enable Nigerians to transfer cash with increased ease have undoubtedly contributed to this

[75] The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution, World Bank, 2018. Accessed on May 14, 2025, at 08:00 AM. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/332881525873182837

trend. Prior to 2017, regulations mandated that Nigerians were prohibited from transferring amounts exceeding $10 without first submitting the necessary documentation[76].

- **Opposition from Banks:** The opposition from banks presents not only an obstacle to financial inclusion in Nigeria, but also accounts for the preference among many Nigerians to conduct transactions in cash. Experts assert that Nigeria's reliance on cash, coupled with its sluggish adoption of formal financial services, stems from the apprehension that financial institutions and service providers have towards potential encroachments by technology start-ups into the market, which could compel industry leaders to adapt and enhance their formal financial service offerings[77].

The emergence of digital technology has caused significant changes in the

worldwide environment and the structure of the global economic system. New ideas that are in line with the needs of the digital era have emerged because of this growth, most notably digital currencies and financial inclusion. Due to its ability to provide equitable access to formal financial services for both individuals and organisations, financial inclusion has emerged as a key component of sustainable development. This kind of access is essential for lowering poverty and boosting the economy. In this regard, digital currencies have grown in significance as potentially useful technical instruments for expanding financial access, particularly in developing nations with weak banking systems and high rates of informal economic activity. Digital technologies provide useful substitutes for conventional obstacles in these situations.

But rather than being a technological solution to an already-existing demand, the advent of digital currencies into the financial sector was a part of a larger wave of changes that forced a new reality on social norms and economic policy. Although digital currencies could first seem to be catalysts for financial innovation, there are a number of complications associated with their incorporation into delicate economic systems. Regulatory frameworks, digital infrastructure, public trust, and institutional preparedness are some of the factors that influence their scalability and efficacy. As a result, their relationship to financial inclusion takes on a dynamic and changing nature—one that varies based on the unique circumstances and

[76] Access to Financial Services in Nigeria 2016 Survey, EFInA, 2016. Accessed on May 14, 2025, at 08:00 AM. https://efina.org.ng/wp-content/uploads/2021/10/A2F-2016-Final-Report.pdf

[77] FinTech and Financial Inclusion in Nigeria, Olayinka David-West & Ifeoma Malo, 2018. Accessed on May 14, 2025, at 08:00 AM. https://www.researchgate.net/publication/383415706_FinTech_and_Financial_Inclusion_in_Nigeria

circumstances in each nation rather than following a straight line or producing consistent results.

Conclusion

The experiences of The Bahamas and Nigeria with digital currencies show how **d**eveloping countries are trying to boost financial inclusion and expand access to formal financial services, particularly in rural and undeveloped areas. Initiatives to reduce financial prejudice include the introduction in Nigeria and the in the Bahamas. For these initiatives to be successful, a variety of institutional, social, and **t**echnical factors are still required. The three that rate highest are the readiness of the infrastructure, public trust in the digital financial system, and the openness of outreach and communication channels. The Nigerian instance, which revealed valid concerns about privacy and monitoring as well as a lack of awareness about the benefits of the eNaira, had a negative impact on public approval. In contrast, adoption in the Bahamas was simpler in urban regions, but challenges persisted in rural ones Findings:

1. Digital currencies have shown potential in facilitating access to financial services for marginalized communities. Engagement was more apparent in the cities of The Bahamas, despite Nigeria slow start.

2. A key factor in the adoption of technology was user interface design. Nigeria eNaira was viewed as less participatory because of its more complicated design, whereas the Bahamas provided a straightforward and easy-to-use digital experience.

3. A lack of knowledge and severe concerns about privacy problems led to lower adoption rates in Nigeria. However, early media initiatives in the Bahamas managed to raise acceptance levels in spite of some misgivings.

4. A notable discrepancy in digital literacy between rural and urban regions was observed, underscoring the need for educational programs to create foundational digital skills and ensure equitable incentive distribution.

5. Inadequate infrastructure was an issue in both countries. While the Bahamas faced internet instability and limited smartphone access on remote islands, Nigeria had low digital connection in semi-urban areas, which affected service accessibility. Result:

1. For Nigeria: It is advised to start open awareness efforts on user security and data privacy, expedite the eNaira registration procedure, and offer specialized technical assistance to new users, especially those who live in rural areas.

2. For the Bahamas: The improvement of digital infrastructure in underserved regions and the empowerment of local communities to customize the Sand Dollar use to suit their own requirements should be the main priorities.

3. Broad Recommendations: It is advised that more straightforward, culturally relevant message be employed in community-focused awareness campaigns. Digital platforms should prioritize ease of use for various user groups and incorporate well-designed incentives, such use rewards or discounts.

4. Institutional and Educational Collaboration: Central banks, academic institutions, and civil society groups should form strategic partnerships in order to provide regular training sessions aimed at enhancing digital literacy.

5. Citizen Participation: Using tools like focus groups and surveys, individuals should actively engage in shaping digital finance policy to ensure that regulations reflect societal aspirations.

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