Occasional Paper

353

February 2024

China's Central Bank Digital Currency: A New Force in African Finance?

LAUREN A JOHNSTON

African perspectives
Global insights

SAIIA 90 EST.1934

Abstract

In line with changes in technology and societal preferences and innovation, money has evolved across time. Over recent decades, the emergence of blockchain technologies and cryptocurrencies has added pressure and built momentum to the adoption of digital currencies. For several interrelated reasons, among major economies, China – Africa's most important trade partner and bilateral creditor – is at the forefront of the digital currency rollout. Evolution of China's digital currency, the e-CNY, is likely to have an impact on the future of Africa's economic landscape too, as well as socio-economic and political economy variables beyond. Understanding the benefits, costs and issues of a central bank digital currency (CBDC), the trajectory of the e-CNY and the broader global monetary reform context is imperative for broader African interests. Yet, China's e-CNY is little understood outside of China, let alone in China. This occasional paper aims to set out the basics of a CBDC and of China's e-CNY. African context is added and suggestions are offered on areas of debate that might be encouraged to bring the CBDC out of monetary halls and into the arena of public interest debate.

Introduction

Tangible mediums of exchange have existed for thousands of years in Africa. The cowrie shell is particularly synonymous with earlier forms of money in West Africa, alongside other forms of currency, such as silver coins, gold dust, salt bars, brass and copper rods, horseshoe-shaped *manillas* (bracelets), cloth and beads.[1] In the 18th and 19th centuries, technological innovation in Europe provided for the emergence and broader implementation of more formal convertible bank notes, known as fiduciary money, which dramatically reduced the transaction costs of trade.[2]

Worldwide today, most money exists only intangibly as entries on bank records in the form of electronic money (e-money). Yet it retains a theoretical, bank-linked, tangible parallel upon demand. E-money refers to an 'electronic store of monetary value on a technical device that may be widely used for making payments to entities other than the e-money issuer'.[3] E-money dates to 1871 when the US firm Western Union debuted the first electronic funds transfer and showed that it was possible to pay for goods and services without also being physically present for the transaction.[4]

E-money has enabled modern credit cards from the 1950s, automatic teller machines from the 1980s and cashless payments since the 1990s – steps in e-money application that have changed payment habits widely.[5] Transformations in money across time have been driven by changing technology and preferences, economic growth and demand to satisfy socio-economic change.

Digital money is a very recent evolution, and a phrase often mistakenly used inter-changeably with e-money, although referring to a slightly different concept. Digital money, unlike e-money, has no parallel physical embodiment and operates on a different technological tracing and accounting method. Conceptually, its early foundations are tied to work by economists in the 1980s.[6] Operationally, cryptographer and computer scientist David Chaum is credited with laying the foundations for digital money by having pioneered the 'blinding signature' protocol as a way to encrypt information and data.[7]

---

1 Pan-African Payment and Settlement System, 'About Us,' https://papss.com/about-us/.

2 Michael Bordo, 'Central bank digital currency in an historical perspective,' Centre for Economic Policy Research, October 19, 2021, https://cepr.org/voxeu/columns/central-bank-digital-currency-historical-perspective; The Bank of England became the sole issuer of sovereign currency in 1844; and Sweden placed sole power for issuing sovereign currency with Sveriges Riksbank in 1897, accordingly.

3 Roy Davies, 'Electronic Money, or E-Money, and Digital Cash,' February 1, 2019, http://projects.exeter.ac.uk/RDavies/arian/emoney.html.

4 'A Brief History of Online Payments - Where Electronic Payments Began,' Ayoconnect, November 9, 2022, https://www.ayoconnect.com/blog/brief-history-of-online-payments-where-electronic-payments-began.

5 Alexander Gallas, 'From shells to bitcoin', Deutsche Bank, https://www.db.com/what-next/digital-disruption/dossier-payments/from-shells-to-bitcoin.

6 James Tobin, 'The case for preserving regulatory distinctions,' *Economic Policy Symposium-jackson Hole* (1987): 167-183; Robleh Ali et al., 'Innovations in payment technologies and the emergence of digital currencies,' Bank of England, https://www.bankofengland.co.uk/-/media/boe/files/quarterly-bulletin/2014/innovations-in-payment-technologies-and-the-emergence-of-digital-currencies.pdf.

7 John Hyatt, 'Decoding Crypto: What Was the First Cryptocurrency and Who Created It?,' Nasdaq, August 18, 2021, https://www.nasdaq.com/articles/decoding-crypto%3A-what-was-the-first-cryptocurrency-and-who-created-it-2021-08-18.

Digital money is a very recent evolution, and a phrase often mistakenly used interchangeably with e-money, although referring to a slightly different concept

Chaum's company DigiCash, inaugurated in 1995, used his new privacy-protecting formula to establish what are considered to be the first forms of digital cash.

Nearly three decades on from DigiCash, the concept of digital money has led to the wide adoption of and trade in unofficial digital money, known as cryptocurrencies. More recently, we have seen the emergence of the concept of more formal sovereign digital currency, which is defined as 'a digital form of money issued by a central bank'[8] and which is intended to serve as a legal tender. The underlying transformation here lies in the creation of digital 'tokens' which serve as a digital representation of money and allow for peer-to-peer transfers without, for example, the need for an intermediary bank account.

In this context, the case for replacing existing cards and electronic transfer with CBDCs is motivated by the fact that these currencies better support monetary regulation of legal and illegal cryptocurrency-based transactions. Further, these also reduce the costs of trade, facilitate financial inclusion, foster financial innovation and expand the monetary and fiscal policy toolkit, as will be elaborated in this paper.[9]

Africa is no stranger to monetary innovation, nor to the notion of digital currency. In terms of mobile electronic payment innovation, since the mid-2000s East Africa has been a world leader in the adoption of e-money-based mobile money payments, with the precedent-setting launch of M-Pesa in Kenya in March 2007. Five years after that launch, East Africa was the world's fastest-growing mobile payment sub-region, with industry leaders that included Vodacom with its M-Pesa service launch in Tanzania in 2008, and MTN launching similarly in Uganda in 2009 and in Rwanda in 2010.[10]

In the footsteps of the founding of the African Continental Free Trade Area (AfCFTA) in March 2018, with the goal of expanding intra-African trade[11] and the reality that long-standing foreign currency issues in many African countries were compounded by the COVID-19 pandemic of 2019, in January 2022 the Pan-African Payment and Settlement System (PAPSS) was launched. Developed by the African Export-Import Bank in

8 Tao Zhang, 'New Forms of Digital Money: Implications for Monetary and Financial Stability,' International Monetary Fund (IMF), October 30, 2020, https://www.imf.org/en/News/Articles/2020/10/30/sp103020-new-forms-of-digital-money.

9 'Committee on Payments and Market Infrastructures,' Bank for International Settlements https://www.bis.org/cpmi/publ/d174.pdf; Burkhard Balz, 'The digital euro: How CBDC can shape tomorrow's payments landscape,' Deutsche Bundesbank, June 30, 2023, https://www.bundesbank.de/en/press/speeches/the-digital-euro-how-cbdc-can-shape-tomorrow-s-payments-landscape-732752.

10 Mike McCaffrey, 'Where in the World is Mobile Money Prominent?,' United Nations Capital For Development, September 6, 2022, https://www.uncdf.org/article/7904/where-in-the-world-is-mobile-money-prominent.

11 African Union, 'CFTA-Continental Free Trade Agreement,' https://au.int/en/ti/cfta/about.

collaboration with the AfCFTA Secretariat,[12] PAPSS is a centralised payment and settlement system for intra-African trade in goods and services, primarily using local currencies.

> Developed by the African Export-Import Bank in collaboration with the AfCFTA Secretariat, PAPSS is a centralised payment and settlement system for intra-African trade in goods and services, primarily using local currencies

Africa currently has about 42 currencies, and these are mainly used only within the issuing zone.[13] Intra-African trade tends to be driven by African companies and their local banks. Correspondent banks are used, which are typically outside of Africa, to settle payments between two African countries in a third, external currency, typically dollars or euros. PAPSS is expected to reduce costs and to accelerate the settlement and payment of trade transactions using local currencies. PAPSS itself is backed by a digital, cloud-based platform based in Cairo, Egypt, and its daily operation is overseen by the African Export-Import Bank. The PAPSS platform and mechanisms may ultimately support the emergence of digital and tokenised cross-border international payments using CBDCs within Africa, too. The continent of Africa has one digital currency in operation so far. In October 2021,

> In October 2021, Nigeria became the first country in Africa and only the fifth worldwide to launch a CBDC

Nigeria became the first country in Africa and only the fifth worldwide to launch a CBDC. Designed to complement but not replace the physical Naira,[14] the eNaira has several goals, according to the International Monetary Fund (IMF).[15] These goals include increasing financial inclusion, facilitating remittances and reducing informality.[16] Introduction of the CBDC and related measures, however, has led to street protests, with demonstrators

12 United States Department of Commerce, International Trade Administration, 'Pan-African Payment and Settlement System, May 11, 2022, https://www.trade.gov/market-intelligence/pan-african-payment-and-settlement-system.

13 Wellisz, 'Freeing Foreign Exchange in Africa'.

14 'Nigeria: Government Launches First African Central Bank Digital Currency,' Honk Kong Trade Development Council, November 12, 2021, https://research.hktdc.com/en/article/OTAzODAwODAz.

15 Jack Ree, 'Five Observations on Nigeria's Central Bank Digital Currency,' International Monetary Fund, November 16, 2021, https://www.imf.org/en/News/Articles/2021/11/15/na111621-five-observations-on-nigerias-central-bank-digital-currency.

16 Jack Ree, 'Five Observations on Nigeria's Central Bank Digital Currency'.

blaming its introduction for cash shortages and insisting on the continued use of and access to paper money.[17] Despite this example of CBDC teething troubles, according to the Atlantic Council's CBDC tracker, as at August 2023, alongside Nigeria's operational CBDC, Ghana and South Africa were at a test phase and 17 countries in Africa were doing related research.[18]

TABLE 1 EXAMPLES OF FOREFRONT CBDC EXPLORATION AND TESTS IN AFRICA	
Country	**Related efforts**
Nigeria	The Central Bank of Nigeria launched the eNaira, a digital version of its currency, in October 2021. The eNaira project aims to foster financial inclusion, improve efficiency of cross-border transactions and support the growth of the Nigerian digital economy.
Ghana	The Bank of Ghana has been working on a pilot CBDC project called the e-Cedi since 2020. The central bank aims to leverage the e-Cedi to enhance the payment system's efficiency and promote financial inclusion among Ghana's unbanked population.
Kenya	The Central Bank of Kenya (CBK) has been exploring the adoption of a CBDC to improve financial inclusion, enhance efficiency of the payment system and reduce reliance on cash. In 2021, the central bank initiated a research and development project to assess the feasibility of a digital Kenyan shilling and to understand the potential impact of this on the economy. In February 2022, the CBK released a discussion paper calling for comments from the public on CBDCs. There are chances the CBDC could be at an advanced stage in the development of a wholesale CBDC.
South Africa	The South African Reserve Bank has initiated a feasibility study to explore the issuance of a digital Rand, which aims to address issues related to financial inclusion, cross-border remittances and monetary policy management.

Source: Benjamin Arunda, 'The Rise of Central Bank Digital Currencies (CBDCs) in Africa,' LinkedIn, April 17, 2023

If Nigeria's struggle to popularise its eNiara plans is in any way representative of challenges in implementing CBDCs in other African countries, what might it mean that Africa's largest trade partner, China, is further ahead, again, in testing the comprehensive implementation of a CBDC? What happens to China–Africa economic plans if, and when, China is already undertaking CBDC-based trade with, for example, Hong Kong Special Administrative Region, Singapore, Cambodia, Thailand and even the United Arab Emirates (UAE)? Indeed, in 2024 China's digital currency test with several countries and sub-regions, including Hong Kong and known asmBridge, will go first-stage live. Potentially, this marks the beginning of a new era of greater global payment fragmentation.[19] Moreover, in October 2023, China announced that a series of cross-border payments were being tested between China and

17 Nicholas Anthony, 'Nigerians' Rejection of Their CBDC Is a Cautionary Tale for Other Countries,' CATO Institute, March 6, 2023, https://www.cato.org/commentary/nigerians-rejection-their-cbdc-cautionary-tale-other-countries

18 'Central Bank Digital Currency Tracker,' Atlantic Council, https://www.atlanticcouncil.org/cbdctracker/#:~:text=The%20European%20Central%20Bank%20is,plan%20to%20launch%20in%202024.

19 'mBridge to launch cross border CBDC payments by mid-2024,' Ledger Insights, October 9, 2023, https://www.ledgerinsights.com/mbridge-cross-border-cbdc-payments-mid-2024/.

the UAE, including payment for oil. This marks a new phase in the application of digital currency interoperability and application.[20]

Given the rise in the number of central banks exploring adoption of a digital currency, including in Africa, 'a closer look at how the idea of CBDCs develops would be vital to a better understanding of their value today and their potential in shaping the global financial system in the future'.[21] Moreover, CBDCs raise mixed feelings among different groups, as the Nigerian case has demonstrated at the country level. For government regulators, the cost-effective means of making and tracing payments is desirable, yet also presents new regulatory and technological risks. For existing banking institutions and payment providers, there is some nervousness as to the complementarity of the evolution of any given digital payment system. For private citizens and human rights advocates, there are fears that a CBDC-based monetary order may reduce privacy and freedom and be used to impose political objectives on citizens that go against their free will and human rights. Preparing the ground for the possibility of a CBDC-driven monetary order requires involvement of multiple stakeholders and more information on what changes this innovation could bring.

Despite rising interest in how China is incrementally implementing a CBDC and how significant this may be for China and, ultimately, the world economy, there is limited knowledge outside of China about the Chinese e-CNY. How will it function given its present design, and what implications might it have for China's domestic and international market? It is imperative for economic policymakers and investors alike to understand these basics and be able to do more research of their own accord. This is especially necessary in Africa, given the advance of mobile payments and the role played by China as an investor, creditor and trader on the continent.

This occasional paper introduces CBDCs in more detail. The paper then explores the particulars of China's CBDC and what it means for China's own economy and, ultimately, China's international economic relations. Policy conclusions for Africa are also offered with respect to its relations with China.

What is a CBDC?

To understand the difference between a digital currency and what is otherwise synonymous with commerce already – e-money – it helps to go back a few steps in time. In particular, it is worthwhile to first understand the technological leapfrog offered by blockchain.

20 'China uses digital RMB to settle first cross border oil transaction,' Ledger Insights, October 20, 2023, https://www.ledgerinsights.com/china-digital-rmb-cross-border-oil/.

21 Shiyun Li and Yiping Huang, 'The Genesis, Design and Implications of China's Central Bank Digital Currency', Institute of Digital Finance and National School of Development, Peking University, 2022, unpublished mimeo, p1.

From the ancient *Rai* to modern blockchain and tokenisation

A few centuries ago, people from the small western Micronesian island group of Yap sailed around 400km to the Palauan archipelago. In Palau, the Yap islanders quarried large disks of limestone, known in their own language as *Rai*. After an arduous ocean voyage back to the islands of Yap the disks were 'offered or exchanged with various individuals and subsequently displayed in prominent locations'.[22] From there, given their weight *Rai* were seldom again moved, yet their ownership was exchanged. 'To ensure ownership was known and indisputable, an oral ledger was used within communities to maintain transparency and security.'[23] *Rai* do not strictly count as money, given the manner in which they were used, but since they were used. However, since they encapsulated value was used for transfer of value or to signal economic relationships between individuals who may or may not have been geographically proximate, these stones are commonly referred to as 'stone money'.

> *Rai* were an ingenious ancient method of enabling trade and asset exchange between people living on distant islands. In the modern world of e-money and digital leapfrogs, *Rai* can be used to help conceptually understand the technological innovation provided by blockchain

Rai were an ingenious ancient method of enabling trade and asset exchange between people living on distant islands. In the modern world of e-money and digital leapfrogs, *Rai* can be used to help conceptually understand the technological innovation provided by blockchain. Specifically, the concept of a digital currency is many decades old but only from the 2000s has encryption technology emerged, which makes the concept a feasible reality. A particular challenge was that there had been insufficient real-time comprehensive network or single locational reconciliation – one unit of currency could only be spent once at any point, known as the 'double spend' problem. The solution came from a 2008 paper titled 'Bitcoin: A Peer-to-Peer Electronic Cash System' by Satoshi Nakamoto, a pseudonym for an unknown individual or possibly a group.

22 Peter Dockrill, 'The "Original Bitcoin" Was This Giant Stone Money on a Tiny Pacific Island' Science Alert, June 2019, https://www.sciencealert.com/the-original-bitcoin-still-exists-as-giant-stone-money-on-a-tiny-pacific-island.

23 Dockrill, The "Original Bitcoin".

The solution to the 'double spend' problem specifically came from blockchain, which has been explained as follows:[24]

> A blockchain is a history of events (transactions or otherwise) that uses cryptography to link timestamped batches of events together in order to make it evident if tampering has occurred. This type of data structure enables the creation of new applications that use a blockchain as a trustworthy public database. The first major usage of a blockchain was in Bitcoin as a currency, but many non-payment applications are now being developed on top of Bitcoin and other systems such as Ethereum. Eventually you can expect blockchain-based systems to be used under the hood to power applications that enable users to prove and transfer ownership of digital and physical assets.

Put less technically, one challenge of commerce between geographies within any form of centralised system is that, since data is managed across different ledgers and these are not synced in real time, the true state of reconciliation is seldom, if ever, reconcilable at any moment. The time taken between sending an electronic bank transfer and its being received by the intended recipient is essentially the time it takes for the related two financial institutions to reconcile their ledgers. Where a transfer cannot be reconciled – for example, where the sender has insufficient funds – a transaction is reversed.

A new approach has since evolved from blockchain, in the form of tokenisation. According to the Bank of International Settlements, tokenising claims involves transforming them into tokens on a common programmable platform that combines a core layer, which contains information about the tokenised asset and its ownership, with a service layer embedding the platform's rules and governance

Like *Rai*, blockchain offers a system that relies on 'a unified and continuous chain of information to ensure that the value is known and ownership indisputable', no matter, for example, the remoteness of related trade. As an analogue version of blockchain, *Rai* used oral ledgers 'solidified through social networks to create accurate and unbroken lines of communications so that economic relationships involving *Rai* could be established, maintained, exchanged, and rectified'.[25]

24 Satoshi Nakamoto, 'A peer-to-peer electronic cash system,' *Bitcoin Papers* 4, no. 2 (2008): 15, https://bitcoin.org/bitcoin.pdf; Paul Bischoff, 'What is blockchain? 10 experts attempt to explain blockchain in 150 words or less,' Comparitech, January 19, 2023, https://www.comparitech.com/blog/information-security/what-is-blockchain-experts-explain/.

25 The Tokenisation Continuum, BIS, April 11, 2023, https://www.bis.org/publ/bisbull72.htm.

A new approach has since evolved from blockchain, in the form of tokenisation. According to the Bank of International Settlements, tokenising claims involves transforming them into tokens on a common programmable platform that combines a core layer, which contains information about the tokenised asset and its ownership, with a service layer embedding the platform's rules and governance. Tokenisation enables the automation of transactions involving money, as well as financial and real assets, and opens the way to the contingent transfer of claims and combinations of transactions via smart contracts.[26] It 'can be seen as the next logical step in digital record-keeping and asset transfer,' and further, 'could dramatically enhance the capabilities of the monetary and financial system by harnessing new ways for intermediaries to interact in serving end users, removing the traditional separation of messaging, reconciliation, and settlement'. As an analogue version of digital and tokenised money, *Rai* instead used stone-anchored oral ledgers.'[27]

The emerging tokenisation of money embodied by CBDCs, tokenised deposits and other tokenised claims on financial and real assets offers a blueprint for a future monetary system. Tokenisation offers an opportunity – for the first time ever – to bring those three monetary activities together into a unified ledger, akin to the role of *Rai* hundreds of years earlier.[28] In doing so, it offers a chance to overcome aspects of imperfection and friction in the current system in terms of, for example, the need for multiple actors and messaging between systems that imposed time delays and costs on monetary reconciliation. Tokenisation also offers a more seamless interaction across applications and other services for users of money.[29] The next sub-section elaborates on the differences between cryptocurrencies and CBDCs.

Understanding the core difference between cryptocurrencies and CBDCs

Nakamoto's 2008 paper defined how blockchain technology could be used to underpin a digitised peer-to-peer payment reconciliation system. From this, alongside tokens, both cryptocurrencies and CBDCs have been born, but where the former are generally run by private companies or individuals, CBDCs are controlled and tracked by a national central bank and correspond to that country's fiat currency. Fiat currency refers to currency that has been declared the legal tender of a country or region, but which itself has no intrinsic or fixed value, and which is also not backed by any tangible asset, such as silver or gold. Table 1 sets out the basic differences between the two blockchain-using concepts.

26 The Tokenisation Continuum.
27 The Tokenisation Continuum.
28 'Blueprint for the future monetary system: improving the old, enabling the new,' BIS, June 20, 2023, https://www.bis.org/publ/arpdf/ar2023e3.htm.
29 'Blueprint for the future monetary system', BIS.

TABLE 2 CRYPTOCURRENCY AND CBDCs: A COMPARISON		
Characteristic	**Cryptocurrency**	**CBDC**
Means of payment	Accepted by a small number of retailers	Universally accepted, legal tender
Store of value	Tends to be volatile, depends on market price	Stable, consistent with central bank price stability mandate
Unit of account	Own unit of account	Fiat currency (for example, Australian dollars)
Governance	Typically decentralised, relies on consensus among a large number of entities	Centralised
Transaction verification	Typically a large number of competing entities	Small number of trusted entities

Source: Reserve Bank of Australia, *What are Cryptocurrencies?*

Since the global financial crisis in 2008, crypto and, more recently, CBDCs have become more popular as a means of organising people-to-people transactions and information flows without intermediaries, while central banks and governments are exploring how CBDCs might take advantage of crypto technologies, including tokenisation, to improve their services.[30] By the start of 2023, 11 countries or currency union areas, representing 95% of world gross domestic product (GDP), were exploring – or implementing – a CBDC.[31] Further, each country takes its own approach to governing cryptocurrencies with China, for example, banning them altogether.[32]

> Overall, there is no consistent case for a CBDC across the world: each country has its own drivers and design preferences

Overall, there is no consistent case for a CBDC across the world: each country has its own drivers and design preferences. Some countries and regions, such as China and the Euro Area, prefer a more state-backed digital equivalent of cash with iron-clad legal tender status, and others appear to be moving toward more flexible market-oriented adoption techniques. For most developing nations, including multi-island nation countries such

30 World Bank Group, 'Cryptocurrencies and Blockchain, WBG: Office of the Chief Economist,' May 2018, https://documents1.worldbank.org/curated/pt/293821525702130886/pdf/Cryptocurrencies-and-blockchain.pdf.

31 'CBDCs: making payments programmable,' Giesecke Devrient, March 9, 2023, https://www.gi-de.com/en/spotlight/payment/cbdcs-making-payments-programmable.

32 Francis Shin, 'What's behind China's cryptocurrency ban?,' World Economic Forum, January 31, 2022, https://www.weforum.org/agenda/2022/01/what-s-behind-china-s-cryptocurrency-ban/.

as the Bahamas, which launched the world's first CBDC, affordable financial inclusion is among the goals of considering a CBDC. For some less-developed regions a digital currency may help with remittances and banking the unbanked. Also important to all governments, but especially developing country governments, is elevated traceability of financial flows to reduce corruption and to prevent money laundering and tax evasion.

How a CBDC works in practice, and the role of market entities in the process versus a central bank, among other factors, is mainly dependent on choices made by policymakers on how it is implemented. In all cases, however, a user will have a digital wallet, likely on their mobile phone. That, in turn, will be linked to either a private financial intermediary or directly to the central bank or other national currency-issuing authority.

Overall, a digital and especially a tokenised system offers some advantages over an electronic system: payments can be unified and will be faster and more streamlined, reducing the costs associated with intermediaries, which include the commercial banking system, thus also making it cheaper.[33] This same advantage, alongside programmability, offers the prospect of empowering governments to make faster payments to citizens in times of need, while increased payment transparency will also decrease money laundering and tax evasion.[34]

Selected core CBDC functionalities: Risks and opportunities

The elevated technology and potential for greater centralisation of the monetary system means, for example, that a central bank can, for the first time, distribute money directly to individual citizens. This brings both opportunities and risks, some of which are discussed here.

The fear that governments will design traceable CBDC tokens for digital payments, making all economic activity transparent and posing a risk to privacy, is a common concern about CBDC. On the one hand, transparency helps to reduce tax evasion and money laundering, but, on the other hand, it poses risks to privacy and the misuse of the extraordinary new amount of transactional data being generated and recorded in almost immediate reconciled time. This is why the European Central Bank and Bank of England are careful to include tiered privacy in their CBDC designs with lower value payments remaining anonymous while higher value payments are known only to their bank and not the central bank.[35] In all modern CBDC designs, the central bank or government does not maintain

33 'What is the digital euro and how does it work?,' N26, November 28, 2022, https://n26.com/en-eu/blog/digital-euro-what-is-it-how-does-it-work.

34 Bordo, 'Central bank digital currency'.

35 European Data Protection Board, 'Digital euro: ensuring the highest data protection and privacy standards, October 18, 2023, https://edpb.europa.eu/news/news/2023/digital-euro-ensuring-highest-data-protection-and-privacy-standards_en.

identifiable user data. Even where this payment data it is not misused, unequal opportunity to access this data could undermine transparency and socio-economic cohesion, and the capacity of the market to operate without constraint. Digital currencies, hence, require extremely sound and transparent economic governance by central banks, and very transparent systems for controlling and accessing the resulting new economic data.[36]

Another risk lies in how a CBDC is implemented. Where the role of banks as a payment intermediary is diminished, consumers instead have digital wallets that may collect limited amounts of digital currency before interacting with a financial institution. A diminished role for banks, however, could result in a migration of bank deposits and could challenge the established lending market. Fears that this may undermine the very business model of the banking system are predicated on the large-scale movement of money out of cash and accounts and into CBDC, which is unlikely given the maximum holding limits that countries are putting on digital wallets. By applying these limits, CBDCs will not disrupt the financial sector. This is a consideration that may be less important in Africa, given the share of the population that today falls outside of the formal banking sector.[37]

Aside from having the potential to change the arteries and veins of the system through which money flows, which is both recordable and near instantaneously reconcilable, a CBDC opens a new world for legal currency: direct programmability.[38]

An introduction to CBDCs' 'programmability' function

'Programmable payments are payments that are automatically executed when a set of pre-determined conditions are met – although the notion is not an entirely new one. Basic programmable payments, such as standing orders or direct debits, are already widely used in the banking system and are triggered by simple transaction events or thresholds.'[39]

The difference with CBDCs in a programmable money context lies in the capacity to automatically apply complex pre-programmed rules to payments and make that interoperable across many different devices and networks. This is broadly thanks to blockchain-utilising distributed ledger technology that can drive a new era of digitisation. This digitisation embodies the technology that 'enables automated processing by means of smart contracts, in which real goods and services are represented as tokens. The full benefits of this processing technology can only be realised if payments are also part of automated (pre-programmed) settlement'.[40]

36 'Central Bank Digital Currency (CBDC)', Board of Governors of the Federal Reserve System, April 11, 2023, https://www.federalreserve.gov/cbdc-faqs.htm.
37 N26, 'What is the digital euro?'
38 Devrient, 'CBDCs: making payments programmable'.
39 Devrient, 'CBDCs: making payments programmable'.
40 'Rising demand for programmable payments', Deutsche Bundesbank, https://www.bundesbank.de/en/press/press-releases/rising-demand-for-programmable-payments-855266.

The potential applications are not yet fully understood or imagined but have been explained as including the applications listed in Table 3.

TABLE 3 SELECTED PROSPECTIVE CBDC PROGRAMMABLE APPLICATIONS

Application	Functionality
Government direct-to-person payments	Programmability could be used to enable public authorities to support citizens' needs; for example, to issue energy subsidies or to activate a right to childcare services.
National policy enactment	CBDC smart wallets could be used to promote policies that help meet sustainability objectives, such as issuing a 'green' wallet that would be a stimulus for consumers to buy environmentally friendly products and services.
Intelligent vehicle wallets	A smart electric car, equipped with its own programmable wallet, could automatically pay at a charging station after searching for the best energy deal, negotiating the price and splitting the payment across relevant stakeholders (the charging station provider, the energy company, the carmaker, and so on).
Self-replenishing machines	Internet of Things-enabled industrial equipment could be set up to order and pay for its own supplies when sensors indicate that these are running low or when a third-party source of data needs to be accessed. Equally, in a domestic setting, a fridge loaded with a smart wallet might automatically order, pay and arrange for the delivery of regularly used items when the fridge detects depleting supply.
Pay-per-use	People and businesses could use programmability features to pay for services at the point of consumption rather than having to make advance payments.
Personalised wallets	Parents could create wallets designed specifically for their children that might set boundaries on the scope of spending, such as blocking purchases of cigarettes or alcohol.
Customer loyalty	Special-purpose wallets could enable merchants to introduce CBDC-based customer loyalty programmes. For example, a customer could apply for a specific merchant wallet that could only be used for purchases at targeted stores and would provide cash-back incentives in the form of a percentage of their spending paid directly into their wallet.

Source: 'CBDCs: making payments programmable', Giesecke Devrient, March 9, 2023

Pre-programmable payments have vast potential to shape innovation in and the patterns of use of fiat money. With populations ageing rapidly in rich countries, and Africa in contrast being youth-rich, pre-programmable payments may empower better use and safer delivery of rising government payments and subsidies.[41] Yet, there are other scenarios where taxes on international payments become harder to collect, and total fragmentation of the payment system could occur. For example, two countries could agree on a channel for convertibility between their currencies that is only open to these two currencies.

41 Tobias Adrian and Tommaso Mancini-Griffoli, 'International Monetary Fund, Digital forms of money could be a boon for emerging market and lower-income economies if the transition is well managed and regulated,' International Monetary Fund, https://www.imf.org/external/pubs/ft/fandd/2021/06/online/digital-money-new-era-adrian-mancini-griffoli.htm.

Implications for cross-border payments

Digital money can lower the cost of obtaining, storing and spending money. This may make it easier to substitute local and foreign currencies. It may also increase the gross capital flows volume. In cases where there is high inflation and a volatile exchange rate, this may be especially desirable. Conversely, this has implications for the risk of capital outflows. There is an emerging debate around how CBDCs should be designed and regulated in an international interoperability context. For example, it 'may be possible to agree on design principles that allow country authorities to set basic parameters for wallets and networks to limit currency substitution. However, these design principles must be coordinated at the global level to ensure that they meet the needs of all countries and that they are widely adopted to limit regulatory arbitrage'.[42]

There is an emerging debate around how CBDCs should be designed and regulated in an international interoperability context. For example, it 'may be possible to agree on design principles that allow country authorities to set basic parameters for wallets and networks to limit currency substitution'

In this context, the risk of fragmentation and emergence of a global digital divide is present. On the one hand, there is a risk that regional arrangements to settle digital money could proliferate, and even be actively sought as part of today's fragmented and highly contested geo-economic landscape. On the other hand, a successful transition to multilateral interoperability could foster new prosperity and more inclusive and barrier-free global trade and payments, including remittances. These discussions are intensively ongoing within and between countries and country blocs (around trade and currency agreements especially), and it is not yet clear what scenario is likely to emerge.

There is a risk that regional arrangements to settle digital money could proliferate, and even be actively sought as part of today's fragmented and highly contested geo-economic landscape

42 Adrian and Mancini-Griffoli, 'International Monetary Fund'.

Political tensions and uncertainty in the US, the issuer of the world's reserve currency, make the global monetary context of CBDCs less predictable. In binary terms, where Democrats have recently tended to support incremental steps towards digital currency adoption, Republican representatives have tended to be against such steps. In September 2023, Republicans in the Senate cleared a bill that would ensure 'any US CBDC must be explicitly authorized by Congress' and also 'protects Americans' privacy and our financial system from the risks a CBDC would pose'.[43] Moreover, the Cato Institute, a US civil libertarian think tank, has gone as far as suggesting that '[t]he real intent of introducing a digital yuan is more likely to be to increase state control of the payments system and to closely monitor transactions and even personal behaviour'.[44] According to the People's Bank of China (PBoC), however, 'The e-CNY system collects less transaction information than traditional electronic payment and does not provide information to third parties or other government agencies unless stipulated otherwise in laws and regulations'.[45]

A selective yet powerful case of US libertarian aversion to a CBDC is in striking contrast to the UK and the EU, which is planning for the launch of a digital euro by 2026. In the US, for example, the Republican leaders of Florida have already passed a law to ban the adoption or use of CBDCs in the state, on the basis of the risks to individual liberties these will hold if introduced, as argued by the related politicians.[46] Opponents of CBDCs also fear that widespread use of a CBDC would increase the 'ability of petty tyrants to control the finances of their citizens and silence voices of dissent'.[47]

For African countries, this raises an additional and fundamental consideration: the potential impact of CBDCs on international and domestic governance

For African countries, this raises an additional and fundamental consideration: the potential impact of CBDCs on international and domestic governance. For example, under the present international payment system, which is dominated by the dollar-based messaging system SWIFT, the US is able to impose financial sanctions on individuals and countries with relative ease. For about two decades until 2017, the US imposed 'stifling economic

43 Jesse Hamilton, 'U.S. CBDC Efforts Opposed in Legislation Advanced by House Republicans', Yahoo News, September 20, 2023, https://finance.yahoo.com/news/u-cbdc-efforts-opposed-legislation-195245605.html.

44 James Dorn, 'China's Digital Yuan: A Threat to Freedom' The Cato Institute, August 25, 2021, https://www.cato.org/blog/chinas-digital-yuan-threat-freedom.

45 Peoples Bank of China, Working Group on E-CNY Research and Development, 'Progress of Research and Development of E-CNY in China,' July 2021, http://www.pbc.gov.cn/en/3688110/3688172/4157443/4293696/2021071614584691871.pdf.

46 Jonathan Tobin, 'Beware The 'Big Brother' Digital Dollar That Will Take Your Freedom,' The Federalist, September 8, 2023, https://thefederalist.com/2023/09/08/beware-the-big-brother-digital-dollar-that-will-take-your-freedom/.

47 Kilian Laverty, 'Keep Big Brother away from my digital currency', FreedomWorks, April 18, 2022, https://www.freedomworks.org/keep-big-brother-away-my-digital-currency/.

and financial' sanctions on Sudan, for example.[48] Various individuals in Zimbabwe and elsewhere in Africa are also under financial sanctions by the US.[49] The levers of control for imposing such sanctions would change dramatically with the introduction of CBDCs, as would the ability of governments domestically to sanction the activity of individuals within the country.

Since China is a major investor in Africa and for more than a decade has been the continent's biggest bilateral trade partner, understanding the choices that China makes for its evolving digital currency are important in African development context also. This is intended to broaden engagement in the debate around whether African countries proceed in terms of CBDC adoption, and to foster discussion on how best to interact with China's CBDC.

The CBDC and China

On a state visit to neighbouring Kazakhstan in September 2013, China's President Xi Jinping noted an intent to forge a 'Silk Road Economic Belt'. The following month, on a state visit to Indonesia, Xi proposed a partnership between China and the Association of South-East Asian Nations that would forge a 'Maritime Silk Road of the 21st century'. The five pillars noted in each speech arguably form the basis of what ensued as a merged creation of a now decade-old 'Belt and Road Initiative' (BRI), '*yidaiyilu*' in Chinese (Table 4).

TABLE 4 BRI LAUNCH SPEECHES: 10 PILLARS (AGGREGATED)
Kazakhstan speech
1. Strengthen policy communication
2. Strengthen road connectivity
3. Promote unimpeded trade
4. Strengthen currency circulation
5. Strengthen people-to-people ties
Indonesia speech
6. We must keep the faith and hold amicable relations
7. We need to pursue win-win cooperation
8. We should stick to mutual assistance
9. Adhere to mutual affinity
10. We need to remain open and inclusive

Source: Lauren Johnston, 'The Belt and Road Initiative as Ten Policy Objectives: Review of Xi's Launch Speeches and the Washington Consensus', University of Sydney China Studies Working Paper, May 2022

48 UN, Office of the High Commissioner, Human Rights, Lifting of all sanctions against Khartoum: A new era for the Sudan, UNOHCHR, October 24, 2017, https://www.ohchr.org/en/statements/2017/10/lifting-all-sanctions-against-khartoum-new-era-sudan.

49 John Shelton, 'US levels sanctions in Zimbabwe, citing corruption', DW, December 12, 2022, https://www.dw.com/en/us-levels-sanctions-in-zimbabwe-citing-corruption/a-64073902.

Point 4 in Table 4 – strengthen currency circulation – is most directly relevant to this paper, as is point 3 (but more indirectly) – promote unimpeded trade. This relates to the fact that the mechanical properties of a digital currency enable new options for China's next phase of economic opening that are not available with today's electronic payments.

At the 10-year anniversary forum of the BRI, held in Beijing in October 2023, Xi promised that China would hold a digital economy expo and would also build pilot e-commerce zones in BRI signatory countries

Moreover, at the 10-year anniversary forum of the BRI, held in Beijing in October 2023, Xi promised that China would hold a digital economy expo and would also build pilot e-commerce zones in BRI signatory countries.[50] These may be especially useful given that, ultimately, cross-border digital payments could be limited to a bilateral currency convertibility context. These may even evolve so as to be digital current pilot zones. At the same forum, agreements were signed on the use of digital currency for cross-border payments between the Bank of China, one of China's largest state-owned commercially-driven banks, and the UAE's largest bank, First Abu Dhabi Bank, alongside the UAE's central bank.[51] For China, this incremental and bilaterally controllable internationalisation of the renminbi could be especially valuable. This is because, since engaging in 'reform and opening' from late 1978, China's leaders have not, to any extent, reformed the lack of international convertibility of the renminbi. What this means, as put by Subacchi,[52] is that:

> China has long privileged economic policies that have fuelled development at the expense of the renminbi's growth, and it has become clear that the underpowered currency is threatening China's future. The nation's leaders now face the daunting task of strengthening the currency without losing control of the nation's economy or risking total collapse.

The most important pillar of that response, as argued here, is the steady advance of China's CBDC. This may also help to explain why China was among the first countries in the world to explore the development and adoption of a digital currency. A CBDC allows for flow and traceability controls of the capital account, rather than the traditional more binary 'open'

50 'Xi announces major steps to support high-quality Belt and Road cooperation', Qiushi, October 18, 2023, http://en.qstheory.cn/2023-10/18/c_931663.htm; '(BRF 2023) Full text of Xi Jinping's keynote speech at 3rd Belt and Road Forum for Int'l Cooperation', News.cn, October 18, 2023, https://english.news.cn/20231018/7bfc16ac51d443c6a7a00ce25c972104/c.html.

51 'First Abu Dhabi Bank, Bank of China sign digital currency agreement,' Ledger Insights, October 19, 2023, https://www.ledgerinsights.com/fab-bank-of-china-digital-currency/.

52 Paola Subbachi, 'The People's Money: How China Is Building a Global Currency,' Columbia University Press, http://cup.columbia.edu/book/the-peoples-money/9780231173469.

and 'closed' capital account status, with the former being exposed to hot money flows and less overall macroeconomic control. But, transforming a CBDC from an idea to nation-wide monetary reality is itself an incremental process that requires many decisions to be made in terms of technology standards adopted, and how to integrate the digital currency into the existing financial system set-up.

> A CBDC allows for flow and traceability controls of the capital account, rather than the traditional more binary 'open' and 'closed' capital account status, with the former being exposed to hot money flows and less overall macroeconomic control

So far in China's case, by policymaker design, there is scant evidence of disintermediation from the PBoC with payment platforms WeChat and Alipay, which control between 60% and 80% of the payment market.[53] We can also, for example, look at the impact on banks from the perspective of how much money is held by mobile payments in their banking operations and compare this with actual bank deposits. Total funding in 'online payment firms deposits'[54] in August 2018 was RMB 763 billion (from Caixin Financial News), with China's total bank deposits in January 2018 hitting RMB 26,640 billion (from CEIC Data). Roughly 3% of total deposits have moved to mobile payment companies; this is significant when considering that total bank deposits include corporate accounts, but is not material to the banks' financial wellbeing.

Genesis of China's CBDC

Macroeconomic policy legacy

The backdrop to the emergence of a CBDC in China is not only shifting monetary system-impacting technologies but also the particular and unique series of policy reforms in China since around 1980 having produced an unusual international macroeconomic circumstance. On the one hand, China's role in world trade has expanded at breakneck pace, especially after 2001, when China joined the World Trade Organization. In the years immediately prior to the COVID-19 pandemic, China's total trade in goods had reached between 12% and 13%, making China the world's greatest trader, followed by the US at between 11% and 12% and then Germany at between 7% and 8%.[55]

53 Richard Turrin, 'Cashless: China's Digital Currency Revolution', April 8, 2021, https://www.amazon.de/-/en/Richard-Turrin-ebook/dp/B0925JY69H.

54 Turrin, 'Cashless: China's Digital Currency Revolution'.

55 'Is China the World's Top Trader,' Centre for Strategic and International Studies, China Power, March 28, 2018, https://chinapower.csis.org/trade-partner/.

On the other hand, despite China's new role in world trade, about half of world trade is invoiced in dollars. Relatedly, in 2022 the dollar accounted for 58% of global foreign exchange reserves with the euro in second place, at 30%, and the renminbi accounting for just 2.7% of global foreign exchange reserves.[56] Unlike that of the US and Germany, China's currency has a very limited international role.[57] For a number of broader contemporary macroeconomic and political economy of reform reasons, including misgivings around the role of the US dollar, and given the emergence of cryptocurrencies and e-commerce technology adoption and option levels, China now seeks to expand the role of the renminbi in the world economy.

Those misgivings have roots in both the Bretton Woods Agreement of 1944 and gold standard reforms of the early 1970s, which have since given the US Federal Reserve the leading place in setting global monetary supply. The result is that most other countries are price takers in terms of global money supply, leading to the 'Triffin dilemma', a quandary arising where one sovereign currency leads the international monetary system and which is explained as follows:[58]

> If the United States stopped running balance of payments deficits, the international community would lose its largest source of additions to reserves. The resulting shortage of liquidity could pull the world economy into a contractionary spiral, leading to instability. If US deficits continued, a steady stream of dollars would continue to fuel world economic growth. However, excessive US deficits (dollar glut) would erode confidence in the value of the US dollar. Without confidence in the dollar, it would no longer be accepted as the world's reserve currency. The fixed exchange rate system could break down, leading to instability.

Pettis argues that this role of the dollar transforms the US into adopting the role of global consumer of last resort; and that that, in turn, has, for example, helped undermine employment and the manufacturing sector in the US.[59]

In that context, the advance of cryptocurrencies offers the potential of a paradigm shift. Rising US interest rates over recent years have added to the cost of capital globally, putting pressure on developing countries especially. Furthermore, the use of the dollar for geopolitical purposes over recent years, including imposition of sanctions against Russia, has also added to momentum for reforming that role of the dollar.

---

56 'The prospect of internationalization and de-dollarization of the RMB', Broad New, July 22, 2023, [Chinese language website] http://europe.new-broad.com/show-11-6725-1.html.

57 There are many papers exploring this topic. See for example the contributions of:Zheng Liu, Mark Spiegel and Jingyi Zhang, 'Optimal capital account liberalization in China,' *Journal of Monetary Economics* 117 (2021): 1041–1061; Nicholas Lardy and Patrick Douglass, 'Capital account liberalization and the role of the renminbi,' in *China's New Role in the World Economy* (Routledge, 2013), 145-161.

58 Robert Triffin, 'The Dollar Glut', Money Matters: An IMF Exhibit – The Importance of Global Cooperation, IMF, November 1960, https://www.imf.org/external/np/exr/center/mm/eng/mm_sc_03.htm.

59 Michael Pettis, 'Why Trade Wars Are Inevitable,' Foreign Policy, October 19, 2019, https://foreignpolicy.com/2019/10/19/trade-wars-inevitable-us-china-economic-imbalances/.

The emergence of cryptocurrencies

In the shadow of the 2008 financial crisis, a new cryptocurrency was born in 2009, in the form of Bitcoin (there are currently about 23 000 cryptocurrencies).[60] The supply of Bitcoin is not decided by a central bank but by an algorithm, and supply is fixed at a maximum 21 million coins.[61] Unlike a sovereign currency of an instrument that is attached to the value of a commodity, Bitcoin has no intrinsic value. Any value of Bitcoin, or not, depends solely on the consensus among and willingness of its users to accept it as a means of payment. That, in turn, makes its more of a digital-based asset since its price is too volatile to become any form of traditional international currency.

The emergence of stablecoins sought to overcome the valuation challenge of Bitcoin. Stablecoins, in contrast to Bitcoin, are backed by sovereign currencies, and thus have an intrinsic value. This, however, raises regulatory challenges in reducing the role of the local currency within a sovereign market and in having potential to circumvent domestic monetary regulatory standards and cross-border transaction standards. In an extreme case where consumers widely opt to adopt Libra, an example of one of the earliest stablecoin projects, a local central bank could lose control of monetary policy and financial stability.[62]

These digital payment innovations have resulted in an increase in interest in sovereign digital currencies by central banks, or CBDCs. After Meta released its Libras and its failed white paper in October 2019, central banks of major economic entities, including the European Central Bank (ECB), the Bank of England and the Bank of Japan, stepped up their research on and design of CBDCs. In addition, more countries are putting forward their agendas on CBDCs successively, creating an atmosphere of unprecedentedly fierce international competition in this specific field of finance. In China's case, however, work on a CBDC had already begun in 2014, the year after the BRI had been launched (see Table 4), because of the influence of digital payment platforms WeChat Pay and Alipay, which were licensed for operation that same year.

China's CBDC (e-CNY): Design and characteristics

China's central bank, the PBoC, started researching the e-CNY in 2014, and the groundwork was fundamentally completed in 2019. Since then, the e-CNY has evolved slowly in the breadth and depth of its applications within China.[63] This section gives an overview of the design and characteristics of what is being rolled out.

---

60 Lyle Daly, 'How Many Cryptocurrencies Are There?,' The Motley Fool, November 20, 2023, https://www.fool.com/investing/stock-market/market-sectors/financials/cryptocurrency-stocks/how-many-cryptocurrencies-are-there/.

61 Ayushi Abrol, 'How Many Bitcoins Are There And How Many Are Left To Mine?,' Blockchain Council, August 28, 2023, https://www.blockchain-council.org/cryptocurrency/how-many-bitcoins-are-left/.

62 G7 Working Group on Stablecoins, 'Investigating the impact of global stablecoins,' Bank for International Settlements, https://www.bis.org/cpmi/publ/d187.htm.

63 Don Weinland, 'China is rapidly rolling out its new digital currency,' The Economist, November 18, 2022, https://www.economist.com/the-world-ahead/2022/11/18/china-is-rapidly-rolling-out-its-new-digital-currency; Huosong Xia, Yangmei Gao and Justin Zuopeng Zhang, 'Understanding the adoption context of China's digital currency electronic payment,' *Financial Innovation* 9, no.63 (2023), https://jfin-swufe.springeropen.com/articles/10.1186/s40854-023-00467-5.

How is the e-CNY defined?

The e-CNY is defined as 'a legal tender in digital form issued by the People's Bank of China'.[64] The e-CNY is positioned as 'the digitisation of the RMB', which means a transformation from notes and coins to a new digital form of currency without any legislative change. That is, there is no fundamental difference between the traditional and digital currency, with the latter still covered under present legislation.[65] So, what is the difference between the traditional and digital versions of the RMB? Five attributes have been suggested as helping to differentiate them (see Table 5). This, in turn, underpins the ensuing new monetary functions and operating mechanisms.[66]

TABLE 5 FIVE WAYS IN WHICH THE E-CNY DIFFERS FROM THE CHINESE YUAN (CNY)

Attribute	Characteristics
A two-tier operating system	The first tier involves issuing the e-CNY and exchanging it with designated operators; and the second tier comprises the 'big four' commercial banks, two payment platforms and three telecom operators, which provide services to and exchange of the e-CNY with the public.
Expanded wallet features	e-CNY wallet accounts are an expanded version of narrow traditional bank accounts to a broader digital account system.
Independence from the banking system	An e-CNY wallet can be opened independently from a traditional bank account, unfastening the closely coupled links to the traditional payment system.
Untied to any account system	The e-CNY as a unit has value in itself instead of being an obligation to a bank, for example.
e-CNY wallets are designed in different grades (tiers)	To accommodate varied levels of user anonymity and access, there will be four to five grades (tiers) of digital wallets based on the strength of the know-your-customer levels. Low-grade wallets are anonymous but have balance and transaction limits to crack down on financial crimes, money laundering and terrorist financing. High-grade wallets have progressively higher limits but require real-name registration.

Source: Li and Huang, 'The Genesis, Design and Implications of China's Central Bank Digital Currency'

An initially limited monetary function

Money issued by a central bank traditionally serves three major functions: payment (liquid transactional settlement); pricing (valuation); and investment (as an institutional asset for investing). The e-CNY is a relatively cost-free medium of exchange, a stable account unit and a safe store of value under optimal conditions. In its early life, however, the e-CNY will focus only on facilitating payment and aim to replace cash in circulation rather than bank deposits or other financial investment products. In future, however, the e-CNY may take on added monetary functions.

64 Li and Huang, 'Genesis, Design and Implications', 4.
65 Li and Huang, 'Genesis, Design and Implications', 4.
66 Li and Huang, 'Genesis, Design and Implications', 4.

Three major operating mechanisms

As a digital currency primarily targeted at retail use (the public) rather than wholesale use (institutions), the e-CNY has been designed with three main mechanisms. These are summarised in Table 6.

TABLE 6 E-CNY MAJOR OPERATING MECHANISMS

Mechanism	Characteristics
The e-CNY is a substitute for M0 (cash in circulation), but not for M1 or M2 (eg, bank deposits)	Concentrating on retail scenarios, the e-CNY solves the pain point of cash and coins not yet being digitised. Digitalisation has not been a problem for M1 and M2; for them an effective electronic payment system has already been established in China, whose operators include Super Online Banking, NetsUnion, UnionPay, WeChat Pay and Alipay, and there is no necessity to reconstruct another.
The PBoC will neither charge fees nor pay interest on e-CNY	As a non-exclusive public good, the e-CNY should be cost-free in provision, as well as in its later circulation or exchange. However, this leaves some room for commercial institutions to decide whether to charge for e-CNY services, and if so at what price, which will ultimately be determined by market mechanisms. Besides being charge-free, the e-CNY will also not be interest-bearing, but just notes and coins.
The e-CNY functions within a two-tier operating system	The e-CNY functions within a two-tier operating system (see Table 5). The role of the PBoC is to provide core infrastructure and supervise the e-CNY programme, while intermediaries provide services to the public. This approach has two major benefits: i) to reduce the risk of financial disintermediation (a single-tier operating system can lead to disintermediation of banks and may even cause the banking system to retrogress); and ii) joint upkeep and risk sharing among the PBoC and other operators (building and maintaining an ecosystem of e-CNY with collective efforts prevent the concentration of risks, especially operational risk, liquidity risk and credit risk, at a single institution level, and can also reduce the duplication or waste of resources given the existing IT infrastructure, processing capabilities and qualified staff at intermediaries).

Source: Author's own summary from Shiyun Li and Yiping Huang, 'The Genesis, Design and Implications of China's Central Bank Digital Currency', Institute of Digital Finance and National School of Development, Peking University, 2022, unpublished mimeo, p.1.

Broader prospective implications and considerations

Mobile payments

The functionality of the e-CNY that serves to replace M0 (cash in circulation) applies mostly to daily retail consumption-related payments. In this way the e-CNY to a large extent overlaps with existing mobile payment systems, which in China include WeChat Pay and Alipay. It differentiates itself by its programmability, universality of acceptance and unlimited maximum payment amount. This makes it suitable for high-value corporate use and even securities settlement.

BOX 1 CORE DIFFERENCES BETWEEN E-CNY AND MOBILE PAYMENT SERVICES

1) **e-CNY is legally compensable by the PBoC** – if an agreed service provider of an e-CNY digital wallet files for bankruptcy, the PBoC is a direct guarantor and, moreover, the public can exchange e-CNY into traditional RMB when wishing to do so. Funds stored in the wallets of mobile payment service providers are not directly compensable by the PBoC. In the case of a bankruptcy, this makes e-CNY more secure and reliable.

2) **e-CNY realises true zero cost**. Mobile payments cost little compared to physical cash, but transactions conducted via e-CNY are directly cost-free and, in this context, are more inclusive.

3) **e-CNY does not require a network system**. For mobile payments that rely on the use of QR codes on a smartphone, an internet connection is always required. In contrast, the e-CNY has features such as offline or near-field communication 'touch and go' payments, and so achieves network independence. This offers both greater security and convenience and greater geographic equality in terms of internet speed not being equal across any given country or broader region.

4) **e-CNY can be anonymous**. Just as with cash, a 'low-grade' (see Table 5) e-CNY wallet permits anonymous transactions, where in China today mobile payments are attached to a registered bank account and identified mobile payments account.

In the first instance, the design of the e-CNY architecture is complementary to existing mobile payment service providers, such as WeChat and Alipay. This is because digital wallets on a user's phone now simply offer two options – to use mobile payment and traditional RMB therein, or to use the e-CNY amount instead. It is as if two bank accounts are attached to one electronic payment card. In this way, the e-CNY is designed to bring no change to the mobile payment architecture. Moreover, major players such as Alipay and WeChat Pay are among the officially designated e-CNY operators.

In the short to medium term, today's mobile payment providers are also protected by the bigger ecosystem of 'super-apps' that they have built around the payment service they provide. For example, today they act as intermediaries not only for payment transactions but also to connect with transportation, food, accommodation and social networks. Payment services are just one of the reasons users sign up and remain loyal. Conversely, it is probable that as the e-CNY evolves, the PBoC will authorise more companies to provide e-wallet services in the future, ensuring that the digital payment landscape in China remains innovative.

e-CNY and commercial banks

Alongside disintermediation fears of mobile payment companies, there have also been concerns that the e-CNY could debilitate commercial banking. Much of this risk depends on the design of the e-CNY. In China's case, the design has been carefully tailored to reduce this risk. For example, the two-layer mechanism (see Table 5) prevents the PBoC from issuing e-CNY directly to the public, hence ensuring a role for intermediaries such as commercial banks. Moreover, a role for commercial banks can help to expand the e-CNY circulation. In addition, the lowest and most common usage tier of personal wallet is limited to a maximum balance of RMB 10 000. Finally, the fact that thePBoC does not pay interest on the e-CNY may reduce the willingness of users to withdraw RMB from their commercial bank accounts and instead keep these stored in a digital wallet as e-CNY.

Most of China already has digital payment and, while e-CNY will expand the overall amount of digital payments, it is not clear whether they will cause a gradual decline in the share of deposits held in commercial banks. Clearly, disintermediation is something the PBoC will watch quite carefully as it could potentially restrict credit supply and even systemic risk in the event of a financial crisis. To this point, the evolution of the e-CNY is taking place gradually while learning from the existing mobile payment services, other CBDC experimentation, and international banking and monetary regulators and researchers.

Having been left out of the mobile payment revolution, many commercial banks view the launch of China's e-CNY as a second chance to reconnect with clients. Commercial banks have lost large sums in payment revenue to the payment platforms. Through CBDC, they may, in contrast to banking system disintermediation, even be enabled to recapture some of their clients' payments.

e-CNY and RMB internationalisation

Whether or not the e-CNY can help to promote the internationalisation of the RMB has two aspects to it. First, digitisation alone does not solve all internationalisation issues. For example, there are many other macroeconomic variables, including the flexibility of the exchange rate, the openness of the market and the level of trust. While there are deep restrictions on the internationalisation of the RMB currently, these restrictions need not be applied to the e-CNY. That is, China may slowly craft a dual currency circulation model, with the RMB circulating at home and the e-CNY circulating at home and abroad. A probable dual Chinese currency carriageway could be further supported by the fact that transacting internationally in the e-CNY could improve transaction efficiency, since a CBDC version of a currency can promote faster, safer and lower-cost international transactions.

However, this may, in turn, also raise secondary geopolitical risks in the global context about the role of the dollar and the sustained role of international payment systems in place today, such as the SWIFT2 messaging service. SWIFT2 facilitates the movement of money across international borders and underpins the capacity of the US to implement financial

sanctions.[67] Changes to that system, and any related emerging geo-economic complexity, could become an opportunity but also a risk for Africa's own development and monetary autonomy and sustainability.

In preparation for internationalising the e-CNY, China launched a test project for cross-border sovereign digital currency payments in 2021 called mBridge.[68] mBridge partners include the PBoC, the Hong Kong Monetary Authority and the central banks of Thailand and the UAE.[69] As early as some time in 2024, mBridge partner cross-border e-CNY payments are expected to become a reality.[70] It was also announced in October 2023 that China's state-owned petroleum giant PetroChina would make its first payment for oil to the UAE using e-CNY by the end of 2023.[71] The October 2023 Belt and Road Forum also led to a few digital currency-related agreements, including those between the state-owned Bank of China and the UAE's largest bank First Abu Dhabi Bank (FAB), which signed a digital currency cooperation agreement.[72]

Hence, where China's last four decades of economic reform have been characterised by continued dominance of the US dollar in international payments and very limited, if any, use of the renminbi in the international monetary system, the next several decades are likely to see a dramatic change, led by new digital and tokenisation technologies.

Mechanical implementation risks

Even outside of the evolution of a complex bifurcation of the Chinese currency into a mainly domestic-only RMB and an internationally and a domestically used e-CNY, and despite the numerous advantages offered by digital currencies, adoption of a CBDC is not without ongoing risk. Such risks include those related to security and technology, adoption risks in terms of inequality of access to related technologies, and how countries manage to agree to new rules for a potential international monetary system based on CBDCs. Some of the core risks are outlined in Table 7.

67 Sarah Sewall and Ming Luo, 'The Geopolitics of Digital Currency,' The Belfer Centre for Science and International Affairs, January 21, 2022, https://www.belfercenter.org/publication/geopolitics-digital-currency.

68 Derek Andersen, 'mBridge CBDC project preparing for new members, launch of minimum viable product', September 25, 2023, https://cointelegraph.com/news/mbridge-cbdc-project-preparing-new-members-minimum-viable-product.

69 Andersen, 'mBridge CBDC project preparing'.

70 'Project mBridge Update: Experimenting with a multi-CBDC platform for cross-border payments', October 2023, https://www.bis.org/innovation_hub/projects/mbridge_brochure_2311.pdf.

71 'China uses digital RMB to settle first cross border oil transaction', Ledger Insights, October 20, 2023, https://www.ledgerinsights.com/china-digital-rmb-cross-border-oil/.

72 'First Abu Dhabi Bank, Bank of China sign digital currency agreement', Ledger Insights, October 19, 2023, https://www.ledgerinsights.com/fab-bank-of-china-digital-currency/.

TABLE 7 IMPLEMENTATION AND OPERATIONAL RISKS	
Risk	**Related concerns**
Security risk led by technical issues	A successful cyberattack on a CBDC system could quickly threaten a significant number of users and their confidence; defending against such attacks will be more difficult as the number of endpoints will be significantly larger than those of current wholesale central bank systems. The PBoC and authorised operators must pay special attention to technical risks, such as cyberattacks, counterfeiting and payment fraud. Individual data privacy should be protected, technical barriers should be set up to the extent possible via testing and back-up plans should be ready to eliminate risks in case of their occurrence. China is well-positioned to learn from WeChat Pay and Alipay, which have accumulated valuable experience.
Inequality and unbalanced conclusiveness	Increasing digitalisation risks leaving some sections of society behind and includes potential barriers such as trust, digital literacy, access to IT and data privacy concerns. Sufficient consideration must be given to digitally vulnerable groups to ensure the accessibility and convenience of all RMB users. In fact, financial conclusiveness is one of the PBoC's motivations for launching the e-CNY, in terms of the lack of banking services available to people in remote areas. Cash presently remains indispensable to protect the legal rights of those who do not like to, are not good at or cannot pay using other mediums.
Supervision	The e-CNY can enhance the efficiency of cross-border funds flow but may also increase the speed of financial risk transmission. Stronger unintended international spillovers can result in undesirable volatility in foreign exchange rates, 'digital dollarisation' for other countries, flight to safety and, if laws and regulations are not equivalent, facilitation of tax avoidance and loss of oversight by domestic authorities. The PBoC and its peers, domestically and internationally, must strike a balance between financial innovation and financial stability.

Source: Shiyun Li and Yiping Huang, 'The Genesis, Design and Implications of China's Central Bank Digital Currency', Institute of Digital Finance and National School of Development, Peking University, 2022, unpublished mimeo, p.1

e-CNY prospects

China's present e-CNY is the first and dramatic step towards the digitisation of the RMB. Moving forward, this nascent CBDC is expected to gradually advance its monetary functions from a single payment tool to a safe store of value, and a new means of payment fit for China's larger societal digital journey (not a new price measure but still RMB). If there is wide acceptance of the e-CNY, China's future financial system is bound to embrace more related innovations of global monetary significance. The e-CNY, in this case, is likely to alter the way payments are made in daily life and to have a profound influence on payment systems, commercial banking systems and even the operation of the capital market.

For Africa, understanding how China's own domestic retail and monetary system is evolving will be an important source of information about the general global economy, not least since this will also less directly shape how and why Chinese entrepreneurs and others reach out to potential economic partners in Africa. Where the e-CNY helps in the internationalisation of the RMB, the impact and implications for Africa, however, are likely to be considerable. In this case, China's role in the international financial system may expand significantly, with an impact on how Africa interacts with the international financial system also.

In the meantime, research into the CBDC system, and the e-CNY especially, is called for since there is almost unknown opportunity and risks in how it might evolve and expand in applications going forward.

> Where the e-CNY helps in the internationalisation of the RMB, the impact and implications for Africa, however, are likely to be considerable. In this case, China's role in the international financial system may expand significantly

The e-CNY: Africa and China–Africa considerations

A handful of African countries are leading the pack in the context of implementation and research around the use of CBDCs on the continent, especially Nigeria, which is the only country on the continent with a CBCD in operation (Table 1). The fluctuations in Nigeria's pilot project offer a window into the complexity of the trajectory ahead.[73] Compared to China and Kenya, which are both in the active CBDC research phase and already home to an advanced and widely adopted mobile payment system, this research and adoption process is both easier and more complex. The South African Reserve Bank, too, has initiated projects that are relatively advanced in stages of exploring a wholesale and a retail CBDC.[74]

That China is both Africa's leading trade partner and bilateral sovereign creditor, and also a frontier for CBDC development, makes what is happening in China important for Africa, even if only in understanding how it may change China's economy itself. More importantly, if China evolves its e-CNY such that a digitised international version of the e-CNY emerges that is strictly separated from the traditional (domestic) RMB, this too could happen sooner or differently to what many may today expect – and the implications of this may be better understood in advance. Those implications could have monetary, international and domestic political economy consequences for African countries' economic ties with China and also for the world economy more broadly.

As many African nations come to consider advancing their own CBDC, what system should be set up also comes into question – independently and in the context of interoperability with other economies, including China. If there is any likelihood that advanced and favourable access to the e-CNY may arise with quick adoption of similar CBDC technologies, for example, the domestic, bilateral and multilateral implications should best be prepared

73 Peterson Ozili, 'eNaira central bank digital currency (CBDC) for financial inclusion in Nigeria,' *Digital Economy, Energy and Sustainability: Opportunities and Challenges* (Cham: Springer International Publishing, 2023), 41-54; Peterson Ozili, 'Central bank digital currency in Nigeria: opportunities and risks,' *The new digital era: digitalisation, emerging risks and opportunities*, (Emerald Publishing Limited, 2022), 125–133.

74 'CBDCs in emerging market economies', BIS, https://www.bis.org/publ/bppdf/bispap123_w.pdf.

for and debated ahead of time. As noted already, as early as mid-2024 China's mBridge tests may become nascent cross-border payments in reality with some, if not all, test partner monetary authorities, including Hong Kong, Thailand and the UAE.[75] As stated earlier, China's PetroChina was to make its first payment for oil to the UAE using e-CNY by the end of last year.[76]

In general, a survey of related studies has called for caution against over-optimism about the potential benefits of CBDCs due to the 'limiting nature of CBDC design and its inability to meet multiple competing goals'.[77] There is a need to undertake country-specific and regional case studies of CBDC design.

CBDCs and Africa: Core issues and prospects

As in the case of China, but perhaps even more so across Africa, the potential of CBDCs is immense because they can help address various challenges that the continent has been grappling with for years. First and foremost, CBDCs – just like their predecessors such as Kenya's M-Pesa – can dramatically facilitate financial inclusion. According to the World Bank, some 350 million people in Africa do not have any formal access to financial services.[78] CBDCs can provide a cost-effective and efficient solution for reaching unbanked individuals. They can also increase the safety of those in the informal economy in terms of transporting money across remote and less secure distances. In addition, a CBDC has the potential to make cross-border remittance payments far more efficiently, at reduced cost and in a speedier manner. This would have a significant impact on the millions of individuals relying on them and would foster greater mobility for African workers. Finally, these would represent new tools for implementing monetary policy that could better support monetary stability.[79]

There are, however, also constraints impeding the potential to develop and adopt CBDCs, even where it is decided that this is desirable. First, not all countries in Africa have a sufficiently robust digital architecture that includes optimal, let alone reliable and affordable, internet connectivity and comprehensive access to digital devices. Second, cybersecurity could also be an issue, since CBDCs are susceptible to hacking and fraud, both of which require intensive and extensive resources to mitigate. The choice of related technological infrastructure and the relevance and comprehensiveness of regulatory frameworks are imperative for successful adoption of a digital currency. It would be

75 'Project mBridge: connecting economies through CBDC'; 'mBridge to launch cross border CBDC payments by mid-2024'.
76 'China uses digital RMB to settle first cross border oil transaction'.
77 Peterson Ozili, 'Central bank digital currency research around the world: a review of literature', *Journal of Money Laundering Control* 26, no. 2 (2023): 215-226, https://www.emerald.com/insight/content/doi/10.1108/jmlc-11-2021-0126/full/html.
78 Enrique Alberola and Ilaria Mattei, 'Central bank digital currencies in Africa,' Bank for International Settlements, BIS Papers no. 128, (2022): 1-23, https://www.bis.org/publ/bppdf/bispap128.pdf.
79 Fabio De Masi, 'The Future of Money in Africa', Rosa Luxemburg Stiftung, https://www.rosalux.de/en/topics/international-and-transnational/africa/the-future-of-money-in-africa

premature to race into such a context just because a major trade partner or investor is doing so.

CBDC design itself matters for the trade-offs involved, and the starting point for that design process matters explicitly and implicitly. Digital infrastructure, faster payment system penetration, financial literacy and payment industry competition all help to shape the most feasible local design of a CBDC.[80] Local priorities shape local design too. The greater capacity to bank the unbanked, track currency movements and reduce transaction costs, facilitate offline digital transactions and facilitate remittances are all priorities in the African context. However, the starting point for considering how to structure the CBDC is managing potentially high operational costs, such as technological infrastructure, and minimising prospective security threats.[81]

> CBDCs can provide a cost-effective and efficient solution for reaching unbanked individuals. They can also increase the safety of those in the informal economy in terms of transporting money across remote and less secure distances

Finally, CBDC design also helps to shape interoperability decision-making; that is, how digital currencies are exchanged across currency borders. For Africa, the fact that its major trade and economic partners, led by China, have such a head start in terms of their own digital currency trials and implementation standards may serve to reduce the degrees of freedom of local policy options around digital currency-related choices. This noted, those major players are each following their own overall priorities. One anecdote described China's CBDC as state-led, that of the US as market-led, and Europe's as people-led.[82] Different African countries will have their own priorities and decision-making notes.

Political economy factors

Beyond the monetary and direct technological complexity, there are additional and important implementation risks with CBDCs. These include user privacy and data protection. Monetary leaders in Europe have noted their view that, for digital currencies to become popular, 'consumers need to have control over their data and how it is used'.[83]

80 Alberola and Mattei, 'Central bank digital currencies in Africa'.

81 Benjamin Arunda, 'The Rise of Central Bank Digital Currencies (CBDCs) in Africa,' LinkedIn, April 17, 2023, https://www.linkedin.com/pulse/rise-central-bank-digital-currencies-cbdcs-africa-benjamin-arunda/.

82 Anecdote recalled by author.

83 Tushar Chitra and Radhika Parkhe Parkhe, 'Identity economics is key to accelerating Central Bank Digital Currency (CBDC) adoption,' Financial Services Blog, July 10, 2023.

In this way, the privacy aspect of the traceability of digital transactions is of concern, with some arguing that 'for CBDCs to become universal and accessible to everyone, they must be privacy-preserving and not linked to an individual's identity or credit history.'[84]

Related warning shots have already been fired in the context of the candidates for the 2024 US election. It is reported that both Florida Governor Ron DeSantis, a Republican, and Robert F Kennedy Jr, a Democrat, are opposed to a CBDC being launched in the US, with DeSantis having on one occasion spoken from a podium bearing a sign reading 'Big Brother's Digital Dollar'. DeSantis has elaborated on his fears that a digital currency could be used to force changed behaviour and to impose new taxes and costs on some nominated behaviours over others. And this means not just purchases of legal and illegal drugs, but also, for example, purchases that embody a high carbon footprint. That is, that CBDCs will be used to swap behaviour and values. In an African context, there are implications for cross-country sanction capacity and the capacity of governments to undermine local freedoms too – just as digital payments can empower individuals and freedoms otherwise.

Another complication arising that is less discussed is the relatively instant reconciliation process enabled by digital currencies; a new level of recordability creates new volumes of data. Beyond fears that this could be linked to an individual and used for adverse political or other reasons, there is also a question of the commercial and political use and value of that data, as well as who has access to it and when. On the one hand, this could create new economic efficiencies and policymaking but, on the other hand, it could create deeply unfair new monopolies and market powers.

There are fears that blockchain technologies in general and digital currencies will undermine human rights and allow governments and companies to unduly punish and control their citizens. However, these technological changes and shifts can also be used to empower individuals, societies, human rights and progress.[85] It is imperative that all national monetary authorities and civil society groups are able to stay abreast of these changes and their full set of consequences, sufficiently far ahead of any sovereign decisions of lasting impact being made.

Little says more than this reported version of Nigeria's own experience of implementing a pilot digital currency:[86]

> In Nigeria, citizens have taken to the streets to protest the nation's cash shortage, further objecting to their government's implementation of a central bank digital currency (CBDC). The shortage came about due to cash restrictions aimed at

84 Chitra and Parkhe, 'Identity economics is key to accelerating CBDC adoption'.

85 Florence G'sell and Florian Martin-Bariteau, Report to the Council of Europe on, *The Impact of Blockchains for Human Rights, Democracy, and the Rule of Law*, September 2022, https://rm.coe.int/report-on-blockchains-en/1680a8ffc0.

86 Anthony, 'Nigerians' Rejection of Their CBDC Rejection of Their CBDC Is a Cautionary Tale for Other Countries,' CATO Institute, March 6, 2023, https://www.cato.org/commentary/nigerians-rejection-their-cbdc-cautionary-tale-other-countries.

pushing the country into a 100% cashless economy. Yet, instead of adopting the CBDC Nigerian protestors are demanding paper money be restored. The country's experience strongly suggests the average citizen understands that CBDCs present a substantial risk to financial freedom while providing no unique benefit.

> In Nigeria, citizens have taken to the streets to protest the nation's cash shortage, further objecting to their government's implementation of a central bank digital currency

Yet, proponents of digital currencies argue that these protests were linked instead to the fact that Nigeria's banks were not supplied with enough digital currency to meet demand, and the lack of counterfeit capacity created a currency shortage.[87] Understanding the conceptual and technological shifts embodied in a digital currency is one challenge. Filtering information in the process is another. As should happen in any country considering adoption of a new digitised currency, African civil society and universities could take a lead in engaging with domestic and international monetary and technical experts in order to keep the public informed, limit disinformation and ensure that, if a digital currency is implemented, this is done with transparency and governance structures that serve the people.

Recommendations

From Micronesia's ancient use of *Rai* for secure transactional accounting to the modern-day emergence of crypto and ongoing evolution of digital currencies, money has changed over time. On that basis alone, it is likely to continue changing. Keeping track of what innovative economies are doing in this context is imperative for all economies and their civil society interests, especially where there is a leading economic partner and given the myriad of decisions and implications associated with crafting, implementing and operating digital currency.

For African economies navigating the next phase of development in an era of enhanced geo-economic competition, it is more imperative than ever to stay fully informed of the underpinnings of that competition, an emerging and fundamental area of which involves currencies and their role in the global economy. Digital currencies have the potential to

87 Nigeria push for new currency notes creates crisis, Africa News, February 10, 2023, https://www.africanews.com/2023/02/10/nigeria-push-for-new-currency-notes-creates-crisis//.

be a game changer in this context and yet, at the same time, present multiple interactive complexity challenges of their own.

To these points above, some recommendations for African interests would include the following:

- It would be helpful to form a cross-country civil society and academic working group to consider the different CBDC models emerging in China and elsewhere on which African countries can draw for wider debate ahead of decision-making.
- Africa's young and typically mobile commerce-literate populations stand to gain tremendously from the open and fair availability of e-commerce data, especially where this derives from the implementation of digital currencies. A more competitive and job-creation-friendly economic environment over coming decades could be shaped by ensuring there is sufficiently inclusive decision-making around these areas of digital commerce and currencies. Data sharing in such a context across borders may also become important in the context of the AfCFTA.
- At the 2023 South Africa-hosted BRICS summit, six new members were invited to join the group from 1 January 2024: Argentina, Egypt, Ethiopia, Iran, Saudi Arabia and the UAE. Two of these – Egypt and Ethiopia – are members of the AfCFTA. At least one of these – the UAE – has been undertaking pilot tests for some years already under the mBridge process and may have begun test payments in October 2023.[88] The members of BRICS, meantime, also have been individually testing CBCDs and experimenting with a cross-BRICS local currencies payment system that is likely to serve as a precursor to an intra-BRICS digital currency exchange. If standards from this served as an automatic default for wider CBDC currency standards adopted into the future, especially applying to South Africa, Egypt and Ethiopia's prospective engagement of the system, there would be broader interest to co-shape these standards ahead of time.
- How the Egypt-based PAPSS configures digital and tokenised payment standards for adoption across intra-African payments may ultimately help set standards for digital currencies across the entire continent. Hence, being aware of these tests and standards being set may also be important for configuring a digital currency payment era of optimal interest across all constituents, and in more challenging domestic governance contexts especially.
- African countries on average and over time have struggled to control illicit financial flows and to collect taxation. Digital currencies offer the chance of a paradigm shift to address those challenges. This, too, is another area where African scholars, activists and experts could collaborate ahead of time to recommend and push for related, appropriate and transparent shifts towards a digital currency-based monetary environment.

88 'China, Hong Kong, Thailand and UAE complete cross-border CBDC test,' Central Banking, October 3, 2022, https://www.centralbanking.com/fintech/cbdc/7953266/china-hong-kong-thailand-and-uae-complete-cross-border-cbdc-test.

- Social welfare groups may be able to advocate expectations of governments implementing digital currencies in terms of fiscal transparency and fiscal transfers. In the case of digital currencies being adopted, this could improve policymaking in the areas of, for example, reducing income inequality and enhancing human welfare through improved educational and medical services access and basic pension payments.
- At the October 2023 BRI Forum hosted by Beijing, not only were digital currency-related agreements signed between the Bank of China and the UAE's FAB but China also promised to launch a series of digital commerce test pilot zones in BRI countries. African countries should perhaps nominate which country could best play such a role to serve as the continent's learning point for interacting with the e-CNY, should this be another goal of the intended zones. Equivalently, there may be much to learn already from the two electronic World Trade Platform-linked digital commerce hubs set up by Chinese e-commerce giant Alibaba in Ethiopia and Rwanda over the past decade.[89]

While China is the most advanced major economy to have rolled out digital currency pilots, the most economy-wide comprehensive adoption so far has been in a much smaller island economy in the Caribbean, the Bahamas. Discussions in the Bahamas and the broader Caribbean context, and the role of the Caribbean Development Bank and monetary authorities, may also offer useful starting points for learning and much greater public debate on the benefits and costs of the CBDC era. Equivalently, the UAE appears to be playing a particularly prominent role in the internationalisation of the e-CNY, meaning that African monetary authorities may have to also keep tabs on the UAE's digital currency activities in order to understand the developments.

89 Lauren Johnston, 'World Trade, E-Commerce, and COVID-19: Role of and Implications for China's Electronic World Trade Platform (eWTP), *The Chinese University of Hong Kong Press* 21, no.2 (2021): 65-86, https://muse.jhu.edu/article/794498/summary.

Author

Lauren A Johnston

is a Senior Researcher (consultant), China/Africa, at the South African Institute of International Affairs (SAIIA), and an Associate Professor at the China Studies Centre, University of Sydney. An economist by training, she specialises in China's economy and its outbound trade and investment, with Africa especially, and was an ODI Fellow in Sierra Leone. She holds a PhD in Economics from Peking University, an MSc in Development Economics from SOAS (London) and a BA/BCom (Melbourne).

Acknowledgement

SAIIA would like to thank the Government of Sweden for their generous support of this work.

About SAIIA

SAIIA is an independent, non-government think tank whose key strategic objectives are to make effective input into public policy, and to encourage wider and more informed debate on international affairs, with particular emphasis on African issues and concerns.

SAIIA's occasional papers present topical, incisive analyses, offering a variety of perspectives on key policy issues in Africa and beyond.

Cover image

Viorika/iStock / Getty Images Plus

African perspectives.
Global insights.

Jan Smuts House, East Campus, University of the Witwatersrand
PO Box 31596, Braamfontein 2017, Johannesburg, South Africa
Tel +27 (0)11 339-2021 • Fax +27 (0)11 339-2154
www.saiia.org.za • info@saiia.org.za