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Demystifying CBDC (Central Bank Digital Currencies)

Central Bank Digital Currencies (CBDCs) have emerged as a pivotal topic at the intersection of finance, technology, and policy. As traditional forms of currency give way to digital alternatives, central banks worldwide are exploring the potential of CBDCs to revolutionize how we conduct financial transactions, manage monetary policy, and safeguard economic stability. The article attempts to demystify CBDCs via a status update on various central bank initiatives, as well as insights into CBDC characteristics, use cases, and potential impact on stakeholders in the payment ecosystem.

Central Bank Digital Currency (CBDC)

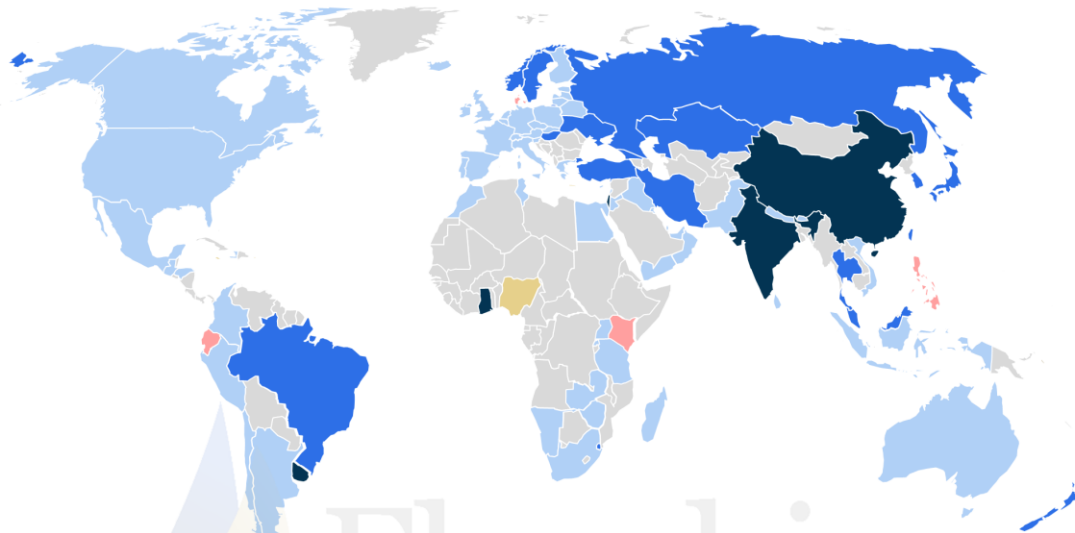
A Central Bank Digital Currency (CBDC) is a digital form of a nation's currency created and overseen by the central bank. It is distinct from current "digital" funds (those that holders see in their bank balance online) as CBDC is issued directly to holders by the central bank, held on the central bank's ledger (not on the ledger of banks, as is the case today). In some design constructs, the central bank operates or manages wallets and payments attached to the CBDC.

Central banks have diverse motivations for issuing CBDCs. For example, Nigeria and Brazil aim to increase financial inclusion and serve the underbanked, while Russia and China seek to reduce reliance on Western currencies and reduce exposure to sanctions. The European Union, currently researching a digital Euro CBDC, views it as a potent monetary policy tool to mitigate wide variances in economic conditions across the eurozone.

Figure 1: Retail Central Bank Digital Currencies (CBDC) Overview (non-exhaustive; selected markets; as of September 2023)

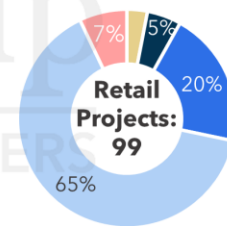
DEFINITION

A Central Bank Digital Currency (CBDC) is a digital representation of a country's national currency issued directly by the central bank to end users and maintained through the central bank's ledger.



CBDC STATUS

- **Launched** CBDCs officially fully launched
- **Pilot** CBDCs developed and tested in a real environment
- **Development** Advanced research stage and published proof of concept
- **Research** First explanatory CBDC research conducted
- **Canceled** CBDCs canceled or decommissioned
- **No data available**



Country	Motivation	Commentary
Nigeria	Financial Inclusion	Central bank aims to improve x-border payments, informal sector accountability, and boost financial inclusion to 95% by 2024 .
China	Stronger Currency	e-CNY's could enhance central bank payments, backup retail systems, and strengthen its international trade finance position .
Russia	Sovereignty	Digital Ruble aims to cut costs, speed up payments, and reduce dependence on USD, helping to evade US sanctions .
USA	Stronger Currency	FED and gov. agencies are exploring if a CBDC would protect privacy and reinforce US leadership in the global financial system.
European Union	Monetary Policy Tool	Digital Euro could ensure safe payments, foster innovative services, strengthen EU payments, and aid the ECB in monetary policy .
Denmark	Alternative to Cash	CBDC would not benefit the existing payment infrastructure and could pose risks of systemic bank runs .
Ecuador	Financial Inclusion	Due to mistrust in the central bank and government defaults, adoption remained extremely low (0.0003% penetration after 2y).

Notes: Retail CBDC accounts for 73% of total CBDC projects globally
 Sources: CBDC Tracker, Atlantic Council, Flagship Advisory Partners research
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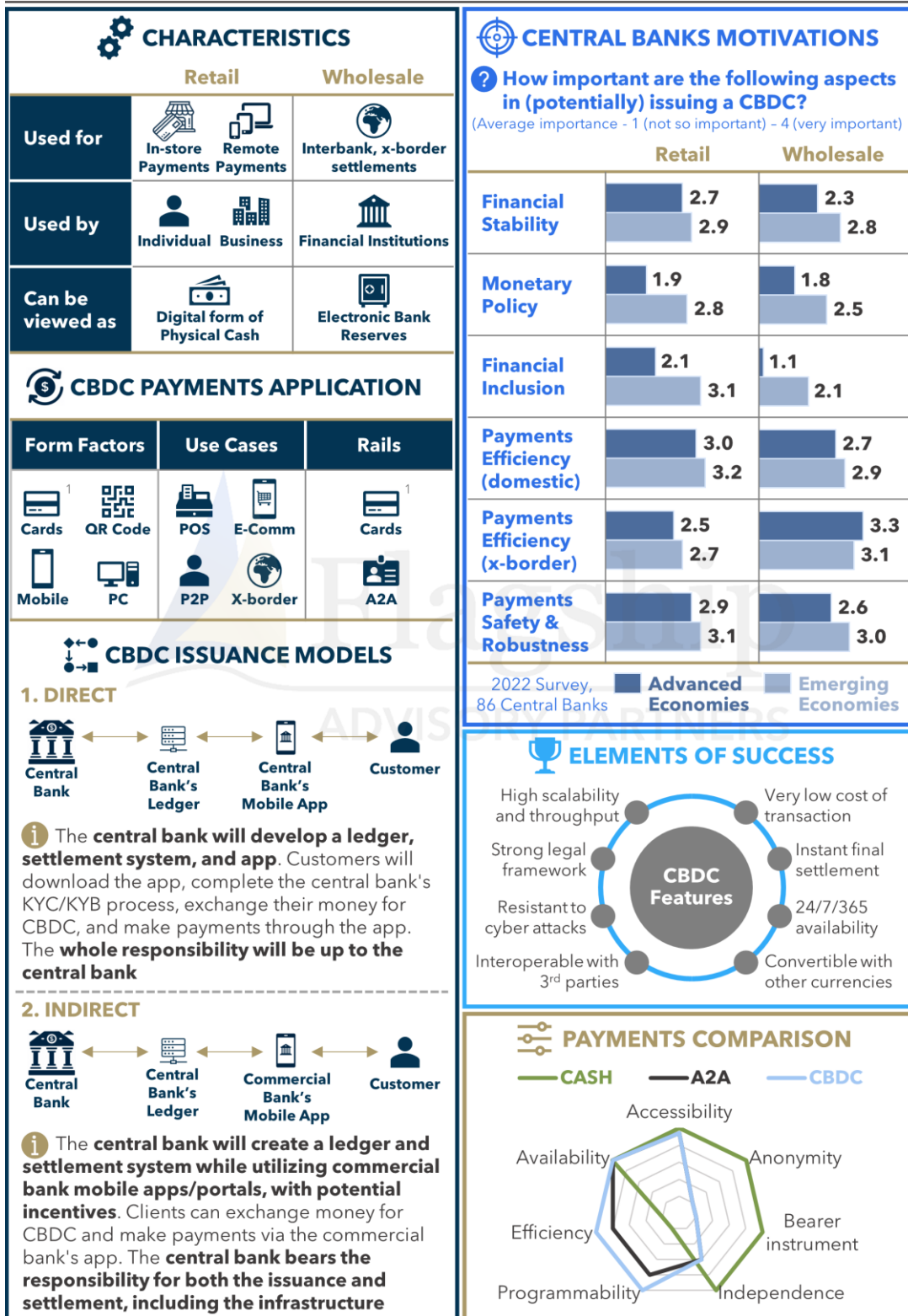
CBDCs come in two types:

- **CBDC Retail:** for public use - individuals and businesses access digital currency from the central bank, replacing cash, and improving payments.
- **CBDC Wholesale:** for financial institutions and governments - used for interbank and cross-border transactions, settlements, and reserves management.

Due to its programmability and technological flexibility, a CBDC can cover multiple payment applications, which depends on the chosen issuance model and intermediaries' role in the value chain. Central banks around the globe are particularly intrigued by the potential applications of such technology.

CBDC development is in its early stages, but two models are emerging: one where the central bank handles the entire value chain, including CBDC holder interfaces (wallets and portals), and another where the central bank leverages existing bank or payment service provider (PSP) infrastructure with specific incentives.

Figure 2: Central Bank Digital Currencies (CBDC) Overview
(non-exhaustive; as of September 2023)





















Notes: ¹ Wallets & QR code payments are preferred over cards
 Sources: BIS, Flagship Advisory Partners research
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Although CBDC offers potential advantages (cost reduction, increased financial inclusion, financial innovation, etc.), some stakeholders and commentators have raised concerns about financial stability, privacy and cybersecurity risks, operational risks, and user adoption challenges. The specific model and design features chosen for an individual country's CBDC will determine how real these advantages and disadvantages will ultimately be, and different stakeholders will have varied impacts.

Figure 3: CBDC Advantages & Disadvantages (non-exhaustive)

	 Central Bank	 Government	 Large Banks	 Small Banks	 Fintechs	 Corporates	 Individuals
 Transaction Cost Efficiency	Favorable	Favorable	Neutral	Neutral	Favorable	Favorable	Favorable
 Physical Cash Efficiency	Favorable	Favorable	Favorable	Favorable	Favorable	Favorable	Favorable
 Technological Innovation	Favorable	Neutral	Neutral	Neutral	Favorable	Favorable	Favorable
 Financial Inclusion	Favorable	Favorable	Favorable	Favorable	Favorable	Favorable	Favorable
 Grey Economy	Favorable	Favorable	Favorable	Favorable	Favorable	Neutral	Neutral
 Bankruptcy Risk	Favorable	Favorable	Neutral	Neutral	Favorable	Favorable	Favorable
 Privacy	Favorable	Favorable	Neutral	Neutral	Unfavorable	Unfavorable	Unfavorable
 Cybersecurity	Unfavorable	Unfavorable	Neutral	Neutral	Neutral	Unfavorable	Unfavorable
 Monetary Policy Tools	Favorable	Unfavorable	Neutral	Neutral	Neutral	Neutral	Neutral
 Financial Stability	Neutral	Neutral	Unfavorable	Unfavorable	Neutral	Neutral	Neutral
 Statecraft	Favorable	Favorable	Unfavorable	Unfavorable	Unfavorable	Unfavorable	Neutral

Favorable Neutral Unfavorable

Commentary

Transaction Cost Efficiency	CBDC could reduce costs compared to current payment systems and potentially impact existing bank revenues.
Technological Innovation	CBDCs might facilitate new financial services like P2P transactions, cross-border payments, and micro-lending, enabling further innovation in the payments/banking system.
Bankruptcy Risk	Individuals might choose CBDC deposits over commercial banks due to central banks' immunity from bankruptcy, potentially reducing commercial bank deposits.
Privacy	Central banks will access a greater volume of data than their current holdings and data breaches.
Cybersecurity	CBDC systems are susceptible to cyberattacks, including hacking attempts.
Monetary Policy Tools	CBDCs have the potential to serve as a monetary policy instrument, potentially reducing the reliance or losing influence of fiscal tools.
Financial Stability	In challenging economic periods, central banks may opt to raise interest rates as a monetary policy tool, aiming to reduce consumer spending. Consequently, this could lead to a shift from deposits in commercial banks to deposits in central banks.

Source: Flagship Advisory Partners research
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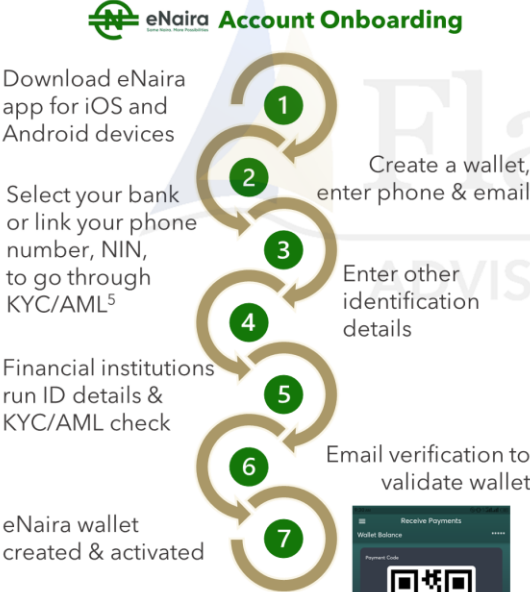
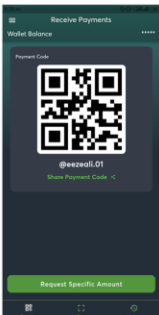




One of the most advanced and successful CBDCs projects are the Nigerian e-Naira and the Chinese Digital Yuan.

In October 2021, the Central Bank of Nigeria introduced its CBDC with the target to achieve a 95% financial inclusion rate by 2024. After some initial challenges with app functionalities in the first year, the Central Bank of Nigeria updated the eNaira wallet a year later in October 2022. Since then, 12x times more wallets have been activated, and penetration reached 6% (as of March 2023). The eNaira app allows individuals to sign up without having a bank account; in this case, a phone number and/or NIN (National Identification Number) is required. According to the profile and the sign-up process, individuals are split into tiers with daily transaction limits and maximum cumulative daily balance.

Launched in April 2020, China's digital yuan pilot (e-CNY) has evolved rapidly. The People's Bank of China expanded its nationwide reach, testing the initiative with existing payment channels. The user base has grown to over 260 million wallets since its debut, operating in only 23 cities (based on numbers cited by the PBoC). Unlike the set-up in Nigeria, the e-CNY employs an indirect CBDC architecture. In this setup, nine Chinese banks, seven commercial and two online banks, serve as intermediaries responsible for offering the application and front-end infrastructure.

Figure 4: Nigeria and China CBDCs Use Cases
(non-exhaustive; as marketed in companies' websites, as of September 2023)

			
Type & Status	CBDC Retail Launched in October 2021 eNaira app updated in Oct 2022	Type & Status	CBDC Retail Pilot from Apr 2020 in 4 cities, extended to 23 in Sep 2022
Design Model	Direct CDBC architecture based on  distributed ledger technology (DLT)	Design Model	Indirect CDBC architecture based on a centralized system managed by People Bank of China (PBoC)
Tech. Partners		Banking Partners	        
Purchasing Payment Wallets	 ¹  ²	Purchasing Payment Wallets	 ³  ⁴
CBDC Stats	As of Mar '23, 13M active wallets (12x from Oct '22, 6% penetration), \$48M transacted in '23 (+63% YTD)	Pilot Stats	As of Aug '23, 260M active wallets (PBoC claimed) capped at ¥10,000 (~\$1,000), max. ¥2,000 per trx.
 <p>eNaira Account Onboarding</p> <ol style="list-style-type: none"> Download eNaira app for iOS and Android devices Create a wallet, enter phone & email Select your bank or link your phone number, NIN, to go through KYC/AML⁵ Enter other identification details Financial institutions run ID details & KYC/AML check Email verification to validate wallet eNaira wallet created & activated <p>Form Factors: QR Code, Mobile, PC</p> <p>Use Cases: POS, E-Comm, P2P, X-border</p> 		 <p>数字人民币 e-CNY Account Onboarding</p> <ol style="list-style-type: none"> Download e-CNY app for iOS and Android devices Create an e-CNY wallet, with ID details Select one of the 9 banking partners' wallets to connect Phone auth required for ID verification Banking wallet successfully activated Username and password verification Digital Yuan add-on installed on the wallet page <p>Form Factors: QR Code, Mobile</p> <p>Use Cases: POS, E-Comm, P2P</p> 	

Notes: ¹ Accepts eNaira payments for merchants in Nigeria only from Sep '22 and charges a 1.4% fee, capped at NGN 2,000 (~\$2.70) per transaction; ² Accepts eNaira POS and e-commerce transactions from Jun '22; ³ Accepts e-CNY from Jan '22 on its platform ecosystem; ⁴ Accepts e-CNY as an express payment option from Dec '22, and it has been integrated into Alibaba's e-commerce ecosystem; ⁵ Citizens can create an eNaira account without having an existing bank account. They can use a phone number or NIN (National Identification Number). According to the profile, citizens are divided into tiers with daily transaction limit and maximum cumulative daily balance.
Sources: Central Bank of Nigeria, Flutterwave, Bloomberg, SilkPay, MIT, South China Morning Post, Flagship Advisory Partners research
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CBDC projects in Western economies are still in the early stages, and most efforts to date have focused on prototypes and technology research, and initial issuance is not expected before 2025. Conversely, CBDC issuance in some major emerging economies is expected sooner. For instance, India, Brazil, and Russia expect to issue their CBDC in the next 18 months.

Figure 5: CBDC Global Overview
(selected key markets and use cases; non-exhaustive; as of September 2023)







<p>Nigeria (Launched)</p> <p>CBDC name CBDC Type eNaira Retail</p> <p>Issuance Partners Oct 2021 bitt Specified</p> <p>Goals: Reach 95% of financial inclusion by 2024; digitalization</p> <p>Update: eNaira could add \$29B to GDP over the next 10y</p>	<p>China (Pilot)</p> <p>CBDC name CBDC Type e-CNY Retail</p> <p>Exp. Issuance Partners Not Specified ICBC, FEITIAN, WeBank, 网商银行</p> <p>Goals: Strengthen China position in international trade</p> <p>Update: AliPay, WeChat accept e-CNY. 260M active wallets</p>	<p>India (Pilot)</p> <p>CBDC name CBDC Type Digital Rupee Retail</p> <p>Exp. Issuance Partners End of 2023 State Bank of India, YES BANK, ICICI Bank</p> <p>Goals: Boost digitalization and reduce cash-related costs</p> <p>Update: Scale user base to 1M users, and build offline capability</p>
<p>Brazil (Development)</p> <p>CBDC name CBDC Type DREX Retail</p> <p>Exp. Issuance Partners 2024 VISA, Itaú, Bradesco, Santander</p> <p>Goals: Foster innovation with secure digital money, inclusion</p> <p>Update: Solution includes codes to freeze & reduce funds</p>	<p>Russia (Development)</p> <p>CBDC name CBDC Type Digital Ruble Retail</p> <p>Exp. Issuance Partners 2024 Alfa-Bank, SBERBANK, GAZPROMBANK, VTB</p> <p>Goals: Reduce costs, reliance on USD, evade US sanctions</p> <p>Update: Launch of beta test with partners before year end</p>	<p>Japan (Development)</p> <p>CBDC name CBDC Type Digital Yen Retail</p> <p>Exp. Issuance Partners 2026 MUFG, SMFG, MIZUHO</p> <p>Goals: Reduce heavy use of cash in retail payments</p> <p>Update: July '22, BoJ is talking with ~60 firms for pilot launch</p>
<p>Australia (Research)</p> <p>CBDC name CBDC Type eAUD Retail, Wholesale</p> <p>Exp. Issuance Partners Not Specified Commonwealth Bank, ANZ, KALIDO</p> <p>Goals: Faster x-border, offline payments & bond, FX settlement</p> <p>Update: First x-border trx. on Ethereum layer-2 in May '23</p>	<p>USA (Research)</p> <p>CBDC name CBDC Type Digital Dollar Retail, Wholesale</p> <p>Exp. Issuance Partners Not specified Western Union, accenture, BDO, Unibank</p> <p>Goals: Ensure privacy, reinforce US leadership in global trade</p> <p>Update: Many White House candidates are against CBDCs</p>	<p>Canada (Research)</p> <p>CBDC name CBDC Type E Dollar Retail</p> <p>Exp. Issuance Partners Not Specified PAYMENTS CANADA</p> <p>Goals: Limit cash usage, facing competition on digital currencies</p> <p>Update: After first consultation, BoC is testing offline payments</p>
<p>EU (Research)</p> <p>CBDC name CBDC Type Digital Euro Retail, Wholesale</p> <p>Exp. Issuance Partners 2027 nexi, amazon, WORLDLINE, EPI</p> <p>Goals: Enhance digital payment innovation, monetary fiscal tool</p> <p>Update: ECB will decide in Oct'23 whether to launch pilot</p>	<p>UK (Research)</p> <p>CBDC name CBDC Type Digital Pound Retail</p> <p>Exp. Issuance Partners Not Specified HM Treasury</p> <p>Goals: Enhance transparency for internal & external stakeholders</p> <p>Update: BoE thinks it is early to take a decision on Digital Pound</p>	<p>Denmark (Canceled)</p> <p>CBDC name CBDC Type E-kroner Retail</p> <p>Shut down Partners Dec 2017 Not Specified</p> <p>Goals: Explore CBDC benefits on payment and financial system</p> <p>Reason: Strong payment system and challenge to comm. banks</p>

Sources: CBDC Tracker, Atlantic Council, Cointelegraph, Reuters, Flagship Advisory Partners research © Flagship Advisory Partners, September 2023

Conclusion and Impacts

Since CBDCs are still in their very early stages, it is premature for most stakeholders to draw definitive conclusions as much will depend on the ultimate design choices made by the central bank issuing the CBDC. For most stakeholders, the path forward is vigilant monitoring and assessing impacts as design specifications and business models become apparent. We summarize the potential implications for key stakeholder categories as they stand today in the table below.

Figure 6: CBDC Conclusions and Impacts (non-exhaustive)

ACTORS	IMPACTS
 Banks	<ul style="list-style-type: none"> ▪ CBDCs may compete with bank deposits, potentially leading to a shift of funds from commercial banks to central banks. This could affect banks' liquidity, funding sources, and could have a disproportionate impact on smaller banks. ▪ CBDCs could offer more efficient and cost-effective payment services, reducing the need for traditional bank payment systems. Banks may need to adapt their services to remain competitive.
 Fintechs	<ul style="list-style-type: none"> ▪ Fintechs can seize opportunities to develop innovative products and services around CBDCs, such as digital wallets, payment platforms, and blockchain-based solutions, enhancing their market presence. ▪ Fintechs could integrate CBDCs into their existing offerings, creating seamless user experiences for customers who use both traditional and digital currencies.
 Payment Schemes	<ul style="list-style-type: none"> ▪ CBDCs could potentially compete with Mastercard and Visa in the digital payment space, offering efficient, low-cost alternatives for consumers and businesses (especially in cross-border transaction payments).
 National Governments	<ul style="list-style-type: none"> ▪ The level of control over fiscal policy systems for national governments can either diminish or expand, contingent on effective communication, collaboration, and the establishment of a clear framework with the central bank system and the issuance of CBDCs. ▪ Governments can leverage CBDCs to promote financial inclusion by providing access to digital financial services for underserved populations, fostering economic development.
 Central Banks	<ul style="list-style-type: none"> ▪ CBDCs provide central banks with additional tools for implementing monetary policies, such as direct control over the digital currency's supply and interest rates. ▪ On the other hand, central banks must ensure that CBDCs do not disrupt financial stability by effectively managing issues like liquidity, cybersecurity, and operational resilience.
 Geopolitical	<ul style="list-style-type: none"> ▪ The adoption of CBDCs could impact the status of reserve currencies, potentially leading to shifts in global financial power dynamics and the relative importance of different currencies in international trade and finance. This is potentially challenging the dominance of certain fiat currencies, such as the U.S. dollar and the euro, in global trade and finance. ▪ If successful at gaining adoption and usage, CBDCs would become a statecraft tool, with associated advantages (e.g., gaining status as a key reserve and international trade currency) and disadvantages (e.g., centralized target for cyber-attacks and asymmetric hot/cold warfare).

Source: Flagship Advisory Partners research
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