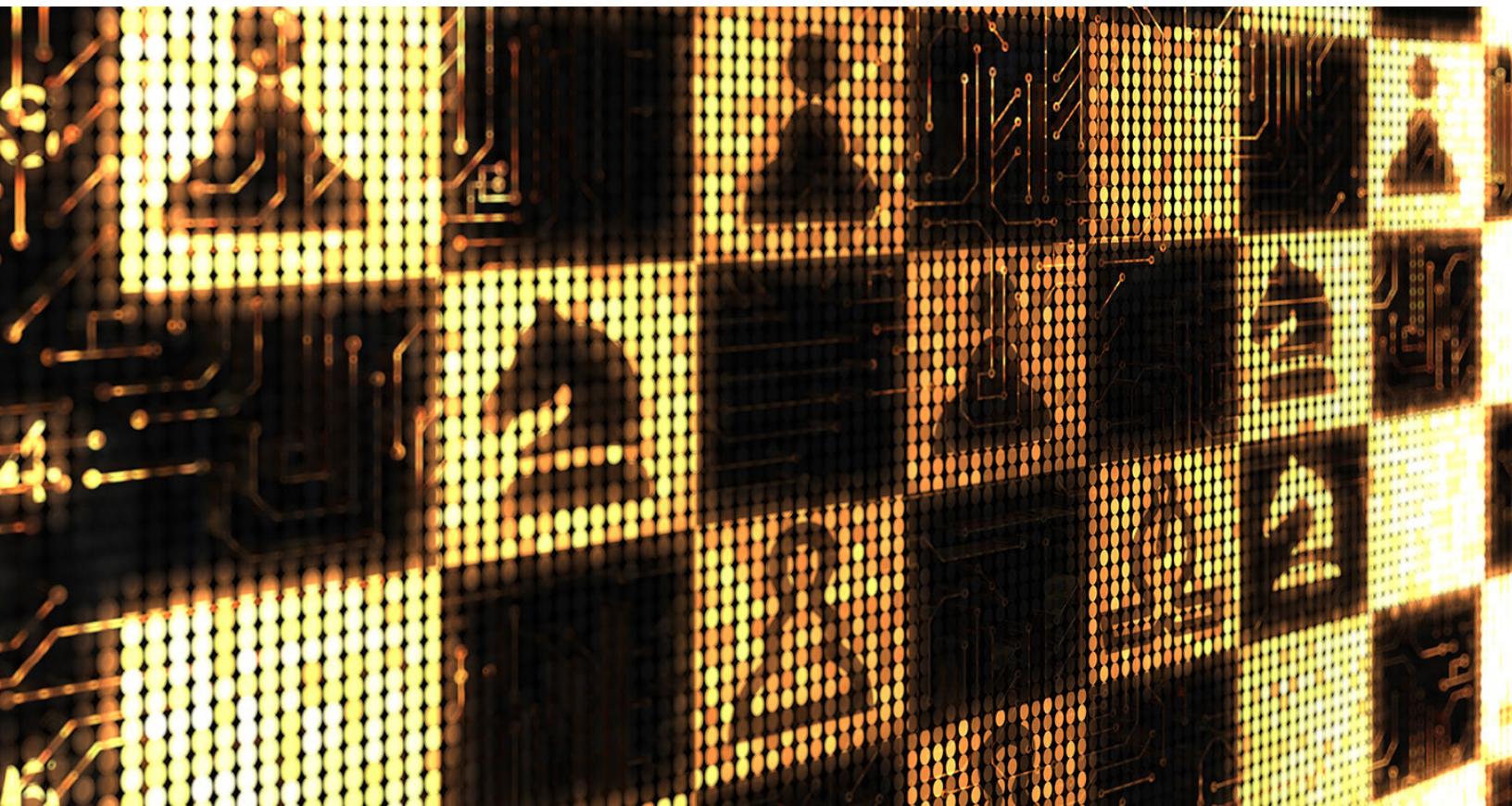


Global Banking & Securities

# Central bank digital currencies: An active role for commercial banks

With central banks increasingly exploring central bank digital currencies (CBDCs), now is the time for commercial banks to establish their role in a fast-changing landscape.

by Olivier Denecker, Arnaud d'Estienne, Pierre-Matthieu Gompertz, and Elia Sasia



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**Roughly 90 percent** of the world's central banks are pursuing central bank digital currency (CBDC) projects.<sup>1</sup> Some, including those in the United States and South Africa, are at the exploratory phase; others are development projects (the European Union) and pilots (China). In some locations, including Nigeria and the Bahamas, solutions are already operable, and central banks are looking to expand. Despite the high level of activity, most CBDC initiatives today remain in the nascent stages of market development and, in many cases, even technical design. However, alongside the conceptually similar but quite distinct digital coins being issued by private entities, this form of digitally issued public money stands at the forefront of central bank innovation in the monetary space.

In particular, four trends have likely spurred central bankers' interest in CBDCs:

1. Cash usage has rapidly declined—by roughly one-third in Europe between 2014 and 2021, dropping to as low as 3 percent (in Norway) of overall payment transactions. This trend threatens to marginalize the sole source of central bank or public money in many economies, requiring central banks to reassess their role in the monetary system.
2. Growing interest in privately issued digital assets signals potential competition with central banks in their role as the sole provider of monetary value in sovereign economies. Various recent sources show a meaningful share of consumers worldwide actively involved in trading, transacting, or holding digital assets, with particularly high rates in emerging markets. For example, 10 percent of UK adults reported holding, or having held, a crypto asset.<sup>2</sup> The European Central Bank (ECB) has indicated that as many as 10 percent of households in six large EU countries owned digital assets.<sup>3</sup> And roughly one-fifth of respondents to a McKinsey survey—22 percent in India, 20 percent in

Brazil, and 14 percent in the US—reported that they held digital assets as part of their financial portfolios.<sup>4</sup> Some see consumer use of digital assets as a potential challenge to fiat currency as a unit of measurement for transactions and value.

3. Some central banks perceive erosion in their role as payments innovators—thought leaders advancing next-generation models beyond today's cash and infrastructure. CBDCs offer the potential to improve on legacy cash use cases, such as by reducing cross-border transaction costs and enhancing financial inclusion. By spearheading the design process and clarifying use cases, central banks can ensure that these strategic conversations take place in a public forum.
4. Many central banks are looking to establish greater local governance over increasingly global payment systems. As the appointed guardians of systemic stability, central banks see potential benefits of establishing a CBDC as the anchor of local digital payment systems.

While most CBDC initiatives are nascent, commercial bank leaders would be well advised to engage central banks in order to learn more about these digital initiatives and help shape future models. Along with summarizing the various models under consideration, this paper outlines the risks, opportunities, and potential paths forward for various stakeholders.

## A central bank solution with many permutations

CBDCs differ fundamentally from other forms of digital coins in that they are directly backed by central bank deposits or a government pledge. Therefore, they offer stable value and can aim to combine benefits in the areas of trust, regulatory stability, and audit transparency.<sup>5</sup>

<sup>1</sup> Anneke Kosse and Ilaria Mattei, *Gaining momentum—Results of the 2021 BIS survey on central bank digital currencies*, Bank of International Settlements (BIS) Papers, number 125, May 2022, [bis.org](http://bis.org).

<sup>2</sup> Alice Fearn and Charlotte Saunders, *Individuals holding cryptoassets: Uptake and understanding*, HM Revenue & Customs, UK government, February 2022, GOV.UK.

<sup>3</sup> Lieven Hermans et al., "Decrypting financial stability risks in crypto-asset markets," European Central Bank, May 2022, [ecb.europa.eu](http://ecb.europa.eu).

<sup>4</sup> McKinsey Survey in United States (July 2022), India (March 2022), and Brazil (June 2022).

<sup>5</sup> For more on how the US Federal Reserve currently views the issues surrounding CBDCs, see *Money and payments: The U.S. dollar in the age of digital transformation*, Federal Reserve, January 2022, [federalreserve.gov](http://federalreserve.gov).

CBDCs can be deployed under a variety of technology models, depending on a central bank's desired objectives and use cases. CBDCs do not necessarily rely on decentralized technologies, as they can be administered by central bank agents as well as distributed via digital-ledger technologies. They can be held on physical devices such as cards or phone wallets or exist as a purely digital book entry. They can be issued as stand-alone tokens (stored at any of multiple carriers) or as account-based assets held directly at the central bank.

A fundamental decision for central banks is whether to issue a retail or wholesale CBDC. Each has its own set of objectives, use cases, and end users. Wholesale CBDCs mostly target financial institutions (banks and nonbanks) and large corporate treasury centers as their primary users, and they aim to improve the efficiency of settlements—both payments and securities, domestic and cross-border. This may or may not involve providing nonbanks with direct access to central-bank accounts.

Cross-border settlements may be a particularly compelling use case for wholesale CBDCs, given the high cost and slow execution of current processes and the opportunity to reduce counterparty risk by enabling connected and instant settlement between parties. For example, Project Aber, launched by the central banks of Saudi Arabia and United Arab Emirates, tested the use of a jointly issued digital currency as an instrument for domestic and cross-border settlement between the two countries. For wholesale CBDCs, the use of new and often "distributed" technologies is frequently central to the exercise, a potential means to expand access to public money.

Retail CBDCs target consumers and local businesses as end users, with possible use cases including disbursement of social benefits, an alternative to cash for e-commerce point-of-service and bill payments, and enabling of seamless peer-to-peer transactions for banked and unbanked users. In more complex initiatives, CBDCs combined

with smart contracts,<sup>6</sup> such as the Bank of Israel's initiative, aim to improve payments convenience. Examples include payment of sales tax directly to tax authorities at point of sale and automated distribution of social benefits for economic relief conditioned on the recipients meeting defined requirements.

## A growing central bank imperative

Although central banks quote numerous reasons to pursue CBDC projects, surprisingly few such projects appear to be driven by specific customer use cases or needs. Notably, the case for CBDCs to date has been focused more on policy and systemic objectives than by specific customer requirements or benefits. CBDCs could enable central banks to address a wide range of systemic objectives—ensuring financial inclusion, reducing fraud and money laundering, guaranteeing sovereign alternatives for digital payments, stimulating local payments innovation, and creating a new vehicle for monetary policy. The objectives central banks have identified in their pursuit of CBDCs at this stage typically fall into one or more of five categories.

### Developing 'cash 2.0'

Central banks are under pressure to deliver a next-generation payments vehicle providing several of the features that users value about cash: ubiquity, universal acceptance, and anonymity. Also, in both emerging markets and developed economies, reduced cash usage and rising digitization of financial services have heightened financial inclusion challenges.

CBDCs could equip central banks to play a direct role in facilitating financial services access for the unbanked who are reluctant to connect to commercial banks or in some cases may be overlooked because they lack sufficient revenue potential. CBDCs could also enable accounts to be held directly on the central bank ledger, with account holders accessing and transacting with their balances through digital wallet applications linked to the central-bank account through APIs.

<sup>6</sup> Contracts that can be self-executing and self-enforcing, without the need for intermediaries.

### **Securing the monetary anchor**

The reduction of cash and the advent of alternative payment currencies have threatened the role of public money (as opposed to commercial bank money) as the fundamental unit of value measurement. An increasing share of commerce is poised to be conducted through alternative payment means that lie outside the bounds of regulatory control. CBDCs could help preserve the role of public fiat in monetary policy, securing central banks' role in protecting financial stability on their markets.<sup>7</sup>

### **Preserving central banks' role in orchestrating payments services innovation**

With the growth of nonbank players in payments, central banks face potential erosion of their oversight role in important areas such as data management, settlement systems, and customer rights—areas they have historically supervised through traditional licensed banks. Central banks have also struggled to achieve efficiencies in areas such as cross-border payments.

A CBDC alternative would allow more direct control and influence over enforcement of minimal market standards. Privacy issues would need to be carefully managed, however, given the (real or perceived) access to detailed transaction data afforded to government entities through a CBDC.

### **Keeping pace with international currency advances**

To ensure the preeminence of their currency zone—core central bank objective—central banks must keep pace with their international currency peers. Most also aim to maintain at least one scalable solution for economic value exchange beyond the control of other countries or central banks. CBDCs are one of the potential policy vehicles in this cross-border competition.

### **Stimulating financial inclusion**

CBDCs can play a key role in providing access to digital payments without the requirement of a bank account. Access would be facilitated by a central bank-issued digital wallet. The Nigerian and

Jamaican CBDC models (see sidebar, "Country case studies") offer a template for how this could be accomplished.

### **Potential for radical redesign**

Ultimately, the success of CBDC launches will be measured by user adoption, which in turn will be tied to the digital coins' acceptance as a payment method with a value proposition that improves on existing alternatives. If such benefits remain unproven, CBDC efforts may fall short of adoption targets. In this scenario, the ramifications for traditional banking and payments players will be limited. However, should initiatives progress beyond the pilot stage, central banks and governments are likely to deploy all tools at their disposal to foster success, given the critical policy objectives just outlined, as well as potential affect on central bank credibility. To be successful, CBDCs will need to gain substantial usage, partially displacing other instruments of payment and value storage.

The successful launch of a CBDC involving direct consumer and business accounts could displace a material share of deposits currently held in commercial bank accounts and could create a new competitive front for payment solution providers. Bankers are already facing the need to strengthen their client relationships beyond the traditional deposit model; CBDCs could exacerbate this challenge.

Commercial banks will likely play a key role in large-scale CBDC rollouts, given their capabilities and knowledge of customer needs and habits. Commercial banks have the deepest capabilities in client onboarding (including know your customer) and the execution and recording of transactions, so it seems likely that the success of a CBDC model will depend on a public-private partnership (PPP) between commercial and central banks, or at minimum a less formal collaborative model that promotes a digitized monetary environment across the banking and payment value chain.

<sup>7</sup> See Markus Brunnermeier and Jean-Pierre Landau, *The digital euro: Policy implications and perspectives*, European Parliament, January 2022; [europarl.europa.eu](http://europarl.europa.eu); and *Gaining momentum*, May 6, 2022.

## Country case studies

Some countries' central banks have already tested CBDC concepts. The experiences of Nigeria, China, and Jamaica suggest lessons that may apply in other parts of the world.

### Nigeria's eNaira

Nigeria became the first African country to introduce a digital currency with the October 2021 launch of retail CBDC eNaira. Its intended benefits include faster and more equitable distribution of cash assistance to households and communities participating in social welfare programs, lower transaction costs and faster settlement, efficient cross-border transaction capabilities, and traceability and security to limit fraud.

The eNaira app garnered almost 800,000 downloads in the first seven months following its launch. According to some reports, half of those downloads have not been activated. Merchant adoption of digital currency has been similarly limited, with fewer than 100 active retailers accepting eNaira payments as of May 2022—a small number, given Nigeria's status as Africa's largest economy.

The low initial uptake of eNaira has been attributed to limited knowledge of the CBDC and how it functions, fear of exposure to security breaches, and poor internet access in some regions. In response to these challenges, the Nigerian government recently announced that eNaira will be made available on feature phones via Unstructured Supplementary Service Data (USSD), which will expand the potential market by 100 million citizens on top of the current 25 million to 40 million smartphone holders.<sup>1</sup> The government also recently sponsored a hackathon to promote visibility and identify key feature and technology improvements.

### China's digital yuan

The People's Bank of China, China's central bank, in 2019 began a large-scale pilot of its E-CNY, spanning 15 cities. As of May 2022, 4.5 million merchant wallets and 260 million transactions worth over 83 billion renminbi have been performed through the E-CNY pilot, focused on transportation, government services, shopping, and other consumer-lifestyle use cases.

Considering China's relatively high penetration of electronic consumer payments, a fully implemented E-CNY could address the last mile in transitioning China to a fully electronic and real-time payment system. Internationally, E-CNY could provide an alternative for global trade settlement, which remains highly reliant on US dollars and the SWIFT network.

E-CNY employs a hybrid design model, which is account based on the wholesale layer and token based at the retail level. According to published documents, state-owned banks, commercial banks, and payments networks will all play operating roles, with both individual and merchant wallets being created and maintained by commercial banks.

Although the pilot has encompassed significantly more volume than any other country's CBDC initiative, it remains a small fraction of China's overall payments activity. An official time for a formal E-CNY launch has yet to be announced; a high-profile pilot expansion to the 2022 Beijing Summer Olympics was muted by the exclusion of spectators.

Meanwhile, pilot testing is being extended to cross-border payments. For instance, pilot testing of cross-border payments between Mainland China and Hong Kong—which has a separate legal and banking environment and infrastructure—is under way. The pilot involves 200 employees and selected merchant clients of the Bank of China (Hong Kong), a subsidiary of the state-owned Bank of China and Hong Kong's second-largest commercial bank.

### Jamaica's Jam-Dex

Jam-Dex, which launched in June 2022 and is the first CBDC to be formally ratified as legal tender, is a relatively simple retail offering with "streamlined" KYC requirements and, in its initial iteration, no advanced use cases such as cross-border payments or smart contracts. Although Jam-Dex leverages distributed technology, it is not blockchain based, setting it apart from the Bahamas' Sand Dollar and the Eastern Caribbean Central Bank's DCash.

The Jamaican Central Bank is pursuing an indirect model, collaborating with the private sector for interfaces and issuance of digital wallets while directly managing the back end, infrastructure, and ledger. The goal is to offer a digital alternative to cash that is seamless, secure, and simple to use. Early Jam-Dex use cases emphasize peer-to-peer payments and payments to small and micro-businesses, including those without traditional bank accounts, enhancing financial inclusion.

<sup>1</sup> Steve Kaaru, "Nigeria's eNaira now available via USSD to boost adoption and financial inclusion," CoinGeek, June 19, 2022, [coingeek.com](https://coingeek.com/nigeria-s-enaira-now-available-via-ussd-to-boost-adoption-and-financial-inclusion/).

However, depending on a central bank's design choices—and there is a multitude of options to consider—a successful CBDC introduction could prove highly disruptive to the traditional banking sector and could simultaneously spur a new wave of financial services innovation.

Estimates vary widely on the potential reduction in commercial bank revenues stemming from a successful retail CBDC launch, but the combined affect on interest (through deposit substitution) and transaction fees (erosion of payments volumes) could quickly reach billions of euros. A more moderate degree of market uptake and CBDCs targeted to specific use cases—wholesale, cross-border or financial inclusion—would, of course, have a smaller impact.

Nonfinancial actors also will feel the impact. Merchants and consumers embracing CBDCs may be enticed by fully digital payment processes featuring lower transaction fees and faster settlement. Corporates and governments could benefit from CBDCs through faster and cheaper transfer of capital (including government subsidies) and enhanced risk control.

While it is possible that governments could mandate CBDC acceptance by all payees through a legal-tender process and perhaps require their use given certain transaction criteria, a mandate in itself is not sufficient to ensure widespread adoption. Therefore, promoting some form of demonstrable benefits for participants, banks, payment players, and nonfinancial actors will be necessary. Creation of this business case for the economy as a whole will remain a key point of reflection for CBDC projects.

### **Central banks as CBDC architects**

Each of the multiple CBDC design options is suited to a different set of strategic objectives. As central banks set their priorities and determine how best to achieve them, we believe they should consider five questions:

1. *What is the end game in terms of adoption and ubiquity compared with traditional money?*

Business cases and scenarios should be based on a market assessment of the current

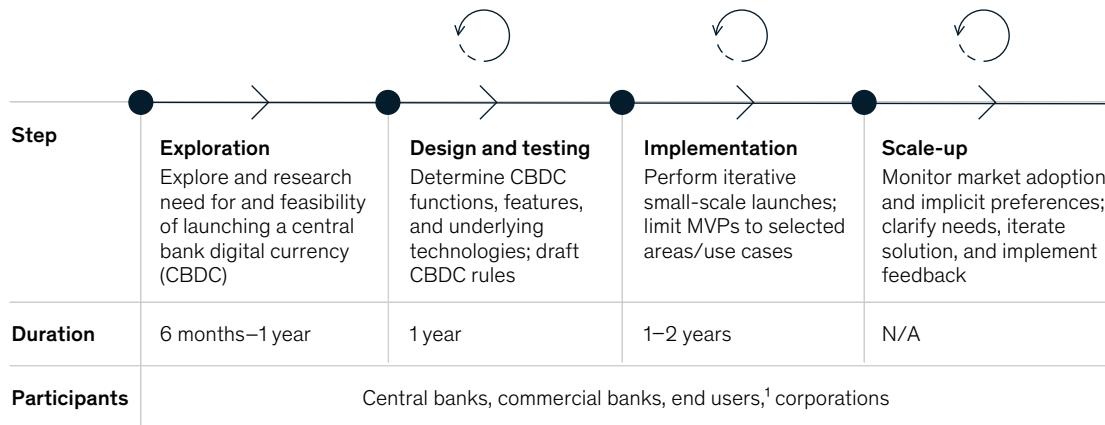
and future payments landscape and realistic adoption goals.

2. *Which constituency(ies) does the CBDC aim to address?* The first step in achieving CBDC policy goals is determining scope. A focus on any combination of user segments—private citizens (consumers), commercial banks, and corporations—can be effective. Design choices should be based on the business cases and features most valued by users. Decisions should draw upon extensive expertise building fintech assets, often from outside of traditional central bank organizations.
3. *What role will the central bank play?* Participation could be deep or light, and the adoption goal may be best accomplished by establishing PPPs that leverage long-standing relationships with commercial banks and key corporate entities.
4. *What resources and capabilities will be required?* Central banks are likely to need new decision-making processes. Request-for-proposal (RFP) processes can be valuable exercises to assess technology options. In addition, central banks should develop enhanced change management practices and acquire new talent experienced in developing partnerships.
5. *What changes will central banks need to enforce beyond payments?* Regulatory changes would be required to achieve several of the previously stated objectives. Hurdles in regulation, commerce enablement, and fiscal rights will need to be cleared. Goals like financial inclusion, to cite one example, could be advanced by reducing minimum balance thresholds, made possible by lower costs, as well as simplifying (without weakening) KYC checks through digital ID solutions.

By adopting an agile approach, central banks can deploy a CBDC within three years, compared with five years or more using a traditional waterfall development model (Exhibit 1). Although adoption and realization of scale will likely prove to be longer-

Exhibit 1

**CBDC deployment can be achieved in three years by applying an agile approach.**



<sup>1</sup>Eg, merchants and consumers depending on wholesale or retail deployment.  
Source: CBDC case studies; World Economic Forum

term efforts, lessons from early launches and a set of best practices (Exhibit 2) can help foster early market acceptance.

#### A key role for commercial banks

Public–private partnerships will be essential to the success of a CBDC launch, enabling central banks to leverage established infrastructure and client relationships. Such alliances will help central banks implement use cases aligned with end-user needs, complementing their gaps in capabilities and knowledge of consumption habits, particularly in a retail scenario. By engaging commercial banks and other private stakeholders (technology enablers, merchants, users) in the launch process, central banks will also foster a broader sense of ownership, manage fears of displacement, and increase the probability of successful adoption.

Different countries will likely pursue CBDC models aligned with their specific goals, capabilities, and stakeholders. The resulting multi-model environment will require global banks to clearly state their CBDC strategy—both globally and locally—and engage with central banks in other countries.

We offer a few key questions that should be helpful for commercial banks in framing productive conversations about adapting to CBDC models.

- What benefits and objectives is a central bank pursuing with its rollout, and what are the implications for bank and nonbank competitors in the region? Launches prioritizing efficiency gains, for instance, may alter the competitive battleground, giving commercial banks a platform to compete with fintechs' cross-border transfer solutions, or the other way around.
- What role do commercial banks seek to play in the new ecosystem, consistent with their overall strategy, digital capabilities, and available capital? Engagement models may include “first movers” who co-create an emerging CBDC ecosystem and “selective adopters” who incrementally adjust existing capabilities to accommodate CBDCs. Players must identify the primary risks and benefits associated with this position, assess their likelihood and impact, and determine potential mitigation levers.

Exhibit 2

**Central banks that apply eight best practices can improve the chances of CBDC adoption.**

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Prioritize 1–2 use cases</b> with an improved <b>user experience</b> and greater <b>customer value</b> than existing alternatives	<b>Maximize simplicity of onboarding and usage</b> for consumers and <b>ease of integration</b> for merchants	<b>Build a strong footprint in local markets</b> , leveraging <b>brand awareness</b> and <b>loyalty</b>	<b>Focus on niche segments</b> ; pursue a phased rollout, starting with use cases that offer high volume and address acute pain points
<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
<b>Create incentives</b> for businesses and consumers to adopt digital currency	<b>Build trust</b> from the beginning by delivering on promises; better to succeed at something simple than half-deliver on something complex	<b>Seek partnerships to accelerate scale-up</b> while maintaining a central relationship with key customers	<b>Leverage existing payment infrastructure</b> to accelerate time to market

Source: McKinsey analysis

- Can commercial banks identify possible alternative digital-asset strategies to address central bank–driven market evolution? The benefits of different approaches should be modeled for both the bank and its clients, and the implications shared early on with the relevant supervisory bodies. The capabilities required to implement such strategies must also be assessed, recognizing that multiple forms of digital coins may well coexist for some period, if not permanently.

stakeholder groups, develop deep technical know-how (design options, technological requirements, and so on), and establish robust implementation and monitoring capabilities.

2. A clear or substantiated market value proposition has yet to be documented. Some consider CBDC benefits to be limited relative to already-established private solutions. CBDCs, which are non-interest-bearing in most models, rarely offer advanced features like smart contracts.
3. Trust remains a hurdle for a meaningful share of citizens and system participants, who question the motives behind CBDCs (often suspecting governments of aiming to monitor or restrict financial activities) or fear cybersecurity risks.
4. Technical challenges are evidenced by service interruptions suffered by some existing *solutions*, as well as the digital divide that exists in rural areas and faces certain small businesses.

### **What next? A CBDC reality check**

Most CBDC launches remain too new to assess fully, but as demonstrated in the sidebar, early adoption has been mostly tepid. What is holding back central banks from achieving their goals more rapidly? Early experience reveals four primary hurdles for effective rollouts:

1. Many central banks have struggled to manage CBDC projects across an array of development stages, from research to full rollout, as they need to foster alignment across multiple

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With most central banks either in a pilot phase or in the process of developing a CBDC, progress is poised to continue over the coming year. Although we have yet to see a fully successful rollout, the policy objectives underpinning many of these pilots is likely to ensure significant pressure for adoption. Given the ongoing decline in cash usage, broad-based interest in digital assets, and persistent concerns about sovereignty and monetary stability, central banks appear highly motivated to continue exploring the potential of CBDCs.

Nonetheless, CBDC launches involve some meaningful risks for the existing banking and

payments landscape, whether via payment system cannibalization, flight of commercial bank deposits to a “risk free” CBDC alternative during times of financial uncertainty, or exceptional pressure on prices and costs of existing payment systems. Unless properly planned for across the ecosystem, a widely adopted CBDC could fuel significant disruption of legacy financial services economics and customer relationships. Banks and payments players will of course still need to determine a positive CBDC business case in order to gain internal support and endorsement.

A successful CBDC launch is likely to require cooperation between central and commercial banks, in an effort to develop a more inclusive and efficient monetary system with a sustainable business case. For either party, a go-it-alone course of action is far less likely to succeed.

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