

Central Bank Digital Currencies

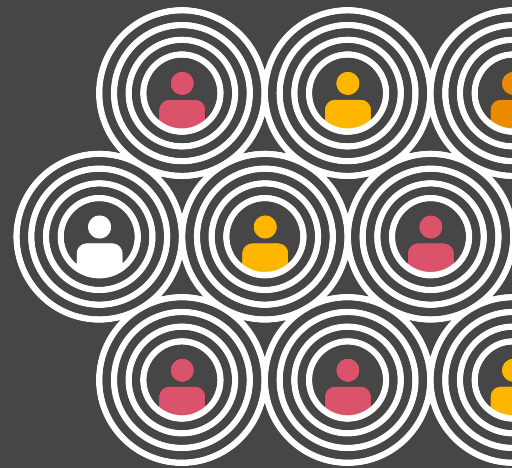
Digital euro, digital
pound and e-krona

March 2024



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Central bank money with technology

Central bank digital currencies

A central bank digital currency (CBDC) is a digital representation of physical money (cash), as issued and regulated by the central bank and government authorities. Retail CBDCs are held directly by citizens and corporates. Wholesale CBDCs are restricted to financial institutions, primarily for interbank payments and financial settlement processes.

In the highly digital world, CBDCs are an important milestone in the evolution of money. According to the Bank for International Settlements (BIS), 93% of central banks are engaged in CBDC development, while nearly 20% are expected to issue a digital currency in the near term.¹

As at 22 March 2024, the Bahamas, Jamaica, Nigeria, Eastern Caribbean and Mainland China have fully live or advanced CBDC projects. Several jurisdictions, including India, Ukraine, Russia and Kazakhstan are expected to adopt their retail CBDCs in the short-term, while others including Switzerland, Singapore and the Philippines are taking significant steps to advance their wholesale CBDC projects.

CBDCs vs. stablecoins

While stablecoins and CBDCs have some similarities, the major difference is that stablecoins are issued by private sector entities and are not backed by any central authority, whereas CBDCs are issued and backed by central banks, thus carrying the same 'risk free' characteristics as cash or central bank reserves. Therefore, CBDCs are not categorised as stablecoins or other crypto-assets under the Markets in Crypto-Assets Regulation (MiCAR) in the EU or under the regulatory frameworks in development in the UK.

This report

The purpose of this report is to outline the direction of travel, as at 22 March 2024, for the Eurosystem's digital euro, the UK's digital pound and Sweden's e-krona. This includes the opportunities and challenges that an adoption of European and global CBDCs will have on the financial services sector, specifically in Europe.

While none of the central banks mentioned in this report have made a definite decision to launch their respective CBDCs, all are taking steps to that end. Private sector firms, including commercial banks, payment firms and FinTechs are well advised to start preparations for the very likely issuance of respective CBDCs in the coming years, and consider what strategic (re-)alignments will be required and how to enable CBDCs to be used seamlessly alongside the existing payments methods.

For further digital assets analysis, please see PwC's other global reports:

- [Global CBDC Index & Stablecoin Overview 2023](#)
- [Navigating the Global Crypto Landscape with PwC: 2024 Outlook](#)
- [PwC Global Crypto Tax Report 2024](#)



The future of retail and wholesale CBDCs is posted to be as diverse as the tapestry of frameworks set to regulate their design and deployment.

Each jurisdiction is meticulously crafting its own approach to CBDCs, reflecting its unique economic landscape, attitudes towards privacy and centralisation, and the strategic importance of promoting financial inclusion, while maintaining monetary sovereignty in the digital age.

As central banks navigate these complex waters, they will not only be shaping the future of their own monetary systems but also contributing to the evolving global dialogue on the intersection of technology and finance.

The journey towards CBDCs is not a race to a uniform finish line, but a multi-faceted exploration of economic innovation. The outcome will be a richly varied landscape of CBDCs, each tailored to the needs and aspirations of users. Yet interoperability will likely need to be put in focus, so CBDCs can all contribute to the broader narrative of an interconnected global economy stepping boldly into a much more digitised future.



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Sources: ¹BIS: [BIS Papers No.136 Making headway – Results of the 2022 BIS survey on central bank digital currencies and crypto](#), July 2023. PwC: [PwC Global CBDC Index and Stablecoin Overview 2023](#), November 2023.

State of play with retail CBDCs

The case for selected European CBDCs

Together with majority of global central banks, the euro area Member States, UK and Sweden have been researching and developing their respective retail CBDCs for some time.

The key drivers remain similar for all jurisdictions. Namely the digital shift in the payments landscape, including the declining cash use, the growth in electronic payments, as well as the introduction of new private sector digital assets, particularly stablecoins.

According to the authorities, CBDCs could also enable a new form of platform for private-sector innovation, promote further competition, efficiency and choice in payments.

Digital euro

The European Central Bank (ECB), as the monopoly issuer of legal tender in the euro area, has since 2020 iterated its goal of enhancing the monetary foundation through the introduction of a digital euro. A digital euro would support the Eurosystem's objectives and provide citizens with a safe form of money in a fast-changing digital world.

Whereas the decision on whether to ultimately issue a digital euro can only be considered after the adoption of the enabling legislative framework, the 'single currency package',³ the European Commission (Commission) considers the adoption and regulation of a digital euro as a necessary measure to further ensure the use of the euro as the single currency while stepping into the digital age.⁴ The single currency package uniformly establishes what constitutes legal tender and aims to safeguard continued and widespread acceptance of cash throughout the euro area. Access to cash and other payment systems thereby remains an enshrined right under the single currency package.

According to the EU-level authorities, a digital euro could strengthen the EU's digital payment strategy, both in financial and retail terms through its innovative and safety-ensuring features overall. Another objective is strategic autonomy. A digital euro would contribute to providing an alternative to non-EU payment providers for fast and efficient payments in Europe and beyond.

The ECB has published its fourth report on the progress on the investigation phase of a digital euro in July 2023,⁵ welcoming legislative proposals under the single currency package and underlying its readiness to provide technical support as the co-legislators are expected to request further consultations in the form of ECB Opinions. On 3 January 2024, the ECB has published a report setting out the progress made by the digital euro Rulebook Development Group (RDG) which has drafted the first chapters of the rulebook in line with the co-legislator's proposals and the digital euro design decisions as approved by the ECB's Governing Council.⁶

Digital pound

The Bank of England (BoE) and HM Treasury (HMT) have indicated that a retail CBDC will 'likely' be needed by 2030. No decision has, as of yet, been made to issue a digital pound.

A digital pound would support the UK's vision for a technologically advanced, sustainable, and open financial services sector. According to the authorities, a digital pound would support UK monetary and financial stability, provide a platform for private sector innovation, promote further choice, competition, efficiency and innovation in payments. Access to cash would continue to be protected as long as people want to use it.

The digital pound project is in the 'design phase', involving experiments, proof of concepts and blueprinting, in collaboration with private-sector working groups.

A decision to start the 'build phase' will be made in 2025 at the earliest. The Government is also committed to introducing a primary legislation with a vote in both Houses of Parliament, before any launch of a digital pound. The legislation would guarantee user privacy as well as ensure that the BoE or the Government could not control how the money would be spent.

A potential digital pound would be for retail use only. In relation to a wholesale CBDC, the authorities currently view a renewed Real-Time Gross Settlement (RTGS) system to deliver the same benefits quicker.

E-krona

The Central Bank of Sweden (the Riksbank) has been actively involved in the development of the e-krona since 2017. Since then, it has conducted research, studies, and pilot projects to explore suitable technology, potential limitations and use cases of a CBDC.

The ultimate decision of introducing an e-krona remains a political one. As at 22 March 2024, the Swedish Government has assessed that a societal necessity for an e-krona remains insufficient. Notwithstanding the above, both the Swedish Government and Riksbank highlight key opportunities with an e-krona, such as securing universal access to a risk-free means of payment, fostering competition in the payment market, and enabling a more resilient payment ecosystem. The latter has become a topic of increased focus in Sweden.

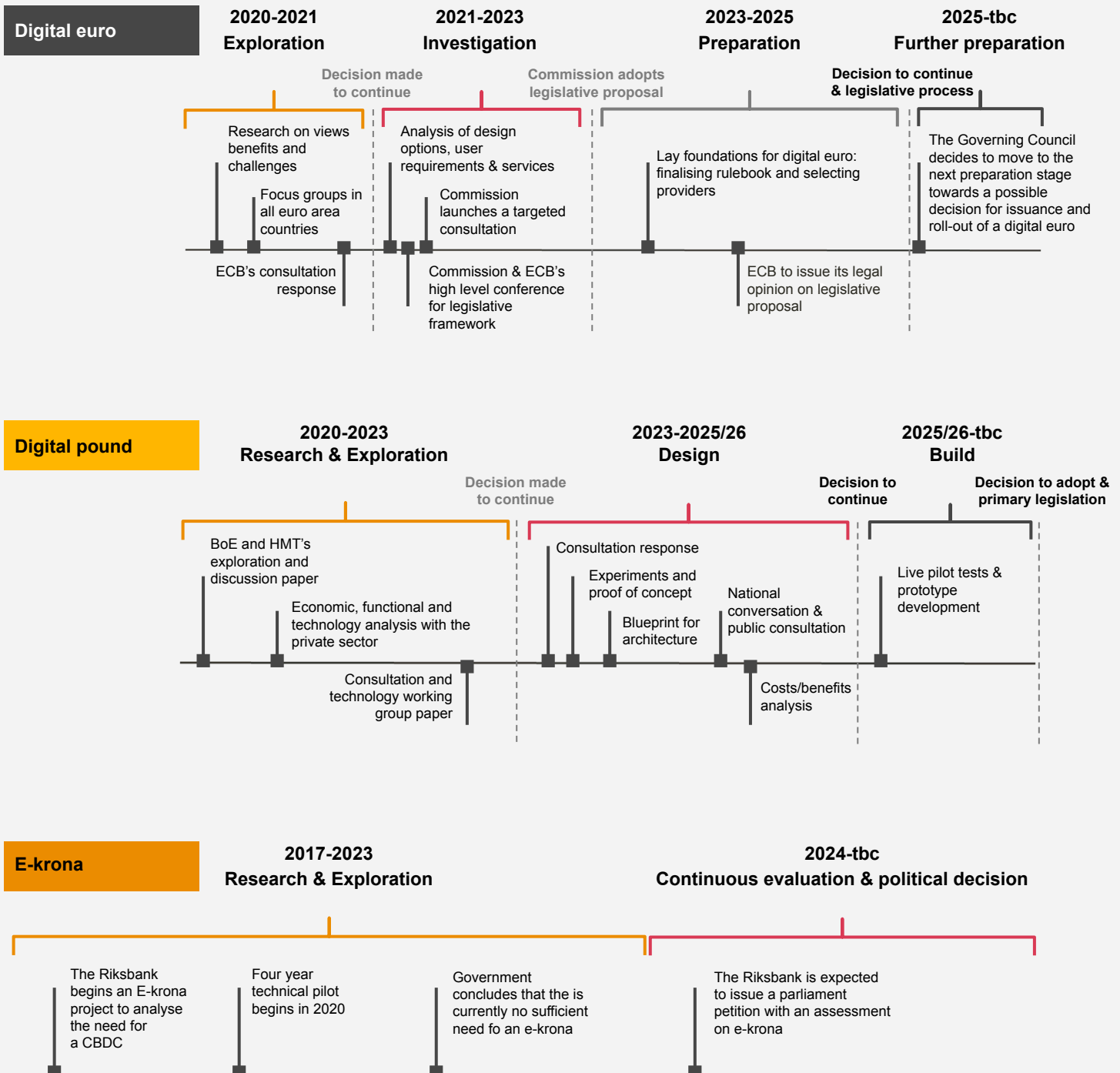
According to the Swedish authorities, changes in the external environment (including a launch of a CBDC elsewhere in Europe) may lead to increased pressures for an issuance of an e-krona. The focus has therefore shifted to monitoring and learning from developments in other jurisdictions. The Swedish Government will probably look to cooperate with the ECB, other central banks and private actors to ensure economies of scale via common platforms and infrastructure.

The Swedish Government continues to support the Riksbank's ongoing efforts to evaluate the conditions for introducing an e-krona, and to enable implementation within a reasonable timeframe if the decision is made. The Riksbank is expected to present a new assessment on the potential case for an e-krona in 2024.

Sources: ³EC: [Proposal for a Regulation on the establishment of the digital euro](#), June 2023, ⁴PwC: [The euro goes digital](#), July 2023, ⁵ECB: [Progress on the investigation phase of a digital euro - fourth report](#), July 2023, EC: [Digital euro package](#), June 2023, PwC: [Authorities push forward with digital pound design](#), January 2024, PwC: [HMT and BoE set out roadmap for a digital pound](#), February 2023, PwC: [BoE sets out new considerations for RTGS](#), February 2024. ECB: [A digital euro - Gauging the financial stability implications](#), November 2023, [Swedish Government Official Reports 2023](#), March 2023.

Project timelines

None of the jurisdictions have made a decision to issue their respective retail CBDCs, and any decision to do so is political. The summary below reflects public comments made pre 22 March 2024 and are subject to change as the CBDC projects develop.



Sources: EC: [Proposal for a Regulation on the establishment of the digital euro](#), June 2023. PwC: [The euro goes digital](#), July 2023. ECB: [Progress on the investigation phase of a digital euro - fourth report](#), July 2023. EC: [Digital euro package](#), June 2023. PwC: [Authorities push forward with digital pound design](#), January 2024, [Swedish Government Official Reports 2023:16](#), March 2023, EC: [Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro](#), June 2023.

Proposed CBDC design features

None of the jurisdictions have made a decision to issue their respective retail CBDCs, and any decision to do so is political. The summary below reflects public comments made pre 22 March 2024 and are subject to change as the CBDC projects develop.

	Digital euro	Digital pound	E-krona
Retail/wholesale	Retail	Retail	Retail
User access	Individuals, businesses and public entities that reside or are established in a euro area Member State on a temporary or permanent basis. Access to people travelling to the euro area unconfirmed.	UK residents, non-UK residents and UK corporates. Access to non-residents and non-UK corporates unconfirmed.	Available to everyone in society, including non-residents and people with limited digital access
Distribution	Distribution via commercial banks, other service providers, or public entities designated by Member State	Platform model, distribution via private sector intermediaries	Distribution likely via approved intermediaries, but unconfirmed
Interoperability	Convertible at par with other forms of the euro, such as banknotes, central bank reserves and commercial bank deposits	Exchangeable to cash and other forms of money	Exchangeable with other forms of money
Programmable	No	No	Unconfirmed
Anonymous	No	No	No
Privacy	Higher degree of privacy than currently required for card payments, increased for offline payments	At least as private as for current forms of digital payments	Unconfirmed
Interest paid	No	No	Unconfirmed
Individual holding limit	Zero-holding limits for merchants and governments in the euro area Approx. €3,000 for individuals (+ waterfall functionality)	£10,000-£20,000	Limits are likely, but unconfirmed
Corporate holding limit	Limits are likely, but unconfirmed	Significantly higher than for individuals, but unconfirmed	Limits are likely, but unconfirmed
Technology model	Unconfirmed	Unconfirmed	Unconfirmed

Sources: June 2023. PwC: [The euro goes digital](#), July 2023. ECB: [Progress on the investigation phase of a digital euro - fourth report](#), July 2023. PwC: [Authorities push forward with digital pound design](#), January 2024. [Swedish Government Official Reports 2023:16](#), March 2023, EC: [Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro](#), June 2023, ECB: [Progress Reports on a digital euro](#), September 2022, December 2022 and April 2023.

Proposed CBDC design features (continued)

None of the jurisdictions have made a decision to issue their respective retail CBDCs, and any decision to do so is political. The summary below reflects public comments made pre 22 March 2024 and are subject to change as the CBDC projects develop.

Introduction

If the decisions were taken to introduce a digital euro, digital pound and e-krona, all CBDCs would likely to have largely the same design features and use cases.

Currently, the only proposed difference between the CBDCs is the fairly low holding limit of approximately €3,000 per individual for digital euro. This is in comparison to the proposed limit between £10,000 and £20,000 for digital pound. Sweden is yet to propose a limit.

Retail CBDC

Retail CBDCs are money issued by central banks and designed for the everyday payments by households and businesses. Wholesale CBDCs are central bank issued money for the use of financial institutions, primarily for cross-border transactions and settlements.

The developments of a potential digital euro, pound and e-krona focus on retail payments and enabling everyday transactions for consumers and businesses.

Wholesale CBDC

All jurisdictions are also engaged in cross-border wholesale CBDC experiments, in cooperation with central banks, private sector and the Bank for International Settlements (BIS).

In the EU, the ECB set up the New Technologies for Wholesale settlement Contact Group (NTW-CG) in 2023 to explore potential solutions for a wholesale CBDC. During 2024, the ECB will work jointly with market stakeholders trialing and experimenting on using CBDCs to settle securities and payments, recorded on distributed ledger platforms.

In the UK, the BoE is upgrading the existing core technology, the Real-Time Gross Settlement or RTGS, with longer opening hours and new participants. According to the BoE, this could achieve many of the benefits often associated with a wholesale CBDC, without a new payment infrastructure.

User access

If introduced, all jurisdictions propose to make the respective CBDCs available to all residents and non-residents, as well as resident businesses. The UK has not yet confirmed the status for non-resident corporates.

Distribution and interoperability

The EU and UK authorities have confirmed that the distribution of the potential CBDCs would be enabled through private sector providers. These would include authorised commercial banks, payments firms, wallet providers and other FinTechs. Consumers and businesses would not hold direct accounts with central banks.

The Swedish authorities have not confirmed the proposed distribution model, but would likely adopt the same position as in the EU and UK.

The CBDCs would be exchangeable with other forms of money, including cash and commercial deposits both online and offline.

Privacy and anonymity

The CBDCs would not be anonymous forms of payment. Authorities require a certain level of privacy to ensure that the payments interface providers would be able to identify and verify users to prevent financial crime.

However, all the in-scope CBDCs would hold the same or increased level of privacy, as currently in place for other digital payments, including commercial bank accounts, card payments and e-money.

As proposed, the governments and central banks would not have access to users' personal data, which would be anonymised by payment interface providers (e.g. commercial banks and payments firms).

Interest payment

The digital euro, pound and e-krona would be designed to provide an alternative means of payment for everyday use.

The ECB and BoE have confirmed that they do not propose to pay (or charge) interest on their respective CBDCs. The CBDCs would also not be designed to replace commercial savings products, bank accounts, or become dominant forms of money for retail payments.

The Riksbank has not yet confirmed its position on interest payments for e-krona.

Sources: PwC: [The euro goes digital](#), July 2023. ECB: [Progress on the investigation phase of a digital euro - fourth report](#), July 2023. PwC: [Authorities push forward with digital pound design](#), January 2024, [Swedish Government Official Reports 2023:16](#), March 2023, EC: [Proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro](#), June 2023, PwC: [Global CBDC Index and Stablecoin Overview 2023](#), November 2023.

Proposed CBDC design features (continued)

None of the jurisdictions have made a decision to issue their respective retail CBDCs, and any decision to do so is political. The summary below reflects public comments made pre 22 March 2024 and are subject to change as the CBDC projects develop.

Holding limit

All central banks would need to ensure that the potential introduction of CBDCs would not result in large, rapid or uncontrolled outflows of bank deposits. This could negatively impact critical money markets and financial stability, particularly in adverse times (and the resulting procyclical dynamics). However, holding limits considered to be too low could reduce the consumer appeal of CBDCs.

The digital euro would be able to be used for payments of effectively any amount. Holding limits may, however, be imposed to secure monetary and financial stability.

In the EU, to safeguard the standing of commercial banks as a vital pillar for a functioning economy, the ECB would determine definite holding limits.⁷ These would be compatible with the principle of proportionality and harmonised at euro area level.

Should the decision be made to issue a digital pound, the BoE and HMT currently propose an individual holding limit between £10,000 and £20,000, which the authorities consider to be the balance between managing risks and supporting wide usability. The limit for corporates would be considerable higher. The exact limits would be announced later, as the project evolves.

The Swedish authorities have not proposed holding limits for e-krona yet, but these would be likely implemented.

Programmability

A programmable CBDC would incorporate built-in rules, meaning that it could only be used in a certain way and/or impose restrictions on the use.

The EU authorities have confirmed that programmable money has been excluded for use cases now and in the future, as it contradicts with the guiding principles of the digital euro. The Eurosystem has therefore settled with the digital euro not being intended of becoming programmable money.

The UK authorities are also not proposing to develop a digital pound allowing the Government or BoE to initiate programmable money.

The Swedish authorities have not yet confirmed their position on programmable money or payments, but would likely follow the EU and UK.

However, all jurisdictions are endorsing programmable payments. Consumers would be able to initiate, set and approve programmability of payments, through private sector payment interface providers and external service interface providers.

Technology model

All the central banks, together with private sector market participants, continue to monitor, assess and experiment with different technology model options, including blockchain and distributed ledger technology (DLT).



Sources: ⁷the precise limit is yet to be defined, as determined based on further in-depth analysis, an order of magnitude of EUR 3,000 per resident has been mentioned (ECB: [Central Bank Digital Currency: functional scope, pricing and controls](#), December 2021, PwC: [The euro goes digital](#), July 2023, ECB: [Progress on the investigation phase of a digital euro - fourth report](#), July 2023, PwC: [Authorities push forward with digital pound design](#), January 2024, PwC: [HMT and BoE set out roadmap for a digital pound](#), February 2023, [Swedish Government Official Reports 2023:16](#), March 2023, ECB: [Update on the work of the digital euro scheme's Rulebook Development Group](#), January 2024, PwC: [Global CBDC Index and Stablecoin Overview 2023](#), November 2023.

Next steps for financial services firms



Introduction

CBDCs represent a new frontier in functionality of the financial landscape. Provided that appropriate preparatory action is taken, the digital currencies present a variety of opportunities for financial services (FS) firms and prospective users of retail CBDCs.

FS firms, merchants and the real economy will need to adapt to a rapidly changing financial ecosystem in which one or more retail and wholesale CBDCs coexist with stablecoins, other digital and crypto assets, as well as with more traditional banking and payment services.



What should FS firms ideally do now?

Ultimately, the future success of a digital euro, pound and e-krona would depend on the level of preparation by the public-private sector to facilitate adoption and development of various use cases.

The advent of retail CBDCs will necessitate a proactive approach from FS firms. Firms will need to undertake a comprehensive and dynamic approach to prepare for this new form of currency, to overcome the complexity of integrating CBDCs into existing financial systems. Firms will also need to proactively consider the broad range of potential impacts on operations, compliance, and strategy.

While the steps outlined below provide a framework for preparation, the specific actions will depend on the unique circumstances of each firm and the particular design and rules governing the CBDCs in question.



Strategic planning and analysis

Market research: Assess market research to gauge consumer and business appetite for CBDCs. This will inform product development and marketing strategies for market participants.

Assess impact: Conduct a thorough analysis of how CBDCs will impact their current business models. This includes understanding the potential effects on revenue streams, customer behavior, and the competitive landscape.

Technology infrastructure: Evaluate and upgrade technology systems to ensure compatibility with CBDC platforms. This may involve investing in blockchain technology or other distributed ledger technologies which underpin CBDCs.



Operational readiness

Integration with existing systems: Develop a plan for integrating CBDC transactions into existing financial systems. This includes payment processing, account management, and reconciliation processes.

Risk management: Update risk management frameworks to account for the unique risks associated with CBDCs, such as cybersecurity threats and operational risks.

Liquidity management: Consider the implications of CBDCs on liquidity management. CBDCs could change the dynamics of deposit and withdrawal behaviours, affecting liquidity ratios and funding strategies.



Product development and service integration

New products and services: Develop new products and services which leverage the unique properties of CBDCs. This could include micro-payments, remittances, and smart contracts.

Integration with existing products: Integrate CBDCs into existing services, such as digital wallets or payment systems, to provide a seamless experience for customers.

Customer education: Create further educational materials, to help customers understand CBDCs and how to use them safely and effectively.



Risk management

Liquidity management: Adjust liquidity management strategies to account for the potential impact of CBDCs on deposits and withdrawals.

Operational risks: Update operational risk frameworks to include risks associated with CBDC transactions, such as settlement risk or technological failures.

Legal and compliance risks: Ensure that legal and compliance teams are prepared to navigate the new regulatory and documentation requirements related to CBDCs.



Human capital and training

Staff training: Train staff on the technical and practical aspects of CBDCs to ensure they are equipped to handle customer inquiries and transactions.

Hiring specialists: Consider hiring or developing in-house specialists with expertise in digital currencies and blockchain technology.



Customer experience and engagement

User experience: Focus on creating a user-friendly experience for customers using CBDCs, including easy-to-use interfaces and clear instructions.

Customer support: Enhance customer support to address the likely increase in inquiries related to CBDC transactions and usage.

Feedback mechanisms: Implement feedback mechanisms to continuously improve CBDC-related services based on customer input.



Monitoring and adaptation

Stay informed: Keep abreast of global trends and developments in the CBDC space to anticipate changes and opportunities including through differing CBDC or stablecoins in circulation.

Adaptation: Be prepared to adapt quickly to changes in the CBDC landscape, including technological advancements or shifts in regulatory policies.

How can PwC help?

PwC and PwC Legal Business Solutions have worked on numerous CBDC projects globally, supporting central banks and private companies to assess and operationalise CBDCs. We support our clients from design to deployment and use.

Knowledge and insight

Financial products and services now and in the future.

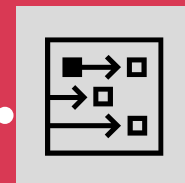
Transform trade finance, treasury liquidity, debt, equity, asset management and other products and services.



Knowledge and insight

Knowing when and where to move

Understand the regulatory and competitive environment.



Knowing when to move

Financial products and services now and in the future.

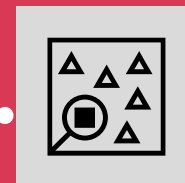
Transform trade finance, treasury liquidity, debt, equity, asset management and other products and services.



Financial products and services now and in the future

Positioning for potential

Realise commercial opportunities, review existing / implement new concepts and processes in counterparty and client-facing documentation, as well as internal systems and controls.



Positioning for potential

Diversity of applications and use cases

Implement CBDCs and other digital assets in a retail and commercial context.



Diversity of applications and use cases

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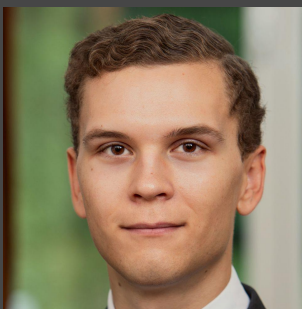
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