



# Organisational report for CBDC in Supply chain Finance

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# Executive summary

A new finance system based on Central Bank Digital Currency (CBDC) presents significant potential for enhancing financial efficiency in supply chains. However, it also introduces new organisational challenges. For example, the early CBDC projects revealed significant hurdles in adoption, such as slow engagement from traditional financial institutions, lack of consumer awareness, and insufficient scale of operations to demonstrate the benefits of technology. ESRC IAA funded the project '*Central Bank Digital Currency (CBDC) for small and medium-sized businesses and supply chains: opportunities and challenge*' and intends to investigate the CBDC adoption with various stakeholders from industry, academia and policymaking.

This report outlines the *internal* (i.e., related to firms) and *external* (i.e., related to supply chain) challenges CBDCs bring to organisations, particularly, SMEs, and how to mitigate them before widespread adoption occurs. In particular, the report outlines the need for improving trust in the new technology, which can be achieved by training on digital skills. Based on the study, we suggest a trust management strategy for CBDC in SCM, incl. direct communication and their involvement in decision-making.

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[1] <https://www.surrey.ac.uk/research-projects/central-bank-digital-currency-cbdc-small-and-medium-sized-businesses-and-supply-chains-opportunities> (accessed 2th August 2024)

# Motivation

The adoption of fintech for payments in organisations has been steadily increasing, driven by the need for faster, more efficient, and cost-effective financial transactions. Real-time payments provide better liquidity management and the ability to reinvest cash more efficiently. This represents enormous potential for small and medium-sized enterprises (SMEs), often facing cash flow constraints. In contrast to cryptocurrencies that are not regulated and accepted by the industries, the CBDC is a promising innovation that can drastically improve cash accessibility and revolutionise Supply Chain Finance (SCF).

CBDC combines the technological advantages of digital currencies (e.g., Distributed ledger technologies) and the legal advantage of the official currency emitted by the government. Existing cases report on improved accessibility of digital forms of money, which is more efficient for supply chain transactions and potentially suitable for broader adoption. CBDC can also bridge the gap between different forms of digital currencies—ultimately contributing to the evolution of the financial landscape. The new opportunities the CBDC brings include changes in conventional organisational finance practices and supply chain finance. Hence, comprehensive industrial research is needed to investigate the managerial aspects of adopting CBDC as a means of payment. However, to date, the emerging role of CBDC in supply chain management is unclear, particularly in the presence of established B2B relationships and the inertia of large buyers to change the status quo.

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[2] See the legal report on CBDC Not Blockchain, Please remove world blockchain with word Distributed ledger technologies” is organisational aspect soft?

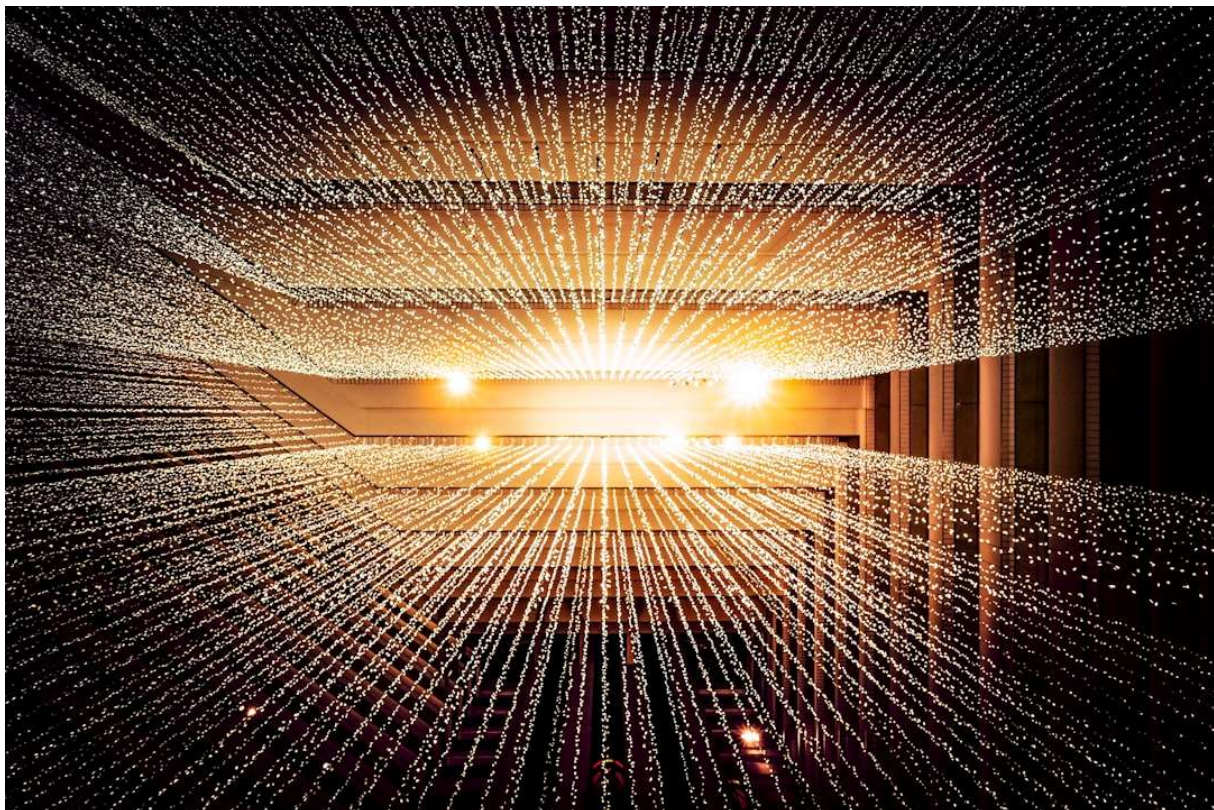


# Goals of the report

A present study on organisational aspects aims to identify:

- a) Organisational challenges that SMEs experience while adopting CBDC in their SC finances
- b) Opportunities to change management that can mitigate these challenges.

Under organisational challenges, we understand both internal and external aspects. Examples of *internal* aspects are the firm's intention to use CBDC in addition to regular forms of payment and confidence in the technology behind it. *External* elements include the issue of supply chain liquidity and the 'cash-to-cash' (C2C) cycle optimisation within supply chain finance using CBDC [2].



[2] See the legal report on CBDC "Not Blockchain, Please remove world blockchain with word Distributed ledger technologies" is organisational aspect soft?

# Methods

- An extensive literature review of academic, industrial, and consultancy papers has been completed to highlight the known organisational challenges with CBDC adoption.
- As the volume of available evidence is relatively scarce, we interviewed 15 professionals about CBDC. These respondents come from various industries, including fintech startups, aerospace engineering, control systems, financial technology, and the Central Bank of one of the G7 countries.
- We organised a panel discussion involving four experts between July and November 2024. Most participants hold top or mid-level management positions, with experience ranging from 5 to 25 years.
- We organised a workshop on “Building trust: bridging technology with social interactions” in Bristol on the 27<sup>th</sup> of March 2025, where the results of the project were discussed with an interdisciplinary group of attendees.

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[3] Based on our interaction with the association of European aerospace SMEs in Northern Germany (see Table A2)

# Overview of International Retail and Wholesale CBDC projects

- **Wholesale CBDCs** are designed for financial institutions to facilitate real-time large-value interbank settlements
- **Retail CBDCs** are meant for use by the general public for everyday transactions to improve financial inclusion and provide an alternative to traditional payment methods.
- While wholesale and retail CBDCs differ primarily in their target users and transaction scales, the **cross-learning** from implementing both CBDCs is crucial for supply chain finance. This learning argues for improved visibility and accuracy of financial and operational data.
- By **integrating insights** from wholesale and retail CBDC implementations, the central banks worldwide can develop simplified and scalable solutions that the citizens and companies accept.
- Citizens would gain better cash accessibility. At the B2B level, that would aid in optimising working capital, inventory turnover, and cash flow management across the entire supply chain.

# The current CBDC projects worldwide and their status (preparation/pilot/live)

Country/ region	Project name	Type	Stage	Year	Key features	Source
<b>Bahamas</b>	Sand Dollar	Retail	Live	2020	Promote financial inclusion, provide non-discriminatory access to payment systems, and increase efficiency in the Bahamian payments system.	Project Sand Dollar: - Central Bank of The Bahamas
<b>China</b>	e-CNY	Retail	Pilot	2023	Improving payment efficiency, enhancing financial inclusion, and providing a secure alternative to private cryptocurrencies.	A Report Card on China's Central Bank Digital Currency: the e-CNY
<b>European Union</b>	Digital Euro	Retail	Preparation	2023	Universally acceptable, free for essential use, available offline, secure, private	European Central Bank reports and press release
<b>India</b>	Digital Rupee	Retail	Pilot	2023	Financial inclusion, faster transactions, integration with existing payment systems	Reserve Bank of India reports and various news articles
<b>Jamaica</b>	Jam-Dex	Retail	Live	2023	Financial inclusion, digital alternative to cash, government payments facilitation	Bank of Jamaica announcements and various news articles
<b>Nigeria</b>	eNaira	Retail	Live	2023	Financial inclusion, cross-border payments, efficient payment systems	Central Bank of Nigeria, various academic papers
<b>Sweden</b>	e-krona	Retail	Pilot	2023	Facilitating digital payments, enhancing competition in the payment market, and improving transaction efficiency.	Riksbank reports and various articles on the e-krona project.
<b>Thailand</b>	Digital Baht	Retail	Pilot	2023	Financial inclusion, payment efficiency, programmable payments	Bank of Thailand Retail CBDC Pilot Program Report
<b>Ukraine</b>	e-hryvnia	Retail	Pilot	2023	Effectively perform all functions of money, supplement cash and non-cash forms of hryvnia, promote digitalisation of the economy, and improve payment infrastructure.	National Bank of Ukraine - E-hryvnia report
<b>Russia</b>	Digital Ruble	Retail	Pilot	2023	Enhancing payment efficiency, reducing dependence on foreign payment systems, facilitating international trade, and providing an alternative to SWIFT.	Central Bank of Russia - press releases



# Internal Challenges of CBDC Adoption

1. A **lack of trust** can undermine the effort to introduce CBDC, even when supported by the national government[4]. In particular, SMEs can resist adopting a new finance system because they fear uncertainty about a new payment method.
2. The new form of payment could become a target for **cyberattacks**, hence many firms fear the potential **cybersecurity threats**. Ensuring adequate data protection is crucial to prevent data theft that could cause significant reputational damage to the central bank [5].
3. Customers are often **reluctant to share personal and financial data** with third parties, and overcoming their right to privacy is another organisational challenge that might undermine CBDC adoption efforts [6].
4. **Organisational culture** also plays a crucial role in facilitating or impeding this transition to CBDC, as cultures that are open to innovation tend to adapt more readily than risk-averse ones [7].

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[4] Abramova, S., Böhme, R., Elsinger, H., Stix, H., & Summer, M. (2022). What can CBDC designers learn from asking potential users? Results from a survey of Austrian residents (No. 241). Working Paper.

[5] Tian, S., Zhao, B., & Olivares, R. O. (2023). Cybersecurity risks and central banks' sentiment on central bank digital currency: Evidence from global cyberattacks. *Finance Research Letters*, 53, 103609.

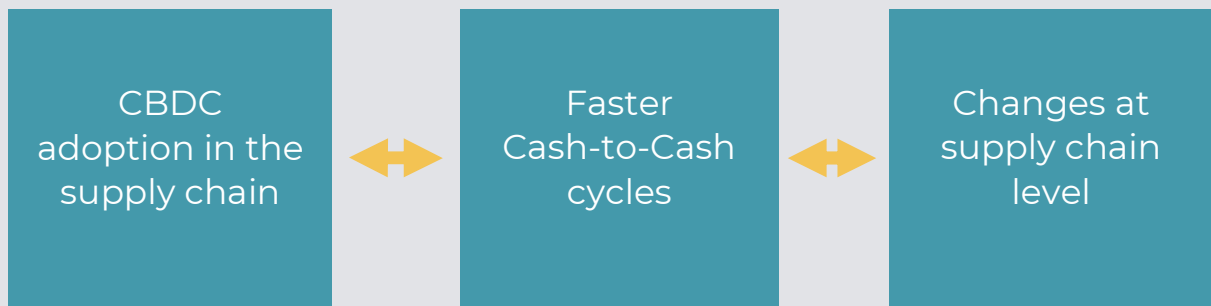
[6] Jabbar, A., Geebren, A., Hussain, Z., Dani, S., & Ul-Durar, S. (2023). Investigating individual privacy within CBDC: A privacy calculus perspective. *Research in International Business and Finance*, 64, 101826.

[7] Luu, H. N., Do, D. D., Pham, T., Ho, V. X., & Dinh, Q. A. (2023). Cultural values and the adoption of central bank digital currency. *Applied Economics Letters*, 30(15), 2024-2029.



# External challenges of CBDC Adoption in SCM

Established supply chains consist of many suppliers arranged hierarchically towards large buyers, concentrating market power in the hands of Original Equipment Manufacturers (OEMs) or Tier-1 suppliers. Large companies cascade contracts upstream and impose stringent payment conditions, optimising their working capital. Delaying supplier payments is a well-known and socially acceptable strategy to optimise working capital in supply chain finance. It is unclear if large buyers will have enough intention to adopt the new technology that can challenge their dominance [8].



## Conceptual model to explain the impact of CBDC on Supply Chain Finance

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[8] A representative from the SME cluster to the largest aerospace manufacturer suggested data for a case study on how CBDC would accelerate cash-to-cash cycles.

# Environmental challenges of CBDC adoption

Aspect	Traditional Paper Banknotes	Digital Currencies (CBDCs)	Blockchain-Enabled Currencies
<b>Production</b>	Raw material extraction (cotton, linen), energy-intensive pulping, bleaching, printing, and security feature integration.	Infrastructure (data centers, servers, telecommunications)	Infrastructure (mining farms, data centers)
<b>Distribution</b>	Transportation of banknotes via vehicles.	Centralised network of nodes distributed nationally	Decentralized network; nodes distributed globally
<b>Destruction</b>	Incineration, releasing greenhouse gases.	No physical destruction; system updates and hardware replacements have some environmental impact.	No physical destruction; Hardware upgrades and e-waste contribute to environmental impact.
<b>Energy Consumption</b>	Relatively lower energy per transaction but continuous production needed.	CBDCs can have lower energy use if powered by renewables and supported by the government.	Generally high due to PoW or other consensus mechanisms; energy source is critical (renewable vs. fossil fuels). [9]
<b>Overall Impact</b>	Significant carbon footprint due to lifecycle processes.	Potential for lower carbon footprint if efficient and powered by renewable energy, but can be very high if inefficient and reliant on fossil fuels.	Highly dependent on the consensus mechanism and energy source; PoW cryptocurrencies are generally less environmentally friendly.

[9] Bitcoin Energy Consumption Index: Cambridge Centre for Alternative Finance, "Bitcoin Electricity Consumption Index," (<https://www.cbeci.org/>)

# Suggested strategies to mitigate the challenges with CBDC

1. **Clear communication strategy on CBDC from regulators:** benefits, barriers, and opportunities of CBDC must be openly communicated for SMEs. It is essential to understand the working principles and technological stack
2. **Public educational campaigns** are needed to ensure that individuals understand how digital money works and feel comfortable with it. Any concerns about potential data misuse, security, and information privacy must be immediately resolved to avoid speculation.
3. **Easy-to-access pilots** must be available for SMEs and individuals to involve them in CBDC adoption. Notably, the smaller firms struggling with payment delays must see evidence of how the technology can potentially improve liquidity through the tokenisation of invoices. This involvement can take the form of feedback sessions or pilot programs. A good set of best practices would be invaluable to support the intention of firms of all sizes, including SMEs, to join the pilot projects.



□ The process of suggested strategy

# Conclusion

The early examples of CBDC adoptions highlight several key implementation aspects:

1. potential cybersecurity threats,
2. customers' reluctance to share financial data with third parties,
3. organisational inertia of large buyers,
4. the potential impact of carbon dioxide are examples of significant concerns for many firms considering CBDC for their supply chain finance.

We emphasise the importance of proactive coherent communication strategy, Public educational campaigns and consumer education programs, Easy-to-access pilots must be available for SMEs to diminish the adverse impacts.

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[1] Nigeria among the catalysts of development and its obstacles - Afrika Hayat.  
<https://afrikahayat.org/nigeria-among-the-catalysts-of-development-and-its-obstacles/>



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