



A Digital Rupee for Indian Retail: A Baseline Policy Assessment

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KOAN ADVISORY GROUP

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GLOSSARY OF TERMS

AML/CFT	Anti-Money Laundering and Combating the Financing of Terrorism
AD Bank	Authorized Dealer Bank
API	Application Programming Interface
ATM	Automated Teller Machine
BIS	Bank of International Settlements
CBDC	Central Bank issued Digital Currency
CCIL	Clearing Corporation of India Limited
CTS	Cheque Truncation System
DLT	Distributed Ledger Technology
e-CNY	Digital Chinese Yuan (Chinese CBDC)
e-Krona	Swedish Kronor (Swedish CBDC)
ECS	Electronic Clearing Service
FEMA	Foreign Exchange Management Act, 1999
FY	Financial Year
IL2	Inthanon-Lionrock, a multi-CBDC project of the central banks of Thailand and Hong Kong
IMPS	Immediate Payment Service
INR	Indian Rupee
KYC	Know Your Customer
LRS	Liberalised Remittance Scheme
ML/TF	Money Laundering / Terrorist Financing
MTSS	Money Transfer Service Scheme
NACH	National Automated Clearing House
NDS-OM	Negotiated Dealing System – Order Matching
NEFT	National Electronic Funds Transfer

NPCI	National Payments Corporation of India
PMLA	Prevention of Money Laundering Act, 2002
Project Jasper	CBDC project of the central bank of Canada
Project Ubin	CBDC project of the central bank of Singapore
Project Jasper-Ubin	Cross-border CBDC linkage project of the central banks of Canada and Singapore
PA/PG	Payment Aggregator and Payment Gateway
PSS Act	Payments and Settlement Systems Act, 2007
RBI	Reserve Bank of India
RBI Act	Reserve Bank of India Act, 1934
RDA	Rupee Drawing Arrangement
RTGS	Real-Time Gross Settlement
UPI	Unified Payments Interface
USD	United States Dollar

EXECUTIVE SUMMARY

Despite growing adoption of digital payments, currency in circulation remains high in the Indian economy. As global attention turns to digital fiat currencies, and India begins experimenting with suitable CBDC designs to improve its currency management systems, we assess how the digital rupee as a means of payment would work in India.

We focus on the retail use-cases of a Central Bank Digital Currency (CBDC) in India, and explore some preliminary considerations around how it could be designed, operated and regulated.

Drawing on the international experience with retail CBDCs, we discuss possible technology infrastructure designs (whether conventional centralized processing or distributed ledger technology) and distribution architectures (whether multi-tier or single tier distribution model) for the digital rupee. We also juxtapose the digital rupee against legacy payment systems, both for domestic retail payments and cross-border remittances to assess the relative merits.

Given the right design choices, the digital rupee as a means of payment could offer improved security due to advanced encryption techniques, and encourage trust in digital payments by virtue of being sovereign legal tender. The digital rupee infrastructure could potentially enable cash-like anonymity, while ensuring traceability for high-risk transactions from a taxation and ML/TF perspective. Further, the digital rupee could potentially lower costs and yield efficiencies in cross-border remittances in a fillip to India's foreign remittance market. From a currency management standpoint, the digital rupee could yield efficiency gains in allowing instant, cash-like settlement. This would alleviate the need to route Multilateral Net Settlement Batch (MNSB) files to the RTGS network to achieve settlement finality in digital retail payments.

On governance structures, we emphasize that regulatory design for the digital rupee should seek to avoid the current pitfalls around fragmentation and siloization within retail payments regulations. It should adopt the principles of responsibility and confidence as its underlying basis. This means ensuring accountability and diligence for system operators and participants so as to uphold safety, resilience and consumer trust.

At this juncture however, there are several unanswered questions around CBDCs for the international community and even more so for India. There are significant challenges and risks involved. India must therefore engage in research, experimentation and collaboration to solve for key questions around the underlying technology design, participation of the private sector in distribution, access to non-resident users, enabling interactions with overseas CBDC projects, along with a host of attendant policy and operational questions.

We break down some of the fundamental concerns surrounding the digital rupee and hope to push the public discourse towards some of the more granular details in the coming months.

INTRODUCTION

The digital payments space in India has transformed in recent years.¹ Policy focus on digitization, innovation and development of open application programming interface (API) stacks² has played a key role in this growth. Consequently, payments using e-money wallets and the Unified Payment Interface (UPI) network in particular are expected to triple from current values, and surpass the USD 1 trillion mark by 2026.³

While the growth in digital payments is exponential, cash still accounts for around half of all retail payment transactions.⁴ **As India forges ahead towards a ‘less-cash’ society, it must address security, privacy and efficiency concerns in the face of rising frauds,⁵ growing trails of financial data and liquidity-demanding deferred net settlement processes.**

Today, assets, physical spaces and payments are becoming increasingly digitized with the onset of new technologies such as blockchain, virtual reality, and machine learning techniques. This is where a Central Bank Digital Currency (CBDC) presents an exciting opportunity.

Simply put, a CBDC is digital fiat currency issued and circulated by trusted institutions (typically the central bank) using algorithmic protocols. The Government of India clarified the legal contours of the digital fiat currency (termed ‘digital rupee’ by the finance minister) during the Union Budget announcement for FY 2022-23. It amended the RBI Act to expand the definition of bank notes to cover both physical (paper currency) and forms,⁶ thereby making the RBI the sole issuer of digital rupees as central bank liability.

In this report, we thus view the digital rupee as a cash-like means of payment. Much like physical bank notes having the status of legal tender, the digital rupee would be a non-interest-bearing instrument, used only for transactional purposes.

We consequently focus our analysis on India’s retail payments space and assess the utility of the digital rupee as a means of payment in the hands of the public. In the following sections, we take a close look at how it would interact with legacy payment systems both for domestic retail payments and cross-border remittances. We delve into issues around design, operation and regulation in order to inform the policy discourse around some of the preliminary concerns involved.

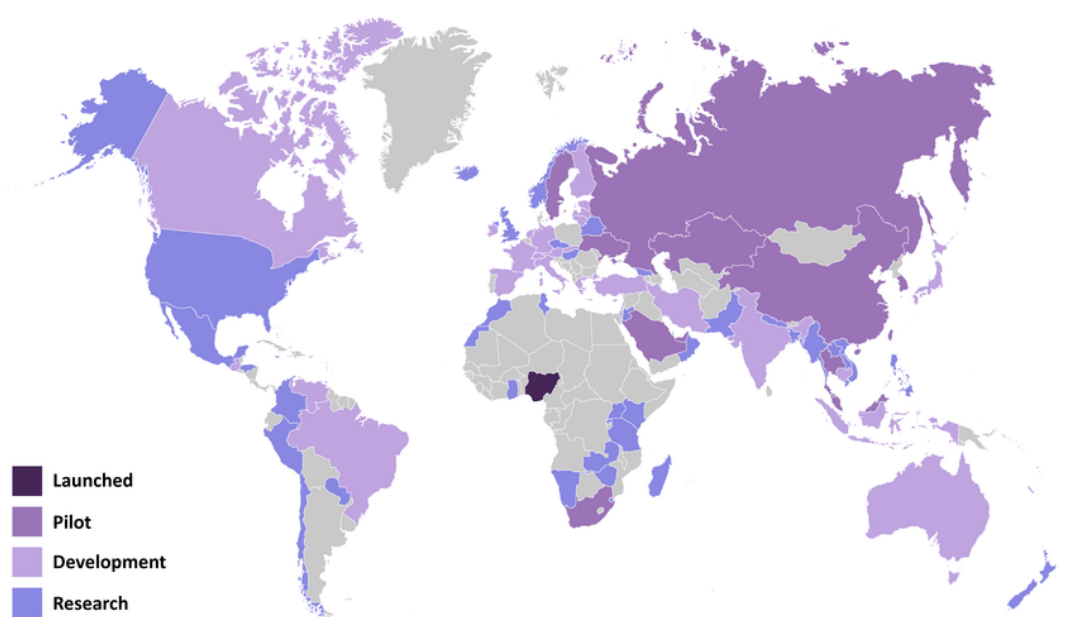
BACKGROUND

A CBDC or digital fiat currency, is essentially a digital record of the issuing central bank's liability on a technology infrastructure.

Conceptually, CBDCs are differentiated based on their retail and wholesale use-cases. A CBDC designed for use as a digital cash equivalent by households and businesses is termed a 'general-purpose' or 'retail CBDC'. A wholesale CBDC on the other hand is designed for the settlement of large interbank payments, akin to those made via reserve or settlement accounts maintained with the central bank.

There is limited international experience with CBDCs, but consensus is emerging among central banks on the reasons for issuing digital currency. According to a 2021 survey by the Bank of International Settlements (BIS)⁷ emerging economies cited **financial inclusion, safety and efficiency in payment systems** as some of the drivers for exploring retail CBDCs. Emerging economies cited monetary policy implementation and financial stability concerns as key reasons for exploring wholesale CBDCs. Notably, strengthening of monetary sovereignty in the face of increasing 'dollarization' of international trade, and reducing paper currency in circulation, were key concerns for emerging and advanced economies alike.

Most jurisdictions today, and almost all the G20 countries are conducting research and experiment with digital fiat currencies.⁸ **These are still early days. Consensus on the ideal technology infrastructure and distribution mechanism is yet to be ascertained.** Currently, CBDC research is underway using conventional centrally managed databases, distributed ledger technology, or a combination of both. In terms of distribution, different jurisdictions are exploring direct (single-tier) and indirect (multi-tier) architectures for their CBDC projects.



Countries engaged in research and development of CBDC projects

Research on the technology infrastructure, distribution mechanism and other core aspects of CBDCs is underway in India as well. The RBI has been examining appropriate design elements and various use cases to unlock further efficiencies in payments and settlement systems.⁹ As things stand, the RBI is working towards a phased implementation strategy with minimal disruption to existing payment channels.¹⁰ **This entails a calibrated approach involving a proof-of-concept stage, pilot experiments and the finally the launch.**¹¹

In the next section, we discuss some foundational concepts around digital fiat currencies, the underlying technology and distribution architectures. Next, we consider how a digital rupee as a means of payment would jostle for space and relevance in India's competitive digital payments landscape. We conclude by discussing the legal and institutional structures of payments in India, and possible regulatory models for the digital rupee.

TECHNOLOGY FUNDAMENTALS OF DIGITAL BANK NOTES

A. Digital banknotes

In conceptual terms, money may be viewed as an account or as an object.¹² Account based money (*such as bank balance*) reflects an entry on a ledger, typically representing a claim on bank assets maintained with the central bank. Object based money (*such as a currency note*) refers to a token of value issued by a sovereign entity in a jurisdiction. Each token is perfectly fungible i.e., representing the same value and being freely exchangeable for another token.

The key differences are in terms of traceability and transaction settlement. Bank balances are easily traced, and interbank settlement between commercial banks is necessary at the back-end for transaction fulfilment. In contrast, payments in cash are much harder to trace and settle immediately as acceptability of the object (cash being legal tender) serves for the lawful discharge of a payment obligation.

As digital bank note, a retail CBDC could offer the advantages of both account and object-based money.

Design choices would determine the extent of the same. Given the Indian context of high digital adoption coupled with high cash circulation, the digital rupee could be designed to settle instantly and offer anonymity akin to object-based money, while ensuring traceability and verifiability akin to account-based money. As such, it would offer a unique value proposition in providing greater privacy than digital payment instruments linked to bank accounts, while ensuring greater traceability when compared to physical cash.

Research suggests that CBDCs designed with cash-like anonymity may increase tax evasion, capital flight and ML/TF risks for regulators.¹³ On the other hand, strict traceability may hamper its widespread adoption as an alternative to physical cash in India. It is crucial therefore to strike the right balance between traceability and anonymity, in order to create the right incentives for businesses and individuals to adopt CBDCs.

An accepted middle path between strict traceability and cash-like anonymity is to **adopt a risk-based approach to traceability**. This would limit transaction functionality (in terms of transaction volume and value) for users who have not completed the requisite KYC checks. For instance, China's retail CBDC project (e-CNY project)¹⁴ adopted the principle of 'managed anonymity', where anonymity is granted for low value domestic payments, while high value transactions are subject to strict traceability and AML/CFT checks.

Design considerations around the digital rupee should focus therefore on balancing competing concerns of mandating strict traceability from a taxation and AML/CFT standpoint, and furthering privacy for the purposes of data protection and individual agency.

Regulators must tread this line carefully, so that appropriate incentives are offered for people to transition from physical cash and other digital payment alternatives towards the CBDC.

B. Under the hood

Research on the underlying technology design for CBDCs is evolving. That said, central banks are primarily experimenting with **conventional centralized databases or distributed ledger technology (DLT)** to assess the trade-offs from a cost and governance perspective.¹⁵ The Indian Finance Minister notably mentioned that the proposed digital rupee would be introduced using “blockchain and other technologies” in her budget speech,¹⁶ indicating a preference of towards DLTs. However, the exact nature of the technology infrastructure is still being explored.

A DLT system makes use of a distributed ledger that exists across locations or among multiple participants. Each participant has a copy of the distributed ledger, which updates itself in real time as transactions are completed on the network. Blockchain is a popular example of DLT where the ledger updates are represented in the form of a chronological chain of blocks which are irrevocably linked to one another. In simple terms, DLT systems can be classed as *permissionless* or *permissioned*, depending upon the extent of access and control available to different nodes on the network.

Permissionless DLT systems (like the Bitcoin network) are accessible to everyone who downloads the software program. Any device can act as a node on the Bitcoin network and begin transacting with other nodes. **Permissioned DLT systems, on the other hand, permit the exercise of discretion over who can become a node and can participate in the consensus building process.**¹⁷ In context of CBDCs, core functions such as CBDC issuance and transaction validation can be centralized with trusted institutions and access for participants to the ledger can be controlled. **Naturally therefore, central banks favour permissioned DLT systems for building their CBDC projects.**¹⁸

Since the ledger is distributed across multiple participants (or nodes), any update to the ledger must be reflected across all nodes in real time. A DLT system must therefore determine how consensus is achieved throughout the network of nodes on the state of the underlying data.¹⁹ As a result, there remain issues around limited throughput (number of transactions per second) in DLT systems.²⁰ This presents scalability challenges, particularly in context of retail CBDCs circulated among large populations. In contrast, centralizing ledger management and transaction validation can potentially address some of the scalability challenges posed by DLT systems.

For instance, a limited²¹ CBDC experiment undertaken by the Massachusetts Institute of Technology’s Digital Currency Initiative²² showed how bottlenecks can arise in infrastructures that batch transactions sequentially into blocks. The project revealed that a centrally controlled transaction processor, when broken up into modular components to initiate and validate transactions, prevent double-spending, etc., can provide superior scalability and flexibility when compared to the linear block-wise transaction ordering (as exemplified in the bitcoin blockchain for instance).²³

Overall, however, neither a DLT system nor a conventional, centrally managed database has a clear advantage over the other.²⁴ While DLT systems have challenges of limited throughput and scalability, conventional central databases risk having a central point of failure. International experience with different CBDC infrastructures is scant at present, particularly in terms of load testing and scalability. The rocky rollout of Nigeria’s DLT-based retail CBDC, which suffered several technical glitches, is a case in point.²⁵

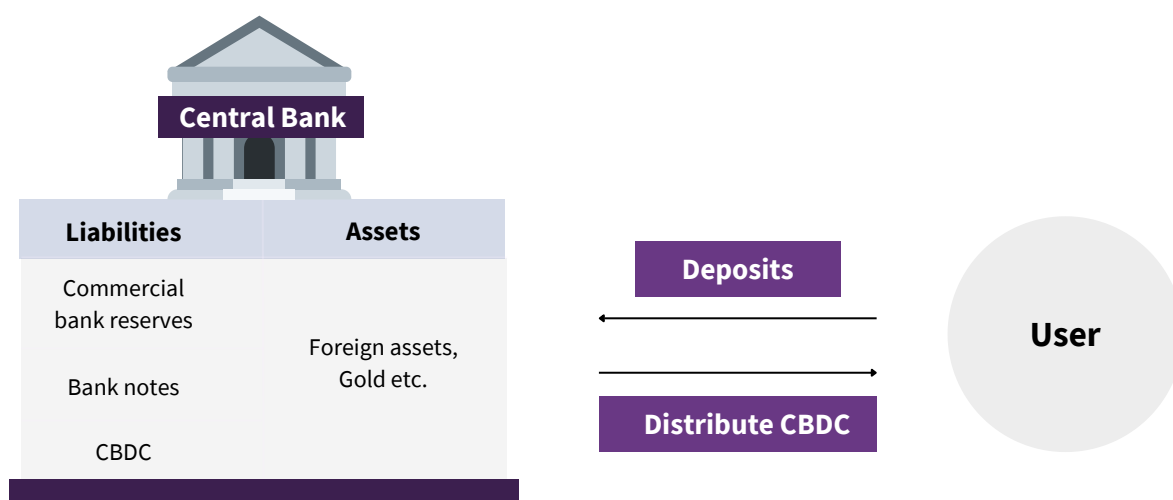
At this juncture therefore, research and experiment on key elements of DLT systems and conventional centrally managed databases could be a way forward for India. Project Hamilton noted that technical ideas from blockchain technology such as using cryptographic hashes representing unspent funds to make transactions can be applied without creating distributed ledgers operating under the jurisdiction of different actors. Indeed, strong encryption techniques which deploy asymmetric keys and cryptographic hash functions could help improve security and trust in payment systems. Similarly, developing payment systems which enable atomic settlement of assets and currencies²⁶ and use smart contracts for governance and programming payments,²⁷ could yield significant efficiency gains for retail payments in India.

C. Distribution architecture

Beyond ledger management and transaction validation, retail CBDC systems need to determine how the public will interface with the technology.

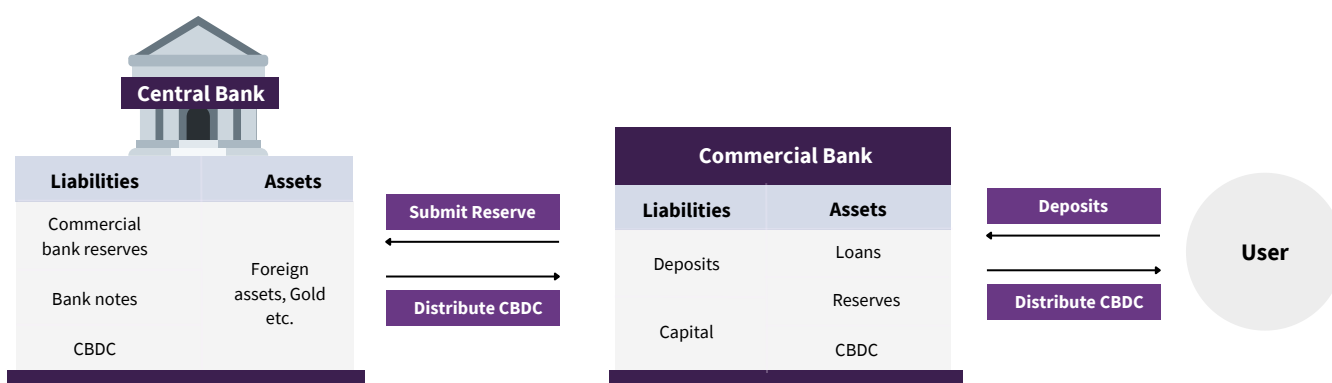
The distribution architecture for the digital rupee could be direct (single-tier model) or indirect (multi-tier model). Under a single-tier model the central bank issues the CBDC and manages consumer wallets without the participation of financial institutions. In contrast a multi-tier model would leverage existing customer servicing channels (commercial banks, financial institutions and PA/PGs) for CBDC rollout.

A single-tier model could ease the implementation of monetary policy objectives, as the central bank would directly manage accounts of businesses and individuals. But it may preclude participation and the scope for innovation, personalization and value generation offered by the private sector.



A multi-tier approach would take the private sector along as a key stakeholder in CBDC rollout, an idea affirmed by almost all central banks according to a BIS report.²⁸ Given India's robust fintech ecosystem, participation by the private sector would lead to the development of consumer-facing services and reduce migration related challenges.

In a multi-tier distribution model, the central bank distributes retail CBDCs through commercial banks. **The central bank carries out CBDC issuance and transaction validation functions, while commercial banks and financial institutions interact with customers and service their accounts.**



For instance, in a large-scale pilot of China's retail CBDC project (e-CNY project)²⁹ digital yuan was circulated to the public via authorized operators (commercial banks and licensed non-bank payment institutions). Authorized operators were allowed to build solutions on top of the core infrastructure for providing e-wallet services, providing e-CNY exchange services, etc.

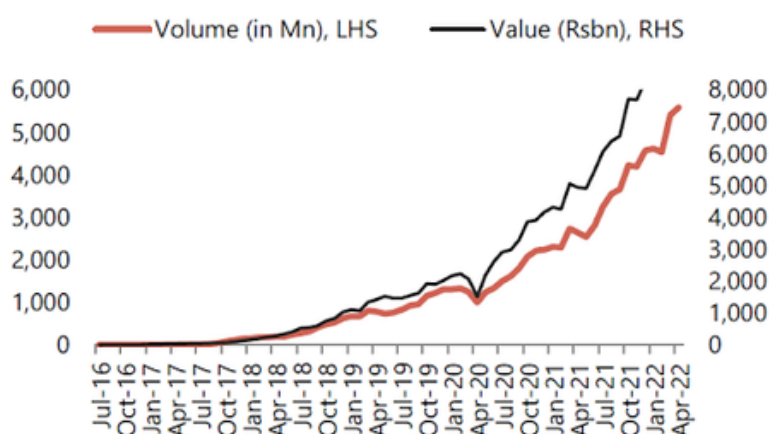
Similarly, project Sand Dollar, the retail CBDC project launched by the Bahamas,³⁰ adopted a multi-tiered distribution architecture with the central bank and authorized financial institutions operating on different tiers. Financial institutions which maintained settlement accounts with the central bank, **acted as gateways in purchasing CBDCs against their reserve balances and thereafter circulating the same with the public**

SITUATING THE DIGITAL RUPEE IN THE INDIAN PAYMENTS LANDSCAPE

Having discussed fundamental concepts relating to digital banknotes, ledger management and transaction validation and distributed architectures, we focus now on the Indian context, and assess how a digital rupee as a means of payment would interact with legacy payment systems

A. Domestic payments

India recorded over 74 billion digital payment transactions in FY 2020-21, a growth of 33% over the prior fiscal.³¹ Apart from payments using cards and net banking solutions, Indians can make instant bank transfers using National Payments Corporation of India (NPCI) products such as Immediate Payment Service (IMPS) and UPI, and private e-money wallet balances. Bank transfers using the indigenous UPI network and e-money wallets have constituted the majority of all retail transactions in recent years.³² UPI is today the country's single largest retail payment system in volume terms.³³ E-money wallet payments are not far behind, having accounted for 68.5% of regional e-commerce transaction value in 2021, and projected to expand to over 72% of transaction value by 2025.³⁴



Source: NPCI, Jefferies

For users, the digital rupee would carry sovereign backing as legal tender. This means that it would be issued and backstopped by the RBI. In contrast, redemption of e-money wallet balances (for instance PayTm³⁵ wallet balances) relies on the terms and conditions, and prudent business practices adopted by the issuer thereof i.e., the e-wallet provider itself.

Use of **measured anonymity techniques, cryptographic hash functions and wallets using public encryption** offer significant value addition over existing privacy and authentication frameworks for digital payments. Further, the digital rupee could offer a convenient interface for different payment use-cases. Algorithmic techniques to pre-program payment instructions at the backend could simplify bulk and recurring payment transactions for users.

From the RBI standpoint, the digital rupee could bring in efficiency gains over UPI and e-money in terms of settlement finality. CBDC transactions settle instantaneously upon validation, much like physical cash, while settlement for NPCI-run payment systems (including UPI) occurs through multilateral netting and are finally settled on the RTGS network.

Essentially, net settlement positions of commercial banks participating in UPI, IMPS, National Automated Clearing House (NACH), Cheque Truncation System (CTS) and other NPCI run systems are grouped in timebound batches (called Multilateral Net Settlement Batch (MNSB) files). These MNSB files are routed to the RTGS network, where the banks' settlement accounts are updated to achieve settlement finality.³⁶ Moreover, MNSB files from the NEFT system as well as payment systems operated by the Clearing Corporation of India Limited (CCIL), are routed to the RTGS network for settlement finality.³⁷ This process of transmitting the net funds positions (receivable/payable) of participant banks occurs over multiple settlement cycles each day.

This architecture results in a steep concentration of settlement functions for domestic payment channels. As consumers continue to shift from cash to digital payments, the need for MNSB settlement on the RTGS will further increase.

In contrast, if CBDC is transacted instead of existing payment alternatives such as UPI and NEFT, the need for interbank settlement disappears. Settlement finality offered by CBDCs can potentially address this overreliance on the RTGS network for MNSB settlement. Transactions in CBDCs can thus reduce settlement risk and the liquidity needs (such as intra-day liquidity) in the RTGS system, thereby improving the efficiency of domestic transaction settlement.³⁸

B. Cross-border payments

A key development in global CBDC research has been in terms of achieving interlinkages between CBDC projects across jurisdictions.³⁹ For instance, Project Jasper-Ubin, undertaken by the central banks of Canada and Singapore showed the possibility of cross-border linkages between CBDC systems having differing technical and governance standards.⁴⁰ In similar vein, Phase 2 of Project Inthanon-Lionrock (IL2) demonstrated the efficacy of a multi-CBDC arrangement. Here, the central banks of Hong Kong and Thailand issued their respective CBDCs on a single DLT platform (termed a ‘corridor network’) to reduce costs and delays in cross-currency and cross-border payments.

Notably, research and pilots involving cross-border CBDC payments has been with wholesale CBDCs, which designed to make large value inter-bank payments more efficient. That said, developing technological interlinkages across distinct CBDC systems (Project Jasper-Ubin) or operating a common multi-CBDC platform with other central banks (Project IL2) throw up **critical technological challenges** in creating scalable and resilient operating infrastructures.

Such interlinkages require coordination among the many stakeholders and participants involved, and as with conventional cross-border payment mechanisms, **these challenges may multiply with each additional CBDC linked to the system**.⁴¹ Further, in the Indian context, cross border capital flows are strictly regulated under FEMA and subject to controls set by the RBI and SEBI.

At this juncture therefore, developing technological interlinkages across jurisdictions must be preceded by a cautious assessment of the legal, regulatory and operational challenges. There however are **more immediate opportunities in making cross-border remittances (current account transactions) more efficient**. The digital rupee infrastructure could be used by non-residents to remit funds and make payments in India, without having to develop technology interlinkages with other jurisdictions.

India’s remittance market has risen to ~USD 90 billion in recent years.⁴² While these numbers are the highest among both emerging and advanced economies, the availability of low cost and rapid payment channels remains weak in India.⁴³ Cross-border remittances to India are enabled primarily by correspondent banking channels, postal channels, and specific enabling schemes by the RBI. These channels suffer from **high costs, low speeds, low transparency and high barriers to access**.⁴⁴ The NPCI has been exploring solutions to enable cross border remittance on UPI rails by executing memorandums of understanding with other jurisdictions.⁴⁵ It has for instance directed participant banks in UPI to enable international merchant payments by implementing APIs for UPI global.⁴⁶

However, there are challenges, ranging from establishing UPI technology integrations globally, to addressing security and settlement efficiency concerns domestically. Moreover, the RBI’s position on localization of financial data and its goal of ring-fencing domestic payment systems through local processing of payments⁴⁷ may affect cross border remittance using UPI.

Extending access to digital rupee wallets to non-residents on the other hand may offer relative advantages for cross-border remittances. Authorized Dealer Banks (AD Banks) which carry out permissible all current and capital account transactions in foreign exchange could play a role here. For instance, AD banks could convert funds held in INR denominated accounts of Non-resident Indians (NRI) and persons of Indian origin (PIO) into special non-resident digital rupee wallets within the digital rupee infrastructure.

Indeed, these non-resident digital rupee wallets would have limited functionality considering the capital flight and ML/TF risks involved. Transactions from these wallets may thus be subject to suitable limits in terms of purpose and volume caps as per extant controls – for instance caps in terms of repatriation of funds from Non-Resident (Ordinary) Rupee Accounts.⁴⁸ Access to preloaded digital rupee wallets (similar to a full-KYC prepaid payment instrument)⁴⁹ for international tourists and students may be explored as well.

China's e-CNY project permitted foreign tourists and business travellers to register to use an entry-level e-CNY wallet with a foreign mobile number during their stay in mainland China. Similarly, the Bahamian central bank lets non-residents transact and hold sand dollars on their visit to the Bahamas by registering for a 'Tier 1' sand dollar wallet (with a holding limit of SD 500 and a transaction limit of SD 1,500 per month).

While the opportunities for research, particularly through pilots and limited rollouts, are immense, concerns around the underlying technological and financial risks, customer identification and monitoring from an AML/CFT perspective, and fraud assessment protocols must be addressed at the outset.

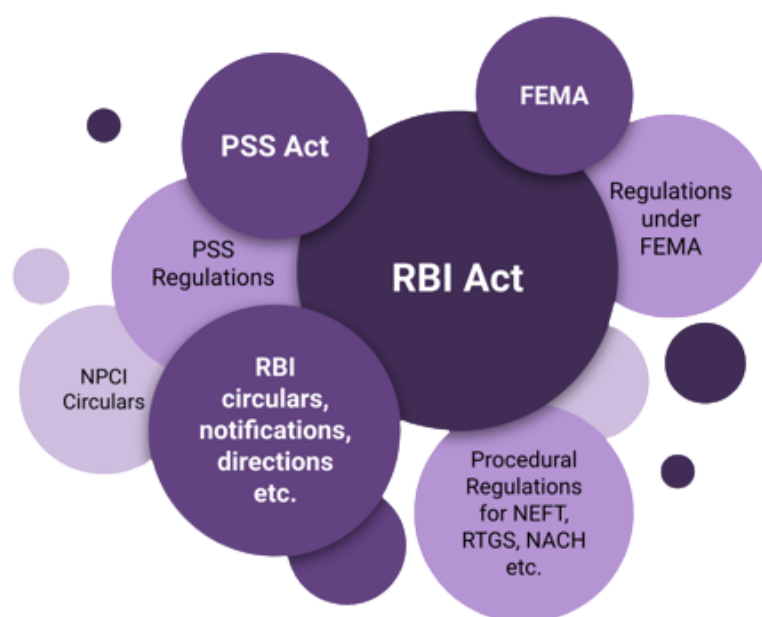
India should thus remain cautious and track global developments on developing interlinked CBDC projects across jurisdictions. As a more immediate step, policymakers in India should **explore ways to leverage the digital rupee infrastructure as a means of enabling remittances.**

LEGAL AND REGULATORY CONSIDERATIONS

A. Regulatory structures governing payments

Stakeholders in the Indian payments landscape are subjected to a complex web of governance structures with differing entry norms and compliance and reporting obligations. These range from statutes such as the PSS Act, and FEMA to directives issued by the RBI and guidelines issued by payment system operators such as the NPCI. The RBI is the principal payments regulator, deriving its powers from the RBI Act, the PSS Act and FEMA.

Product specific regulations govern the various domestic payment channels in India. For instance, the NEFT System Procedural Guidelines, 2011⁵⁰ issued by the RBI regulate the NEFT system. Additionally, RBI directives such as the Access Criteria for Payment Systems⁵¹ and the Master Direction on KYC Norms⁵² lay down capital adequacy thresholds and consumer due diligence norms respectively for participant banks and financial institutions involved in NEFT.



The complex web of regulatory and compliance structures governing payments in India

The NPCI, a payment system operator plays a key role in India's retail payments space. It operates the UPI and NACH payment systems for fast payments and bulk payment mandates respectively and the communication network for ATM transactions, among others. The NPCI issues technical standards through guidelines and periodic circulars for each of its payment products which cover aspects such as membership, transaction flows, compliance and minimum technical standards.

Cross-border payments are governed by FEMA which lists the entities authorized to deal in foreign currency and empowers the RBI to regulate such authorized persons. A number of RBI directives govern various aspects of cross-border payments such as money changing activities, forex transaction reporting, risk control and audit requirements management of individuals' accounts, and customer due diligence.

Specific enabling schemes issued under RBI directions such as the Money Transfer Service Scheme (MTSS)⁵⁹, the Rupee Drawing Arrangement (RDA)⁶⁰ and the Liberalised Remittance Scheme (LRS)⁶¹ offer structured cross-border payment channels. The MTSS involves tie-ups between overseas principles (for instance Western Union, MoneyGram, etc.) and their agents incorporated in India. Similarly, the RDA operates basis tie-ups between non-resident exchange houses and AD Banks. MTSS and RDA enable inward personal remittances (i.e., transactions from non-residents to residents) only. The LRS on the other hand is used for outward remittances by resident individuals in India. Under LRS, the remitter furnishes a request to purchase foreign exchange in a specific format, against which funds are remitted via a designated AD Bank to the non-resident beneficiary.

The RBI issues a diverse set of regulatory instruments such as notifications, circulars, and guidelines which it parallelly collates in the form of Master Circulars and Master Directions. These prescriptive regulatory instruments are often reactive to developments in technology and innovation and issued in a piecemeal manner.

This approach creates confusion in compliance and **dilutes the predictability of regulatory instruments**.⁶² A recent report of the RBI Regulations Review Authority also echoed the above concerns and recognized the need for standardisation and consolidation of regulatory instruments through regulatory handbooks for each kind of regulated entity or each subject matter.⁶³ As things stand however, the retail payments space in India remains unwieldy and has thus been characterized as being caught in a low-equilibrium trap.⁶⁴

Regulatory designs for the digital rupee infrastructure must look to avoid these legacy issues. For instance, a regulation for the digital rupee which prescribes thresholds and conditions for system participants, incorporates sections of other directions by reference etc., could lead to regulatory gaps and rigidity which may throttle innovation. System participants should instead be governed **under a consolidated first-principles framework** which takes certain core pillars as fundamental, while leaving adequate room for technical directions to be issued as and when required.

We delve deeper into these aspects in the following section.

B. Regulatory and operational framework for the digital rupee

Existing laws grant the RBI sufficient powers to set up legal and regulatory structures for a retail digital rupee. The RBI is the sole authority empowered to issue digital rupees.⁶⁵ Under the PSS Act, the RBI is empowered to regulate payment systems i.e., systems enabling the transfer of funds between a payer and a beneficiary, along with clearing and settlement functions.⁶⁶ This function-based definition of a ‘payment system’ would cover a CBDC system (regardless of the underlying technology) used for issuing and circulating digital rupees. Existing laws also empower the RBI to regulate operators⁶⁷ and participants⁶⁸ of payment systems.

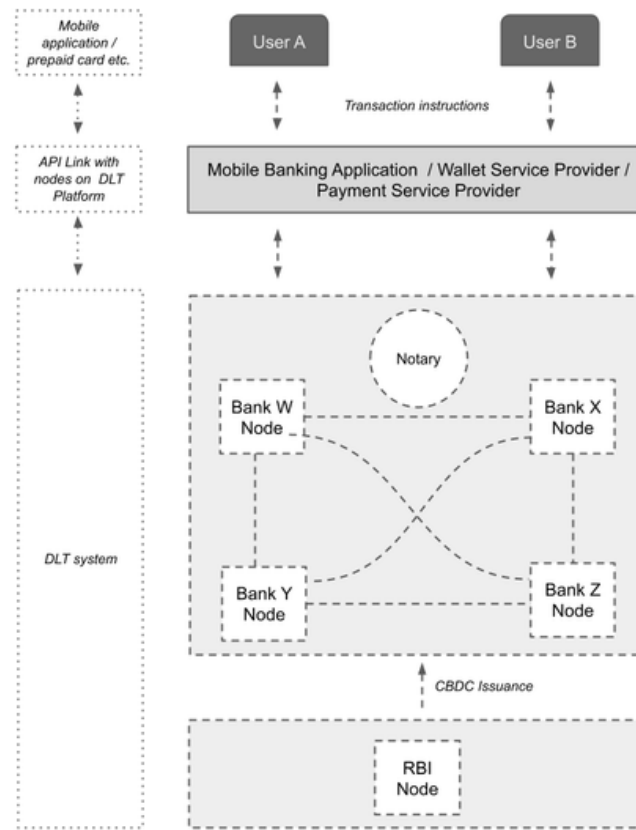
In developing a regulatory framework, the RBI should uphold the twin principles of responsibility and confidence. Responsibility entails that the operator and participants in the payments system are accountable and diligent in terms of risk monitoring, fraud assessments, adherence to prudential norms, and reporting. Confidence is the other side of the same coin which entails upholding consumer trust by ensuring transparency, safety of funds, maintaining secure and resilient systems and protecting financial data.

Indeed, the regulatory and operational frameworks for this retail payment system would vary depending on the choice of distribution architecture. Under a single-tier model, the RBI or a trusted payment system operator like the NPCI, or a dedicated new umbrella entity (as per existing authorization frameworks⁶⁹), may set up digital rupee accounts which may be funded from bank balances or cash deposits. However, given the RBI’s expansive operational mandate,⁷⁰ **enabling access to the private sector in serving households and businesses could develop the CBDC ecosystem more effectively.**

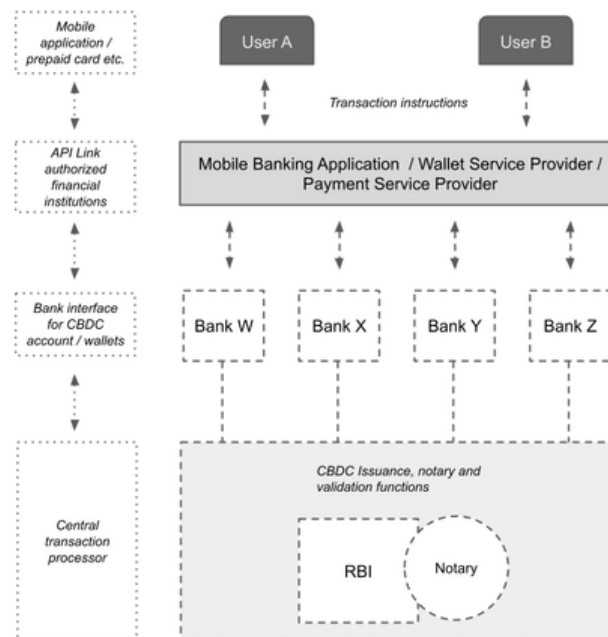
Under a multi-tier model, operation of the digital rupee infrastructure, particularly in terms of backend processing and discharging notary functions, could be entrusted with an umbrella entity such as the NPCI. However, when it comes to servicing consumer wallets, building financial products linked to the digital rupee and facilitating merchant integrations, financial institutions and PA/PGs could play a more central role.

In terms of governance of such a multi-tier digital rupee infrastructure, **the oversight framework for Financial Market Infrastructures⁷¹ (FMIs)** may be a useful point of reference. The framework governs systematically important payment systems i.e., those which have the potential to trigger or transmit systemic disruptions, or have systemic importance given the degree of interconnectedness and interdependencies in payment activities.

It delineates the scope of the RBI’s oversight activities - ranging from monitoring system functions, reviewing filings and disclosures, conducting audit inspections, and coordinating with other regulators through inter-regulatory committees.



Illustrative representation of interactions between users, financial institutions and PA/PGs on a DLT system



Illustrative representation of interactions between users, financial institutions and PA/PGs on a central processing system

Similarly, regulations such as the RBI Master Direction on Access Criteria for Payment Systems⁷² and Master Direction on Money Changing Activities⁷³ which lay down capital adequacy thresholds, minimum balance requirements etc., could inform regulatory questions on the maintenance and issuance of digital rupee wallets.

Given the consumer identification and ML/TF risks involved, particularly if non-residents are permitted access to CBDC wallets, the consolidated framework for the digital rupee may draw on the detailed customer diligence and risk management requirements set out in the RBI Master Direction on KYC norms⁷⁴ and reporting norms under the Prevention of Money Laundering Act, 2002, (PMLA)⁷⁵.

The Financial Intelligence Unit-India (FIU-IND) should have oversight powers to in respect of suspect financial transactions. Should non-residents be permitted access to digital rupee wallets for cross-border remittances, suitable limits in terms of purpose and volume caps as per current controls could be included. Such accounts and transactions should be subject to higher diligence, risk monitoring and reporting standards. Similarly, in case limited non-resident wallets are explored for international tourists or students, the controls applicable under the Master Directions on Prepaid Payment Instruments may be applicable with suitable modifications to improve adoption.

Thus, a consolidated governance framework centred around responsibility and confidence would focus regulatory attention towards security and resilience and subject authorized participants to high liquidity and solvency thresholds along with detailed risk management consumer diligence and reporting norms.

CONCLUSION

Payments are a dynamic, constantly evolving business. They have witnessed rapid improvements in India, whether it be the transition from Electronic Clearance Service (ECS) systems to the centralized NACH system, or from multiple cheque processing centres to the CTS, or the development of interoperable fast payment systems with offline capability.

Yet these improvements have been system specific, and are governed by silos of regulatory structures, reducing the scope for efficiency gains sharable across systems. As India looks to usher in the next frontier in retail payments technology, it should focus on improving security and trust in retail digital payments and ensuring measured anonymity. It should in addition look to address the steep centralization of settlement functions using MNSB files on the RTGS system.

A digital rupee designed as a means of payment could improve security in digital payments, balance data protection and privacy against traceability concerns from a taxation and ML/TF standpoint, and engender greater trust by virtue of being digital legal tender. And should access to non-residents via AD Banks be allowed, digital rupee payments could offer significant efficiency gains over legacy channels, further benefiting India's remittance market.

That said, issuance of fiat currency on a novel technology platform, must be preceded by a careful assessment of the operational, monetary policy and financial stability risks. Further, considering the sanctity of central bank services in maintaining public trust in domestic financial systems, the reliability, scalability, throughput and resilience of any CBDC project must be examined in depth.

We touched upon the global efforts to interlink wholesale CBDC systems across jurisdictions for boosting cross-border payments. Such rich interactions across CBDC systems presuppose a degree of maturity in the domestic CBDC infrastructure. India may look to exchange information, form partnerships and develop compatible systems to avoid long-time frames of post-hoc coordination exercises. As the RBI looks to join the global discourse and research around CBDCs, it should remain cognizant of the global challenges, concerns and research objectives in this exciting new field.

In terms of legal structures, policymakers should be mindful of the fragmented legal landscape of payments in India, and accordingly forge a streamlined, principles-based framework governing the payments system of tomorrow. This framework could flow from the twin principles of responsibility and confidence and may draw on existing regulations to lend clarity and agility for regulated entities and regulators alike.

In sum, CBDCs promise increased convenience, security and measured anonymity, coupled with instant settlement of retail payments which would help India's ambitions of transforming into a resilient, less-cash economy. To ease the trade-off against the risks and challenges involved, researchers and policymakers should look to address critical design elements of the digital bank note. Questions relating to the extent of participation of the private sector in distribution, the underlying technology architecture, access to non-residents and balancing anonymity with traceability ought to remain primary focus areas for India over the next few years.

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