Venom

# The End of Traditional Money

## How Asia and MENA Are Rewriting Global Finance

Stablecoins and CBDCs - The $2 Trillion Transformation That Will Make Physical Cash Obsolete

VENOM FOUNDATION

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# Executive Summary

## Three Factors That Will Transform Finance Forever

### 1. Post-2028 Cash Will Become Obsolete

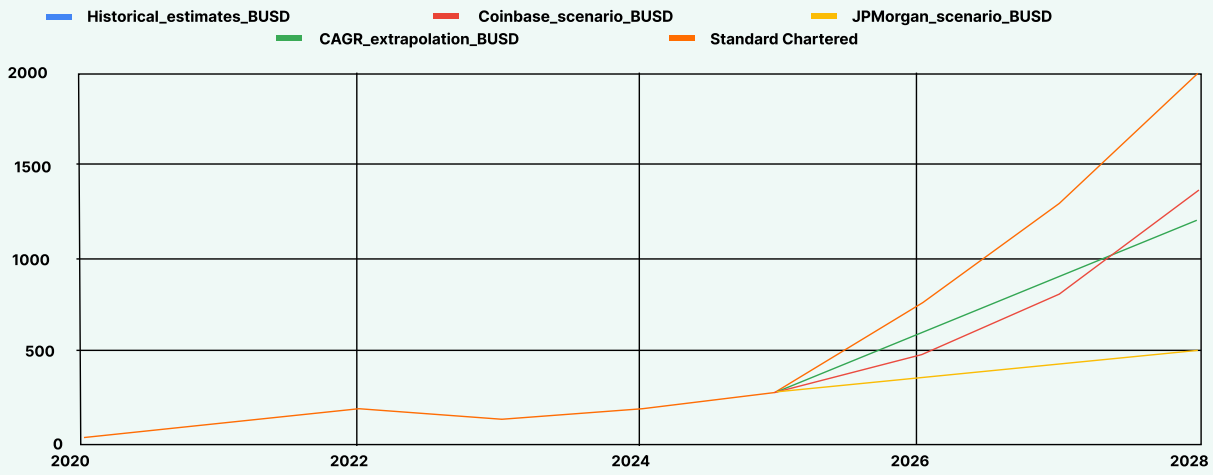
The era of physical money is ending faster than anyone predicted. With 137 countries representing 98% of global GDP now actively building CBDCs and China already processing $986 billion in digital yuan transactions, we're witnessing the largest monetary transformation in human history. The UAE launches its Digital Dirham in Q4 2025, India's digital rupee grew 334% in one year, and by 2028, traditional cash transactions will become the exception, not the rule.

### 2. The $2 Trillion Stablecoin Explosion Will Crush Traditional Banking

Private stablecoins are projected to skyrocket from $246 billion today to $2 trillion by 2028—an 8X growth in just 3 years. This isn't gradual change; it's a financial revolution. Every major economy is racing to regulate stablecoins (EU's MiCA, US GENIUS Act, UAE's licensing framework) because they know: whoever controls digital currency standards will control the future of money. Traditional banks that don't adapt will become irrelevant.

### Global Stablecoin Market Size (2020–2028, USD billions)

**Historical data (2020–2025) and forecast scenarios (2026–2028)**



Historical/anchor points (2020-2025): actual market data showing growth from ~$5B (2020) to ~$190B (2022), then decline to ~$130B (2023), recovery to ~$190B (2024), and ~$290B (2025)
Coinbase scenario (forecast to 2028): optimistic projection reaching ~$1.2 trillion by 2028
JPMorgan scenario (forecast to 2028): conservative projection reaching ~$500B by 2028
CAGR extrapolation (2020-2025 baseline, CAGR=58.72%): middle ground projection reaching ~$1.13 trillion by 2028

**Key message:** The stablecoin market has shown strong historical growth and forecasts vary widely - from conservative $500B to optimistic $1.2T by 2028, depending on regulatory environment and adoption rates. The historical CAGR-based projection sits between the two scenarios.
Title: "Stablecoin market: historical anchors (2020-2025) and forecasts (2026-2028)" with subtitle meaning "billions of USD"
Legend should clearly distinguish historical data (solid line) from forecasts (dashed/dotted lines). Use different colors for each scenario. Style should be professional, clean, easy to read. Make sure the divergence of scenarios after 2025 is visually clear - that's the story.

### 3. Asia and MENA Will Dethrone the Dollar

Project mBridge—connecting China, UAE, Thailand, Hong Kong, and Saudi Arabia—has achieved MVP status and is already processing real cross-border transactions. This isn't theory anymore. The platform bypasses SWIFT, eliminates the $120 billion annual cost of correspondent banking, and settles transactions in seconds instead of days. Saudi Arabia's oil, UAE's trade, and China's manufacturing are moving off-dollar rails right now. The 80-year era of dollar hegemony in global payments is ending—not in decades, but in the next 24-36 months.

# The New Reality

The landscape of digital currencies in Asia and the Middle East & North Africa (MENA) regions is undergoing a profound transformation. As of 2025, 137 countries and currency unions representing 98% of global GDP are exploring Central Bank Digital Currencies (CBDCs), with Asia and MENA emerging as pioneering regions in both CBDC development and stablecoin adoption. This research examines the convergence of public and private digital currency initiatives, analyzing key trends, technological innovations, and regulatory frameworks that position these regions at the forefront of the global digital finance revolution.

The dual mandate of reducing cross-border payment costs while enhancing financial inclusion drives most initiatives. With remittance flows to low- and middle-income countries reaching $685 billion in 2024 and the average cost of sending $200 remaining at 6.4%—well above the UN Sustainable Development Goal target of 3%, digital currencies present a compelling solution to long-standing financial infrastructure challenges.

# 1. Introduction and Outlook

## 1.1 Relevance and Context

The digital currency revolution in Asia and MENA is driven by three converging forces:

**Economic Imperative:** Traditional banking systems impose significant costs on cross-border transactions. The global network of correspondent banks is hindered by high costs, low speed and transparency, and operational complexities due to duplicated processes in payment chains. Emerging markets particularly bear the brunt of these inefficiencies.

**Financial Inclusion Gap:** Despite rapid economic growth, significant portions of the population in both regions remain unbanked or underbanked. Digital currencies offer a pathway to extend financial services to underserved populations through mobile-first infrastructure.

**Technological Readiness:** High mobile penetration rates, advanced digital infrastructure, and supportive regulatory frameworks have created an environment conducive to digital currency adoption. In Asia, countries have achieved remarkable mobile payment penetration, while MENA nations are investing heavily in blockchain-based financial infrastructure.

## 1.2 Dual Objectives

### This research synthesizes:

**Digital currency initiatives in these regions pursue two primary goals:**

1. Reducing Cross-Border Payment Costs: Current remittance costs average 6.4% globally, with some corridors experiencing even higher fees. Digital currencies promise near-instantaneous, low-cost transactions.

2. Enhancing Financial Inclusion: By providing digital access to central bank funds and enabling programmable payments, CBDCs and stablecoins can extend financial services to previously excluded populations.

## 1.3 Research Methodology

### This research synthesizes:

- Official central bank publications and policy documents
- International organization reports (BIS, IMF, World Bank)
- Industry analysis from financial institutions and consulting firms
- Regulatory frameworks and legislative updates through Q4 2025
- Cross-border pilot project results and technical documentation

# 2. Market Overview: Stablecoins and CBDCs

## 2.1 Key Definitions and Classifications

Central Bank Digital Currencies (CBDCs)

CBDCs represent digital forms of sovereign fiat currency issued and regulated by central banks. They exist in two primary models:

Retail CBDCs: Designed for use by the general population and businesses for everyday transactions. These function as digital equivalents of cash, accessible through digital wallets and payment platforms. Examples include China's Digital Yuan (e-CNY) and India's Digital Rupee (e₹).

Wholesale CBDCs: Restricted to financial institutions for interbank settlements and securities transactions. These aim to improve the efficiency of existing financial market infrastructure. Notable examples include Singapore's Project Ubin and the multi-country Project mBridge.

## Stablecoins

Stablecoins are privately issued digital tokens designed to maintain stable value through various mechanisms:

**FIAT-COLLATERALIZED STABLECOINS**

Backed 1:1 by fiat currency reserves (e.g., USDT, USDC). These dominate the current market with USDT's market capitalization reaching $139.5 billion as of February 2025.

**COMMODITY-BACKED STABLECOINS:**

Pegged to physical assets like gold or other commodities, offering an alternative to fiat-based stability.

**ALGORITHMIC STABLECOINS:**

Use algorithms and smart contracts to maintain stability without full collateral backing. These face increased regulatory scrutiny and are prohibited in several jurisdictions.

**HYBRID PUBLIC-PRIVATE MODELS**

An emerging category involves partnerships between central banks and private technology providers, combining the trust of government-backed currencies with private sector innovation and efficiency.

## 2.2 Macro Trends in the Regions

### Banking and Financial Inclusion Statistics

Financial inclusion remains a critical challenge. The World Bank data indicates varying levels of bank account ownership across regions, with rural and low-income populations particularly underserved. Digital currencies offer potential solutions through mobile-accessible financial services.

### Remittance Flows

**SOUTH ASIA**

leads global remittance growth, with flows expected to increase by 11.8% in 2024, driven primarily by IIndia alone accounted for an estimated $129 billion in remittances in 2024 making it the world's largest recipient.

**MENA REGION**

Remittances are projected to grow 5.4% in 2024, rebounding from a 14.6% decline in 2023,primarily due to recovered flows to Egypt. However, the region faces challenges deriving from exchange rate instability, which diverts flows to informal channels.

**EAST ASIA AND PACIFIC**

Remittances reached $85 billion in 2023, with growth projected at 3.2% in 2024 (excluding China).

### Technology Infrastructure

**Mobile Penetration:** High smartphone adoption rates across both regions enable rapid digital payment adoption. Digital remittances now constitute nearly half of all remittances globally, with 553% of consumers turning to digital apps to send and receive funds internationally.

**Regulatory Support:** Progressive regulatory frameworks, particularly in Singapore, UAE, Hong Kong, and Bahrain, have created favorable environments for digital currency innovation through regulatory sandboxes and clear licensing regimes.

**Blockchain Readiness:** Investment in distributed ledger technology infrastructure and blockchain expertise has accelerated, with both regions hosting major blockchain development hubs.

# 3. Regional Analysis: Key Countries

## 3.1 Asia

### China: Digital Yuan (e-CNY) – World's Largest CBDC Pilot

China's Digital Yuan represents the most advanced and large-scale CBDC implementation globally:

**Scale and Adoption:** By June 2024, total transaction volume reached 7 trillion e-CNY ($986 billion) across 17 provincial regions, nearly quadruple the 1.8 trillion yuan recorded in June 2023. The system spans diverse sectors including education, healthcare, and tourism.

**Ecosystem Integration:** The People's Bank of China (PBOC) has integrated e-CNY into major commercial banks and payment platforms, including partnerships with state-owned banks and technology companies like Tencent. The system supports both online and offline functionality.

**Cross-Border Initiatives:** China actively participates in Project mBridge, demonstrating its commitment to international CBDC interoperability and positioning the e-CNY as a potential alternative to dollar-dominated payment systems.

**Strategic Objectives:** Beyond domestic modernization, the e-CNY serves China's broader goals of financial system autonomy, enhanced transaction traceability, and gradual internationalization of the yuan.

### Singapore: Project Ubin and Regulatory Leadership

Singapore has established itself as Asia's premier digital finance hub through systematic innovation:

**Project Ubin Evolution:** Launched in 2016, Project Ubin successfully completed five phases by 2020, exploring wholesale CBDC applications. The project demonstrated that blockchain technology can enable faster and cheaper cross-border transactions than conventional systems.

**Ubin+ Initiative:** Building on Project Ubin's foundation, Singapore launched Ubin+ in 2022 to advance cross-border connectivity with wholesale digital currencies. Current collaborations include Project Cedar Phase II with the New York Federal Reserve and Project Mariana with France, Switzerland, and the BIS.

**Regulatory Framework:** The Monetary Authority of Singapore (MAS) provides clear guidance for stablecoin issuers under its Digital Payment Token framework, allowing stablecoins pegged to any G10 currency. This regulatory clarity has attracted major issuers and fintech innovators.

**Commercial Applications:** Project Ubin validated use cases including cross-border payments in multiple currencies, foreign currency exchange, settlement of foreign currency denominated securities, and integrated payment and settlement for securities and trade finance.

### India: Digital Rupee and UPI Integration

India's approach combines CBDC development and leveraging its highly successful United Payments Interface (UPI):

**Rapid Growth:** Digital rupee circulation rose to ₹10.16 billion ($122 million) by March 2025, up 334% from ₹2.34 billion in 2024, making it the second-largest CBDC pilot globally after China.

**Dual Approach:** The Reserve Bank of India (RBI) is expanding both retail and wholesale CBDCs with new use cases, offline functionality, and broader participation. The pilot involves multiple banks and has expanded to include fintech platforms.

**Integration Strategy:** India's strategy leverages its existing UPI infrastructure, which processes billions of transactions monthly, to accelerate digital rupee adoption. The first fintech platform to join, Cred, made the e-rupee available to users in January 2025.

**Legal Framework:** The RBI Act 1934 has been amended to redefine 'bank note' to include digital forms, providing clear legal authority for digital currency issuance.

**Population Reach:** With India's massive population and the world's largest remittance inflows, the digital rupee has potential for significant impact on financial inclusion and cost reduction in remittances.

### Thailand: Project Inthanon and Cross-Border Corridors

Thailand has pioneered wholesale CBDC exploration with strong focus on regional connectivity:

**Project Inthanon:** The Bank of Thailand (BOT) developed a proof-of-concept decentralized Real-Time Gross Settlement (RTGS) system using a CBDC on distributed ledger technology. The project successfully completed multiple phases exploring DLT applications in specific use cases.

**Cross-Border Innovation:** Project Inthanon-LionRock, a collaboration between Thailand and Hong Kong, formed a cornerstone of the eventual Project mBridge, demonstrating successful cross-border CBDC settlement.

**Retail CBDC Development:** Thailand is preparing retail CBDC pilots based on a hybrid architecture, with the BOT issuing currency while intermediaries handle KYC and customer-facing functions. The design combines centralized technology for scalability with decentralized elements for resilience.

**Stablecoin Progress:** Thailand made headlines by approving domestic trading of USDT in March 2025, signaling a more flexible regulatory approach. The government is also considering issuing a stablecoin backed by 10 billion baht in government bonds.

### Indonesia: Emerging CBDC Leadership

Indonesia is positioning itself as an early adopter of CBDC-backed financial instruments:

**Digital Securities Initiative:** Bank Indonesia announced plans to issue digital securities backed by government bonds, described as the country's own stablecoin version supported by its CBDC framework. These will be tokenized representations of government bonds, fully supported by the digital rupiah.

**Crypto Adoption:** Indonesia ranked seventh in the 2025 Global Crypto Adoption Index, demonstrating strong retail and institutional participation. This high engagement level creates favorable conditions for official digital currency initiatives.

**Innovation Strategy:** By combining the digital rupiah with government bond-backed securities, Indonesia is creating a hybrid financial model blending traditional economic stability with blockchain technology advantages.

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## 3.2 MENA Region

### United Arab Emirates: Comprehensive Digital Currency Strategy

**The UAE has emerged as the MENA region's digital currency leader through coordinated federal and emirate-level initiatives:**

**Digital Dirham Launch:** The Central Bank of the United Arab Emirates (CBUAE) plans to launch a retail CBDC—the Digital Dirham—by Q4 2025. This represents the culmination of the Financial Infrastructure Transformation (FIT) Programme, which achieved 85% completion by January 2025.

**Cross-Border Leadership:** The UAE is a founding participant in Project mBridge alongside China, Hong Kong, and Thailand. In January 2024, the UAE conducted its first cross-border digital dirham payment worth AED 50 million (approximately $13.6 million).

**Project Aber:** A bilateral wholesale CBDC initiative with Saudi Arabia (launched 2019) successfully demonstrated that distributed ledger technology can effectively facilitate both domestic and cross-border transactions using central bank funds.

**Stablecoin Regulation:** In June 2024, the CBUAE approved regulations for dirham-backed stablecoins, establishing licensing guidelines for fiat-referenced tokens (FRTs). The framework requires 1:1 backing by fiat currency, prohibiting algorithmic stablecoins.

**First Licensed Stablecoin:** AE Coin, launched by AED Stablecoin LLC in January 2025, became the first dirham-pegged stablecoin approved in the UAE's digital financial ecosystem.

**Regional Hub Status:** The UAE received $30 billion in digital assets in the year ending June 2024, making it the third-largest digital asset destination in MENA (following Turkey and Saudi Arabia).

**Strategic Vision:** The Digital Dirham initiative aligns with the "We the UAE 2031" vision and the UAE Digital Economy Strategy, which aims to double the digital economy's contribution to non-oil GDP within 10 years.

## Saudi Arabia: Vision 2030 and Digital Currency Integration

**Saudi Arabia's approach reflects its broader economic transformation strategy:**

**mBridge Participation:** Saudi Arabia joined Project mBridge as a full participant in June 2024, expanding the platform's reach and adding significant geopolitical weight to the initiative. This move aligns with Saudi efforts to diversify away from dollar-dependency.

**Project Aber Legacy:** The successful three-phase CBDC pilot with the UAE demonstrated the feasibility of central bank and commercial bank cross-border settlement using digital currencies.

**Vision 2030 Alignment:** Saudi Arabia is advancing Web3 applications through its NEOM smart city project, experimenting with NFTs and tokenized digital economies. A formal licensing regime for Virtual Asset Service Providers (VASPs) is expected by late 2025.

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**Regulatory Development:** While Saudi Arabia has taken a more cautious approach than the UAE—partly due to Sharia-related considerations—draft stablecoin guidelines are under discussion, with foreign stablecoins remaining heavily restricted.

## Bahrain: Regional Fintech Pioneer

**Bahrain established early leadership in crypto regulation and continues to advance:**

**Regulatory Framework:** : Since 2019, Bahrain's Central Bank (CBB) has integrated virtual assets under its Capital Markets Rulebook through the Crypto Assets Module (CRA), updated quarterly.

**CBDC Pilot:** A wholesale CBDC pilot with commercial banks using USD was completed in 2021. Further regional interoperability pilots are underway in 2025.

**Fintech Hub Status:** Bahrain was the first GCC country to formalize a comprehensive crypto regulatory framework, positioning itself as an attractive jurisdiction for blockchain innovators and VASPs.

**Stablecoin Approach:** The CBB governs stablecoins under existing CRA rules without separate legislation, integrating them into the broader crypto assets regulatory framework.

### Turkey: Economic Pressures and Digital Lira Research

**Turkey's digital currency exploration is taking place against a backdrop of economic challenges:**

**Digital Lira Research:** Turkish authorities are conducting research into a digital lira, though progress has been more measured compared to Gulf nations.

**Economic Context:** High inflation and currency volatility create both challenges and opportunities for CBDC implementation. A well-designed digital currency could enhance monetary policy transmission and provide more stable payment infrastructure.

**Crypto Activity:** Turkey ranked as a leading digital asset destination in MENA, with $30+ billion received in the year ending June 2024, indicating strong grassroots demand for digital currency alternatives.

## 3.3 Role of Technology Partners in Regional Development

#### Successful Central Bank-Blockchain Platform Partnerships

The development of CBDCs requires sophisticated technological infrastructure and expertise that central banks typically acquire through partnerships:

**BIS Innovation Hub:** Provides technical expertise and facilitates multi-country collaboration on projects like mBridge, Dunbar, and Mariana. The BIS brings credibility and international coordination to experimental initiatives.

**Commercial Technology Providers:** Companies like Accenture, J.P. Morgan, Deloitte, and Nasdaq have provided technical expertise for various CBDC pilots. For example, Project Ubin involved multiple technology partners including Anquan, Deloitte, and Nasdaq.

**Blockchain Platform Providers:** Various distributed ledger technologies have been tested, including Corda (used in Canada's Project Jasper), Quorum (used in Singapore's Project Ubin), and custom-built solutions like the mBridge Ledger.

# Venom: Innovative Platform for Governmental Digital Currencies

As governments and central banks seek scalable, secure blockchain infrastructure for CBDCs, specialized platforms like Venom offer compelling advantages:

**Technical Architecture:** Purpose-built blockchain platforms designed specifically for institutional requirements offer advantages in scalability, security, and regulatory compliance compared to general-purpose blockchains.

**Scalability Solutions:** Handling millions of transactions for retail CBDCs requires infrastructure capable of matching or exceeding traditional payment systems. Specialized CBDC platforms must demonstrate performance under real-world load conditions.

**Privacy and Compliance:** CBDC platforms must balance transaction privacy with regulatory requirements for AML/KYC compliance and law enforcement access. Advanced cryptographic techniques enable selective disclosure while maintaining user privacy.

**Interoperability Design:** Modern CBDC platforms must support cross-border interoperability, atomic settlement, and integration with existing financial market infrastructure.

**Governance Frameworks:** Successful CBDC implementation requires sophisticated governance mechanisms that allow central bank control while enabling innovation through developer ecosystems.

## Contributing to CBDC Ecosystem Development

### Technology partners contribute across multiple fronts:

**Technical Innovation**: Advancing consensus mechanisms, privacy-enhancing technologies, and scalability solutions specifically tailored for central bank requirements.

**Standards Development:** Contributing to emerging international standards for CBDC interoperability, security, and data formats.

**Capacity Building:** Providing training and knowledge transfer to central bank technical teams, enabling them to evaluate and operate complex distributed systems.

**Pilot Implementation:** Supporting proof-of-concept development and pilot programs that allow central banks to test functionality before committing to full deployment.

# 4. Technological Models and Partnerships

## 4.1 Architectural Solutions

### One-Tier vs. Two-Tier CBDC Models

**One-Tier (Direct) Model: Central banks issue a CBDC directly to end users, maintaining direct relationships with all wallet holders. This approach:**

- Provides maximum central bank control
- Ensures uniform user experience
- Requires central banks to handle customer service, KYC, and compliance
- May burden central banks with operational complexity
- Raises disintermediation concerns for commercial banks

**Two-Tier (Indirect/Hybrid) Model: Central banks issue a CBDC to authorized intermediaries (commercial banks, payment service providers), who then distribute to end users. This approach:**

- Leverages existing banking infrastructure and customer relationships
- Reduces operational burden on central banks
- Preserves role of commercial banks in the financial system
- Allows competition among intermediaries for better services
- Most jurisdictions favor this model, including China, India, Thailand, and UAE

## DLT vs. Traditional Technologies

### The technical foundation for CBDCs varies by jurisdiction:

**Distributed Ledger Technology (DLT):**

- Project mBridge uses a custom-built permissioned blockchain (mBridge Ledger) with Ethereum's Solidity smart contract language and HotStuff+ consensus mechanism
- Offers transparency, resilience, and cryptographic security
- Enables programmable money and smart contract functionality
- Most advanced CBDC pilots employ DLT in some form

**Hybrid Approaches:**

- Thailand's retail CBDC combines centralized technology for scalability with decentralized technology for resilience
- Allows central banks to optimize for different requirements (speed, security, compliance)

**Centralized Databases:**

- Some jurisdictions explore traditional database architectures with cryptographic security
- Can offer higher transaction throughput and simpler governance
- May be appropriate for specific use cases or transitional phases.

## 4.2 Cross-Border Solutions

### Project mBridge: Multi-CBDC Platform

**Project mBridge represents the most advanced cross-border CBDC initiative:**

**Participants:** Hong Kong Monetary Authority, Central Bank of UAE, Digital Currency Institute of the People's Bank of China, Bank of Thailand, and Saudi Central Bank (joined 2024). Over 26 central banks participate as observers.

**Technical Architecture:** The mBridge Ledger enables instant peer-to-peer cross-border payments and foreign exchange transactions using wholesale CBDCs. The platform is compatible with the Ethereum Virtual Machine and supports atomic settlement.

**Milestone Achievement:** Project mBridge reached minimum viable product (MVP) status in mid-2024, enabling real-value transactions subject to jurisdictional preparedness.

**Transaction Results:** During the pilot phase, $22 million in trade transactions were executed involving 20 commercial banks over six weeks. The platform validated 160 transactions.

**Governance:** A bespoke governance and legal framework including a comprehensive rulebook was developed, tailored to match the platform's decentralized nature.

**Strategic Significance:** The platform addresses key cross-border payment inefficiencies: high costs (currently estimated at $120 billion annually in transaction fees), low speed, limited transparency, and operational complexity.

**Future Direction:** Following BIS Innovation Hub's transition from the project in October 2024, the participating central banks continue development with potential for broader international participation. The initiative has attracted significant attention as a potential alternative to SWIFT-dominated payment infrastructure.

### Bilateral CBDC Corridors

**Beyond multilateral platforms, bilateral initiatives are exploring specific use cases:**

**Project Aber (UAE-Saudi Arabia)**:Successfully demonstrated domestic and cross-border settlementusing a single dual-issued currency on DLT.

**Inthanon-LionRock (Thailand-Hong Kong):** Laid the groundwork for mBridge, proving feasibility of cross-border wholesale CBDCs.

**Cedar x Ubin+ (Singapore-USA):** Examined atomic settlement of cross-border transactions using wholesale CBDCs as settlement assets, demonstrating DLT connectivity across heterogeneous currency ledgers.

### Interoperability Standards

Emerging standards are critical to cross-border CBDC success:

ISO 20022: Most projects have adopted this global messaging standard for financial information, enabling easy connection and integration through APIs.

Atomic Settlement: Ensures simultaneous exchange and final settlement of digital currencies and securities, eliminating settlement risk.

**Cross-Ledger Connectivity:** Technical solutions enabling different DLT platforms to communicate and transact, addressing the challenge of multiple countries potentially using different technologies.

## 4.3 Public-Private Partnerships

### Models of Central Bank-Technology Company Collaboration

**Several partnership models have emerged:**

**Research Consortia:** Central banks convene technology companies, academics, and financial institutions to jointly research CBDC feasibility (e.g., Project Ubin's five-phase evolution).

**Proof-of-Concept Development:** Technology providers build prototypes for central bank testing under specific technical specifications and requirements.

**Commercial Deployment:** In some cases, technology partners may provide ongoing infrastructure services, though central banks typically retain ultimate control.

**Regulatory Sandboxes:** Jurisdictions like Singapore and UAE provide controlled environments where technology companies can test innovations with regulatory oversight.

### Examples of Successful Alliances

**Singapore's Multi-Partner Approach:** Project Ubin involved collaboration with J.P. Morgan, Accenture, Nasdaq, Deloitte, Anquan, and the Association of Banks in Singapore, enabling diverse expertise.

**mBridge Industry Involvement:** Private sector participation includes major corporations like Tencent (since September 2023), enhancing cross-border clearing and settlement services.

**India's Phased Expansion:** The RBI enlisted major banks (SBI, ICICI, IDFC First, HDFC) for retail pilot phases, then expanded to fintech platforms, demonstrating systematic partnership expansion.

### Role of International Consortia

**BIS Innovation Hub:** Facilitates technical experimentation and knowledge sharing across multiple jurisdictions, reducing duplication of effort.

**World Bank and IMF:** Provide analytical support, technical assistance, and capacity development for member countries exploring CBDCs.

**Industry Organizations:** Groups like the Financial Stability Board (FSB) are developing high-level recommendations for global stablecoin arrangements and CBDC standards.

## 4.4 Innovative Technological Solutions

### Advanced Blockchain Platforms for CBDCs

**The evolution of CBDC technology requires platforms to fulfill specific requirements:**

**Scalability:** Ability to process high transaction volumes (potentially hundreds of thousands or millions per second) to serve entire populations.

**Privacy Enhancement:** Technologies like zero-knowledge proofs, secure multi-party computation, and selective disclosure enable privacy while maintaining regulatory compliance.

**Programmability:** Smart contract functionality enabling conditional payments, automatic tax collection, targeted stimulus distribution, and supply chain finance.

**Offline Functionality:** Solutions enabling CBDC transactions without internet connectivity, critical for rural areas and disaster scenarios.

### Specialized Platforms: Technical Advantages

**Purpose-built CBDC platforms offer several advantages over general-purpose blockchain technologies:**

**Institutional Control:** Governance mechanisms providing central banks with appropriate oversight while enabling innovation.

**Regulatory Compliance:** Built-in features for AML/KYC, transaction monitoring, and reporting that meet central bank requirements.

**Performance Optimization:** Architecture specifically designed for payment system requirements rather than general-purpose computing.

**Integration Capabilities:** Native support for connecting with existing financial market infrastructure, including RTGS systems, securities exchanges, and international payment networks.

**Disaster Recovery:** Robust backup and recovery mechanisms meeting central bank operational risk standards.

# 5. Regulatory Approaches

## 5.1 Regulatory Evolution

### From Prohibition to Experimentation

**The regulatory journey across Asia and MENA demonstrates significant progress:**

**Early Skepticism (2017-2020):** Initial responses ranged from cautious observation to outright prohibition. China banned cryptocurrency trading in 2021, while several MENA countries maintained restrictive stances.

**Shift to Exploration (2020-2023):** Recognition of blockchain technology's potential led central banks to initiate research and pilot programs. The number of countries exploring CBDCs expanded from 35 in May 2020 to 137 by 2025.

**Current Phase (2024-2025):** 91% of 93 surveyed central banks are now exploring either retail CBDCs, wholesale CBDCs, or both. Acceleration occurred as more than one in three jurisdictions responded to developments in stablecoins and cryptoassets

### Regulatory Sandboxes and Pilot Zones

**Progressive jurisdictions established controlled environments for innovation:**

**Singapore:** MAS's fintech regulatory sandbox allows companies to test innovative financial products and services in a contained environment with regulatory oversight.

**UAE:** Both the Abu Dhabi Global Market (ADGM) and Dubai's Virtual Asset Regulatory Authority (VARA) provide comprehensive frameworks for digital asset testing.

**Thailand:** Established a regulatory sandbox in August 2024, allowing specific service providers to experiment with cryptocurrencies under supervision.

**Hong Kong:** Plans to introduce a stablecoin regulatory bill and has launched extensive pilot programs for both wholesale and retail CBDC applications.

**Bahrain:** Integrated virtual assets into its regulatory framework through quarterly-updated Crypto Assets Module.

### Licensing vs. Permissioned Regimes

**Different jurisdictions are adopting a variety of approaches:**

**Comprehensive Licensing:** Singapore, Hong Kong, Japan, and Bahrain require explicit licenses for digital asset services, with detailed requirements for capital, governance, and risk management.

**Permissioned Access:** Some CBDCs operate on permissioned networks where only authorized institutions can participate, with central bank oversight determining access.

**Hybrid Models:** The two-tier CBDC model allows central banks to maintain control of currency issuance while licensed intermediaries provide services to end users.

## 4.4 Innovative Technological Solutions

### Role of BIS and IMF in Standardization

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**Disaster Recovery:** Robust backup and recovery mechanisms meeting central bank operational risk standards.

### Bank for International Settlements (BIS)

Through its Innovation Hub, BIS facilitates technical experimentation including major projects like mBridge, Dunbar, and Mariana

- Publishes research and best practices for CBDC design and implementation
- Provides neutral platform for multi-country collaboration
- BIS 2024 survey found 91% of central banks exploring CBDCs

### International Monetary Fund (IMF):

Published comprehensive papers on CBDCs in Middle East & Central Asia and global considerations

- Provides technical assistance and capacity development to member countries
- Identifies key policy questions including financial stability implications, operational risks, and design considerations
- Emphasizes importance of country-specific analyses rather than one-size-fits-all approaches

### Financial Stability Board (FSB):

- Published High Level Recommendations on Global Stablecoin Arrangements in 2023
- Coordinates cross-border regulatory approaches
- Addresses systemic risks for large-scale stablecoin adoption

## Regional Initiatives and Agreements

**ASEAN Cooperation:** Countries in Southeast Asia are increasingly coordinating on digital payment systems and CBDC research, recognizing the benefits of regional interoperability.

**GCC Coordination:** Gulf Cooperation Council countries (UAE, Saudi Arabia, Bahrain, Kuwait, Oman, Qatar) share information and coordinate approaches on digital currency initiatives, as evidenced by bilateral projects like Aber.

**BRICS Digital Currency Discussions:** Emerging discussions about alternative payment mechanisms, with mBridge positioned as potential infrastructure for reducing dependency on dollar-dominated systems.

## Harmonization of AML/KYC Requirements

**FATF Travel Rule**: As of April 2024, 65 out of 94 nations have implemented Travel Rule laws for digital assets, with 15 more in progress. The rule requires transmission of originator and beneficiary information for crypto transfers.

**Common Standards:** Jurisdictions increasingly adopt consistent approaches to Anti-Money Laundering (AML) and Know Your Customer (KYC) requirements for digital currency services.

**MiCA Framework:** The EU's Markets in Crypto-Assets Regulation, fully effective December 2024, sets comprehensive standards influencing global approaches.

**Cross-Border Cooperation:** Information sharing agreements between regulators facilitate detection of illicit activity across jurisdictions.

## 5.3 Stablecoin Regulation

### Major Regulatory Frameworks (2024-2025)

#### European Union - MiCA

- Fully implemented December 2024
- Distinguishes between E-Money Tokens (EMT) - backed by single fiat currency - and Asset-Referenced Tokens (ART) - backed by baskets of assets
- Requires EU-based authorization, reserve requirements, and consumer protection measures
- Imposed delisting deadlines for non-compliant stablecoins by end of Q1 2025

#### United States - GENIUS Act:

- Signed by President Trump in 2025 as first major federal crypto legislation
- Focuses on stablecoin regulatory guidelines
- Working group tasked with submitting recommendations by July 2025
- Emphasizes dollar-backed stablecoins to strengthen dollar dominance

**United Arab Emirates:**

- CBUAE approved fiat-referenced tokens (FRT) regulation June 2024
- Requires 1:1 fiat backing; prohibits algorithmic stablecoins
- AE Coin became first licensed dirham stablecoin in January 2025
- Major issuers like Tether approved to operate in ADGM

**Hong Kong:**

- Stablecoin Ordinance passed in May 2025
- Establishes licensing regime for fiat-referenced stablecoins
- Requirements cover value stability, redemption rights, governance, and risk management
- Permits stablecoins pegged to HKD, offshore RMB, EUR, and other currencies

**Singapore:**

- Digital Payment Token framework allows stablecoins pegged to any G10 currency
- Clear regulatory guidance attracts major issuers
- StraitsX's XSGD (SGD-linked) achieved broad local adoption

**Japan:**

- Most advanced stablecoin regulation globally through Payment Services Act amendments
- 2025 amendments allow trust-type stablecoins to use up to 50% reserves in low-risk instruments
- Introduced special registration for crypto intermediaries

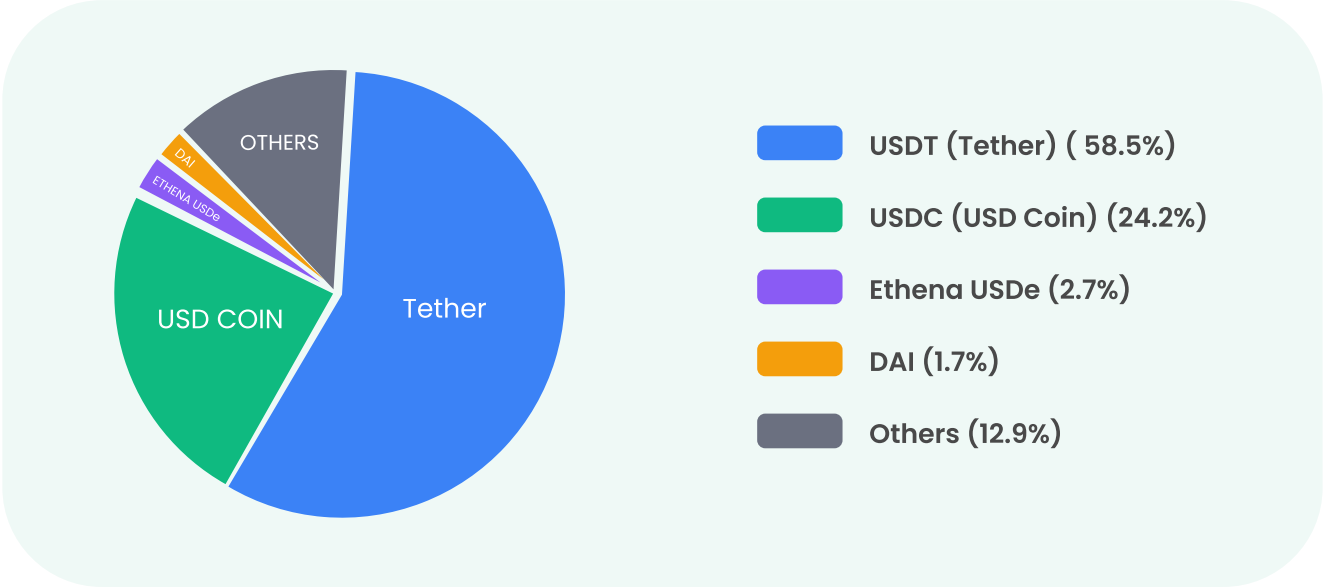
**Thailand:**

- Approved domestic USDT trading March 2025, signaling flexible approach
- Government considering 10 billion baht government bond-backed stablecoin

# 6. Key Trends and Forecasts

## Stablecoin Market Share

### Source: CoinMarketCap (November 2025)




**Key message:** USDT dominates the market with nearly 60% share, and together with USDC, the top two players control over 80% of the market. That's the main insight. The remaining players are significantly smaller.

## 6.1 Observable Trends

### Acceleration Post-COVID-19

**The pandemic catalyzed digital transformation:**

**Digital Payment Surge:** E-commerce and contactless payments expanded dramatically, compressing years of digital adoption into months.

**CBDC Urgency:** Health considerations around physical cash handling accelerated CBDC research. The number of countries exploring CBDCs grew from 35 in May 2020 to 137 in 2025.

**Stablecoin Growth:** The stablecoin market expanded from $20 billion in 2020 to $246 billion in 2025, with projections reaching $400 billion by year-end.

**Remittance Digitization**: Digital remittances now constitute nearly half of all remittances globally, up significantly from pre-pandemic levels.

### Focus on Financial Inclusion

**Financial inclusion emerged as a primary CBDC objective:**

**Targeted Design**: China, India, Eastern Caribbean, and Peru explicitly target underserved populations through CBDC design.

**Mobile-First Approach:** CBDC platforms prioritize smartphone accessibility, recognizing mobile as the primary access point for many unbanked populations.

**Offline Functionality:** Development of offline CBDC transaction capabilities addresses connectivity gaps in rural areas.

**Lower Cost Structure:** Elimination of intermediary fees makes small-value transactions economically viable, enabling broader participation.

### Growth of Cross-Border CBDC Projects

Cross-border initiatives have multiplied significantly:

Since Russia's Ukraine invasion and G7 sanctions, the number of cross-border wholesale CBDC projects has more than doubled. There are currently 13 active projects, including mBridge.

**Geographic Expansion:** mBridge observers include 26 central banks from diverse regions, indicating broad international interest.

**Alternative Infrastructure:** Projects position themselves as potential alternatives to SWIFT-dominated systems, particularly attractive to countries concerned about sanctions exposure.

**Commodity Settlement:** Saudi Arabia's mBridge participation opens possibilities for oil and gas transactions outside the dollar system.

### Technological Convergence

Common technological approaches are emerging:

**Two-Tier Architecture:** Most jurisdictions favor hybrid models preserving commercial bank roles while enabling central bank oversight.

**DLT Foundation:** Distributed ledger technology becomes standard for CBDC platforms, though specific implementations vary.

**Privacy-Enhancing Technologies:** Advanced cryptographic techniques balancing privacy with compliance requirements gain adoption.

**Interoperability Focus:** Standards development for cross-platform transactions has become a priority, with ISO 20022 widely adopted.

## 6.2 Development Barriers

### Technical Limitations and Scalability

**Transaction Throughput:** Achieving visa-level transaction processing (thousands per second) while maintaining decentralization remains challenging.

**Network Resilience:** Ensuring 24/7 operation with disaster recovery capabilities requires sophisticated infrastructure.

**Latency Requirements:** Real-time gross settlement requires near-instantaneous finality, challenging for some DLT architectures.

**Offline Capability:** Enabling secure offline transactions without network connectivity involves complex cryptographic solutions.

**Integration Complexity:** Connecting new CBDC infrastructure with legacy banking systems requires extensive middleware development.

### Regulatory Uncertainty

**Cross-Border Legal Frameworks**: Lack of international legal clarity creates uncertainty for multi-country initiatives.

**Stablecoin Classification:** Varying definitions across jurisdictions complicate global stablecoin operations.

**Compliance Costs:** Meeting diverse regulatory requirements across markets imposes significant operational expenses. Stablecoin issuers face average annual compliance costs of $10 million.

**Evolving Standards:** Rapid regulatory changes require continuous adaptation, creating planning challenges for technology providers and financial institutions.

### Privacy and Cybersecurity

**Privacy Concerns:** Public skepticism about government surveillance of transactions. A Bank of Canada survey found 90% of respondents concerned about privacy and fund security.

**Cyber Threats:** Central bank digital infrastructure is a high-value target for state and non-state actors.

**Data Protection:** Balancing transaction transparency for compliance with user privacy rights under data protection regulations.

**Quantum Computing:** Future quantum computers may threaten current cryptographic protections, requiring quantum-resistant algorithms.

### Traditional Financial Sector Resistance

**Disintermediation Risk:** Commercial banks fear CBDCs could reduce deposits and their role in the financial system.

**Profit Impact:** Digital currencies may compress margins on payment services and remittances, core revenue sources for many banks.

**Operational Burden:** Adapting to new infrastructure requires significant investment in technology and training.

**Competition Concerns:** Stablecoins and CBDCs may compete with bank deposit products, affecting bank funding models.

## 6.3 Two to Three Year Outlook (2025-2028)

### Expected Commercial CBDC Launches

**High Probability Launches (2025-2026):**

**UAE Digital Dirham:** Scheduled for Q4 2025, with 85% of preparatory work complete. Represents the most imminent major retail CBDC launch.

**India Digital Rupee Expansion:** Transition from pilot to broader rollout expected, potentially becoming the largest retail CBDC by user count given India's population.

**Russia Digital Ruble**: Wide-scale adoption planned by July 2025, though international usage may be constrained by sanctions.

**Hong Kong e-HKD:** Following completion of Phase 2 pilot in October 2025, gradual commercial rollout possible, initially focused on wholesale applications.

### Moderate Probability Launches (2026-2028):

**European Digital Euro:** ECB preparation phase concludes November 2025 at earliest, with potential development and rollout phase following. Full launch likely 2027-2028.

**Brazil Digital Real:** Phased implementation targeting late 2025 for initial regulations, with full rollout potentially 2026-2027.

**Thailand Retail CBDC:** Pilot completion targeted for 2026, with potential limited commercial launch subsequently.

### Regional Payment Corridors

**mBridge Commercialization:** Transition from MVP to commercial platform enabling real cross-border settlements. Potential transaction volumes could reach hundreds of billions annually as more institutions join.

**ASEAN Connectivity:** Enhanced digital payment integration across Southeast Asian nations, potentially through mBridge participation or bilateral arrangements.

**GCC Integration:** Continued development of Gulf region digital currency infrastructure, potentially expanding beyond UAE-Saudi bilateral to include other GCC members.

**Africa-Asia Corridors:** Growing remittance flows between regions may drive specialized digital currency corridors.

### Growth of Private Stablecoin Initiatives

**Market Expansion:** Standard Chartered forecasts stablecoin market could reach $2 trillion by 2028, up from $230 billion today.

**Currency Diversification:** Euro, GBP, yen, and emerging market currency-pegged stablecoins will gain market share beyond dollar dominance.

**Regional Stablecoins:** Local currency stablecoins serving specific regions or corridors (e.g., dirham, rupee, baht-pegged) addressing regional trade and remittance needs.

**Institutional Adoption:** Major corporations and banks issuing proprietary stablecoins for supply chain finance and treasury operations. B2B use cases accounting for over $36 billion in annualized volume by 2025.

**Programmable Features:** Enhanced smart contract capabilities enabling automatic compliance, tax collection, and conditional payments.

### Technology Maturation

**Privacy Solutions:** Wider deployment of zero-knowledge proofs and confidential transactions balancing privacy with compliance.

**Cross-Chain Interoperability:** Standardized protocols enabling seamless transactions across different CBDC platforms and stablecoin networks.

**AI Integration:** Machine learning for fraud detection, AML monitoring, and anomaly detection in digital currency transactions.

**Quantum Readiness:** Migration toward quantum-resistant cryptography as quantum computing threats materialize.

**Green Finance:** Integration of environmental considerations into programmable currency features, enabling carbon tracking and green finance incentives.

# 7. Conclusion

## 7.1 Key Findings: State of the Market

**Unprecedented Momentum:** With 137 countries, representing 98% of the global GDP, exploring CBDCs and 49 active pilot projects worldwide, the question has shifted from "whether" to "how and when" to implement digital currencies.

**Regional Leadership:** Asia and MENA have emerged as pioneering regions, with China operating the world's largest CBDC pilot, processing nearly $1 trillion in transactions, India achieving 334% growth in digital rupee circulation, and the UAE preparing for an imminent retail CBDC launch.

**Cross-Border Innovation:** Project mBridge achieving MVP status represents a potential paradigm shift in international payments, offering an alternative to correspondent banking networks that currently cost $120 billion annually in transaction fees.

**Dual Track Development:** Parallel evolution of both public CBDCs and private stablecoins creates a dynamic competitive/collaborative ecosystem. The stablecoin market, projected to reach $2 trillion by 2028, demonstrates sustained private sector innovation.

**Regulatory Maturation:** Evolution from prohibition to comprehensive frameworks, with major jurisdictions implementing clear licensing regimes for stablecoins and CBDCs (MiCA, UAE FRT regulations, Hong Kong Stablecoin Ordinance, US GENIUS Act).

## 7.2 Success Factors for CBDC Technology Solutions

### Analysis of successful implementations reveals critical success factors:

**Technical Capabilities**

**Scalability at Central Bank Standards:** Ability to process transaction volumes matching or exceeding existing payment infrastructure while maintaining security and reliability.

**Robust Privacy Architecture:** Balance between user privacy protection and regulatory compliance requirements through advanced cryptographic techniques.

**Proven Interoperability:** Demonstrated ability to connect with diverse platforms and legacy systems using standard protocols (ISO 20022).

**Operational Resilience:** 24/7 availability, disaster recovery, and security meeting central bank operational risk requirements.

### Partnership and Governance

**Collaborative Approach:** Successful projects involve central banks, commercial banks, technology providers, and regulators in structured partnerships.

**Clear Governance Frameworks:** Well-defined decision-making processes, risk management, and accountability structures.

**Stakeholder Alignment:** Balancing interests of central banks, commercial banks, consumers, and regulators through inclusive design.

**Phased Implementation:** Systematic progression from research to proof-of-concept to limited pilots to broader rollout.

### Policy and Regulatory Integration

**Legal Certainty:** Clear legal basis for digital currency issuance and use, as demonstrated by India's RBI Act amendments.

**Regulatory Compliance:** Built-in features addressing AML/KYC, transaction monitoring, and reporting requirements.

**International Standards:** Alignment with emerging global standards from BIS, IMF, and FSB for broader acceptance and interoperability.

**Public Communication:** Transparent communication about objectives, privacy protections, and implementation plans to build public trust.

## 7.3 Role of Innovative Platforms in Financial Infrastructure Development

**Specialized blockchain platforms contribute to CBDC ecosystem development across multiple sectors:**

**Technical Innovation:** Advancing state-of-the-art consensus mechanisms, privacy technologies, and scalability solutions specifically designed for institutional requirements rather than general-purpose applications.

**Standards Contribution:** Active participation in developing international standards for CBDC interoperability, security protocols, and data formats ensures compatibility across different implementations.

**Capacity Building:** Providing technical expertise and training to central bank teams enables informed decision-making and effective oversight of complex distributed systems.

**Pilot Infrastructure:** Offering robust, production-ready platforms for proof-of-concept and pilot programs allows central banks to test functionality without committing to specific long-term technology choices.

**Bridge Building:** Facilitating connections between traditional financial infrastructure and blockchain-based systems through well-designed APIs and integration layers.

Platforms like Venom, designed specifically for institutional use cases including government digital currencies, exemplify the specialized solutions required for this next generation of financial infrastructure. Purpose-built platforms offering institutional-grade scalability, regulatory compliance features, and proven security architectures will be essential partners as more countries transition from pilot to production CBDC deployments.

## 7.4 Long-Term Prospects and Global Financial System Impact

### Two-Decade Transformation (2025-2045)

**The digital currency revolution will likely unfold across several phases:**

**Near Term (2025-2028):** Major retail CBDC launches in several Asian and MENA countries, expansion of cross-border CBDC platforms beyond initial pilots, stablecoin market consolidation under clear regulatory frameworks.

**Medium Term (2028-2035):** CBDCs become standard features of monetary systems in most developed and emerging economies, international standards for CBDC interoperability widely adopted, substantial reduction in correspondent banking intermediation, programmable money features enabling new economic models.

**Long Term (2035-2045):** Potential emergence of multi-CBDC reserve systems reducing dollar dominance, tokenization of broader asset classes integrated with CBDC infrastructure, AI-driven autonomous economic agents transacting via digital currencies, quantum-resistant cryptography standard across systems.

### Impact on Global Financial Architecture

**Monetary Sovereignty:** CBDCs strengthen central bank control over monetary policy transmission while reducing dependence on foreign payment infrastructure.

**Financial Inclusion:** Digital currencies potentially bringing billions of unbanked individuals into the formal financial system through mobile-accessible services.

**Payment System Competition:** Alternative payment rails challenging SWIFT dominance, particularly for regional and emerging market transactions.

**Programmable Finance:** Smart contract-enabled CBDCs enabling automated taxation, targeted stimulus delivery, and conditional payments transforming government financial operations.

**Reduced Remittance Costs:** Achievement of UN Sustainable Development Goal of 3% remittance costs through digital currency corridors, saving billions annually for low-income families.

### Geopolitical Implications

**De-Dollarization Pressures:** Multi-CBDC platforms like mBridge provide infrastructure for reducing dollar dependency, though complete de-dollarization unlikely given network effects and dollar's deep liquidity.

**Regional Integration: Digital currency cooperation strengthening regional blocs (ASEAN, GCC, potentially expanded BRICS cooperation).**

**Sanctions Circumvention: Alternative payment systems reducing effectiveness of financial sanctions as foreign policy tools.**

**Technology Competition: Digital currency leadership becoming an element of great power competition, with different technological and governance models competing for adoption.**

### Risks and Challenges

**Cyber Warfare:** Central bank digital infrastructure becoming high-value military targets in potential conflicts.

**Privacy Erosion:** Risk of surveillance capabilities enabling authoritarian control if proper safeguards absent.

**Financial Stability:** Rapid CBDC adoption potentially destabilizing bank funding models during transition.

**Technology Dependency:** Over-reliance on digital systems creating vulnerability to technical failures or cyberattacks.

**Digital Divide:** Risk of excluding populations lacking digital access or literacy from financial system.

## 7.5 Final Observations

The convergence of technological innovation, policy evolution, and market demand is driving a transformation of monetary systems. Asia and MENA regions have positioned themselves at the forefront of this revolution, demonstrating both ambition and pragmatism in developing digital currency infrastructure.

Success will require sustained collaboration between central banks, technology providers, commercial banks, and regulators. Clear-eyed assessment of both opportunities and risks, combined with phased implementation approaches that allow learning and adjustment, will be essential.

The institutions and countries that successfully navigate this transformation and build digital currency systems that are simultaneously secure, efficient, inclusive, and respectful of privacy will gain significant competitive advantages in the increasingly digital global economy. The next 2-3 years will be particularly critical as multiple major economies move from pilot programs to commercial deployment, setting patterns that may persist for decades.

As specialized platforms purpose-built for institutional digital currency requirements continue to mature, they will play increasingly important roles in enabling this transformation while maintaining the security, compliance, and governance standards that central banks require.

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**Risk Warning:** Digital currencies, blockchain technologies, and related investments carry significant risks including but not limited to: regulatory risk, technological risk, market volatility, cybersecurity threats, and potential total loss of capital.

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### About the Authors

This research has been prepared by the Venom Foundation Analytics Department—a team of experts in blockchain technology, cryptoeconomics, and distributed systems. The department specializes in in-depth analysis of industry trends, comparative studies of network protocols, and evaluation of technological innovations in the Web3 sector.

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