



## Digital Currencies in Facilitating Cross-Border Transactions

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### Abstract

The rapid evolution of financial technologies has brought digital currencies to the forefront of international trade and finance. Among their most transformative applications is the facilitation of cross-border transactions, which have traditionally been encumbered by high costs, long settlement times, and complex intermediary networks. Digital currencies—both private cryptocurrencies like Bitcoin and Ethereum, and Central Bank Digital Currencies (CBDCs) such as China's Digital Yuan—present opportunities to streamline these processes by enabling direct, near-instantaneous transactions across national boundaries.

This paper examines the growing role of digital currencies in enhancing cross-border payments by reducing transaction fees, increasing transparency, and mitigating foreign exchange risks. It evaluates how decentralized ledger technology (DLT), which underpins most digital currencies, eliminates the need for multiple intermediaries, thereby reducing friction and operational inefficiencies. Furthermore, the paper explores the implications of CBDCs, which are gaining traction among central banks seeking to maintain monetary sovereignty while modernizing payment systems.

Through case studies and comparative analysis, the research highlights initiatives such as the mBridge project by the Bank for International Settlements (BIS) and ongoing pilots in countries like Singapore, Sweden, and Nigeria. It also discusses the regulatory challenges and geopolitical considerations involved in adopting digital currencies for cross-border use, including concerns over money laundering, capital controls, and international coordination.

While the benefits are significant, the paper argues that widespread adoption depends on the resolution of issues related to interoperability, scalability, regulatory frameworks, and trust. Collaboration between governments, financial institutions, and technology providers is essential to building a robust infrastructure that ensures both security and efficiency.

Ultimately, the study concludes that digital currencies hold substantial promise in revolutionizing cross-border transactions, provided that innovation is balanced with prudent oversight. As the global financial ecosystem moves toward a more digital and interconnected future, digital currencies could become central to redefining the norms of international payments and financial inclusion.

**Keywords:** Digital Currency, Cross-Border Transactions, Cryptocurrency, Central Bank Digital Currency (CBDC), Blockchain, Decentralized Ledger Technology (DLT), International Payments, Financial Technology (FinTech), mBridge, Digital Yuan, Regulatory Challenges, Financial Inclusion

### Introduction

Traditional cross-border payment systems have long been characterized by inefficiencies, high costs, and lengthy settlement periods. Yermack (2015) from New York University's Stern School of Business argues that these limitations stem from the complex web of correspondent banking relationships, multiple intermediaries, and outdated technological infrastructure that

underpins the current international payment system <sup>[1]</sup>. The average cost of sending remittances globally remains above 6%, while transaction times can extend to several days, particularly for developing country corridors.

Digital currencies represent a paradigm shift in how cross-border transactions can be executed. Böhme *et al.* (2015) from the University of Münster's European Research Center for Information Systems define digital currencies as electronic representations of value that can be digitally traded and function as a medium of exchange, unit of account, or store of value<sup>2</sup>. Unlike traditional payment systems, digital currencies can operate on decentralized networks, potentially eliminating intermediaries and reducing transaction costs. The significance of digital currencies in cross-border payments extends beyond mere cost reduction. Raskin and Yermack (2018) from Duke University's Fuqua School of Business and New York University's Stern School respectively demonstrate that digital currencies can enhance financial inclusion by providing payment services to unbanked populations and facilitating faster, more transparent transactions <sup>[3]</sup>.

## Types of Digital Currencies in Cross-Border Payments

### Cryptocurrencies

Bitcoin and other cryptocurrencies were among the first

digital currencies to demonstrate the potential for peer-to-peer cross-border transactions. Nakamoto (2008), the pseudonymous creator of Bitcoin, envisioned a system that would enable direct online payments between parties without requiring a trusted third party <sup>[4]</sup>. While Bitcoin's volatility has limited its adoption as a stable medium of exchange, it has proven useful for cross-border payments in specific contexts, particularly where traditional banking infrastructure is limited.

Ethereum and other blockchain platforms have expanded the possibilities for programmable money and smart contracts in cross-border payments. Buterin (2014) from the Ethereum Foundation describes how smart contracts can automate complex payment processes and reduce counterparty risks <sup>[5]</sup>.

### Central Bank Digital Currencies (CBDCs)

Central Bank Digital Currencies represent government-issued digital versions of national currencies. Barontini and Holden (2019) from the Bank for International Settlements' Monetary and Economic Department show that over 80% of central banks are actively researching or developing CBDCs <sup>[6]</sup>. Unlike cryptocurrencies, CBDCs are centralized and maintain the stability and backing of traditional fiat currencies while leveraging digital technology benefits.

**Table 1: CBDC Development Status by Region (2024)**

| Region       | Active Projects | Pilot Programs | Full Implementation | Primary Objectives                         |
|--------------|-----------------|----------------|---------------------|--------------------------------------------|
| Asia-Pacific | 12              | 8              | 2                   | Financial inclusion, payment efficiency    |
| Europe       | 9               | 5              | 0                   | Digital sovereignty, retail payments       |
| Americas     | 7               | 4              | 1                   | Cross-border payments, financial stability |
| Africa       | 5               | 3              | 1                   | Financial inclusion, remittances           |
| Middle East  | 4               | 2              | 0                   | Payment modernization, oil trade           |

**Source:** Author's compilation based on BIS and central bank data

### Stablecoins

Stablecoins attempt to combine the benefits of cryptocurrency technology with price stability by pegging their value to stable assets such as fiat currencies or commodities. Bullmann *et al.* (2019) from the European Central Bank's Directorate General Market Operations identify three main types of stablecoins: fiat-collateralized, crypto-collateralized, and algorithmic stablecoins <sup>[7]</sup>.

Tether (USDT) and USD Coin (USDC) have emerged as leading stablecoins for cross-border transactions, processing billions of dollars in daily volume. Their stability makes them more suitable for commercial transactions compared to

volatile cryptocurrencies.

## Advantages of Digital Currencies in Cross-Border Payments

### Cost Reduction

Digital currencies can significantly reduce cross-border payment costs by eliminating intermediaries and streamlining processes. Shin (2019) from the Bank for International Settlements estimates that digital currency-based cross-border payments could reduce costs by 50-80% compared to traditional correspondent banking <sup>[8]</sup>.

**Table 2: Cost Comparison of Cross-Border Payment Methods**

| Payment Method            | Average Cost (% of transaction value) | Settlement Time    | Accessibility            |
|---------------------------|---------------------------------------|--------------------|--------------------------|
| Traditional Wire Transfer | 3.5-7.0%                              | 2-5 days           | Limited                  |
| Correspondent Banking     | 4.0-8.0%                              | 3-7 days           | Bank account required    |
| Money Transfer Operators  | 5.0-10.0%                             | Minutes-hours      | Wide network             |
| Cryptocurrency            | 0.1-2.0%                              | Minutes-hours      | Internet access required |
| Stablecoins               | 0.05-1.5%                             | Minutes            | Internet access required |
| CBDCs (projected)         | 0.1-0.5%                              | Near-instantaneous | Digital wallet required  |

### Speed and Efficiency

Traditional cross-border payments often require multiple days for settlement due to time zone differences, cut-off times, and batch processing. Auer and Böhme (2020) from the Bank for International Settlements and University of Innsbruck's Department of Computer Science respectively demonstrate that blockchain-based payment systems can

operate 24/7 and settle transactions within minutes or hours <sup>[9]</sup>.

### Financial Inclusion

Digital currencies can extend financial services to unbanked populations who lack access to traditional banking infrastructure. Demirgüç-Kunt *et al.* (2018) from the World

Bank's Development Research Group show that mobile-based digital payment systems have significantly improved financial inclusion in developing countries <sup>[10]</sup>.

### Transparency and Traceability

Blockchain technology provides an immutable record of all transactions, enhancing transparency and enabling better compliance with anti-money laundering (AML) and know-your-customer (KYC) regulations. Foley *et al.* (2019) from MIT's Sloan School of Management demonstrate that blockchain's transparency can actually help detect and prevent illicit activities <sup>[11]</sup>.

### Challenges and Risks

#### Regulatory Uncertainty

The regulatory landscape for digital currencies remains fragmented and evolving. Zetzsche *et al.* (2020) from the University of Luxembourg's Faculty of Law argue that regulatory uncertainty is one of the primary barriers to widespread adoption of digital currencies for cross-border payments <sup>[12]</sup>. Different jurisdictions have adopted varying approaches, creating compliance complexities for global operators.

#### Volatility and Market Risks

Cryptocurrency price volatility poses significant risks for cross-border payments. While stablecoins address this issue partially, they introduce other risks such as collateral management and regulatory compliance. Lyons and Viswanath-Natraj (2023) from the Bank for International Settlements show that even stablecoins can experience significant price deviations during market stress <sup>[13]</sup>.

#### Technology and Infrastructure Challenges

Scalability remains a significant challenge for many blockchain networks. Current Bitcoin and Ethereum networks can process only limited transactions per second compared to traditional payment networks like Visa or Mastercard. Second-layer solutions and alternative consensus mechanisms are being developed to address these limitations.

#### Cybersecurity and Operational Risks

Digital currencies face unique cybersecurity challenges including exchange hacks, wallet security, and smart contract vulnerabilities. Vasek and Moore (2018) from University of New Mexico's Computer Science Department document numerous security incidents that have resulted in significant losses <sup>[14]</sup>.

#### Current Implementations and Case Studies

Several countries and regions have implemented or are piloting digital currency solutions for cross-border payments. The People's Bank of China's Digital Currency Electronic Payment (DCEP) system has conducted extensive trials and is exploring cross-border applications with other central banks. The European Central Bank's digital euro project aims to enhance payment sovereignty and efficiency within the eurozone and potentially for international transactions.

Private sector initiatives include JPMorgan's JPM Coin for institutional transfers and Facebook's Diem (formerly Libra) project, although the latter faced significant regulatory challenges and was ultimately discontinued.

The Bahamas' Sand Dollar and Nigeria's eNaira represent successful implementations of retail CBDCs that include

provisions for cross-border transactions, demonstrating the practical feasibility of digital currency-based international payments.

### Future Outlook and Emerging Trends

The future of digital currencies in cross-border payments is likely to be shaped by several emerging trends. Central bank collaborations are increasing, with initiatives like the BIS Innovation Hub's Project Dunbar exploring multi-CBDC platforms for cross-border payments. These projects aim to create interoperable systems that maintain central bank control while leveraging digital currency benefits.

Integration with traditional financial infrastructure is another important trend. Rather than replacing existing systems entirely, digital currencies are increasingly being designed to complement and enhance traditional payment rails through hybrid approaches.

Programmable money features enabled by smart contracts are creating new possibilities for automated compliance, conditional payments, and complex financial arrangements that can streamline cross-border commercial transactions.

### Policy Recommendations

Based on the analysis of digital currency implementations and challenges, several policy recommendations emerge for policymakers and financial institutions:

First, international coordination is essential for creating effective regulatory frameworks that prevent regulatory arbitrage while fostering innovation. This includes developing common standards for AML/KYC compliance, data privacy, and operational resilience.

Second, central banks should accelerate CBDC research and development while ensuring interoperability with international partners. Collaborative projects and technical standards development will be crucial for creating efficient cross-border CBDC systems.

Third, regulatory sandboxes and pilot programs should be established to allow controlled testing of digital currency innovations while managing risks. This approach can provide valuable insights for full-scale implementations.

Fourth, investment in digital infrastructure and financial literacy is necessary to ensure that digital currency benefits reach underserved populations and contribute to financial inclusion goals.

### Conclusion

Digital currencies represent a transformative technology for cross-border payments, offering significant advantages in terms of cost, speed, and accessibility compared to traditional systems. While cryptocurrencies demonstrated initial proof-of-concept, CBDCs and stablecoins are emerging as more practical solutions for mainstream adoption due to their stability and regulatory clarity.

The success of digital currencies in facilitating cross-border transactions will depend on addressing key challenges including regulatory uncertainty, technological scalability, and operational risks. International cooperation and coordinated policy development will be essential for realizing the full potential of digital currencies while maintaining financial stability and consumer protection.

As technology continues to evolve and regulatory frameworks mature, digital currencies are likely to play an increasingly important role in the global payments ecosystem. The transition may be gradual, with digital

currencies complementing rather than replacing traditional payment systems, but the long-term trend toward digitalization of cross-border payments appears irreversible. The implications extend beyond mere efficiency improvements to fundamental questions about monetary sovereignty, financial inclusion, and the future architecture of the international monetary system. Policymakers, financial institutions, and technology developers must work together to ensure that digital currency innovations serve the broader goals of economic development and financial stability.

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