The Value Proposition of Stablecoins in South Africa's Evolving Digital Payment Landscape: A Comparative Analysis of Transaction Efficiency, Financial Inclusion, and Regulatory Frameworks

ECO5016W - Minor Dissertation in FinTech (Non-unitary option) - Topic 1 DRAFT

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1 Abstract

This paper examines the value proposition of stablecoins within South Africa's evolving payment ecosystem through comparative analysis of digital payment alternatives. The research investigates whether stablecoins offer meaningful advantages over existing regulated digital payment infrastructure or merely replicate established services with additional complexity and risk exposure.

Drawing from Brazil's implementation of Pix as a benchmark for effective digital payment system design and utilizing frameworks from Adrian and Mancini-Griffoli (2021) and Catalini et al. (2022), this study analyzes stablecoins across technical, economic, and institutional dimensions. The analysis reveals that while stablecoins demonstrate advantages in cross-border transactions and programmable payment functionality, their benefits within domestic payment contexts are constrained by the capabilities of modern, well-designed payment infrastructure.

The findings suggest that in jurisdictions with robust, interoperable, and inclusive digital payment systems under appropriate regulatory oversight, stablecoins primarily serve specialized use cases rather than providing broad-based improvements to payment efficiency or financial inclusion. This conclusion has significant implications for policymakers, financial institutions, and technology developers operating within emerging economies implementing comprehensive payment system modernization programmes.

Keywords: stablecoins, digital payments, financial inclusion, payment systems, South Africa, financial technology, regulatory frameworks

Word Count: 5,922

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2 Introduction

2.1 Research Context and Motivation

The global financial landscape has witnessed unprecedented innovation in digital payment technologies over the past decade, with stablecoins emerging as a prominent category of crypto assets designed to maintain stable value relative to reference currencies or baskets of assets (Adrian & Mancini-Griffoli, 2021). Proponents argue that stablecoins represent fundamental innovation in digital payment infrastructure, offering potential solutions to longstanding challenges in cross-border payments, financial inclusion, and programmable money applications (Catalini et al., 2022).

The emergence of stablecoins reflects broader trends in the digitization of money and payments, driven by technological advances in distributed ledger technology, mobile computing, and cryptographic protocols. These innovations promise to address fundamental inefficiencies in traditional payment systems, particularly regarding cross-border transactions, settlement speed, and access for underbanked populations. However, the practical significance of these promised benefits depends critically on the context within which they are evaluated.

However, sophisticated government-backed digital payment platforms in emerging economies present compelling counter-narratives to the necessity of blockchain-based payment solutions. Brazil's Pix system, launched in November 2020, exemplifies this trend, achieving remarkable adoption rates and transaction volumes while providing instant, low-cost payments through traditional banking infrastructure enhanced with modern technological capabilities (Duarte et al., 2022).

The Brazilian experience demonstrates that many benefits commonly attributed to blockchain-based payment systems can be achieved through careful design and implementation of traditional payment infrastructure. This success raises fundamental questions about the unique value proposition of stablecoins in jurisdictions where policymakers have the opportunity to implement comprehensive payment system modernization.

South Africa's ongoing payment system modernization, anchored by the South African Reserve Bank's (SARB) Vision 2025 strategy published in 2018 and the implementation of PayShap in 2023, raises fundamental questions about the residual value proposition of stablecoins in jurisdictions with well-functioning digital payment infrastructure. The South African context is particularly relevant for this analysis, as it represents a middle-income economy with sophisticated financial markets but significant socioeconomic challenges that affect payment system adoption and effectiveness.

2.2 Research Objectives and Questions

This research addresses a gap in the literature concerning comparative advantages and limitations of stablecoins within evolving national payment systems. The primary research question is:

In countries with high-functioning, low-cost interoperable digital payment systems under public oversight, do stablecoins offer residual value, or do they replicate existing services with added complexity and risk?

This question has significant policy implications for emerging economies implementing payment system modernization programs. Understanding the relative benefits and constraints of different technological approaches can inform resource allocation decisions and regulatory frameworks. The question also addresses broader debates about the optimal design of monetary and payment systems in the digital age.

Subsidiary questions examine several key dimensions: technical performance capabilities including transaction throughput, settlement finality, and operational resilience; financial inclusion contributions based on accessibility requirements, user onboarding processes, and infrastructure dependencies; regulatory framework implications affecting innovation potential, consumer protection, and systemic risk management; and the practical significance of unique cross-border and programmability capabilities offered by stablecoins.

2.3 Scope and Approach

This analysis focuses on South Africa as the primary case study, using Brazil's Pix system as a comparative benchmark for evaluating the potential of well-designed traditional payment infrastructure. The research employs comparative analysis incorporating frameworks from monetary economics, payment system design, and financial inclusion research.

The research examines stablecoins broadly, encompassing fiat-collateralized, crypto-collateralized, and algorithmic variants, while recognizing that different stablecoin designs may have different performance characteristics and use cases. The temporal scope covers 2020-2025, capturing the period of stablecoin emergence alongside next-generation payment infrastructure development, enabling assessment of parallel technological trajectories.

3 Literature Review

3.1 Digital Payment System Foundations

Traditional payment system theory, grounded in network economics and transaction cost analysis, emphasizes network effects, interoperability, and settlement finality in determining system efficiency. These frameworks require extension to address blockchain-based payment systems and stablecoins adequately. Classical payment system theory, developed primarily to understand check clearing systems and electronic funds transfers, focuses on concepts such as float, clearing mechanisms, and systemic risk management through central bank oversight.

Adrian and Mancini-Griffoli (2021) provide a comprehensive framework for understanding digital money, positioning stablecoins within a broader taxonomy including central bank digital currencies (CBDCs), enhanced traditional systems, and private digital money. Their analysis emphasizes how design choices determine risk-return profiles, particularly redemption mechanisms, backing assets, and governance structures. This framework is particularly valuable because it moves beyond binary comparisons between traditional and digital money to examine the spectrum of possible designs and their implications.

The framework suggests that the value proposition of different digital money forms depends critically on the quality and characteristics of existing payment infrastructure. In jurisdictions with efficient, accessible, and low-cost payment systems, alternative digital money forms face structural challenges in achieving widespread adoption. This insight challenges technological deterministic views that assume new technologies will automatically displace existing systems regardless of context.

Catalini et al. (2022) develop formal stablecoin economic theory, demonstrating how design choices influence stability, efficiency, and systemic risk. Their framework highlights trade-offs in collateralization approaches and reserve management importance. Crucially, their analysis suggests stablecoin benefits are most pronounced where existing payment infrastructure exhibits significant cost, speed, or accessibility deficiencies.

The economic theory of stablecoins addresses several key challenges in monetary economics: maintaining stable value in decentralized systems without central bank backing, trade-offs between different collateralization mechanisms and their implications for systemic risk, and the role of governance mechanisms in maintaining system stability and user confidence.

3.2 Payment System Modernization in Emerging Economies

Recent literature extensively documents payment system modernization success in emerging economies, with particular attention to instant payment systems and their design principles. This literature is especially relevant for understanding the potential of traditional payment infrastructure to achieve outcomes commonly attributed to blockchain-based alternatives.

Frost et al. (2024) provide comprehensive comparative analysis of fast payment systems across multiple jurisdictions, identifying key design principles that determine success: open architecture enabling broad participation, 24/7 availability matching user expectations for digital services, comprehensive education programmes facilitating adoption, and appropriate regulatory oversight balancing innovation with consumer protection.

Their analysis demonstrates that successful instant payment systems share common characteristics regardless of specific technological implementation. These characteristics include real-time processing capabilities, broad institutional participation, user-friendly interfaces, and cost structures encouraging adoption. The consistency of these success factors across different contexts suggests that payment system effectiveness depends more on design principles than on specific technologies.

Duarte et al. (2022) examine Pix's design and implementation in detail, highlighting critical success factors including seamless integration with existing banking infrastructure, strong regulatory oversight by the Central Bank of Brazil, and mandated participation by major financial institutions. Within 18 months, Pix processed over 2 billion monthly transactions, demonstrating the potential of well-designed infrastructure without blockchain technology.

The Brazilian experience is particularly instructive because it achieved rapid adoption in a large emerging economy with significant financial inclusion challenges. Pix succeeded by building upon existing banking relationships while dramatically improving user experience through instant transfers, proxy payments using phone numbers or email addresses, and 24/7 availability.

The design principles that enabled Pix's success provide a template for other emerging economies implementing payment system modernization. These include mandatory participation by systemically important financial institutions, which ensures comprehensive coverage and network effects. Standardized technical specifications enable interoperability across different service providers. Central bank oversight ensures system-wide stability and consumer protection.

The South African context presents important parallels to Brazilian experience while also highlighting unique challenges and opportunities. The SARB's Vision 2025 initiative, launched in 2018, emphasizes accessible, efficient, and inclusive payment infrastructure development, following similar principles to those that guided Pix implementation. PayShap implementation in 2023 demonstrates similar design principles including real-time processing, universal bank participation, and financial inclusion focus.

However, the practical implementation of instant payment systems faces adoption challenges. PayShap's uptake has been slower than anticipated, with issues including limited initial bank participation, fee structure concerns at launch, and insufficient user awareness campaigns affecting adoption rates.

3.3 Stablecoin Landscape and Regulatory Approaches

The stablecoin landscape has evolved rapidly, with global market capitalization reaching significant levels by 2024, accompanied by increased regulatory scrutiny and stability events highlighting risks from inadequate reserve management and governance. Understanding this evolution is crucial for assessing the current state and future potential of stablecoin systems.

Different stablecoin designs present different risk profiles and use cases. Fiat-collateralized stablecoins, backed by traditional currency reserves, offer the most straightforward value proposition but require trusted custodial arrangements and regulatory oversight. Crypto-collateralized stablecoins enable more decentralized governance but face volatility risks in their collateral assets. Algorithmic stablecoins attempt to maintain stability through market mechanisms but have proven vulnerable to confidence crises.

The SARB's approach to stablecoin regulation exemplifies the challenges facing emerging economy central banks in balancing innovation with financial stability. The SARB emphasizes robust reserve backing, transparent governance, and appropriate risk management frameworks, reflecting concerns about potential financial system vulnerability amplification if adoption reaches systemically significant levels (SARB, 2023a, 2023b).

Regulatory approaches vary significantly across jurisdictions, reflecting different perspectives on the balance between innovation and consumer protection. Some jurisdictions have adopted permissive approaches to encourage innovation, while others have implemented restrictive frameworks to limit potential risks. The optimal regulatory stance depends partly on the quality of existing payment infrastructure and the potential benefits of alternative payment methods.

3.4 Comparative Analysis Frameworks

The development of appropriate frameworks for comparing payment systems across multiple dimensions represents an ongoing challenge in the literature. Traditional approaches focus primarily on cost and speed metrics, but comprehensive evaluation requires broader assessment of factors including accessibility, security, regulatory compliance, and systemic risk implications.

Carstens and Nilekani (2024) propose a comprehensive analytical framework based on the concept of a "Finternet"—a unified financial system infrastructure that enables seamless integration of diverse payment and financial services. Their framework emphasizes the importance of interoperability, programmability, and regulatory coherence in determining system effectiveness.

This approach highlights the potential for hybrid systems that combine the benefits of different technological approaches while mitigating their respective limitations. For example, systems that provide programmability features through APIs while maintaining traditional regulatory oversight and consumer protection mechanisms.

4 Methodology

This research employs comparative analysis based on established frameworks examining payment systems across six key dimensions that capture the primary value propositions commonly attributed to different payment system designs. The analytical approach enables assessment of complex, multi-dimensional payment system characteristics while addressing the evolving nature of both traditional and blockchain-based payment systems.

The comparative framework examines: transaction costs and efficiency, including both direct costs to users and broader economic efficiency implications; settlement finality and speed, evaluating the time required for transactions to achieve finality and certainty of settlement; security and operational resilience, assessing protection against fraud, system failures, and operational disruptions; financial accessibility and inclusion, evaluating barriers to adoption with particular attention to historically excluded populations; cross-border interoperability, examining effectiveness for international transactions; and programmability and automation, assessing capacity to enable automated transactions and integration with other systems.

Analysis draws on academic literature, central bank publications, international experience documentation, and technical specifications to provide comprehensive assessment while acknowledging the rapidly evolving technological landscape.

5 Transaction Cost Analysis and Settlement Efficiency

5.1 Transaction Cost Structures

The comparative analysis of transaction costs reveals fundamental differences between stablecoins and traditional digital payment systems. The economic framework developed by Catalini et al. (2022) demonstrates that stablecoin cost structures are primarily determined by underlying blockchain network fees, which are typically fixed per transaction regardless of value but vary significantly based on network congestion.

Remittance cost data is calculated from the World Bank Remittance Prices Worldwide Database, using simple arithmetic mean of CC2 total cost percentages across all valid remittance services for each country-period combination.

The CC2 total cost percentage represents the comprehensive cost of sending remittances, calculated as a percentage of the principal amount transferred. Unlike partial cost measures, CC2 encompasses:

1. **Service fees**: Explicit charges levied by money transfer operators (MTOs) for processing transactions
2. **Foreign exchange margins**: The difference between the wholesale interbank exchange rate and the retail rate offered to consumers
3. **Intermediary costs**: Fees charged by correspondent banks, agents, or other intermediaries in the transaction chain

The World Bank methodology calculates CC2 based on a standardised transfer amount of $500 USD equivalent, representing typical remittance transaction values globally (World Bank, 2024).

For the purposes of comparing stablecoins with traditional remittance systems, CC2 provides a rigorous foundation. Traditional remittance costs often include substantial hidden components, particularly foreign exchange margins, which can represent a substantial part of total transfer costs in certain corridors. Partial measures such as service fees alone would systematically understate the true cost burden faced by remittance users.

When evaluating stablecoin transaction costs, users similarly face multiple cost components: - Network transaction fees (gas fees on blockchain networks) - On-ramp and off-ramp fees for converting between fiat and digital assets - Exchange rate spreads when converting between different currencies - Wallet management and custody fees

The use of CC2 enables direct comparison between these total cost structures, avoiding the methodological inconsistency that would arise from comparing partial traditional costs with total stablecoin costs.

The use of simple arithmetic means across services follows World Bank standard practice but may not reflect market-share weighted costs actually experienced by users. This limitation applies consistently across all countries analysed, maintaining comparative validity while acknowledging absolute measurement constraints.

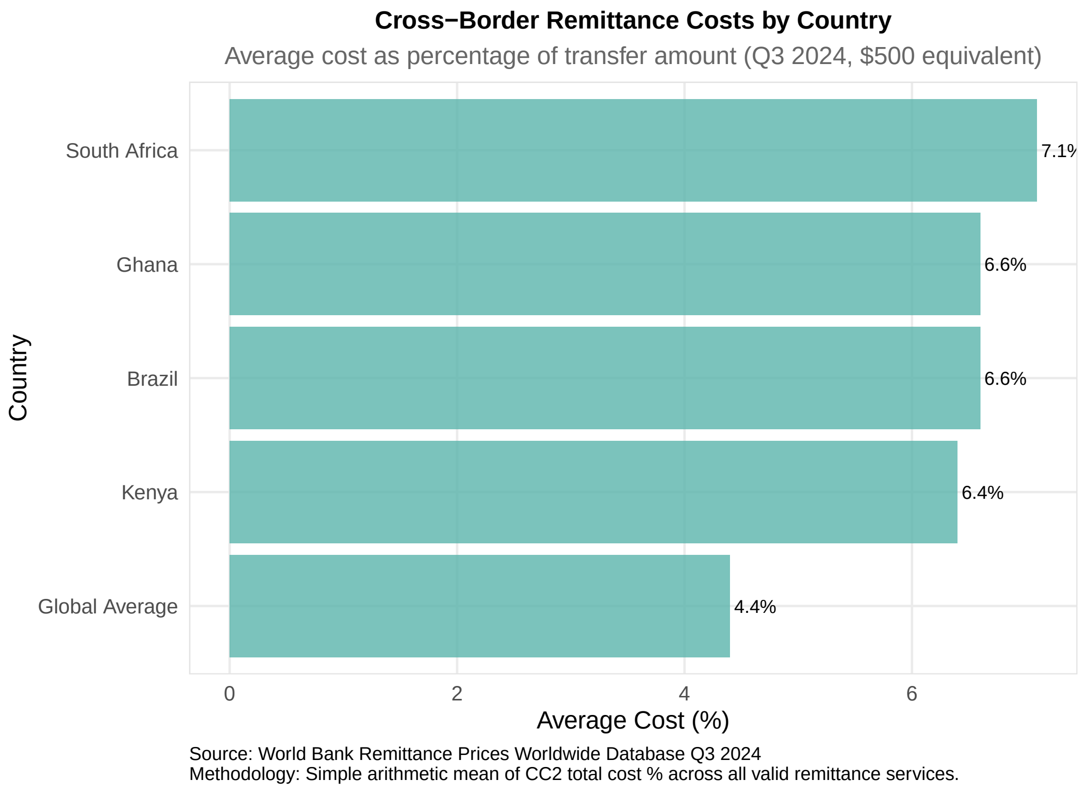

Figure 1: Cross-Border Remittance Costs by Country

During periods of high network utilization, transaction fees for major blockchain networks can increase dramatically. Historical data shows Bitcoin and Ethereum transaction fees can reach substantial levels during peak congestion periods, creating unpredictable cost structures that may make small-value transactions economically unviable during certain periods.

Table 1: Blockchain Network Performance Characteristics (2024)

Network	Block Time (min)	Max TPS	Actual TPS	Confirmation Time	Finality Type
Bitcoin	10	7	3-7	60+ minutes (6 blocks)	Probabilistic
Ethereum (Post-merge)	0.2	15	12-15	12-15 minutes	Economic Finality

Network	Block Time (min)	Max TPS	Actual TPS	Confirmation Time	Finality Type
Polygon PoS	0.034	7,000	34-38	2-3 minutes	Probabilistic
Arbitrum One	Variable	4,000	20+	~1 week (challenge period)	Optimistic

Sources: Nakamoto (2008), Ethereum.org (2024), Bitquery (2024), Arbitrum Docs (2024)

The cost comparison becomes complex when considering the complete transaction chain required for stablecoin usage. Users typically must purchase stablecoins through cryptocurrency exchanges (incurring exchange fees and spreads), execute blockchain transactions (paying network fees), and potentially convert back to local currency (incurring additional exchange costs). These cumulative costs often exceed the headline blockchain transaction fees commonly cited in stablecoin advocacy.

Frost et al. (2024) identify that successful fast payment systems typically implement flat-fee or zero-fee structures to promote financial inclusion, contrasting with percentage-based fees common in traditional payment systems. This design principle reflects policy objectives to reduce barriers to small-value transactions that comprise the majority of retail payments.

The SARB's Vision 2025 framework mandates that instant payment systems like PayShap are structured to minimize transaction costs, particularly for small-value payments. This approach aligns with international best practices observed in Brazil's Pix system, where low transaction costs have been instrumental in achieving widespread adoption (Duarte et al., 2022).

5.2 Settlement Finality Mechanisms

Settlement finality represents a critical dimension where payment systems differ fundamentally in their architectural approaches. The framework established by the Bank for International Settlements emphasizes that settlement finality—the point at which a payment becomes irrevocable—varies significantly across payment system architectures (Frost et al., 2024).

Table 2: Settlement Finality Characteristics Across Payment Systems

System	Finality Type	Time to Finality	Reversibility	Certainty	Infrastructure
PayShap/RTGS	Immediate	< 1 second	Irrevocable	100%	Central Bank
Pix (Brazil)	Immediate	< 1 second	Irrevocable	100%	Central Bank
USDC (Ethereum)	Economic Finality	12-15 minutes	Highly unlikely	99.9%+	Blockchain
Bitcoin	Probabilistic	60+ minutes	Highly unlikely	99.9%+	Blockchain

Sources: Nakamoto (2008), Duarte et al. (2022), Ethereum.org (2024)

Instant payment systems operating through central bank infrastructure provide immediate settlement finality through real-time gross settlement (RTGS) systems. This immediate finality is achieved because transactions are processed through central bank money, eliminating settlement risk between financial institutions. Both PayShap and Brazil's Pix exemplify this approach, providing immediate finality that enables instant availability of funds.

Stablecoins operating on blockchain networks achieve settlement finality through different mechanisms depending on their underlying blockchain's consensus protocol. Bitcoin-based systems typically require 6 confirmations for practical finality, representing approximately 60 minutes given the average 10-minute block time (Nakamoto, 2008).

Ethereum-based systems achieve economic finality within 12-15 minutes under normal network conditions following the transition to proof-of-stake consensus. However, the probabilistic nature of blockchain settlement means that transactions remain potentially reversible until sufficient block confirmations accumulate, creating technical risk that doesn't exist in traditional RTGS systems.

The settlement finality comparison highlights fundamental architectural differences between traditional central bank payment systems and blockchain-based systems. Traditional systems achieve immediate, deterministic finality through centralized infrastructure, while blockchain systems achieve probabilistic or economic finality through distributed consensus mechanisms that require time to reach sufficient confidence levels.

5.3 Network Capacity and Performance

Network capacity and scalability represent fundamental constraints that differentiate traditional payment infrastructure from blockchain-based systems. Traditional payment infrastructure benefits from decades of investment in high-capacity processing systems designed specifically for retail payment applications. These systems can handle millions of transactions per day without degradation in performance, reflecting the mature scaling capabilities of established payment processing infrastructure.

Blockchain-based stablecoin systems face documented scalability constraints that limit transaction throughput. Technical specifications and academic analysis demonstrate that Bitcoin processes approximately 3.3-7 transactions per second globally, limited by the 10-minute average block time and block size constraints (Croman et al., 2016; Nakamoto, 2008). During periods of high demand, transactions may experience significant delays or require higher fees to achieve timely confirmation.

Ethereum handles approximately 12-15 transactions per second under current proof-of-stake configurations (Ethereum.org, 2024). The network consistently operates at or near maximum capacity, with transaction fees increasing during high utilization periods. Layer-2 scaling solutions such as Polygon and Arbitrum attempt to address these limitations by processing transactions off-chain while maintaining security through various mechanisms.

Polygon, operating as a proof-of-stake sidechain, achieves significantly higher throughput with actual performance of 34-38 transactions per second and theoretical capacity approaching 7,000 TPS (Bitquery, 2024). Arbitrum, utilizing optimistic rollup technology, processes over 20 transactions per second while maintaining Ethereum-level security through its fraud-proof mechanism (Arbitrum Docs, 2024). However, optimistic rollups face trade-offs including extended challenge periods of approximately one week for final settlement.

The scalability limitations of blockchain-based systems become particularly problematic during high network utilization periods, when transaction fees increase substantially due to congestion—a challenge not faced by systems that leverage dedicated payment infrastructure designed for high-volume processing.

6 Financial Inclusion and Accessibility Analysis

6.1 Accessibility Requirements and Digital Infrastructure

Financial inclusion represents a primary policy objective for South Africa's payment system modernization efforts. The World Bank Global Findex Database (2021) indicates that 84.4% of South African adults have access to a bank account, providing substantial foundation for traditional payment infrastructure adoption. This established banking relationship infrastructure offers important advantages for systems that build upon existing financial services rather than requiring entirely new onboarding processes.

Table 3: Financial Inclusion Indicators (2021)

Indicator	South Africa	Sub-Saharan Africa	Brazil	Global
Account Ownership (%)	84.4	55.0	84.0	76.0
Mobile Money Account (%)	8.7	33.2	5.2	10.2
Made Digital Payment (%)	72.0	50.0	85.0	57.0
Received Digital Payment (%)	65.2	42.1	78.3	51.8

Source: World Bank Global Findex Database (2021)

Traditional instant payment systems benefit from leveraging existing banking relationships through integration with established customer identification procedures and account management systems. This approach reduces barriers to adoption for users who already have relationships with participating financial institutions while enabling access to enhanced payment capabilities through familiar interfaces and customer service channels.

However, reliance on existing banking relationships also means that instant payment system adoption may be limited by existing patterns of financial exclusion. Users who lack bank accounts or have inactive accounts may not benefit from new payment capabilities unless they first establish formal banking relationships.

Stablecoins present more complex accessibility profiles. While blockchain-based systems enable financial participation without traditional banking relationships, practical access requires several technological and procedural prerequisites that may create barriers for target populations:

Smartphone and internet access requirements may exclude users who lack access to modern telecommunications infrastructure or cannot afford data connectivity. Rural areas and low-income populations may face particular challenges in meeting these technological prerequisites, potentially recreating digital divides in new forms.

Advanced digital literacy requirements for understanding private key management, blockchain confirmation processes, and wallet security may create barriers for users with limited formal education or technological experience. The irreversible nature of blockchain transactions means that user errors can result in permanent loss of funds, creating high stakes for proper system understanding.

Cryptocurrency exchange access requirements for conversion between stablecoins and local currency may create additional friction and costs that limit practical accessibility. Users must navigate complex interfaces and potentially volatile exchange rates to utilize stablecoin systems effectively. Regulatory restrictions on cryptocurrency exchanges in some jurisdictions may further limit access.

Technical risk management requirements mean that users must understand and manage security risks including device security, private key storage, and transaction verification. These requirements may be particularly challenging for users with limited technological experience or resources.

6.2 Infrastructure Dependencies and Network Effects

The effectiveness of different payment systems depends partly on their ability to leverage existing infrastructure and achieve network effects that encourage widespread adoption. Traditional payment infrastructure benefits from existing telecommunications and banking networks that represent substantial investments in physical infrastructure, human capital, and institutional relationships developed over decades.

The network effects achieved by successful instant payment systems reflect the importance of institutional coordination in payment system development. Central bank mandates for participation by major financial institutions can ensure that systems achieve critical mass rapidly rather than facing coordination problems that often affect payment system adoption.

Brazil's Pix achieved remarkable adoption rates, reaching over 150 million users within three years of launch in November 2020 (Duarte et al., 2022). This rapid adoption was facilitated by mandatory participation requirements for major financial institutions and seamless integration with existing banking infrastructure.

Stablecoin adoption faces coordination challenges where consumer adoption depends on merchant acceptance, while merchant acceptance depends on consumer demand. Overcoming this coordination problem typically requires either significant subsidies or mandated participation that may be difficult to achieve for private systems operating outside established regulatory frameworks.

The network effects literature suggests that established payment infrastructure has significant advantages in achieving the critical mass necessary for sustainable adoption, particularly for domestic payment applications where existing systems already provide basic functionality.

However, infrastructure dependencies also create potential vulnerabilities and limitations. Payment systems that rely heavily on existing infrastructure may be constrained by the performance characteristics and coverage limitations of that infrastructure. Rural areas with limited telecommunications infrastructure or banking presence may continue to face challenges regardless of payment system design.

6.3 User Experience and Adoption Patterns

The practical barriers to payment system adoption often involve factors beyond technical capabilities or cost structures. User experience design, customer education, and support systems play crucial roles in determining whether new payment technologies achieve meaningful adoption among target populations.

Traditional payment systems benefit from established customer service frameworks, dispute resolution mechanisms, and regulatory protections that provide users with recourse in cases of system malfunction or fraudulent activity. These institutional safeguards may be particularly important for users with limited technological experience or resources for independent problem resolution.

Stablecoin systems typically offer limited customer support and dispute resolution capabilities due to their decentralized nature and the irreversible characteristics of blockchain transactions. Users who experience technical difficulties or make errors may have little recourse for recovering funds or resolving problems.

The educational requirements for effective stablecoin usage may be particularly challenging for populations that financial inclusion policies aim to serve. Understanding concepts such as private key management, blockchain confirmations, and exchange rate risks requires technological sophistication that may exceed the capabilities of many potential users.

7 Cross-Border Interoperability and International Integration

7.1 Cross-Border Payment Inefficiencies

Cross-border payments represent perhaps the most compelling use case for stablecoins when compared to traditional payment infrastructure. Conventional cross-border payment systems involve multiple intermediary banks, complex correspondent banking relationships, and settlement cycles that can extend several business days while creating substantial costs for users.

Data from the World Bank Remittance Prices Worldwide database shows that average fees for cross-border remittances from South Africa reached 7.1% of transaction value in Q3 2024, based on 301 remittance services. While this remains above the global average of 4.4%, it represents a more moderate premium than some other emerging market corridors (World Bank, 2024). These above-average costs reflect the complexity and inefficiencies inherent in correspondent banking arrangements that require multiple intermediary institutions, each adding costs and processing delays.

Sub-Saharan Africa more broadly remains among the more expensive regions to send money to, with costs reflecting documented inefficiencies in correspondent banking arrangements, complex compliance procedures, and limited competition in many corridors. These costs particularly affect low-income households that rely on remittances for basic needs, creating regressive burden that falls disproportionately on vulnerable populations.

Regional cryptocurrency adoption patterns demonstrate growing interest in alternative payment methods. Chainalysis research indicates South Africa ranks among countries with meaningful cryptocurrency adoption globally, with Sub-Saharan Africa accounting for 2.7% of global cryptocurrency transaction volume between July 2023 and June 2024 (Chainalysis, 2024). The region received an estimated $125 billion in on-chain value during this period, representing a $7.5 billion increase compared to the previous year.

Regional patterns suggest that where traditional cross-border payment infrastructure faces structural limitations, alternative payment methods including stablecoins may offer meaningful value propositions, particularly for users seeking to circumvent capital controls or access more stable store-of-value options.

7.2 Stablecoin Advantages and Implementation Challenges

Stablecoins offer advantages in cross-border contexts through direct peer-to-peer transfers that bypass traditional correspondent banking networks. Users can transfer USD-denominated stablecoins to recipients globally within blockchain confirmation timeframes, with transaction costs determined by network fees rather than traditional banking margins and intermediary charges.

The peer-to-peer nature of blockchain-based transfers eliminates the need for correspondent banking relationships and reduces the number of intermediaries involved in cross-border transactions. This streamlined process can potentially reduce both costs and settlement times compared to traditional wire transfers or remittance services.

However, practical implementation faces significant challenges. Total cost analysis for stablecoin cross-border payments must account for complete transaction chains including on-ramp costs (converting local currency to stablecoins through cryptocurrency exchanges), network transaction fees, exchange spreads, and off-ramp costs (converting stablecoins back to recipient's local currency).

On-ramp costs involve converting local currency to stablecoins through cryptocurrency exchanges, which typically charge trading fees and spreads that can range from 0.5% to 2% or more depending on the exchange and transaction size. Users may also face minimum transaction requirements or withdrawal fees that affect cost efficiency for smaller transactions.

Network transaction fees are determined by blockchain network congestion and can vary dramatically based on network utilization. During high congestion periods, fees can exceed traditional remittance costs, particularly for smaller transaction amounts typical of many remittance flows.

Off-ramp costs involve converting stablecoins back to recipient local currency, which may require access to local cryptocurrency exchanges or peer-to-peer trading arrangements. In many developing economy contexts, limited exchange infrastructure or regulatory restrictions may create substantial barriers or costs for currency conversion.

When accounting for these complete transaction chains, research comparing stablecoin remittances to traditional fiat transfers has found that total costs vary significantly by corridor and transaction size, with stablecoin advantages being most pronounced for larger transaction values where fixed costs constitute smaller percentages of total transfer amounts.

7.3 Regulatory and Compliance Considerations

The global nature of stablecoin networks creates opportunities for regulatory arbitrage that present both benefits and challenges. While users may benefit from access to global liquidity and reduced regulatory friction, the same characteristics create challenges for regulatory oversight and consumer protection.

Anti-money laundering and combating the financing of terrorism (AML/CFT) compliance represents another significant challenge for cross-border stablecoin usage. Traditional correspondent banking relationships incorporate established AML/CFT procedures and information sharing arrangements that may be more difficult to replicate in decentralized blockchain-based systems.

The Financial Action Task Force (FATF) guidance emphasizes the importance of applying consistent standards to stablecoin systems, but implementing these standards in decentralized environments presents practical challenges that traditional payment systems with established intermediaries can more readily address.

Regional adoption patterns reveal important infrastructure and regulatory factors that influence stablecoin uptake. Countries with more restrictive foreign exchange controls or limited access to international banking services often show higher cryptocurrency adoption rates, suggesting that stablecoins may serve as alternatives to traditional financial infrastructure where such infrastructure is limited or constrained.

The SARB has indicated openness to allowing eligible stablecoins used for domestic payments to be tested in regulatory sandboxes with a two-year timeline, enabling experimentation with stablecoin applications while maintaining oversight and protecting consumers from potential risks associated with nascent technologies.

8 Regulatory Frameworks and Institutional Considerations

The South African regulatory framework for stablecoins reflects a balanced approach seeking to accommodate innovation while ensuring appropriate consumer protection and financial stability safeguards. The SARB's regulatory stance emphasizes several key principles that shape the competitive landscape for different payment technologies.

Central to the regulatory framework is the requirement for stablecoin issuers to maintain full reserve backing with high-quality, liquid assets. The SARB's approach requires reserves to consist primarily of government securities and cash deposits at regulated financial institutions, held in segregated accounts subject to regular reporting requirements (SARB, 2023a). This approach addresses fundamental stability risks that differentiate stablecoins from traditional electronic money.

The regulatory framework also emphasizes governance and operational risk management requirements that may create barriers to entry for potential stablecoin issuers. These requirements include robust risk management frameworks, regular external audits of reserve holdings, transparent reporting of reserve composition and investment strategies, and compliance with anti-money laundering and counter-terrorism financing regulations.

However, several regulatory challenges remain. Consumer protection mechanisms for stablecoin users are less developed compared to traditional banking services, where deposit insurance and established dispute resolution procedures provide recourse for users. The irreversible nature of blockchain transactions complicates the application of traditional consumer protection frameworks.

International regulatory developments increasingly emphasize regulatory consistency between stablecoins and traditional payment instruments with similar economic functions. The European Union's Markets in Crypto-Assets (MiCA) regulation requires stablecoin issuers to obtain e-money institution licenses and maintain reserves equivalent to traditional e-money providers.

This trend towards functional regulation suggests that regulatory advantages sometimes attributed to stablecoins may diminish as frameworks mature and achieve technological neutrality. The convergence of regulatory requirements between stablecoins and traditional payment instruments reduces potential competitive advantages that might arise from regulatory arbitrage.

Jurisdictions with well-developed payment infrastructure tend to adopt more stringent stablecoin regulations, while those with payment infrastructure gaps maintain more permissive approaches. This pattern suggests that regulatory approaches partly reflect the relative benefits and risks of alternative payment methods within specific national contexts.

Current adoption levels in South Africa remain well below thresholds that would create significant macroeconomic effects. The availability of efficient domestic payment alternatives through traditional banking systems and emerging instant payment infrastructure may limit potential for stablecoins to achieve systemically significant adoption levels.

9 Conclusions and Policy Implications

9.1 Summary of Research Findings

This dissertation examined the value proposition of stablecoins within South Africa's evolving digital payment landscape through comparative analysis based on established frameworks and international experience. The analysis reveals important insights about the relative positioning of stablecoins versus traditional payment infrastructure across multiple dimensions of payment system performance.

The frameworks developed by Adrian and Mancini-Griffoli (2021) and Catalini et al. (2022) demonstrate that the value proposition of different digital money forms depends critically on the quality and characteristics of existing payment infrastructure. In jurisdictions with high-quality, accessible, and low-cost payment systems, alternative digital money forms face structural challenges in achieving widespread adoption for domestic payment applications.

The international experience, particularly Brazil's success with Pix, provides evidence that well-designed traditional payment infrastructure can achieve rapid adoption and high transaction volumes while maintaining lower costs and greater accessibility than blockchain-based alternatives. Pix achieved over 150 million users within three years by building upon existing banking relationships while dramatically improving user experience through instant transfers, proxy payments, and 24/7 availability.

The comparative analysis across six dimensions reveals that stablecoins face fundamental challenges in most domestic payment applications due to network effects favoring established infrastructure, regulatory frameworks designed for traditional financial services, and performance characteristics that may not exceed those achievable through proper traditional infrastructure modernization.

However, stablecoins retain advantages in specific use cases, particularly cross-border payments where traditional correspondent banking arrangements create substantial inefficiencies. With documented remittance costs of 7.1% from South Africa (above the global average of 4.4%) and regional adoption patterns demonstrating meaningful stablecoin usage for cross-border applications, this specialized use case represents the most compelling stablecoin value proposition.

9.2 Policy Recommendations

Based on the analysis, several policy recommendations emerge for South African policymakers and other emerging economies implementing payment system modernization:

Prioritize domestic payment infrastructure development: The documented success of instant payment systems, particularly Brazil's Pix, supports continued focus on traditional payment system enhancement as the primary vehicle for achieving domestic payment efficiency and financial inclusion objectives. This approach offers predictable benefits with manageable implementation risks while building upon existing institutional capabilities and relationships.

Establish targeted regulatory frameworks for stablecoin specialization: Evidence of meaningful cross-border stablecoin adoption supports the SARB's approach of establishing regulatory sandboxes for testing stablecoin applications while maintaining appropriate consumer protection and financial stability safeguards. This measured approach enables experimentation with innovative technologies in areas where they demonstrate clear advantages while protecting consumers from potential risks.

Leverage educational initiatives to improve existing infrastructure utilization: If barriers to adoption of existing payment methods include misconceptions about eligibility or usage requirements, targeted educational programs could substantially improve utilization of existing payment infrastructure. These interventions may provide greater financial inclusion benefits than technological solutions while requiring fewer resources and creating fewer risks.

Coordinate international regulatory approaches: The global nature of stablecoin networks requires enhanced international coordination to ensure consistent consumer protection standards and prevent regulatory arbitrage. South Africa should engage actively in international regulatory development while maintaining focus on domestic policy objectives and infrastructure capabilities.

Focus cross-border policy attention on stablecoin applications: Given documented above-average costs of traditional cross-border payments and evidence of regional stablecoin adoption for remittance applications, policy frameworks should acknowledge this potential while addressing implementation challenges through appropriate regulatory oversight and consumer protection measures.

9.3 Research Contributions and Future Directions

This research demonstrates the value of evidence-based policy analysis in rapidly evolving technological domains. The comparative framework provides replicable methodology for payment system evaluation in emerging economy contexts applicable to other countries implementing infrastructure modernization programs.

The research contributes to technology policy debates by demonstrating the importance of contextual factors in determining technological value propositions. The finding that stablecoin benefits depend critically on existing infrastructure quality has implications beyond payment systems for other domains where similar questions arise about optimal balances between innovation and enhancement of existing systems.

Future research directions include primary data collection through user and merchant surveys, collaboration with payment system operators to access performance data, longitudinal adoption studies, experimental research using controlled pilot programs, and regional comparative analysis across multiple emerging economies.

9.4 Final Observations

This research demonstrates that emerging payment technology value propositions depend critically on evaluation context, particularly existing infrastructure quality. While stablecoins offer advantages in certain applications, their practical benefits appear constrained by well-designed traditional infrastructure capabilities, particularly for domestic applications.

The policy challenge lies in maintaining innovation openness while focusing resources on approaches most likely to achieve broad-based improvements. The evidence supports optimal payment system policy that leverages proven approaches for general applications while maintaining measured openness to innovation in specialized areas where traditional infrastructure faces fundamental limitations.

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10 References

Adrian, T. and Mancini-Griffoli, T. (2021). The Rise of Digital Money. *Annual Review of Financial Economics*, 13(1), 57-77.

Arbitrum Docs. (2024). Optimistic Rollup Protocol. Available at: https://docs.arbitrum.io/how-arbitrum-works/optimistic-rollup [Accessed 20 June 2025].

Bitquery. (2024). Understanding Blockchain Demand: Analyzing TPS and Throughput Needs. Available at: https://bitquery.io/blog/understanding-blockchain-demand-tps-throughput-analysis [Accessed 20 June 2025].

Carstens, A. and Nilekani, N. (2024). Finternet: The Financial System for the Future. *BIS Working Papers* No 1178. Basel: Bank for International Settlements.

Catalini, C., de Gortari, A. and Shah, N. (2022). Some Simple Economics of Stablecoins. *Annual Review of Financial Economics*, 14(1), 117-135.

Chainalysis. (2024). The 2024 Global Crypto Adoption Index. Available at: https://www.chainalysis.com/blog/202 crypto-adoption-index/ [Accessed 20 June 2025].

Croman, K., Decker, C., Eyal, I., et al. (2016). On Scaling Decentralized Blockchains. In International Conference on Financial Cryptography and Data Security (pp. 106-125). Springer.

Duarte, A., Frost, J., Gambacorta, L., Koo Wilkens, P. and Shin, H.S. (2022). Central Banks, the Monetary System and Public Payment Infrastructures: Lessons from Brazil's Pix. *BIS Bulletin* No. 52. Basel: Bank for International Settlements.

Ethereum.org. (2024). Proof-of-stake (PoS). Available at: https://ethereum.org/en/developers/docs/consensus-mechanisms/pos/ [Accessed 20 June 2025].

Frost, J., Koo Wilkens, P., Kosse, A., Shreeti, V. and Velásquez, C. (2024). Fast Payments: Design and Adoption. *BIS Quarterly Review*, March 2024, 31–43.

Nakamoto, S. (2008). Bitcoin: A Peer-to-Peer Electronic Cash System. Available at: https://bitcoin.org/bitcoin.pdf [Accessed 20 June 2025].

South African Reserve Bank (SARB). (2018). The National Payment System Framework and Strategy: Vision 2025. Pretoria: South African Reserve Bank.

South African Reserve Bank (SARB). (2023a). A Primer on Stablecoins. *Financial Stability Topical Briefing*. Pretoria: South African Reserve Bank.

South African Reserve Bank (SARB). (2023b). The Financial Stability Considerations of Stablecoins in South Africa. *Financial Stability Topical Briefing*. Pretoria: South African Reserve Bank.

South African Reserve Bank (SARB). (2024). Digital Payments Roadmap: Towards Inclusive, Accessible, Effective and Sustainable Digital Payments in South Africa. Pretoria: South African Reserve Bank.

Wood, G. (2014). Ethereum: A Secure Decentralised Generalised Transaction Ledger (Yellow Paper). Ethereum Foundation.

World Bank. (2021). The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19. Washington DC: World Bank.

World Bank. (2024). Remittance Prices Worldwide Database. Washington DC: World Bank.