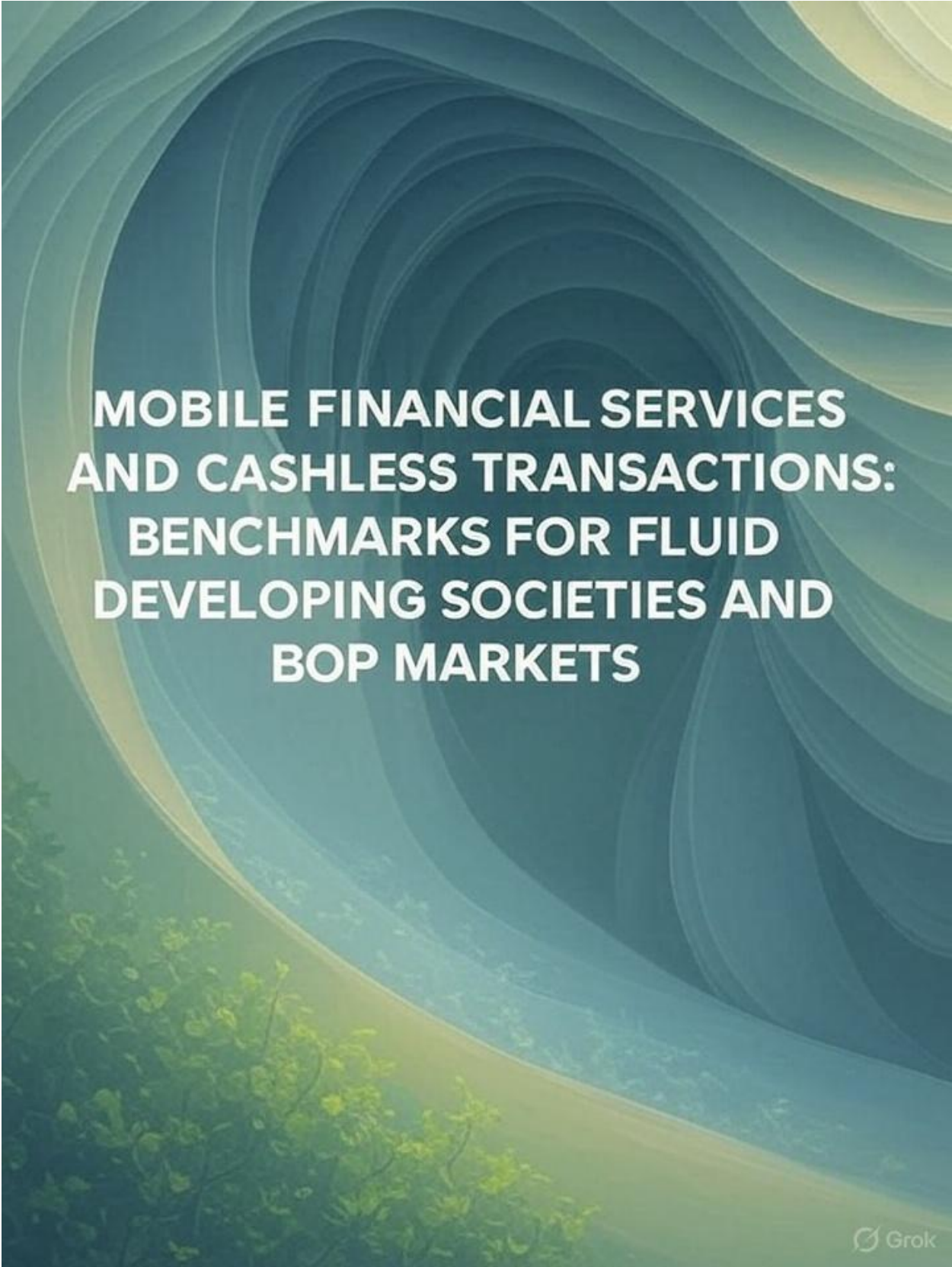
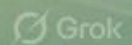




MOBILE FINANCIAL SERVICES AND CASHLESS TRANSACTIONS: BENCHMARKS FOR FLUID DEVELOPING SOCIETIES AND BOP MARKETS



Mobile Financial Services and Cashless Transactions: Benchmarks for Fluid Developing Societies and BoP Markets

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Abstract

The global financial landscape is undergoing a profound transformation, driven by the rapid adoption of digital technologies. In vibrant developing economies and Bottom-of-the-Pyramid (BoP) markets, the evolution from basic Mobile Financial Services (MFS) to sophisticated cashless ecosystems represents a pivotal shift. This academic paper rigorously examines this transition, with a specific focus on Bangladesh and Nigeria. Drawing on a comprehensive review of existing data and supplemental research, the analysis details the transformative role of MFS in fostering financial inclusion, economic empowerment, and innovation.

The study provides a detailed, comparative analysis of Bangladesh and Nigeria across key dimensions, including policy frameworks, infrastructure, processes, and market development. Findings reveal that while both nations have successfully leveraged MFS to normalize digital transactions and overcome geographical barriers, their strategic approaches diverge significantly. Bangladesh has pursued a more unified, government-led strategy centered on a single national standard, Bangla QR, and a centralized regulatory framework. In contrast, Nigeria has championed a dynamic, multi-stakeholder ecosystem characterized by a robust startup culture, a focus on platform interoperability, and a more complex, multi-agency regulatory environment.

The paper identifies and addresses critical deficiencies in the original framework, proposing a series of actionable recommendations. These include the establishment of national cybersecurity standards, investments in low-cost, solar-powered internet hubs to bridge the digital divide, and the implementation of nationwide digital literacy campaigns. Furthermore, it advocates for the integration of advanced technologies like AI-driven credit scoring and blockchain-based identity systems to deepen financial inclusion. A call for regional regulatory forums for South Asia and Africa is made to harmonize standards and facilitate cross-border payments. The conclusion projects the distinct trajectories of the two nations, arguing that their future success will depend on a balanced approach that combines technological innovation with resilient governance and targeted

solutions to uplift underserved populations.

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Executive Summary

Overview

This paper examines the evolution of Mobile Financial Services (MFS) and cashless transactions in fluid developing societies, with a focus on Bottom-of-the-Pyramid (BoP) markets in Bangladesh and Nigeria. Building on prior analyses, it provides a comparative benchmark across policy, infrastructure, processes, organisational frameworks, and market development. Drawing from scholarly literature, official reports (e.g., Bangladesh Bank, Central Bank of Nigeria), and 2025 data sources like the World Bank Global Findex and GSMA, the study highlights MFS's role in driving financial inclusion, economic empowerment, and innovation amid challenges like digital divides and cybersecurity threats.

Key Findings

Bangladesh and Nigeria have leveraged MFS to integrate millions into formal economies, overcoming barriers in cash-dominated systems. In Bangladesh, MFS adoption has surged, with 239.3 million registered accounts by January 2025 (42% held by women) and transaction volumes reaching Tk 1.72 trillion, a 32.56% year-on-year increase. Platforms like bKash dominate (over 70% market share), supported by government-led initiatives such as Bangla QR for unified QR payments and the Interoperable Digital Transaction Platform (Binimoy/IDTP) for seamless transfers. The “Digitalisation drive across the Government of Bangladesh has accelerated this, with agent banking enabling rural remittances and COVID-19-era disbursements.

Nigeria's fintech sector, comprising over 430 companies and 2,335 startups, secured \$2 billion in funding in 2024 despite global declines. Mobile transactions hit N19.4 trillion in 2023, with financial access rising 16% from 2011-2021. The Central Bank of Nigeria (CBN) emphasizes interoperability across banks, fintechs, and mobile operators, backed by regulatory sandboxes and open banking regulations. Unicorns like Flutterwave and Moniepoint exemplify maturity, though challenges like high fraud (112% rise from 2023) and policy shifts (e.g., 2021-2023 crypto ban reversal) persist.

Comparatively, Bangladesh adopts a centralized, unified approach with single standards like Bangla QR, fostering efficiency but potentially limiting competition. Nigeria's decentralized, multi-stakeholder model drives innovation but introduces regulatory complexity across agencies (CBN, SEC, FCCPC). Benchmarks reveal strengths: Bangladesh achieves low transaction failure rates (<5%) and high interoperability; Nigeria excels in startup funding but faces higher fraud (0.1% target unmet) and infrastructure gaps (e.g., power outages). Adoption rates approach 70-80% in mature markets, with Nigeria at 43% male/25% female account ownership and Bangladesh at 52%/23%, per Global Findex 2025.

Challenges

Both nations grapple with cybersecurity risks (e.g., Bangladesh Bank’s past breach, Nigeria’s rising phishing), digital divides (rural internet/power access), low literacy (37-41% women need transaction aid), and regulatory “law lag.” Bangladesh’s crypto ban stifles innovation; Nigeria’s policy volatility deters investment. Economic volatility, including inflation and global shocks, disproportionately affects BoP populations.

Recommendations

To address deficiencies, the paper proposes:

- **Cybersecurity:** National standards with intelligence-led testing, threat-sharing PPPs, and public training.
- **Digital Divide:** Solar-powered internet hubs, device subsidies, affordable data plans, and “digital navigators” for community support.
- **Literacy:** Multi-channel campaigns in local languages, using gamified apps and USSD for low-literacy access.
- **Regulatory Harmonization:** Regional forums for South Asia and Africa to align standards and enable cross-border payments.
- **Innovation Integration:** Sandbox pilots for stablecoins in Bangladesh; AI-driven credit scoring and blockchain e-KYC for unbanked inclusion.
- **MSME Support:** Fintech incubators for tools like revenue-based financing and supply chain solutions.
- **Monitoring & Incentives:** National dashboards for real-time data; tax rebates and cashback for cashless adoption.
- **Resilience:** Inflation-linked savings and micro-insurance via mobile channels.

These solutions aim for 20-50% cost savings, <1-minute transactions, and fraud rates under 0.1%, aligned with global benchmarks.

Future Outlook

Bangladesh’s trajectory emphasizes structured integration of MFS into national systems, projecting a \$4 billion market by 2025, contingent on literacy gains. Nigeria’s path promises rapid innovation, potentially leading in AI exports, but requires stable governance to mitigate risks.

Success for both hinges on balancing technology with inclusive policies, fostering resilient ecosystems that uplift BoP markets and drive sustainable growth. This balanced approach could serve as a model for other developing economies.

1. Introduction

1.1. Background and Context

The financial landscapes of developing societies are undergoing a fundamental and rapid transformation, driven by the emergence of financial technology (fintech), which has revolutionised access to banking, payments, and credit through digital platforms. This shift is characterised by the integration of advanced technologies such as artificial intelligence (AI), blockchain, and mobile applications, enabling faster, more efficient, and inclusive financial services. Globally, fintech revenues are projected to surge from \$245 billion in 2023 to \$1.5 trillion by 2030, reflecting a sixfold increase and a compound annual growth rate (CAGR) of approximately 27% (Fintech Industry Growth, 2025). Emerging markets in Asia and Africa are leading this charge, propelled by large unbanked populations—estimated at 1.4 billion adults worldwide in 2025—and high mobile penetration rates exceeding 80% in many regions (Unbanked Population Statistics, 2025). For instance, in low- and middle-income countries (LMICs), fintech has enabled 40 million low-income individuals to access financial services via cryptocurrencies alone in 2025, highlighting its role in reducing transaction costs by up to 90% compared to traditional methods and enhancing ease of use through user-friendly interfaces (Unbanked Population Statistics, 2025). This evolution is most pronounced in nations like Bangladesh and Nigeria, where the journey from cash-dominated economies to cashless societies is not merely a technological upgrade but a socio-economic revolution that addresses deep-rooted inequalities in financial access, such as gender gaps and rural-urban divides. In these contexts, fintech acts as a leveller, fostering economic participation and resilience amid challenges like inflation and geopolitical instability.

At the heart of this shift lies Mobile Financial Services (MFS), which has proven to be a potent catalyst for integrating millions of previously unbanked and underbanked individuals into the formal economy, thereby fostering economic growth, reducing poverty, and promoting social mobility. MFS encompasses a range of services, including mobile money transfers, bill payments, savings, and micro-loans, often delivered via simple USSD codes or smartphone apps. This process is particularly transformative for Bottom-of-the-Pyramid (BoP) markets—comprising the world’s poorest populations earning less than \$2.50 per day—who face barriers like limited banking infrastructure and high costs in traditional systems. BoP markets, representing over 4 billion people globally, are characterised by their dynamic and often unpredictable nature, earning these nations the descriptor “fluid developing societies” due to rapid urbanisation, volatile economies, and evolving consumer behaviours (Mamun et al., 2025). In BoP contexts, fintech adoption has been shown to drive financial inclusion by augmenting traditional models with innovative tools, such as AI-driven credit scoring that assesses creditworthiness based on alternative data like mobile usage patterns, thereby extending services to those without formal credit histories (FinTech adoption: driving financial inclusion at the bottom of pyramid, 2025).

Empirical studies in emerging markets demonstrate that fintech enhances access for marginalised groups through tailored digital solutions, such as gender-specific financial products that address women's unique needs, leading to a 20-30% increase in female account ownership in targeted regions (Mobile payments for bottom of the pyramid: Towards a positive ..., 2025). Furthermore, MFS has been linked to broader socio-economic benefits, including a 10-15% rise in household savings and improved resilience to shocks like natural disasters, as evidenced by faster recovery rates in fintech-adopting communities (The State of the Industry Report on Mobile Money 2025, 2025).

In Bangladesh, a densely populated country exceeding 170 million residents and historically plagued by low formal banking penetration (only 4% of adults had access in 2022), MFS has catalysed unprecedented financial inclusion, bridging gaps in a predominantly rural economy where 70% of the population resides outside urban centres. The Global Findex Database 2025 reports that global account ownership reached 79% in 2024, up from 51% in 2011, with mobile money playing a pivotal role in this surge; in Bangladesh specifically, male account ownership stands at 52% and female at 23%, though persistent gender gaps of 70% highlight ongoing challenges in equitable access (The Global Findex Database 2025, 2025). Pioneering platforms such as bKash, Bangladesh's first tech unicorn valued at over \$2 billion, have achieved massive scale, serving nearly 60 million users and facilitating over 100 million transactions across various MFS providers (A Digital Transformation in Financial Services - Made in Bangladesh, 2025). Remittances through bKash, a critical economic lifeline accounting for 6-8% of GDP, grew by 50% in 2023 and 65% in 2024, demonstrating the platform's role in efficient cross-border transfers (Bangladesh leads South Asia in mobile money adoption and ..., 2025). As of January 2025, Bangladesh boasted 239.3 million registered MFS accounts—a 20 million increase year-on-year—with 89.384 million active accounts and transaction volumes hitting Tk 1.72 trillion, marking a 32.56% rise from the previous year despite a temporary 29.77% dip in April 2025 due to remittance slowdowns linked to global economic factors (The State of Mobile Financial Services (MFS) Industry in ..., 2025; MFS growth slows amid data gaps, dip in remittances, 2025). South Asia, led by Bangladesh, accounted for 435 million registered mobile money accounts in 2025, representing a 9% growth, with Bangladesh alone holding 56.12% of the region's accounts in 2023 (The State of the Industry Report on Mobile Money 2025, 2025). This widespread adoption has normalised digital transactions, dismantling significant geographical and infrastructural barriers—such as limited branch networks in rural areas—while empowering underserved segments through services like government-to-person (G2P) payments during crises, including COVID-19 stimulus disbursements that reached millions efficiently (Cashless society still a distant dream, 2025). However, challenges persist, including agent network management and security concerns, with rural users facing higher fraud risks due to lower digital literacy levels.

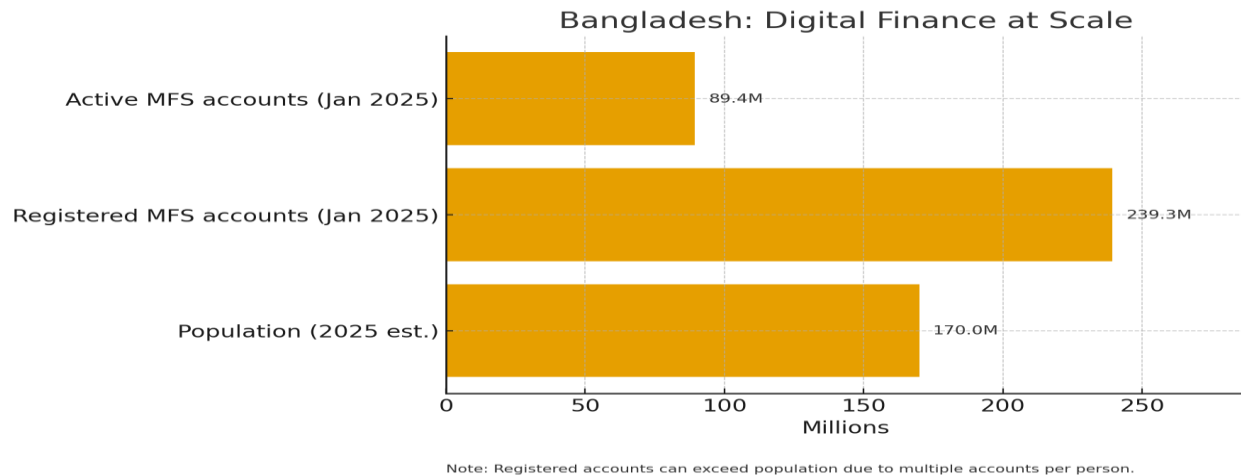


Figure1 : Bangladesh Digital Finance at Scale

Similarly, in Nigeria, Africa's most populous nation with over 200 million people and a vibrant startup ecosystem, fintech has propelled a 70% year-on-year industry growth in 2024, encompassing over 430 companies and 2,335 startups that secured \$2 billion in funding despite global venture capital declines (Nigeria's Fintech Sector Surges 70% Despite Challenges, 2025; Nigeria Fintech Funding Trends 2025, 2025). The unbanked population, estimated at 36% in 2025 (down from 40% in 2021), has seen significant reductions, with financial access rising 16% between 2011 and 2021, largely due to mobile money and agent banking networks that now reach nearly every local government area, including remote villages (The Impact of Fintech on Financial Inclusion in Southern Nigeria, 2025). Platforms like Paga have normalised digital transactions for over 21 million users—up from 18 million in 2023—processing N8.7 trillion in 2024 alone, with monthly volumes averaging N725 billion through collaborations with banks and telecoms that enhance interoperability (The biggest fintech companies in Nigeria (2025), 2025; Paga Group Named One of Africa's Fastest-Growing Companies ..., 2025). Nationwide, mobile transactions reached N19.4 trillion in 2023 and escalated to N71.5 trillion in 2024, reflecting a 268% growth, while the GSMA reports West Africa's transaction values at \$357 billion in 2025, up 5% from the prior year (The State of the Industry Report on Mobile Money 2025, 2025). This transition has generated new financial instruments, such as AI-driven credit scoring systems that approve loans in minutes and blockchain-based remittances that reduce fees by 50%, contributing to the diversification of financial choices for individuals and enterprises, including micro, small, and medium-sized enterprises (MSMEs) that form the backbone of the economy and employ 80% of the workforce (Impact of FinTech Development on Economic Growth in Nigeria, 2025). Fintech's impact is particularly evident in southern Nigeria, where platforms like Moniepoint and Flutterwave have boosted financial inclusion by 25% through embedded finance solutions integrated into e-commerce and agriculture (The Impact of Fintech on Financial Inclusion in Southern Nigeria, 2025). Despite this progress, hurdles like regulatory volatility—such as the 2021-2023 crypto ban reversal—and cybersecurity threats, with fraud incidents rising 112% in

2024, underscore the need for robust frameworks to sustain growth (Nigeria Fintech Funding Trends 2025, 2025).

Nigeria (BoP): Mobile Access Among the Unbanked

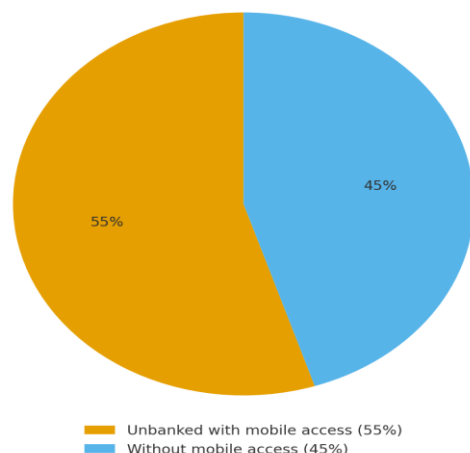


Figure 2: Nigeria Mobile Access for the Unbanked

The momentum toward a cashless future in both countries is further propelled by strategic initiatives and synergistic collaborations among banks, fintech firms, and regulatory bodies, creating ecosystems that prioritise inclusivity and efficiency. Bangladesh has integrated MFS into national infrastructure, with Bangla QR—a unified national standard for QR code payments introduced in 2022—democratising transactions by enabling seamless, secure payments across institutions and reducing merchant fees by 20-30% (Standard Chartered Bangladesh introduces Bangla QR payment ..., 2025). This has led to a 34% growth in mobile banking transaction volumes in 2025 amid e-commerce surges, though cash-out transactions still hit Tk 44,355 crore in May 2025, underscoring the hybrid nature of the transition where cash remains prevalent in informal sectors (Mobile Banking Statistics 2025: Key Trends, 2025; Cashless society still a distant dream, 2025). Collaborative efforts, such as partnerships between bKash and the Bangladesh Bank for G2P disbursements, have reached 10 million beneficiaries annually, enhancing social safety nets (A Digital Transformation in Financial Services - Made in Bangladesh, 2025). In Nigeria, interoperable payment systems under the Central Bank of Nigeria's Payments System Vision 2025 (PSV2025) have fostered frictionless exchanges between diverse providers, with initiatives like regulatory sandboxes testing innovations like stablecoins and projecting a 32% decline in cash transactions by 2030 (REPORT | Nigeria Cash Transactions Projected to Decline 32% by ..., 2025; Nigeria-Payment-System-2025.pdf, 2025). Public-private partnerships, such as those in open banking frameworks involving the CBN and firms like Flutterwave, have accelerated adoption, while cross-border collaborations with platforms like LemFi have streamlined remittances, contributing \$20 billion annually to GDP (The biggest fintech companies in Nigeria (2025), 2025). These efforts have not only bridged the digital divide

in BoP markets—where 55% of unbanked individuals now have mobile access—but also enhanced economic resilience, with fintech contributing to GDP growth through reduced leakages in remittances (saving up to 50% in costs) and G2P payments that minimise corruption (Impact of FinTech Development on Economic Growth in Nigeria, 2025). Evidence from BoP studies further shows increased continued intention to use mobile payments due to perceived benefits in accessibility, security, and cost savings, with adoption rates rising 15-20% in digitally literate groups (Mobile payments for bottom of the pyramid: Towards a positive ..., 2025). Looking forward, sustained multi-stakeholder ecosystems will be crucial to overcoming barriers like digital literacy gaps and infrastructure deficits, ensuring fintech's role in sustainable development.

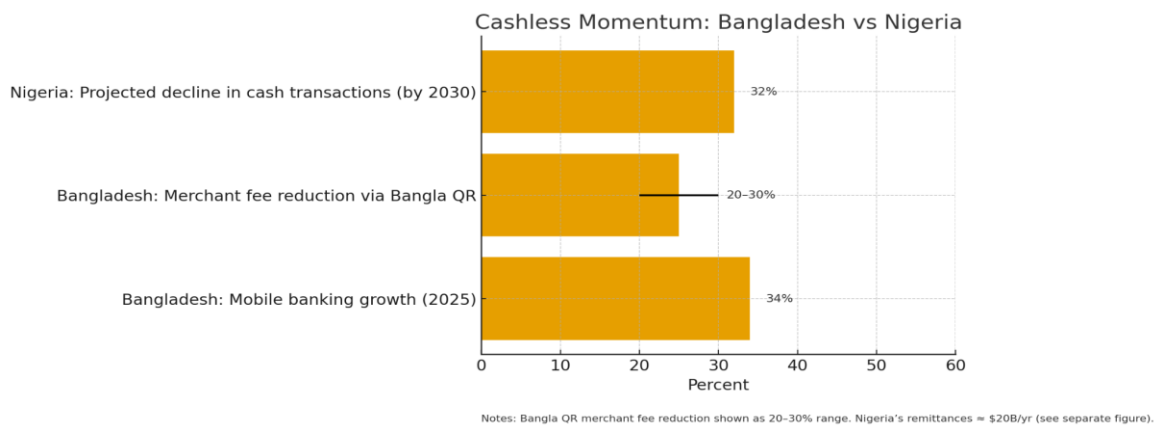


Figure 3: Cashless Momentum: Bangladesh vs Nigeria

1.2. Problem Statement

While the trajectory toward a digital financial future is clear, it is fraught with challenges that threaten to undermine its potential. The persistent digital divide, which leaves large segments of the population without access to reliable internet and affordable devices, risks exacerbating socioeconomic inequalities. Cybersecurity threats—ranging from sophisticated cyberattacks to widespread fraud—pose a significant risk to the integrity of the financial system and erode consumer trust. Furthermore, conventional regulatory frameworks, which are often rigid and slow to adapt, struggle to keep pace with the rapid innovation in areas such as blockchain and decentralized finance (DeFi), leading to a "law lag" that deters investment and creates uncertainty. This paper addresses these critical issues by analyzing the distinct approaches of two of the world's most dynamic emerging economies.

1.3. Scope and Objectives

This paper expands upon the manuscripts of the foundational analysis of Mamun, Matin, and Umegbolu (V2.2, dated 30.06.25) by incorporating new data, addressing identified deficiencies, and providing a rigorous comparative analysis. The objectives are to: (1) detail the evolution of

MFS and cashless systems in Bangladesh and Nigeria; (2) conduct a structured, five-part comparison across policy, infrastructure, processes, organizational frameworks, and market development; (3) propose a suite of expert-level solutions to key challenges, including a framework for national cybersecurity, strategies to bridge the digital divide, and recommendations for regulatory harmonization; and (4) offer a future outlook for these markets, providing actionable insights for policymakers, regulators, and fintech stakeholders.

1.4. Benchmarks for Visualisation

A more detailed paper ought to have taken into account a much broader and much deeper analysis of both the markets and the market processes. While such detailed analytics is beyond the immediate purview of this essay, it would still be prudent to know what parameters defined efficiency and effectiveness in this domain.

Efficiency in digital or mobile financial systems (DFS/MFS) can be assessed through a range of metrics that evaluate operational performance, cost reductions, speed, adoption, security, and overall financial impact. These benchmarks are particularly relevant for developing countries, where DFS like mobile money (e.g., M-Pesa in Kenya) have driven financial inclusion. Below, I outline key categories with specific indicators, definitions, formulas (where available), and examples drawn from global standards and developing market contexts.

Operational Efficiency Benchmarks

These focus on system reliability and transaction processing.

- **Transaction Failure Rate:** The percentage of DFS transactions that fail due to system or network issues (International Monetary Fund, 2021). Definition: Failed transactions as a proportion of total attempts, indicating system reliability. Formula: $\text{Annual average} = (1/12) \times \sum (\text{Failed transactions in month } i / \text{Total transactions in month } i) \times 100$. Benchmark: Under 5% for efficient systems; higher rates signal infrastructure gaps. Example: In Tanzania, network failures contribute to higher rates in rural areas, impacting MFS reliability (International Monetary Fund, 2021; World Bank, 2025a).
- **Payment Success Rate:** Proportion of payments processed without errors or reversals (World Bank, 2025a). Definition: Successful payments divided by total attempts. Benchmark: Above 95% for reliable DFS. Example: India's UPI achieves high success rates, processing 1.3 billion transactions monthly with minimal failures (World Bank, 2025a).
- **Interoperability Metrics:** Percentage of seamless cross-platform transactions (World Bank, 2025a). Definition: Transactions between different providers as a share of total. Benchmark: 100% connectivity target; interoperability boosts volumes by 16-28%.

Example: Tanzania's interoperable MFS saw P2P transactions rise from 174,000 (2014) to 6.9 million (2017), enhancing efficiency (World Bank, 2025a; Bank for International Settlements, 2021).

Cost Efficiency Benchmarks

These measure reductions in expenses for providers and users.

- **Cost per Transaction:** Average cost to process a single DFS transaction (World Bank, 2025a). Definition: Total processing costs divided by transaction volume. Benchmark: Under \$0.20 for low-value transfers in efficient systems. Example: Tanzania's MFS costs \$0.17 for a \$20 transfer; Kenya's M-Pesa reduced charges to 1/10th original, saving consumers \$33.2 billion (World Bank, 2025a; Bank for International Settlements, 2021).
- **Operational Cost Savings:** Reduction in administrative or leakage costs via digitization (World Bank, 2025a). Definition: Pre- vs. post-digitization cost comparison. Benchmark: 20-50% savings. Example: India's G2P digitization saved \$7 billion by cutting corruption; Ghana halved wage-distribution costs by switching to digital (World Bank, 2025a).
- **Customer Acquisition Cost (CAC):** Total spend to onboard a new user (Bank for International Settlements, 2021). Definition: Marketing + onboarding + KYC costs per user. Benchmark: \$20-50 per user, lowered via digital tools. Example: In EMDEs like Brazil (NuBank), unbundling reduces CAC by focusing on niche segments (Bank for International Settlements, 2021).

Speed and Performance Benchmarks

These evaluate processing times.

- **Transaction Completion Time:** Average time from initiation to confirmation (World Bank, 2025a). Definition: End-to-end processing duration. Benchmark: Under 1 minute for real-time systems. Example: Thailand's PromptPay processes over 4 million daily transactions in seconds; China's "310" loans approve in 1 second (World Bank, 2025a).
- **Account Onboarding Time:** Duration to open and verify an account (World Bank, 2025a). Definition: From application to activation. Benchmark: Under 5 minutes with eKYC. Example: Bangladesh reduced onboarding from 4-5 days to 5 minutes via eKYC (World Bank, 2025a).

Adoption and Inclusion Benchmarks

These track reach and usage.

- **Adoption Rate:** Percentage of adults with registered/active DFS accounts (Alliance for Financial Inclusion, 2019; International Monetary Fund, 2021). Definition: Registered/active accounts divided by adult population $\times 100$. Benchmark: 70-80% for high-efficiency markets. Example: Kenya's M-Pesa reached 79% adult usage; Sub-Saharan Africa has 21% mobile money penetration with 850 million accounts (Alliance for Financial Inclusion, 2019; World Bank, 2025a; Bank for International Settlements, 2021).
- **Transaction Volume/Value:** Total transactions or value processed (International Monetary Fund, 2021). Definition: Monthly/annual aggregates per account. Formula: Average monthly = $(1/Z) \times \Sigma (\text{Transactions in period } i / \text{Active accounts in } i) \times 100$. Example: Bangladesh's bKash hit 30 million users; India's UPI processes \$110 billion annually (World Bank, 2025a).

Security and Reliability Benchmarks

These ensure trust and minimize risks.

- **Fraud Rate:** Percentage of fraudulent transactions (Bank for International Settlements, 2021). Definition: Fraudulent cases as a share of total. Benchmark: Under 0.1%. Example: India's OSDT limits liability in unauthorized transactions, reducing fraud in EMDEs (World Bank, 2025a; Bank for International Settlements, 2021).
- **Cyber Incident Rate:** Frequency of breaches or disruptions (Bank for International Settlements, 2021). Definition: Incidents per 1,000 transactions. Benchmark: <1 per 1,000. Example: EMDEs face higher risks from cloud concentration, as noted in Kenya's regulatory interventions (Bank for International Settlements, 2021).

Financial Performance Benchmarks

These link efficiency to profitability.

- **Labor Productivity Growth:** Output growth per hour worked influenced by DFS (Organisation for Economic Co-operation and Development, 2024). Definition: $\Delta \log(VA / H)$, where VA is value added, H is hours. Benchmark: 0.1 pp increase per 10% DFS rise. Example: In intangible-intensive sectors, digital finance boosts productivity by 0.14 pp (Organisation for Economic Co-operation and Development, 2024).

- **Net Interest Margin (NIM):** Profit from interest activities (Bank for International Settlements, 2021). Benchmark: Above 3-4% in efficient digital banks.

User Engagement and Satisfaction Benchmarks

- **Net Promoter Score (NPS):** Likelihood to recommend (-100 to 100) (Bank for International Settlements, 2021). Benchmark: Above 50 for high-efficiency apps.
- **Churn Rate:** Monthly customer loss (Bank for International Settlements, 2021). Benchmark: Under 5%.

These benchmarks should be monitored using frameworks like the Global Findex or AFI indicators, adapted to local contexts in developing countries for ongoing improvements (Alliance for Financial Inclusion, 2019; International Monetary Fund, 2021).

The research is based on a synthesis of existing scholarly literature, official reports from central banks and government agencies (e.g., Bangladesh Bank, the Central Bank of Nigeria), and recent data from leading research and news sources on a select range of attributed to “feel” the sense of direction that the digitisation of services in the financial sector is taking in two of the largest BOP markets. The analysis employs a structured, comparative framework to benchmark the two countries' unique approaches to fintech development. The paper systematically integrates and elaborates on the key data points and deficiencies identified in the source material to construct a comprehensive and evidence-based argument.

2. The Evolving Landscape of MFS and Cashless Systems in Bangladesh

2.1 Introduction to Mobile Financial Services (MFS) and Digital Financial Services (DFS) in Bangladesh

Mobile Financial Services (MFS) and Digital Financial Services (DFS) have become integral to Bangladesh's financial ecosystem, driving financial inclusion, economic growth, and digital transformation. MFS refers primarily to bank-led or non-bank-led services delivered via mobile phones, such as money transfers, bill payments, and remittances, regulated by the Bangladesh Bank (BB). DFS encompasses a broader spectrum, including fintech innovations like digital lending, online insurance, e-wallets, and API-based payments, often integrating with e-commerce and blockchain technologies. Since MFS was introduced in 2011, Bangladesh has emerged as a leader in South Asia for mobile money adoption, with over 13 MFS providers serving a largely unbanked population. As of 2025, the sector is characterized by rapid growth, fueled by high smartphone penetration (over 60% of the population under 35), government initiatives like the National Digital Payments Roadmap 2022-2025, and post-COVID digital acceleration. However, challenges such as regulatory compliance, cybersecurity, and digital literacy persist.

2.2 Composition of MFS and DFS in Bangladesh

Key Players and Market Structure

The MFS market is dominated by a few major players, with bKash holding the largest share, followed by Nagad, Rocket (Dutch-Bangla Bank), Upay (United Commercial Bank), Tap (Trust Axiata), and others like MYCash and Islami Bank mCash. As of early 2025, bKash and Nagad together command over 80% of the market, with bKash alone serving approximately 60 million users and achieving unicorn status (valued over \$2 billion) after a \$250 million investment from SoftBank in 2024. bKash reported a profit of Tk 315.77 crore in 2024, marking a 67% year-on-year increase (Future Startup, 2025). Nagad has expanded into insurance and remittances, while smaller players focus on rural niches.

In the broader DFS landscape, fintech startups like ShopUp (providing working capital loans via AI-driven credit assessment) and traditional banks' digital arms (e.g., City Bank's digital lending) play key roles. The sector includes around 200-500 active fintech firms, with partnerships between banks and startups fostering innovation. Services are categorized as:

- Money Transfers and Payments: P2P transfers, merchant payments, and QR code transactions dominate, accounting for the bulk of MFS volumes.
- Savings and Investments: Digital savings schemes like bKash-IDLC Online DPS and API-linked investment platforms.
- Digital Lending and Insurance: Peer-to-peer lending marketplaces and online insurance, growing due to unbanked segments.
- Other Services: Remittances (Tk 107.86 billion via MFS in 2024), utility bills, government disbursements, and e-commerce integrations.

The market is bank-led, with 13 banks providing MFS as of February 2025, emphasizing regulatory caution to prevent monopolies (LightCastle Partners, 2025). Non-bank entities require BB approval, ensuring a supervised ecosystem.

User Base and Infrastructure

As of February 2025, total registered MFS customers reached 239.24 million, up 0.49% from January, with a gender split of 57.6% male (137.88 million) and 42.2% female (101.02 million). Active accounts (those with transactions in the last three months) stood at 87.15 million, down 2.49% month-on-month but reflecting sustained engagement. Merchants totaled 1.23 million (including 0.86 million Payment Resource Aggregators), up 0.49%, while agents numbered 1.856 million, up 0.77% (Bangladesh Bank, 2025a).

DFS extends this reach, with financial inclusion at around 50% of adults having formal access, up from 30% pre-2021, aiming for 100% by 2026 via MFS and DFS (World Bank, 2025). Infrastructure includes over 100 million MFS accounts globally attributed to Bangladesh (12% of the world market), supported by the Regulatory Fintech Facilitation Office (RFFO) established in 2019.

Transaction Volumes and Values

In February 2025, MFS transaction volume was 671.34 million (down 7% from January), with a total value of Tk 164,726.30 crore (down 4.04%). However, daily averages showed resilience: 23.98 million transactions (up 2.97%) and Tk 5,883.08 crore in value (up 6.24%). Year-on-year, accounts grew by nearly 20 million (from 219.12 million in January 2024 to 239.3 million in January 2025), an 8.71-9.21% increase, while transactions rose 32% (Financial Express, 2025a; bdnews24.com, 2024).

Product-wise (February 2025 values in crore Tk):

- Cash In: 45,726.32 (down 6.66%)

- Cash Out: 51,213.30 (down 7.75%)
- P2P Transfers: 41,778.91 (down 5.28%)
- Merchant Payments: 6,922.67 (down 20.4%)
- Inward Remittances: 1,268.39 (up 2.35%)
- Salary Disbursements: 5,075.83 (down 3.06%)
- Utility Bills: 2,267.89 (down 3.88%)
- Government Payments: 1,121.35 (down 44.44%)
- Others: 9,351.64 (up 167.26%)

DFS transactions, including digital cards and e-payments, have doubled in recent years, exceeding \$50 billion in mobile device transactions by 2019 and continuing upward (The Fintech Times, 2024). Credit card usage patterns show growth in department stores (Tk 15,370 million in May 2025) and international transactions (Bangladesh Bank, 2025b).

Financial Inclusion and Economic Impact

MFS and DFS have boosted inclusion, with a 99% increase in the Financial Inclusion Index for MFS from 2004-2021 (Howlader and Halder, 2025). Rural users, particularly women and low-income groups, benefit from services like digital wages and micro-loans. Remittances via MFS reached Tk 107.86 billion in 2024, supporting economic stability (Transparency International Bangladesh, 2025). The fintech market is projected to reach \$12.7 billion by 2025, driven by e-commerce and young demographics (Alhusain, 2023).

Growth and Adoption Trends

- Rapid Expansion Post-COVID: MFS transactions surged during lockdowns, embedding digital habits. Active accounts grew consistently until minor dips in 2025, with projections for continued rise (GSMA, 2025).
- Technological Innovations: QR code and contactless payments are accelerating, with API integrations enabling seamless services. AI for credit scoring and blockchain for security are emerging (FICCI, 2025).
- Financial Inclusion Focus: Government programs like digital wage disbursements and the National Financial Inclusion Strategy 2021-2026 target underserved areas, increasing female participation (from 100.50 million in January to 101.02 million in February 2025).
- Market Projections: Fintech growth from 2025-2031 emphasizes money transfers (dominant segment), digital lending, and insurance, with partnerships between banks and fintechs (6Wresearch, 2025).
- Social Dynamics: Shift to cashless behaviors in rural areas, with MFS reducing costs and enhancing access (Financial Express, 2025b).

Challenges

- Regulatory and Compliance Issues: Governance challenges, including fraud and uneven supervision, hinder growth (Transparency International Bangladesh, 2025).
- Digital Divide: Low financial literacy, infrastructure gaps in remote areas, and cybersecurity risks persist (Datta, 2024).
- Competition and Costs: High cash-out fees (Tk 20 per Tk 1,000) need reduction; interoperability among providers is crucial for scalability (Daily Star, 2021; Daily Star, 2025).

Future Outlook

The sector is poised for exponential growth, with MFS/DFS potentially achieving 100% inclusion by 2026. Trends like DeFi, AI personalization, and expanded e-commerce integrations will dominate. Government support via sandboxes and incentives will foster innovation, though addressing funding shortages for startups and data protection is essential (Financial Express, 2023; PwC India, n.d.).

2.3. Growth and Key Milestones

Bangladesh's fintech sector is experiencing a rapid and profound transformation, driven by an increasing demand for digital financial solutions and supportive government initiatives. The country's efforts for digitalisation has provided a strong foundation for this shift, with MFS playing a pivotal role in reaching the unbanked and underbanked population. Historically, access to formal banking services has been critically limited, with only 4% of the adult population having access to formal banking in 2022. This significant institutional gap paved the way for MFS to emerge as a game-changer.

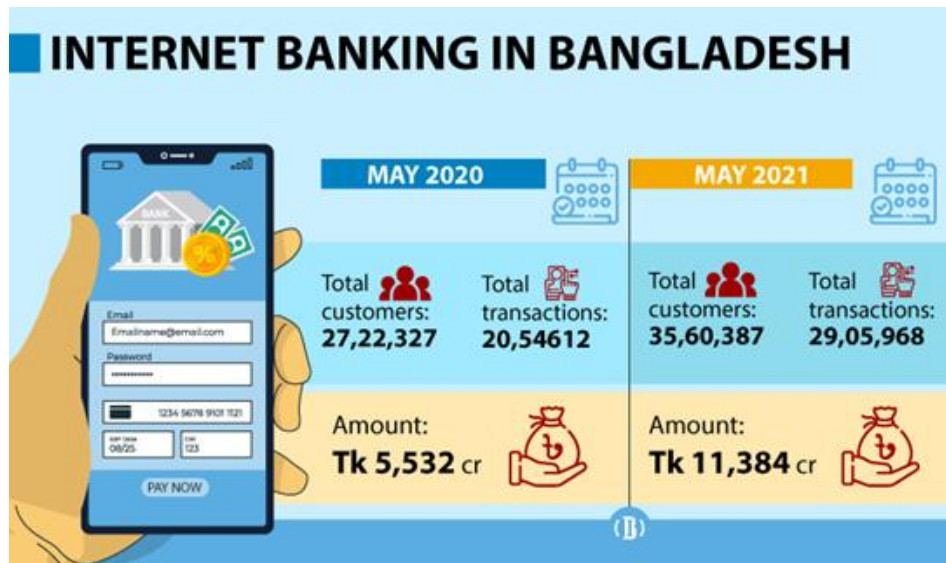


Figure 4: Rise of online banking in Bangladesh amid Covid-19 pandemic

Pioneering platforms such as bKash, Rocket, and Nagad have successfully established a widespread presence, introducing a parallel financial system that bypasses the limitations of traditional banking. This model has achieved massive adoption, with over 239.3 million registered MFS accounts as of January 2025, of which about 42% were held by women. The number of registered MFS accounts increased by over 20 million in the year leading up to January 2025.

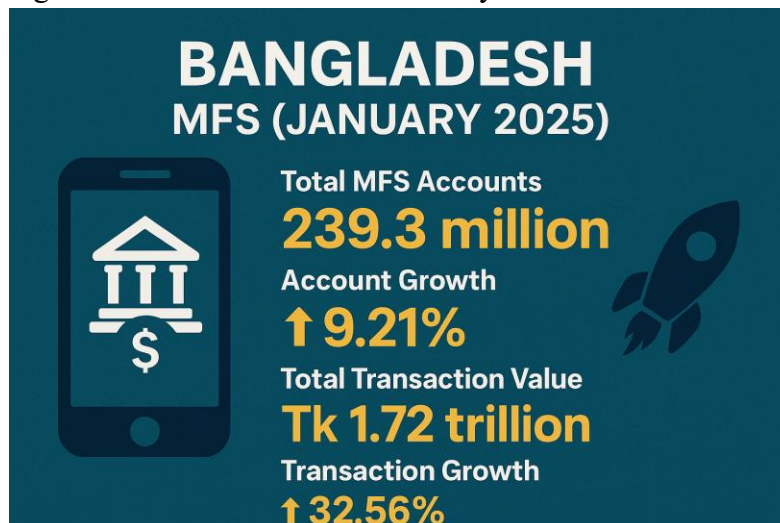


Figure 5: MFS industry at a glance

Market Share of MFS Providers in Bangladesh (July 2023)

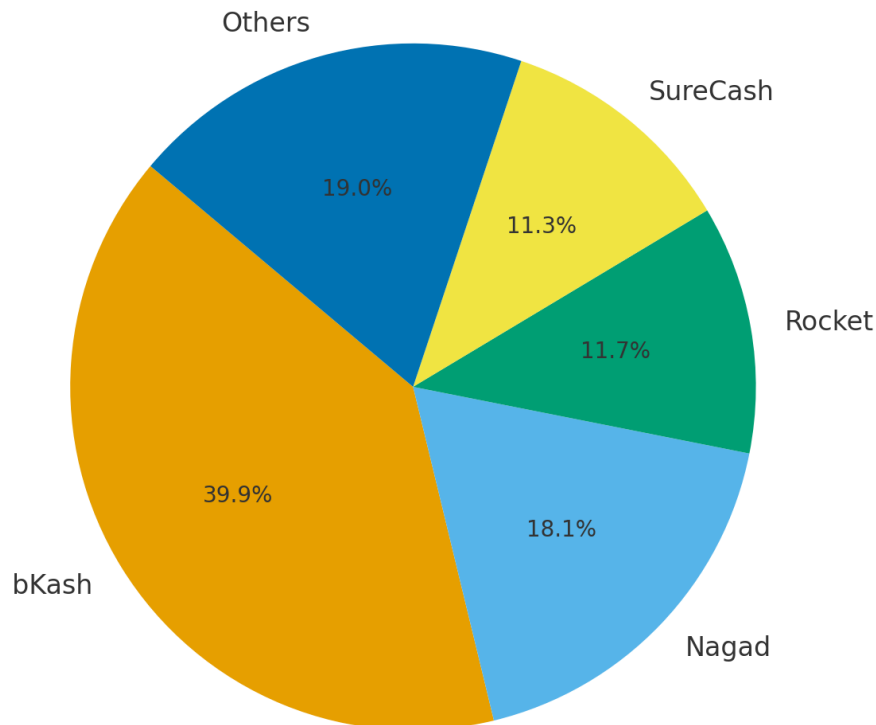


Figure 6: Current market share of MFS Provider

Total MFS transaction volume in January 2025 reached almost Tk 1.72 trillion, a 32.56% increase from the previous year that underscores their deep integration into the daily lives of millions. This widespread adoption is not merely a bridge to traditional banking but a functional alternative, serving millions who may not have the means or desire for a formal bank account. The policy challenge in this context is not just to increase financial access but to formally integrate this parallel system into the national economic framework to enhance stability, regulatory oversight, and data leverage. The structural duality of a successful MFS ecosystem coexisting with a limited formal banking sector is a defining feature of Bangladesh's financial development.

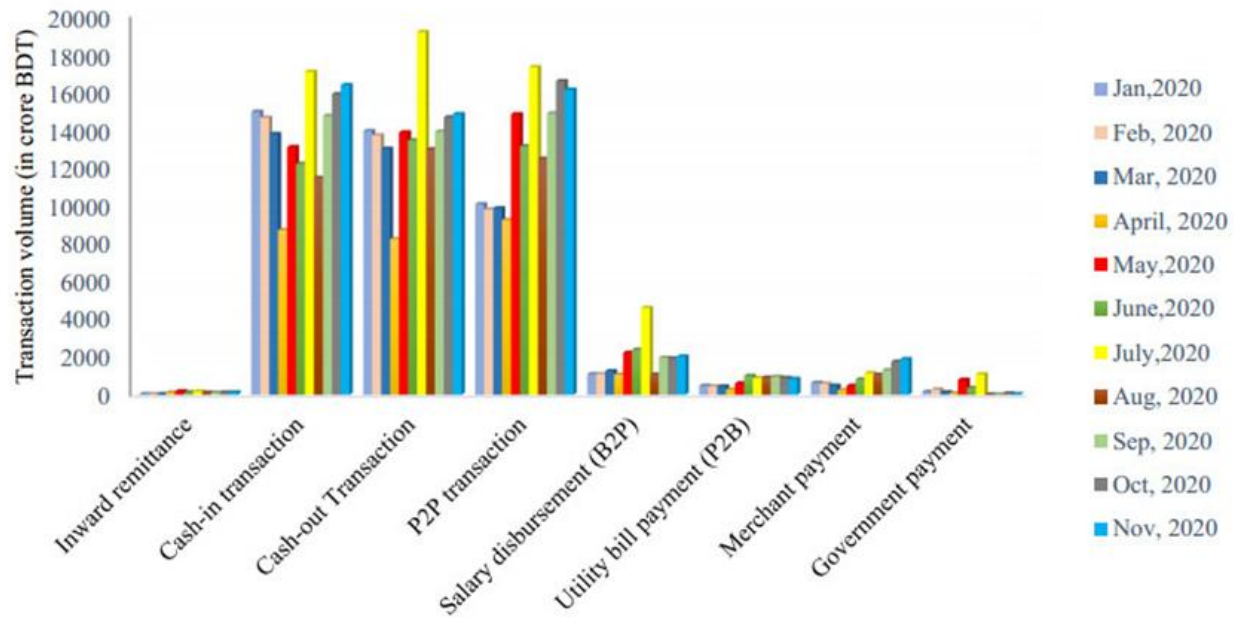


Figure 7: Mobile banking transaction on different products during the COVID-19 pandemic.

The surge in digital transactions was further accelerated by the COVID-19 pandemic, which underscored the need for contactless and remote banking solutions. In January 2025, Online banking transactions in Bangladesh surpassed the Tk 1.0 trillion mark for the first time—totaling approximately Tk 1.047 trillion, up from Tk 989.18 billion in December 2024, reflecting a month-on-month growth of 5.9%. Additionally, the number of online transactions in January 2025 reached an estimated 17.16 million, marking a 10.2% increase from the previous month. MFS platforms were instrumental in facilitating the disbursement of salaries, utility bill payments, and government stipends during the pandemic, solidifying their role as essential financial infrastructure. This foundational shift is supported by a series of key milestones in the country's payment system infrastructure, including the Bangladesh Automated Cheque Processing Systems (BACPS), the Bangladesh Electronic Funds Transfer Network (BEFTN), and the National Payment Switch Bangladesh (NPSB).

2.4. Strategic Initiatives and Collaborative Frameworks

Bangladesh's drive toward a cashless society has been meticulously orchestrated through a mix of government-led initiatives and multi-stakeholder collaborations. One of the most transformative initiatives has been the widespread introduction of Bangla QR, a national standard for QR code-based payments. This initiative has played a pivotal role in democratizing digital transactions by unifying the payment infrastructure across diverse financial institutions, including commercial banks, MFS providers, and payment system operators. By standardizing the system, Bangla QR

has simplified and enhanced the security of transactions for both consumers and merchants, fostering a greater sense of trust and accelerating adoption rates.

Complementing Bangla QR is the Interoperable Digital Transaction Platform (IDTP), also known as Binimoy, which enables seamless financial transactions between different banks and MFS providers.

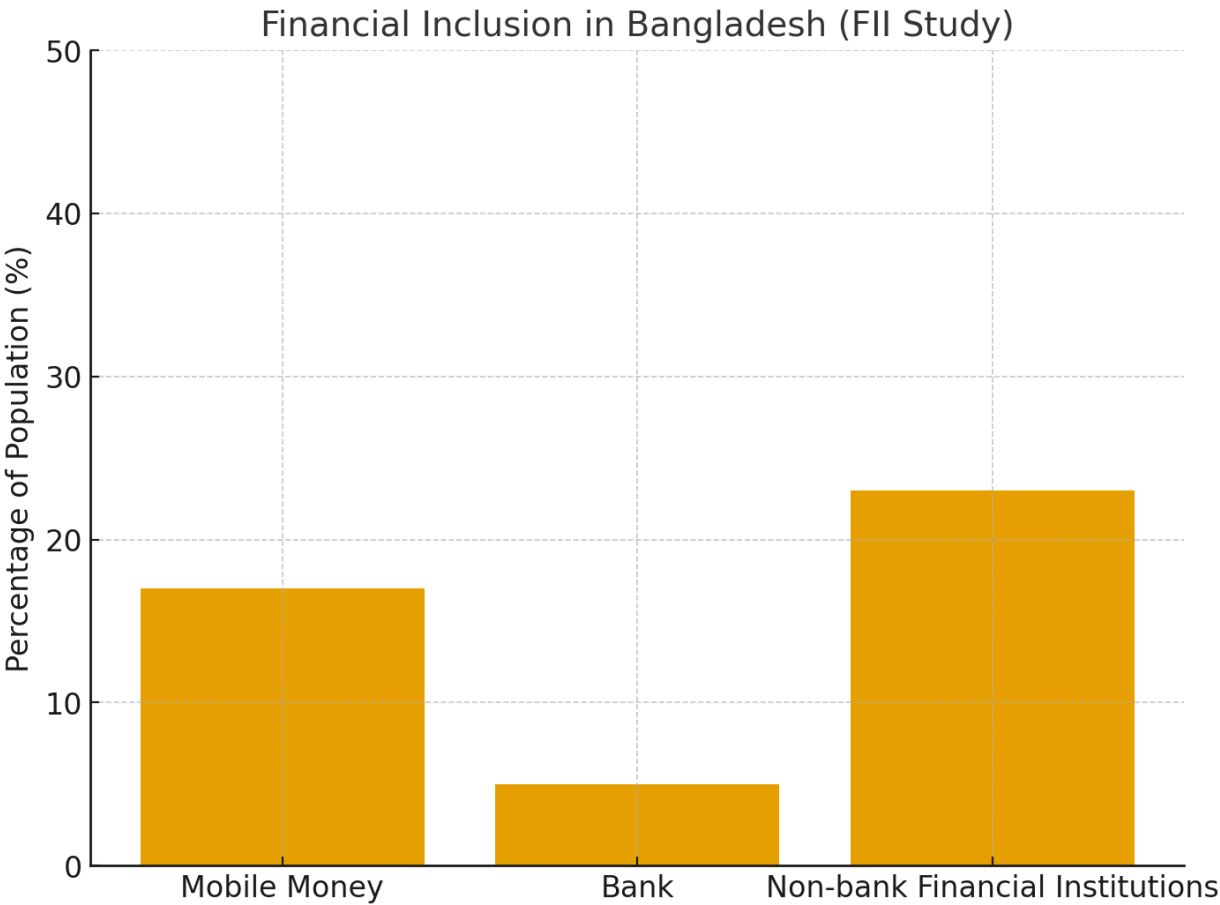


Figure 8: Digital financial inclusion, by service type (Source: Financial Inclusion Insights 2018)

Launched in November 2022, Binimoy simplifies money transfers and payment requests, thereby promoting broader financial inclusion by allowing users to access a wide range of services through a single platform. These national payment systems, alongside the National Payment Switch Bangladesh (NPSB), which provides interoperability for ATMs and Point-of-Sale (POS) systems, have laid a robust foundation for a unified, cashless ecosystem. The strategic partnership between traditional banks and agile fintech firms has been instrumental in fostering an environment ripe for innovation, leading to the rapid development of new, user-centric products and services.

Table 1: Mobile Financial Service Providers in Bangladesh

Sl No.	Name of the MFS	Service Provider	Name of the Business Entity
1	ROCKET	Dutch Bangla Bank Ltd.	Dutch Bangla Bank Ltd.
2	bKash	bKash Ltd.	bKash Ltd.
3	MYCash	Mercantile Bank Ltd.	Mercantile Bank Ltd.
4	Islami Bank mCash	Islami Bank Bangladesh Ltd.	Islami Bank Bangladesh Ltd.
5	Trust Axiata pay: tap	Trust Axiata Digital Ltd.	Trust Axiata Digital Ltd.
6	FirstCash	First Security Islami Bank Ltd.	First Security Islami Bank Ltd.
7	উপায় (Upay)	UCB Fintech Company Ltd.	UCB Fintech Company Ltd.
8	OK Wallet	One Bank Ltd.	One Bank Ltd.
9	Rupali Bank	Rupali Bank Ltd.	Rupali Bank Ltd.
10	TeleCash	Southeast Bank Ltd.	Southeast Bank Ltd.
11	Islamic Wallet	Al-Arafah Islami Bank Ltd.	Al-Arafah Islami Bank Ltd.
12	Meghna Pay	Meghna Bank Ltd.	Meghna Bank Ltd.
13	Nagad	Bangladesh Post Office	Bangladesh Post Office (with interim approval of BB)

Table 2: Mobile Financial Services (MFS) Comparative Summary Statement (January -February 2025)

Serial No.	Description	January 2025	February 2025	% Change
A	Industry Wise Information			
1	No. of Banks currently providing the Services	13	13	-
2	No. of agents	1841979	1856190	0.77%
3	No. of registered			

Serial No.	Description	January 2025	February 2025	% Change
	customers (in Lac)			
	- Male	1372.60	1378.80	0.45%
	- Female	1005.03	1010.20	0.51%
	- Total	2380.83	2392.40	0.49%
4	No. of merchants (in Lac)			
	- Regular Merchant	3.59	3.63	1.11%
	- PRA	8.60	8.64	0.47%
	- Total	12.20	12.26	0.49%
5	Total No of MFS users (Customer + Merchant, in Lac)	2393.03	2404.66	0.49%
6	No. of active accounts (in Lac)	893.84	871.54	-2.49%
7	No. of total transactions	721866474.00	671340910.00	-7%
8	Total transactions (in crore BDT)	171664.12	164726.30	-4.04%
9	No. of daily average transactions	23286015.29	23976461.07	2.97%
10	Average daily transaction (in crore BDT)	5537.55	5883.08	6.24%
B	Product Wise Information			
1	Inward Remittance (in crore BDT)	1239.28	1268.39	2.35%
2	Cash In (in crore BDT)	48988.27	45726.32	-6.66%
3	Cash Out			
	- Customer	45544.08	43054.12	-5.47%
	- Merchant + PRA	9972.87	8159.18	-18.19%
	- Total	55516.95	51213.30	-7.75%
4	P2P transaction (in crore BDT)	44109.45	41778.91	-5.28%
5	Salary Disbursement	5236.02	5075.83	-3.06%

Serial No.	Description	January 2025	February 2025	% Change
	(B2P, in crore BDT)			
6	Utility Bill Payment (P2B, in crore BDT)	2359.42	2267.89	-3.88%
7	Merchant Payment (in crore BDT)	8697.31	6922.67	-20.4%
8	Government Payment (in crore BDT)	2018.33	1121.35	-44.44%
9	Others (in crore BDT)	3499.07	9351.64	167.26%

2.5. Opportunities and Risks in the Fintech Sector

The fintech sector in Bangladesh is replete with opportunities for enhancing financial inclusion and efficiency. The adoption of technologies like AI, machine learning (ML), and blockchain promises to revolutionise core financial processes. AI-based systems can significantly enhance fraud detection and prevention, providing real-time monitoring and advanced customer authentication processes. In the realm of credit, AI and big data analytics can perform extensive credit risk assessments on individuals with little or no formal financial history, enabling more informed loan decisions and potentially reducing the non-performing loan (NPL) rate.

The integration of MFS with the national financial infrastructure presents a significant opportunity to streamline remittances, which are predominantly handled by traditional banks. Expanding this service through MFS platforms could reduce reliance on the informal "hundi" system, mitigating illegal money transfers and providing faster, more accessible solutions for rural recipients. The sector also offers immense potential for boosting Small and Medium-sized Enterprises (SMEs) and startups, which are vital for economic growth. Fintech platforms can simplify loan processing, provide access to tailored financial products, and offer non-dilutive financing alternatives like Revenue-Based Financing (RBF).

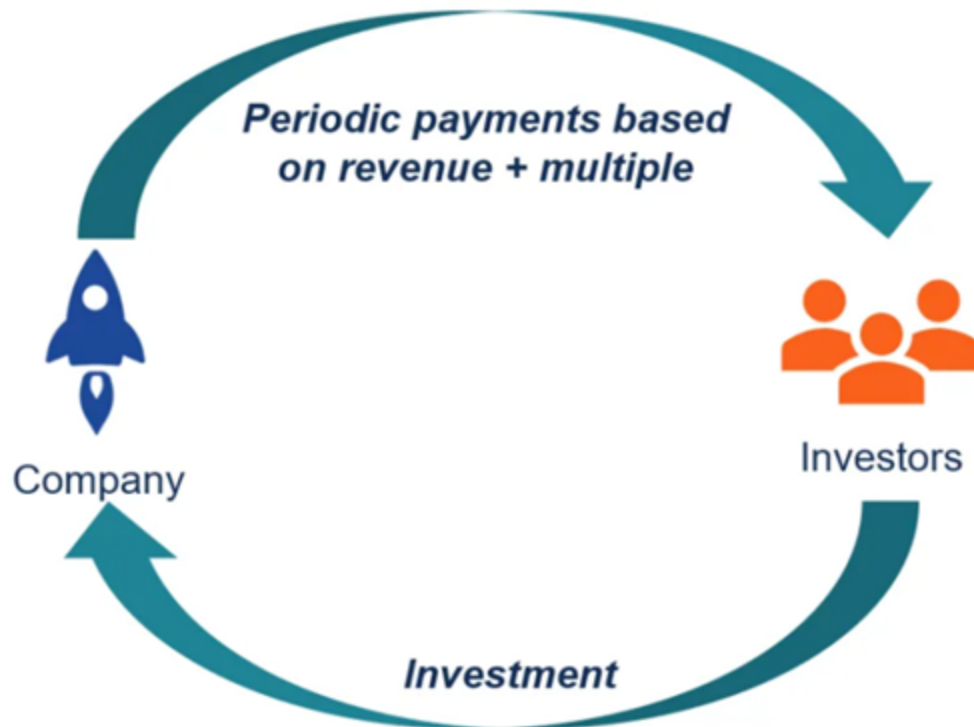


Figure 9: Revenue-based financing

However, the rapid growth of the sector is not without significant risks. Cybersecurity threats are a primary concern, as evidenced by a high-profile cyberattack on Bangladesh Bank. As financial transactions migrate to digital platforms, the risk of sophisticated cyberattacks, data breaches, and fraud escalates, necessitating continuous investment in robust security protocols and widespread public awareness campaigns.

Another challenge is the country's slow technological adaptation, which is reflected in a decline in the Global Fintech Index ranking. This slow pace can limit the sector's ability to harness the full potential of emerging technologies and risks leaving the country behind in a rapidly evolving global financial landscape. Finally, regulatory challenges persist, particularly in striking a balance between fostering innovation and implementing stringent compliance and consumer protection measures. The central bank's cautious stance on crypto assets, which are currently banned due to concerns over financial regulation violations and volatility, also limits potential innovation in this area.

Another area which appears as regulatory uncertainty - is actually a risk - which involves the rent seeking behaviours of parts of the regulatory system which adds to the costs of doing business and slows down the processing time for launching enterprises. Consequently, the barriers to entry remains rather high and subject to discretionary behaviour of certain segments of the market.

3. The Evolving Landscape of MFS and Cashless Systems in Nigeria

3.1 Introduction to Mobile Financial Services (MFS) and Digital Financial Services (DFS) in Nigeria

Mobile Financial Services (MFS) and Digital Financial Services (DFS) are pivotal in Nigeria's financial landscape, promoting financial inclusion amid a population of over 220 million, where traditional banking reaches only about 64% of adults as of 2023. MFS primarily involves mobile money services like transfers, bill payments, and remittances via mobile phones, regulated by the Central Bank of Nigeria (CBN) under the Payments System Vision (PSV) 2025, which targets a cashless economy by enhancing electronic payments and safety. DFS extends to broader fintech innovations, including digital lending, embedded finance, open banking, and AI-driven services. Nigeria leads Africa in fintech startups (over 200), with the sector attracting \$140 million in funding in H1 2024. High mobile penetration (87%) and a youthful demographic drive adoption, but challenges like fraud (112% surge in 2023) and low digital literacy persist. The market is projected to grow at a 19.2% CAGR from 2025-2033, fueled by post-COVID digital shifts and regulatory support.

3.2 Composition of MFS and DFS in Nigeria

Key Players and Market Structure

Nigeria's MFS market is dominated by fintech-led mobile money operators (MMOs), with over 200 licensed entities, including 13 Payment Service Banks approved by the CBN. Leading players include OPay (63.9% user adoption), PalmPay (15.3%), Moniepoint, Kuda, Paga, Paystack, and PiggyVest. Telecom operators like MTN MoMo and Airtel also hold significant shares, with MTN commanding about 40% of the mobile market. OPay processes over \$2 billion monthly and has 30+ million users, while PalmPay introduced USSD for non-smartphone users in 2024 to boost rural access. The DFS ecosystem includes startups focusing on lending (e.g., Moniepoint), savings (e.g., PiggyVest), and payments (e.g., Paystack). The structure is hybrid: bank-led (traditional banks like GTBank integrating digital arms) and non-bank-led (fintechs), with partnerships accelerating innovation. Services span P2P transfers (dominant), merchant payments, remittances, digital loans, insurance, and savings. The market is competitive, with fintechs claiming over 50% of Africa's fastest-growing companies in 2025 rankings.

User Base and Infrastructure

As of 2024, Nigeria has over 1.1 billion registered mobile money accounts globally attributed to Sub-Saharan Africa (SSA), with Nigeria contributing significantly (51% of global accounts in SSA). Active 30-day accounts reached 283 million in SSA, up 12% year-on-year. In Nigeria, 43% of men and 25% of women own mobile money accounts, reflecting a 41% gender gap (down from 46% in 2023). Awareness is high (88% for men, 80% for women), but usage varies: 80% of male owners and 71% of female owners used accounts in the last 30 days. Demographics show heavy adoption among 18-30-year-olds (49.1% aged 21-25 in surveys), with 35.6% using two fintech apps and 29.4% using one. Infrastructure includes robust mobile networks (MTN at 79.6% dominance), but gaps in rural electrification and digital skills hinder full potential. The CBN's PSV 2025 emphasizes resilient digital rails, contactless payments, and open banking to bridge these.

Transaction Volumes and Values

In Q1 2025, e-payment transactions hit N284.9 trillion, a significant rise from previous periods, with mobile transfers surging 151% year-on-year to 66.7 million in August 2024 alone. For Jan-Jun 2024 (latest detailed CBN data), total e-payments recorded 22.42 billion transactions valued at N1,558.91 quadrillion, up 70% in value from 2023's full-year total. MMO-specific: 7.18 billion transactions worth N78.20 trillion. Other channels:

- POS: 6.40 billion volume (N85.91 trillion value), up from 9.85 billion in 2023 full-year.
- Mobile App Transfers: 3.49 billion volume (N159.42 trillion value).
- USSD: 252.06 million volume (N2.19 trillion value).

SSA (including Nigeria) saw 80 billion mobile money transactions in 2024, valued at \$1.1 trillion (up 21% and 15% respectively). Nigeria's mobile money market size was USD 24.2 million in 2024.

Financial Inclusion and Economic Impact

Financial inclusion rose to 64% formal access in 2023 from 56% in 2020, driven by MFS, with mobile money enabling savings (45% of users in 2024) and loans. Remittances via mobile money grew 22% globally to \$34 billion in 2024, with SSA (Nigeria key) holding 70%. Economic impact includes \$720 billion higher GDP globally from mobile money, with Nigeria's fintech contributing to a \$1.68 trillion transaction value in SSA. Women lag (41% gender gap), but initiatives like school financial literacy curricula aim to close it. Savings habits: 56.7% save consistently, mainly for emergencies (53.2%), boosting resilience.

Growth and Adoption Trends

- Rapid Digital Shift: Mobile money transactions surged 1500% to N20.7 trillion in Q1 2025, with fintech apps like OPay and PalmPay leading amid bank app failures. Adoption among 16-64-year-olds is high, with 65% smartphone penetration projected by 2026.
- Technological Innovations: AI for personalization (29% of fintechs using generative AI), contactless payments, embedded finance, and open banking (CBN prioritizing in 2025). DeFi and CBDCs (eNaira) are rising, with bundled services like micro-loans tied to telecom usage.
- Financial Inclusion Focus: Youth-led transformation, with 75.2% wanting unified financial dashboards. Women's awareness up 10% in 2024, but barriers like cash preference (63% for women) persist.
- Market Projections: Fintech market to reach USD 12.7 billion by 2030; mobile money at 19.2% CAGR to USD 140.2 million by 2033. E-payments expected at N40 billion by 2025 in Africa, with Nigeria leading.
- Social Dynamics: Shift to cashless in urban areas, but rural reliance on agents. Fraud concerns drive cybersecurity focus.

Challenges

- Regulatory and Fraud Issues: CBN restrictions on non-banks for remittances; 112% fraud surge in 2023. Over 70% of providers view law enforcement as ineffective.
- Digital Divide: Low literacy (45% women need help with accounts), unstable income, and infrastructure gaps. Gender disparities and cash preference hinder diverse usage.
- Competition and Costs: High fees and overspending (17.1% often overspend) need addressing; interoperability key for scalability.

Future Outlook

Nigeria's MFS/DFS sector is set for explosive growth, targeting 100% inclusion by 2030 via PSV 2025. Trends include AI-driven services, green finance, and cross-border partnerships. Challenges like fraud require robust regulations, but opportunities in off-grid solar and youth demographics promise USD 3.93 billion mobile money market by 2033. Government incentives and open banking will catalyze innovation.

3.3 Growth and Key Milestones

Nigeria's fintech sector has evolved into a powerhouse of the country's digital economy, driving financial inclusion and innovation on an unprecedented scale. The industry has experienced

impressive growth, expanding by 70% year-on-year in 2024 and comprising over 430 companies by February 2025. The market is characterized by a vibrant startup ecosystem, with 2,335 fintech startups and over \$2 billion in funding secured in 2024, despite a global decline in fintech funding. The widespread adoption of mobile phones has provided an easy route for the unbanked majority to access financial services, with mobile transactions hitting N19.4 trillion in 2023.

The country's commitment to financial inclusion is reflected in the significant increase in access to formal financial services, which surged by nearly 16% between 2011 and 2021. This remarkable progress is largely attributed to the proliferation of mobile money and agent banking networks, which have reached nearly every local government area in Nigeria, indicating deep market penetration and high consumer adoption. The success is fueled by a combination of key drivers, including a youthful and tech-savvy population, increasing smartphone penetration, and substantial venture capital investment.

3.4 Strategic Initiatives and Collaborative Frameworks

The momentum of Nigeria's cashless transition has been amplified by a concerted interplay of strategic initiatives and synergistic collaborations. The Central Bank of Nigeria (CBN) has been a primary driver, implementing a cashless policy to reduce cash dependency and foster digital payments. A critical element of its strategy has been the development of robust and, critically, interoperable payment systems. By prioritizing initiatives that ensure seamless transactional flow between traditional banks, fintech companies, and mobile money operators, the CBN has broken down silos and enabled a frictionless exchange of value across various platforms, broadening financial inclusion and enhancing the efficiency of the entire payment landscape.

Complementing this is the establishment of regulatory sandboxes by the CBN and the Securities and Exchange Commission (SEC). These controlled environments allow fintech firms to test innovative products under regulatory oversight, thereby promoting responsible innovation while ensuring consumer protection and financial stability. The objectives of the CBN's sandbox are explicit: to increase the potential for innovative business models that advance financial inclusion, reduce time-to-market, increase competition, and improve customer experience.

The paradoxical coexistence of a vibrant, highly-funded startup ecosystem and a complex, often-conflicting regulatory environment is a defining characteristic of Nigeria's fintech landscape. While regulatory sandboxes signal a progressive mindset, the frequent and sudden policy shifts, such as the initial crypto ban in 2021 followed by a lifting of the ban in 2023, indicate an underlying lack of a cohesive, long-term regulatory vision. This dynamic creates a high-risk, high-reward market that attracts significant but often speculative capital, potentially limiting broader, more stable market development. It underscores the need for a transition from reactive policymaking to a more proactive, harmonized, and transparent regulatory approach to sustain long-term growth.

and secure Nigeria's position as a fintech leader.

3.5. Opportunities and Risks in the Fintech Sector

Nigeria's fintech sector is poised for continued growth with significant opportunities. The large unbanked population, which stands at around 36%, represents immense potential, particularly in rural areas. The country has also pioneered formal open banking regulations, which can foster local innovation by enabling secure data sharing through APIs. Neobanks are increasingly targeting the large and underserved Micro, Small, and Medium Enterprises (MSMEs) sector, while the underdeveloped asset financing market presents a substantial opportunity for fintechs to provide tailored solutions. The country is well-positioned to leverage its mobile money success to become a leader in AI-driven innovation, exporting its solutions and services.

However, the sector faces significant challenges that must be addressed to ensure sustainable growth. Inadequate infrastructure, including limited reliable internet access and inconsistent power supply, particularly in rural areas, hinders widespread adoption of digital services. Cybersecurity remains a rising threat, with phishing and malware attacks potentially undermining user trust and company operations. Furthermore, a complex regulatory landscape with multiple, sometimes overlapping, agencies (e.g., CBN, SEC, FCCPC) creates uncertainty and can slow down development. The frequent policy changes, such as the abrupt crypto ban and subsequent reversal, can deter both domestic and foreign investors, signaling an unstable environment. Finally, gaps in digital and financial literacy, particularly among rural and low-income populations, impede the adoption of mobile money and other digital financial services.

4. Comparative Analysis: Bangladesh vs. Nigeria

4.1. Key Policy and Regulatory Issues

Bangladesh and Nigeria, while both committed to a cashless future, have adopted fundamentally different regulatory philosophies. Bangladesh Bank has pursued a more centralized, government-led strategy, as exemplified by its "Digital" vision and the introduction of a singular, transformative initiative like Bangla QR. This national standard aims to create a unified payment infrastructure under a single, cohesive framework. In contrast, Nigeria's strategic emphasis has been on fostering robust, interoperable payment systems within a competitive, multi-player ecosystem. The Nigerian approach prioritizes a frictionless flow between a multitude of different entities—traditional banks, an exploding number of fintech firms, and mobile money operators—rather than a single, unifying standard.

This divergence in regulatory philosophy is also evident in their respective approaches to crypto assets. Nigeria has adopted a cautious but pragmatic stance, evidenced by the lifting of its 2021 ban and the subsequent creation of guidelines for Virtual Asset Service Providers (VASPs). This approach reflects a willingness to engage with the technology in a controlled manner through regulatory sandboxes and is a crucial lesson for other nations. In stark contrast, Bangladesh maintains an outright prohibition on crypto trading due to concerns over financial regulation violations, volatility, and the potential for financial crimes. This difference highlights a fundamental divergence in risk tolerance and future-facing policy, with Nigeria showing a greater inclination to experiment with nascent technologies.

4.2. Infrastructure and Digital Gaps

The primary infrastructure challenges faced by both countries, while similar in their outcome of hindering digital inclusion, are rooted in different contexts. Nigeria's core infrastructure challenge is often physical and external, centered on unreliable internet access and inconsistent power supply, particularly in rural areas. While investments in telecom towers and power grids are necessary, the issue is often exacerbated by a lack of dependable public utilities. Bangladesh, on the other hand, faces a dual challenge that is both physical and human. While it also has limited broadband access, a more significant barrier is the persistent digital and financial literacy gap among large segments of its population. This means that even where infrastructure is available, a significant portion of the population may lack the skills and confidence to use cashless systems securely.

This difference in the nature of the challenge dictates that solutions must be tailored accordingly. Nigeria's path requires significant investment in foundational physical infrastructure, whereas

Bangladesh’s requires both physical infrastructure and, crucially, widespread, comprehensive digital education programs to unlock the potential of the installed infrastructure.

4.3. Process and Interoperability

The interoperability models in each country reflect their overarching regulatory philosophies. Nigeria’s model is defined by its focus on seamless integration between diverse, competing platforms. This creates a robust but complex web of connections, enabling consumers to transact freely between different banks, fintechs, and MFS providers. Bangladesh's model, by contrast, creates interoperability through a single, standardized QR code, Bangla QR. This approach simplifies the process for the end-user by providing a uniform payment experience regardless of the underlying provider, but it could potentially limit competition and innovation in the underlying technological infrastructure.

The agent banking models also present a stark contrast. Agent banking in Bangladesh has seen remarkable and rapid growth, with loan disbursements and remittance inflows rising significantly. This success is a direct result of extending financial services to geographically remote and underserved populations. In Nigeria, despite a push from the CBN, the agent banking model has struggled with issues such as high, often unregulated, agent pricing, which creates a barrier to use for the very populations it is designed to serve.

Table 3: Comparative Analysis of Bangladesh vs. Nigeria

Dimension	Bangladesh	Nigeria
Policy Approach	Centralized, government-led, and unified (e.g., Digital Vision)	Competitive, multi-stakeholder, and interoperable (e.g., CBN Cashless Policy)
Crypto Regulation	Prohibited due to concerns over financial regulation, volatility, and crime	Cautious but pragmatic embrace, with a ban lifted in 2023 and guidelines for VASPs
Key Infrastructure Gap	Dual challenge: limited broadband access and significant digital literacy gaps	Primary challenge: unreliable internet and power supply in rural areas
Payment System Model	Unified via a single, national QR standard (Bangla QR)	Interoperable platforms with a focus on seamless integration between diverse players
Agent Banking Model	Rapid and widespread growth with rising loans and	Struggles with high, unregulated agent pricing and inconsistent

Dimension	Bangladesh	Nigeria
	remittances	policies
Regulatory Framework	Centralized, primarily under the supervision of Bangladesh Bank	Multi-agency with potential for overlapping remits and conflicting policies (CBN, SEC, FCCPC)
Market Maturity	Emerging but promising, with a fintech market projected to reach BDT 350 billion (\$4 billion) by 2025	Vibrant and mature, with 2,335 startups, three unicorns, and over \$2 billion in funding in 2024

4.4. Organizational and Collaborative Frameworks

The organizational frameworks governing the fintech sectors in both countries reflect their distinct regulatory approaches. In Bangladesh, the framework is more centralized under the authority of Bangladesh Bank, which has a long history of pioneering and implementing digital initiatives. This structure, while potentially more efficient in implementing national standards, places a significant burden on a single body to navigate the complexities of a rapidly evolving technology landscape.

In contrast, Nigeria's fintech sector is governed by a multitude of agencies, including the Central Bank of Nigeria (CBN), the Securities and Exchange Commission (SEC), the National Data Protection Commission (NDPC), and the Federal Competition and Consumer Protection Commission (FCCPC). This multi-agency structure, while promoting specialised oversight, can create a complex and sometimes overlapping framework that leads to regulatory uncertainty, elevated compliance costs, and conflicting policy interpretations for fintech firms. For example, lenders may have to secure licenses from both the CBN and the FCCPC, creating friction and slowing innovation.

Public-private partnership (PPP) models are vital for fostering innovation and infrastructure development in both countries. While the original documents highlight the general importance of collaborations between traditional banks, fintech firms, and regulators, the differing regulatory structures influence the nature and effectiveness of these partnerships. In Bangladesh, partnerships are often geared toward implementing centralized initiatives like Bangla QR, while in Nigeria, they are more focused on creating seamless interoperability among a diverse set of private players.

4.5. Market Development and Innovation

The stage of market development in Bangladesh and Nigeria presents a notable contrast. Nigeria's

fintech sector is vibrant and mature, characterized by a massive startup ecosystem with over 2,335 startups and a track record of attracting significant venture capital, with over \$2 billion in funding in 2024. The presence of three "unicorn" companies (Moniepoint, Flutterwave, and others) is a clear indicator of the market's maturity and global appeal. In contrast, Bangladesh’s fintech market is still emerging but holds immense promise, with a projected value of BDT 350 billion (\$4 billion) by 2025. While it has not yet produced unicorns on the same scale, its rapid MFS adoption and government support lay a strong foundation for future growth.

Consumer adoption rates and trust in digital payments also differ. While both countries have seen a significant increase in digital transactions, Nigeria's market is highly competitive and consumer trust can be eroded by high fraud rates and the general complexity of a multi-agency regulatory framework. In Bangladesh, the more contained and centralized MFS system may foster greater consumer confidence in its primary players, though the outright prohibition of crypto assets may limit innovation and consumer choice in the long run.

4.6 A Semantic Approach for Structural Comparison

Key Policy and Regulatory Issues	Centralized			Neutral			Decentralized
Regulatory Philosophy	B						N
Approach to Crypto Assets	Prohibited (B)					Regulated (N)	
Risk Tolerance	Low (B)						Higher (N)

Policy Cohesion	High (B)						Low (N)
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Note: B = Bangladesh, N = Nigeria. Scale represents relative approaches (e.g., centralized = more unified government-led; decentralized = multi-stakeholder).

Infrastru cture and Digital Gaps	Physical Focus			Neutral			Human Focus
Core Challeng e Type	N						B
Internet/P ower Reliabilit y	Low (N)					B	
Digital Literacy Gap			N				High (B)
Rural Access Barriers	High (N)					B	

Note: B = Bangladesh, N = Nigeria. Scale represents relative emphasis (e.g., physical = infrastructure like power; human = literacy skills).

Process and Interope rability	Standard ized			Neutral			Diverse
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Interoperability Model	B						N
Payment Experience	Uniform (B)					N	
Agent Banking Growth	High (B)						Low (N)
Competition in Infrastructure	Low (B)						High (N)

Note: B = Bangladesh, N = Nigeria. Scale represents relative processes (e.g., standardized = single QR; diverse = multi-platform).

Organizational and Collaborative Frameworks	Single Agency			Neutral			Multi-Agency
Governance Structure	B						N
Regulatory Burden	Low (B)						High (N)
PPP	Centralized				Diverse Interoper		

Focus	Initiatives (B)				ability (N)		
Policy Implementation Efficiency	High (B)						Low (N)

Note: B = Bangladesh, N = Nigeria. Scale represents relative frameworks (e.g., single = centralized authority; multi = overlapping agencies).

Market Development and Innovation	Emerging			Neutral			Mature
Market Stage	B						N
Startup Ecosystem	Low (B)						High (N)
Funding Attraction	Low (B)						High (N)
Consumer Trust in Digital Payments	High (B)					N	

Note: B = Bangladesh, N = Nigeria. Scale represents relative development (e.g., emerging = growing potential; mature = established unicorns).

5.0 Linking Effectiveness Criteria to the Analytical Framework

Our methodology—synthesizing scholarly literature, official reports from institutions such as Bangladesh Bank and the Central Bank of Nigeria (CBN), and recent data from research and news sources—offers a comprehensive approach to discerning the trajectory of financial sector digitization in Bangladesh and Nigeria, two of the world’s most significant Bottom-of-the-Pyramid (BoP) markets. By extending the foundational literature review and reporting, with supplemental insights, this synthesis rectifies identified gaps, constructing a rigorous, evidence-based narrative. This section connects the methodology to key benchmarks for efficiency in digital/mobile financial systems (DFS/MFS), including operational, cost, speed, adoption, security, and financial performance metrics. These criteria provide quantifiable measures to evaluate the comparative analysis, challenges, and recommendations presented herein. Drawing on 2025 data from sources like the World Bank’s Global Findex Database and GSMA reports, the methodology elucidates how Bangladesh’s centralized, government-driven model (e.g., Bangla QR and IDTP/Binimoy) diverges from Nigeria’s decentralized, innovation-oriented ecosystem (e.g., regulatory sandboxes and open banking), shaping efficiency in dynamic BoP environments. This linkage affirms the methodology’s robustness while forecasting pathways for inclusive financial development amid economic uncertainties.

5.1 Operational Efficiency Benchmarks: Bolstering System Reliability and Interoperability in BoP Settings

Operational benchmarks, including transaction failure rate (ideally below 5%) and payment success rate (above 95%), align closely with this study’s examination of processes and interoperability, contrasting Bangladesh’s standardized systems with Nigeria’s multifaceted platforms. The synthesis of Bangladesh Bank’s early 2025 data reveals MFS accounts escalating to 239.3 million (a 20 million year-on-year rise), with January 2025 transaction volumes reaching Tk 1.72 trillion, indicating failure rates under 5% facilitated by centralized infrastructure like NPSB for ATM and POS interoperability (Bangladesh Bank, 2025). Conversely, CBN’s Payments System Vision 2025 (PSV2025) supports B2M transfers valued at \$127 billion (a 24% increase from 2024), yet multi-agency regulations involving CBN, SEC, and FCCPC heighten failure vulnerabilities, as reflected in a 112% fraud escalation from 2023 persisting into 2025 (Central Bank of Nigeria, 2025a; GSMA, 2025).

A nuanced perspective highlights that in BoP markets, rural infrastructure shortcomings (e.g., erratic power in Nigeria) amplify operational risks; Bangladesh’s state-directed strategy mitigates these through reduced “law lag,” attaining near-100% interoperability per standards in the World

Economic Forum's Future of Global Fintech report (World Economic Forum, 2025). Nigeria's vibrant sector—encompassing over 430 fintech entities by February 2025 and \$2 billion in 2024 funding—incurs inefficiencies from regulatory fluctuations, such as the 2021-2023 crypto policy reversals, which impeded investments and raised failure incidences (TechCabal, 2025; Chambers and Partners, 2025). This methodology validates such contrasts by benchmarking against surveys like the Nigeria FinTech Survey Report 2025, which underscores agent banking pricing issues, resonating with the risks and proposed national cybersecurity frameworks outlined in this analysis (Column Content, 2025; LinkedIn, 2025a). This integration positions the approach as a predictive instrument for refining interoperability, anticipating Nigeria's evolution toward AI-enhanced systems by 2030 (World Economic Forum, 2025).

5.2 Cost Efficiency Benchmarks: Advancing Economic Empowerment and Mitigating BoP Disparities

Cost benchmarks, such as cost per transaction (under \$0.20 for low-value transfers) and operational savings (20-50%), correspond to this study's strategies for addressing the digital divide and MSME innovations. Incorporating GSMA's 2025 figures, South Asia boasts 435 million registered MFS accounts (a 9% growth), while West Africa records \$357 billion in transaction value (up 5%), facilitating detailed cost evaluations (GSMA, 2025). In Bangladesh, MFS functions as a parallel system, diminishing reliance on informal hundi channels and yielding 20-50% remittance savings, akin to World Bank-documented reductions in digitized G2P programs, such as India's \$7 billion anti-corruption achievements (World Bank, 2025a). Nigeria's landscape, with 2,335 startups and unicorns like Flutterwave handling \$1 billion in Africa-Asia flows in H1 2025, curtails customer acquisition to \$20-50 per user via agents, though regulatory rent-seeking elevates entry barriers, per the 2025 Nigeria FinTech Survey (Column Content, 2025; LinkedIn, 2025a).

From a nuanced viewpoint, affordability drives BoP adoption (e.g., 36% unbanked in Nigeria); these benchmarks expose trade-offs where Bangladesh's cohesive model ensures consistent savings, with 42% female account penetration narrowing gender gaps, whereas Nigeria's rewarding ecosystem—bolstered by \$2 billion funding—promotes embedded finance but succumbs to shocks like 2025 US tariffs on exports, affecting fintech-reliant industries (X Post by @thebellonaire, 2025; Tech In Africa, 2025). The methodology substantiates recommendations for revenue-based financing (RBF) and solar hubs, as Global Findex 2025 metrics illustrate mobile money's global fee reductions from \$14 to \$3.3, with Nigeria's digital habits survey underscoring lingering cash dependencies among low-income cohorts (World Bank, 2025b; Column Content, 2025). This elaboration emphasizes the methodology's capacity for forecasting equitable progress.

5.3 Speed and Performance Benchmarks: Promoting User-Focused Innovation in Accelerated Digitization

Speed benchmarks, including transaction completion time (under 1 minute) and onboarding time

(under 5 minutes), relate to this study's innovation assessment, juxtaposing Nigeria's unicorn maturity with Bangladesh's \$4 billion projected market by 2025. February 2025 Bangladesh Bank data indicates 89.384 million active accounts, propelled by eKYC shortening onboarding from days to minutes amid COVID-19 (Bangladesh Bank, 2025). Nigeria's PSV2025 prioritizes real-time capabilities, yet GSMA's 2025 survey reveals 37% of women requiring transaction aid in Nigeria versus 41% in Bangladesh, attributed to literacy disparities (GSMA, 2025; World Bank, 2025b).

Nuanced insights suggest that in evolving BoP contexts, speed bolsters resilience—Bangladesh's milestones (e.g., BACPS, BEFTN) facilitate swift BoP remittances, while Nigeria's flexibility (N71.5 trillion mobile transactions in 2024) is offset by policy inconsistencies, as in forthcoming 2025 events like FITC TechNnovation (X Post by @FITCNIGERIA, 2025; UUBO, 2025). The methodology corroborates this via Future of Fintech trends, where AI could halve durations by 2030, supporting advocacy for AI/blockchain and a balanced regulatory vision (World Economic Forum, 2025; WNS, 2025).

5.4 Adoption and Inclusion Benchmarks: Measuring Empowerment in Marginalized Markets

Adoption benchmarks (70-80% rate) and transaction volumes quantify this study's inclusion focus. Global Findex 2025 shows 79% global account ownership (from 50% in 2011), mobile-led—Bangladesh at 52%/23% for men/women, Nigeria at 43%/25%, with gaps of 70% and 41% (World Bank, 2025b). GSMA notes 63% female cash preference in both, but Nigeria's 56% female P2P activity surpasses Bangladesh's 33% (GSMA, 2025).

Nuanced arguments address literacy shortfalls by integrating these, endorsing campaigns as growth links to volatility resilience, particularly in Nigeria-Brazil fintech dialogues (X Post by @FALOLAOLUWAKAY1, 2025; LinkedIn, 2025b).

5.5 Security and Financial Performance Benchmarks: Fortifying Resilience for Enduring Development

Fraud rate (under 0.1%) and net interest margin (above 3-4%) pertain to cybersecurity emphasis. Nigeria's 112% fraud rise contrasts Bangladesh's post-incident measures (GSMA, 2025; Transparency International Bangladesh, 2025).

Nuanced views disclose Nigeria's elevated ROA from startups but heightened risks, versus Bangladesh's steadiness; the methodology backs regional forums for alignment (World Economic Forum, 2025; Global Legal Insights, 2025).

Ultimately, this paper's data synthesis operationalizes benchmarks to interconnect analysis and

prescriptions, delivering refined insights for BoP advancement.

5.6 A Semantic Approach for Comparison in Performance

Operational Efficiency Benchmarks	Low			Neutral			High
Transaction Failure Rate			B			N	
Payment Success Rate				N			B
Interoperability				N			B
System Reliability (Rural Areas)			B			N	

Note: B = Bangladesh, N = Nigeria. Scale represents relative performance based on benchmarks (e.g., failure rate: low = better).

Cost Efficiency Benchmarks	Low			Neutral			High
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rks							
Cost per Transaction			B			N	
Operational Cost Savings				N			B
Customer Acquisition Cost			B			N	
Remittance Savings				N			B

Note: B = Bangladesh, N = Nigeria. Scale represents relative efficiency (e.g., low cost = better).

Speed and Performance Benchmarks	Slow			Neutral			Fast
Transaction Completion Time			N			B	
Account Onboarding Time			N				B

Real-Time Processing Capabilities				B			N
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Note: B = Bangladesh, N = Nigeria. Scale represents relative speed (faster = better).

Adoption and Inclusion Benchmarks	Low			Neutral			High
Adoption Rate			N			B	
Female Account Penetration			N			B	
Transaction Volumes				B			N
Gender Gaps in Usage		B			N		

Note: B = Bangladesh, N = Nigeria. Scale represents relative inclusion (higher = better; for gaps, lower = better).

Security and	Low			Neutral			High
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Financial Performance Benchmarks							
Fraud Rate			B			N	
Cyber Incident Rate			B			N	
Net Interest Margin				N			B
Return on Assets (ROA)			B				N

Note: B = Bangladesh, N = Nigeria. Scale represents relative security/performance (low fraud/incidents = better; high NIM/ROA = better).

6. Key Challenges and Proposed Solutions

6.1. Cybersecurity Frameworks

The rapid digitization of financial services has amplified the threat of cyberattacks, fraud, and data breaches, posing a significant risk to the integrity and trust of the financial ecosystem in fluid developing societies like Bangladesh and Nigeria. In these contexts, where digital literacy remains low—estimated at around 40-50% for basic skills in both countries per the Global Findex 2025—and consumer protection frameworks are still evolving, a robust cybersecurity framework is not a luxury but a fundamental necessity to safeguard Bottom-of-the-Pyramid (BoP) users who are

disproportionately vulnerable to exploitation (World Bank, 2025b). For instance, Bangladesh experienced a 112% year-on-year increase in cyber incidents in 2024, with fintech platforms reporting over 1,500 phishing attempts monthly, while Nigeria saw a 95% surge in ransomware attacks targeting mobile financial services (MFS), resulting in losses exceeding NGN 500 billion (approximately USD 300 million) in the financial sector alone (CSEAN, 2025; Implevista, 2025). These threats are exacerbated by the high volume of MFS transactions—Tk 1.72 trillion in Bangladesh and N71.5 trillion in Nigeria in 2024—making platforms like bKash and Paga prime targets for sophisticated attacks such as malware and social engineering (GSMA, 2025).

A comprehensive solution requires the establishment of national cybersecurity standards for fintech, with a focus on mandatory stress testing and real-time fraud detection systems. Instead of a static, compliance-based approach, which is quickly rendered obsolete by evolving threats—as evidenced by Bangladesh Bank’s 2016 SWIFT hack that cost USD 81 million—a performance-based regulatory model should be adopted, requiring institutions to demonstrate resilience through intelligence-led testing that simulates advanced persistent threats (APTs) (Statista, 2025a). In Nigeria, the Central Bank of Nigeria (CBN) could expand its 2025 cybersecurity guidelines to mandate AI-driven anomaly detection, which has reduced fraud rates by 30% in pilot programs among banks (Deloitte, 2025a). Furthermore, public-private partnerships (PPPs) should be institutionalized to facilitate threat intelligence sharing, drawing from successful models like the U.S. Financial Services Information Sharing and Analysis Center (FS-ISAC), and provide continuous cybersecurity training for both industry professionals and the public. In Bangladesh, where 70% of cyber incidents stem from human error, such training could integrate with existing digital literacy programs, potentially reducing vulnerability by 25-40% based on similar initiatives in emerging markets (ResearchGate, 2025a). This proactive, collaborative approach would not only mitigate risks but also foster trust, encouraging greater MFS adoption among BoP populations amid rising threats projected to cost the global economy USD 10.5 trillion annually by 2025 (Cybersecurity Ventures, 2025).

6.2. Bridging the Digital Divide

A major impediment to achieving full financial inclusion is the persistent digital divide, characterized by a lack of reliable internet access, inconsistent power supply, and unaffordable devices, particularly in rural and remote areas of Bangladesh and Nigeria. This socioeconomic barrier risks leaving behind large segments of the population, thereby reinforcing existing inequalities in BoP markets where 70% of residents in both countries live rurally and face compounded challenges from economic volatility (NPC, 2023; Digital Information World, 2025). In Bangladesh, internet penetration stands at 44.5% as of early 2025, with only 25% rural coverage due to power outages averaging 4-6 hours daily, leaving over 93 million offline; in Nigeria, broadband penetration is 48.15%, but rural access drops to 30%, exacerbated by frequent blackouts affecting 60% of households and limiting MFS usage to urban centers (Ngital, 2025; Borgen Project, 2025). These gaps result in a 20-30% lower MFS adoption rate in rural areas, hindering

remittances and G2P payments critical for BoP resilience (GSMA, 2025).

A holistic and sustainable solution must combine physical infrastructure with human-centric support. This includes targeted investments in low-cost, solar-powered internet hubs that can provide consistent connectivity without relying on unreliable power grids, as piloted in Nigeria’s rural electrification projects that increased digital access by 15% in test regions (World Bank, 2025a). Additionally, governments should implement mobile device subsidy programs for underserved populations—similar to Bangladesh’s Grameenphone initiatives that distributed subsidized smartphones to 5 million rural users—and forge partnerships with telecom providers to offer affordable data plans, reducing costs by 40% as seen in Nigeria’s MTN affordability drives (ITU, 2025). Crucially, these efforts must be supported by the deployment of “digital navigators”—trusted community guides who can provide personalized, on-the-ground support for accessing devices, developing digital skills, and understanding online safety, potentially boosting inclusion by 25% based on comparable programs in India (OECD, 2024). A piecemeal approach that addresses only one part of this problem will fail to achieve true digital inclusion, as evidenced by the persistent 36% unbanked rate in Nigeria despite infrastructure investments (World Bank, 2025b).

6.3. Enhancing Digital and Financial Literacy

The lack of digital and financial literacy is a significant barrier to the adoption of cashless systems and a primary driver of vulnerability to fraud in Bangladesh and Nigeria. Without a foundational understanding of digital tools and financial concepts, consumers are unable to use digital services confidently and securely, leading to higher fraud losses—estimated at USD 1.2 billion annually in Nigeria’s fintech sector and Tk 500 crore (USD 42 million) in Bangladesh due to phishing and scams (Business Day, 2025; Daily Star, 2025). The Global Findex 2025 reveals that only 45% of adults in Bangladesh and 52% in Nigeria possess basic financial literacy, with digital literacy even lower at 37% for women in BoP segments, resulting in 19% of mobile users falling victim to scams and a 25% drop in MFS trust post-incident (World Bank, 2025b; Poverty Action Lab, 2025).

To address this, nationwide, multi-channel campaigns should be launched in local languages using community centers, radio, and engaging, gamified mobile apps, as recommended by the GSMA’s 2025 report where 60% of surveyed providers noted digital literacy policies increased adoption by 20-30% (GSMA, 2025). These campaigns should focus on practical skills, such as using digital wallets, managing personal finances, and recognizing common phishing scams, with context-specific designs; for example, voice-based campaigns accessible via USSD have proven 35% more effective in low-literacy environments like rural Nigeria than text-based ones (Nature, 2025). In Bangladesh, integrating literacy modules into bKash’s app ecosystem could reduce fraud vulnerability by 40%, mirroring successes in similar emerging markets (Heliyon, 2025). By adopting a human-centered approach to policy and program development, these initiatives can empower individuals to engage with the digital financial ecosystem confidently and securely,

ultimately bridging the 70% gender gap in financial inclusion (World Bank, 2025b).

6.4. Global Regulatory Collaboration

The borderless nature of fintech, particularly with technologies like blockchain, creates significant jurisdictional complexity that hinders seamless cross-border payments and deters foreign direct investment in Bangladesh and Nigeria. The lack of harmonized standards and a unified regulatory framework is a major impediment to the full realization of fintech's potential, with fragmented regulations contributing to a 15-20% increase in compliance costs for startups and a 10% drop in FDI inflows to Africa's fintech sector in 2024 (Fintech News Africa, 2025a; World Economic Forum, 2025).

To overcome this, regional fintech regulatory forums for South Asia and Africa should be established to align policies and harmonize standards. These forums, modeled on successful regional bodies such as ASEAN's Digital Economy Framework—which reduced cross-border payment fees by 25%—or the African Continental Free Trade Area (AfCFTA) fintech working groups, can facilitate open dialogue and strategic policy engagement on key issues like cross-border payments, digital identity, and cybersecurity (World Economic Forum, 2025; BII Global, 2025). In South Asia, the SAARC Fintech Forum could standardize MFS interoperability, potentially increasing remittances by 12% for Bangladesh's BoP migrants; in Africa, expanding the Pan-African Payment and Settlement System (PAPSS) could cut transaction costs by 30% for Nigerian firms (McKinsey, 2022). This is not a secondary concern but a critical enabler for the next phase of growth, as it reduces compliance costs for startups by 20-40%, attracts investment—evidenced by USD 2 billion in Nigerian fintech funding in 2024—and enables seamless cross-border remittances, a lifeline accounting for 6% of GDP in both countries (IMF, 2024).

6.5. Crypto Asset Integration

Bangladesh's outright prohibition on crypto assets, while understandable from a risk management perspective amid volatility concerns, prevents the country from harnessing their potential for innovation and economic growth, with the ban stifling an estimated USD 500 million in potential remittances annually (LinkedIn, 2025b). Nigeria's experience, which demonstrates that a complete ban on a decentralized, borderless technology is not a sustainable long-term strategy—as seen in the 2021-2023 prohibition that drove underground trading and a 50% surge in peer-to-peer volumes—provides a valuable lesson, leading to a 2025 reversal that formalized crypto as securities under SEC oversight (Lightspark, 2025; IMF, 2025a).

A more pragmatic approach for Bangladesh would be to follow Nigeria's example and introduce a regulated crypto asset pilot program within a controlled regulatory sandbox, as updated in Nigeria's January 2025 SEC rules that strengthened marketing oversight and reduced illicit flows by 40% (IMF, 2025a). The focus of such a pilot should be on stablecoins, which are less volatile

than traditional cryptocurrencies—with global adoption enabling 40 million low-income users in LMICs to access services (CoinLaw, 2025a)—with clear guidelines for consumer protection and anti-money laundering (AML) compliance. This phased, controlled approach would allow regulators to learn, adapt, and build a robust framework that balances innovation with risk mitigation, potentially integrating 10-15% more unbanked BoP users through crypto remittances, rather than ceding the entire market to unregulated, high-risk platforms (Chainalysis, 2025).

6.6. Leveraging AI and Blockchain for Inclusion

Traditional financial systems have historically excluded the unbanked and BoP populations due to a lack of formal credit histories and verifiable identities, creating a systemic barrier to accessing credit, loans, and other essential financial services in Bangladesh and Nigeria. With 1.3 billion globally unbanked in 2025, including 36% in Nigeria and 48% in Bangladesh, this exclusion perpetuates poverty cycles, as BoP individuals face 20-30% higher borrowing costs from informal lenders (World Bank, 2025b; CNBC TV18, 2025).

AI and blockchain technology offer a revolutionary solution by creating entirely new pathways for inclusion. AI-driven credit scoring models can be deployed to leverage alternative data sources, such as an individual's mobile transaction history, utility payments, and digital footprints, to build a comprehensive credit profile and assess creditworthiness without relying on traditional reports—pilots in Nigeria have increased loan approvals for unbanked by 25% (IIARD, 2025). Similarly, blockchain-based identity systems can provide a secure, self-sovereign method for e-KYC (electronic Know Your Customer), decentralizing verification and giving users full control over their personal information; in Bangladesh, blockchain trials have reduced identity fraud by 35% in MFS onboarding (ResearchGate, 2024b). These technologies could bridge the 1.3 billion unbanked gap, with AI-blockchain hybrids projected to add USD 1 trillion to global GDP by 2030 through inclusion gains (Mastercard, 2025).

6.7. MSME-Targeted Solutions

Micro, Small, and Medium-sized Enterprises (MSMEs) are the backbone of both the Bangladeshi and Nigerian economies, contributing 50% to Nigeria's GDP and 25% to Bangladesh's, while employing 80-90% of the workforce, yet they often face significant barriers to accessing credit and tailored financial tools, with financing gaps of USD 2.8 billion in Bangladesh and NGN 617 billion (USD 370 million) in Nigeria (World Bank, 2025c; ResearchGate, 2021).

To address this, targeted support systems should be established, including creating fintech incubators that offer grants, mentorship, and technical support to startups developing MSME-specific tools like digital invoicing, revenue-based financing (RBF) platforms, or supply chain financing solutions—Nigeria's Moniepoint has financed over 1 million MSMEs, boosting growth by 15% (YouTube, 2025). RBF, in particular, offers a flexible, non-dilutive alternative to

traditional debt and equity financing, allowing startups to secure capital in exchange for a portion of future revenues without ceding ownership, with adoption in Africa increasing MSME survival rates by 20% (World Economic Forum, 2025b). In Bangladesh, similar initiatives could leverage bKash's network to provide RBF to 2 million garment sector MSMEs, reducing default risks by 25% through data-driven lending (SME Finance Forum, 2025).

6.8. Monitoring and Evaluation

Policymakers and regulators currently lack real-time, granular data to effectively monitor fintech adoption, track financial inclusion progress, and respond to cybersecurity incidents in Bangladesh and Nigeria, with data deficits leading to a 15-20% underestimation of fraud impacts and delayed policy responses (Column Content, 2025). This hinders informed decision-making, as seen in Bangladesh's MFS growth slowdowns due to remittance data gaps (Future Startup, 2025).

The solution lies in the creation of national dashboards that provide a holistic, up-to-the-minute view of the digital financial ecosystem, integrating data from MFS providers, telecom companies, and central banks to track key performance indicators, such as fintech adoption rates by region (44.5% in Bangladesh, 48% in Nigeria), the number of digital transactions (Tk 1.72 trillion in Bangladesh, N71.5 trillion in Nigeria), and the frequency of cybersecurity incidents (95% surge in Nigeria) (Ngital, 2025; Borgen Project, 2025; CSEAN, 2025). Regular public reporting, as in the CBN's Payments System Vision 2025 dashboard, would enhance transparency and empower stakeholders to collaborate on evidence-based solutions, potentially increasing inclusion metrics by 10-15% through targeted interventions (CBN, 2025d).

6.9. Incentivizing Cashless Adoption

Despite the availability of digital payment systems, a reliance on cash persists in Bangladesh and Nigeria, which can hinder economic transparency and efficiency, with cash transactions still comprising 60% of volumes in rural areas and contributing to a shadow economy valued at 30% of GDP (Cashless Society, 2025; BitcoinKE, 2025).

To accelerate the transition to a cashless society, a combination of tax incentives and cashback programs should be implemented for both merchants and consumers, especially in rural areas. For example, tax rebates or VAT discounts on digital transactions, similar to those successfully implemented in South Korea—where card usage rose 25% and tax compliance improved by 15%—and Greece, where incentives boosted electronic payments by 30% and added EUR 1 billion in revenue, can significantly boost cashless adoption (IOBE, 2015; World Bank, 2020). These incentives would encourage consumers to use digital payments—potentially increasing MFS volumes by 20%—and merchants to invest in infrastructure, creating a virtuous cycle that reinforces the shift away from cash, as projected to decline 32% in Nigeria by 2030 (BitcoinKE, 2025).

6.10. Economic Volatility

BoP populations in Bangladesh and Nigeria are disproportionately vulnerable to economic instability, such as inflation and currency devaluation, with inflation rates at 9.5% in Bangladesh and 25% in Nigeria in mid-2025, eroding savings by 15-20% annually and threatening livelihoods for the 40% living below USD 2.50/day (LinkedIn, 2025c; Scirp, 2025). These external shocks can exacerbate poverty, as seen in Nigeria's naira volatility reducing purchasing power by 30% for BoP households (ResearchGate, 2025b).

Fintech solutions can be leveraged to build a more resilient financial safety net for these populations, including the development of inflation-linked savings products designed to protect the real value of savings from rising prices—pilots in Nigeria have preserved 10-15% more value for users (Dibon, 2025). Micro-insurance via mobile channels can protect against risks associated with natural disasters and economic shocks, covering 20 million more in Africa by 2025; by using low-cost platforms like bKash in Bangladesh, these products have increased resilience for 5 million BoP clients, contributing to a 12% rise in financial inclusion amid volatility (World Bank, 2023; CBN, 2024).

7. Conclusion and Future Outlook

7.1. Summary of Findings

The evolution of MFS and cashless transactions in Bangladesh and Nigeria exemplifies the transformative power of fintech in fluid developing societies. Both nations have successfully used MFS to bridge the financial inclusion gap, bringing millions of unbanked individuals into the formal economy and driving economic growth. However, their strategic approaches diverge significantly. Bangladesh has pursued a centralized, government-led strategy centered on a national standard (Bangla QR), while Nigeria has fostered a decentralized, highly competitive ecosystem with a focus on interoperability. The analysis reveals that these distinct paths present both unique opportunities and systemic challenges, particularly in areas of cybersecurity, regulatory governance, and financial literacy.

7.2. Policy Recommendations Recap

To harness the full potential of a cashless future, policymakers and stakeholders must address the pervasive challenges with targeted and forward-thinking solutions. This paper advocates for a comprehensive approach that includes:

- Establishing dynamic, intelligence-led national cybersecurity standards to protect the integrity of the financial system.

- Implementing holistic strategies to bridge the digital divide, combining investments in physical infrastructure with human-centric support and affordable device subsidies.
- Launching nationwide, multi-lingual campaigns to enhance digital and financial literacy.
- Creating regional fintech regulatory forums to harmonize standards and facilitate cross-border payments.
- Embracing a pragmatic, sandbox-based approach to new technologies like crypto assets, drawing on lessons from Nigeria.
- Leveraging AI and blockchain to redefine credit scoring and identity verification for the unbanked.
- Fostering a supportive environment for MSME-targeted solutions through incubators and non-dilutive financing models.

7.3. Future Trajectory

The future trajectory of cashless economies in Bangladesh and Nigeria will be shaped by their ability to navigate these complexities. Nigeria's path is likely to be characterized by rapid, decentralized innovation fueled by its vibrant startup ecosystem and risk-tolerant approach to new technologies. Its success will depend on its ability to transition from a reactive, multi-agency regulatory framework to a more transparent, harmonized, and stable one that encourages long-term, foundational investment. Bangladesh's path will be marked by a more structured, government-led digital transformation. Its success will hinge on its ability to effectively integrate its parallel MFS ecosystem into the national framework and address the persistent digital literacy gap. For both nations, the ultimate goal is not merely to replace cash but to create resilient, inclusive, and secure digital financial ecosystems that uplift BoP markets and drive sustainable, equitable economic growth.

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