CBDC vs Cryptocurrency in Pakistan: A Comparative Review

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Abstract

This analytical review examines Pakistan's dual-path approach to digital finance by assessing the policy tension between decentralized cryptocurrencies (CC) and a Central Bank Digital Currency (CBDC). Through a comprehensive analysis of grey literature and policy documents, the study identifies a significant ideological struggle between risk-averse financial institutions and a pro-innovative government faction. Our findings reveal that this conflict has led to a pragmatic, dual-track strategy: the formalization of the CC market via the Virtual Assets Ordinance 2025 and the parallel development of a state-controlled CBDC. The research quantifies the scale of the informal CC economy, estimating it involves 15-20 million Pakistanis and holds the potential to unlock $20-25 billion in dormant assets for the formal economy. Concurrently, the Digital Pakistani Rupee (CBDC) is projected to reduce the substantial direct costs of cash, estimated at Rs76 billion annually, and enhance financial inclusion for approximately 100 million unbanked adults. The study concludes that for this dual strategy to succeed, Pakistan must prioritize policy harmonization, a privacy-centric CBDC design, and a streamlined regulatory framework for virtual assets. This case offers critical lessons for developing nations navigating the trade-offs between financial innovation, stability, and inclusion

Keywords: CBDC, *Cryptocurrency, Digital Pakistani Rupee, Pakistan Crypto Council (PCC), Distributed Ledger Technology (DLT), Virtual Asset Ordinance, Pakistan Virtual Asset Regulatory Authority (PVARA)*

Introduction

Almost 50 years before most people could not imagine electronic money or any form of money or coin regulated without sovereign authority. The global financial landscape is rapidly changing, as a new digital revolution challenges the centuries-old traditional system of fiat currencies and coins. With the advent of Bitcoin, the first cryptocurrency, which has a decentralized structure, enables cross-border transactions, and promises financial inclusion, a paradigm shift has occurred in financial markets. The world has entered the third stage of Monitory History which can be considered as the era of digital virtual economy. This shift poses a serious threat to traditional banking practices, the sovereignty of central banks, and international monetary regulations (Kayani & Hasan, 2024).

Moreover, the overall Global Financial outlook in 2025 is also changing rapidly with tariffs imposed by United States of America, de dollarization threats from BRICS, China America Trade war and Russian Ukraine war (Arnold, 2025; Contractor, 2025; Meng et al., 2025) In this evolving environment, developing nations like Pakistan face a critical choice in shaping their financial future. This decision is particularly urgent given the country's macroeconomic vulnerabilities. The total public debt stands at Rs 76,007 billion (approximately $130.4 billion at the current exchange rate), with external debt at Rs 24,489 billion ($87 billion), while the trade deficit in goods widened to $21.3 billion in FY2025. A significant portion of Pakistan's external financing relies on remittances ($31.2 billion) and foreign loans, exposing the economy to global shocks. Furthermore, despite recent improvements, foreign exchange reserves remain vulnerable, with liquid reserves at the State Bank of Pakistan (SBP) amounting to just $11.5 billion as of May 2025 (Economic Advisor's Wing Finance Division Government of Pakistan, 2025) Pakistan is actively exploring ways to digitize its financial system and promote greater financial inclusion.

However, a significant debate has emerged between two competing visions: the unregulated, decentralized world of cryptocurrencies and the structured, state-backed model of a Central Bank Digital Currency (CBDC). While the allure of quick returns and technological innovation has driven significant informal cryptocurrency adoption in Pakistan, this review article argues that such an unregulated financial asset poses substantial and disastrous risks to the nation's monetary sovereignty and economic stability. Instead, CBDC offers a controlled, secure, and regulated path toward financial inclusion, economic formalization, and enhanced monetary policy control.

The advent of Decentralized Finance (DeFi) presents a fundamental and growing threat to the monetary sovereignty of economies like Pakistan. Although the State Bank of Pakistan has banned the purchase and sale of cryptocurrency, user adoption continues to grow. Reports show that Pakistan's revenue in the cryptocurrencies market is projected to reach US$2.4 billion in 2025, with the number of users expected to reach to 28.90 million by 2026 (Statista, 2025). This significant demand for alternative financial instruments is driven by a desire for financial autonomy and a hedge against domestic inflation. While annual inflation eased to 4.1% in December 2024 which is down sharply from 29.7% in 2023 volatility persists, as seen in July 2024's sharp 2.9% monthly price surge, which temporarily pushed inflation to a seven-month high. Such fluctuations, alongside elevated core inflation (8.1% urban, 10.7% rural), continue

to erode purchasing power, fueling interest in decentralized assets (State Bank of Pakistan, 2024). This parallel financial system undermines the State Bank of Pakistan's (SBP) ability to conduct effective monetary policy, regulate capital flows, and manage the exchange rate, thereby threatening the stability of the Pakistani Rupee (PKR).

Pakistan's journey into the digital financial realm is a roller coaster ride that often shows deep-seated policy conflicts between the SBP and the political establishment. A thorough examination of this history is essential for understanding the complex landscape of today. On the one hand, the Pakistani government is weighing innovative solutions like CBDC as an alternative to the unregulated, decentralized, informal cryptocurrency economy. On the other hand, it is also exploring ways to formalize the cryptocurrency economy by enhancing regulatory oversight and improving payment efficiency, an approach that embodies the diametrically opposed ideology of centralized control (Shahid & Kim, 2025). The core conflict is not merely a technical or economic one, but a deep ideological and political battle: how can a state like Pakistan navigate the dual pressures of a decentralized, libertarian-driven financial movement and its own institutional mandate to ensure economic stability and inclusion? The central problem is to design and implement a digital monetary strategy that can harness the efficiencies and cross-border payment advantages of digital currencies, while simultaneously safeguarding monetary sovereignty, curbing illicit activity, and critically addressing digital divides and privacy concerns to avoid alienating the very population it aims to serve. Failure to reconcile this conflict risks either continued erosion of state monetary control through unregulated crypto adoption or, conversely, the creation of a centralized digital system that fails to meet the population's core needs for financial freedom and resilience

Research Methodology

This study employs a qualitative analytical review methodology, specifically structured as a systematic narrative review of grey literature and secondary data. The objective is to synthesize existing information, policies, and scholarly discourse to provide a comprehensive analysis of Pakistan's evolving digital finance landscape. The methodology was designed to ensure a transparent, structured, and replicable process for literature selection and analysis.

Literature Search and Selection Criteria

A systematic search was conducted to identify relevant documents, focusing on non-traditional academic sources (grey literature) crucial for capturing real-time policy developments.

- Sources and Databases: The search encompassed:

  o Institutional Repositories: Official websites of the State Bank of Pakistan (SBP), Securities and Exchange Commission of Pakistan (SECP), Government of Pakistan (e.g., Finance Division), and the Pakistan Virtual Asset Regulatory Authority (PVARA).

  o International Databases: Google Scholar, SSRN, and IEEE Xplore for working papers, pre-prints, and conference proceedings.

  o Media and Industry Reports: Reputable international and local news outlets (e.g., Reuters, Dawn, Al Jazeera), specialized fintech publications, and reports from industry analysts (e.g., Chainalysis, Statista).

- Search Terms: Key phrases included: "Pakistan CBDC," "Digital Rupee," "Pakistan cryptocurrency regulation," "Virtual Assets Ordinance 2025," "Pakistan Crypto Council," "SBP circular virtual currency," "financial inclusion Pakistan," combined with Boolean operators (AND, OR).

Inclusion Criteria

Documents were included if they:

1. Were published between 2018 (marking the SBP's first major circular) and 2025.
2. Directly addressed Pakistan's policy, regulation, or adoption of CBDCs or cryptocurrencies.
3. Were official government documents, legislation, circulars, or policy briefs.
4. Provided empirical data, expert analysis, or documented specific case studies relevant to the Pakistani context.
5. Were published in English or Urdu (with official translations used).

Exclusion Criteria:

Documents were excluded if they:

1. Were purely speculative or opinion-based without substantive backing.
2. Duplicated information already captured in more authoritative sources.
3. Did not focus specifically on the financial, regulatory, or economic dimensions of digital assets.

Analytical Framework

1. The selected literature was analyzed using a conceptual framework centered on the policy tension between monetary sovereignty and financial innovation. This framework guided the synthesis of data by focusing on three interconnected themes:
2. The Regulatory-Innovation Dichotomy: Analyzing the conflicting stances of institutions like the SBP (prioritizing stability and control) versus pro-innovation bodies like the Pakistan Crypto Council (prioritizing economic opportunity and technological adoption).
3. Drivers of Adoption: Examining the socio-economic factors (e.g., inflation hedging, remittance costs, financial exclusion) fueling grassroots cryptocurrency use despite regulatory bans.
4. Comparative Policy Analysis: Evaluating Pakistan's proposed solutions (CBDC and Virtual Assets Ordinance) against international precedents (e.g., China's e-CNY, Nigeria's eNaira, India's digital Rupee) to identify potential risks, implementation challenges, and best practices.

This structured approach allowed for a critical synthesis of diverse sources, enabling the identification of key policy trends, contradictions, and strategic trade-offs in Pakistan's path toward digital finance.

Research Design (Briefly Discuss research type, population and sample and sample technique, research instrument and its validity and reliability)

Table 1
Findings from Grey Literature: Pakistan's Digital Finance Landscape

Category	Key Finding / Evidence	Source (Grey Literature)	Implication / Policy Insight
Regulatory Policy & Conflict	SBP's BPRD Circular No. 03 of 2018 prohibits financial institutions from dealing in virtual currencies.	State Bank of Pakistan (2018a)	Highlights initial risk-averse, prohibitionist stance focused on financial integrity and stability.
	SECP Directive S.R.O. 795 (I)/2020 reinforces SBP's ban and mandates reporting to the FMU.	Securities and Exchange Commission of Pakistan (2020)	Shows a unified institutional front against crypto, emphasizing consumer protection and AML/CFT concerns.
	Contradictory stance: Finance Secretary & SBP Exec. Director declare crypto "illegal" in May 2025, conflicting with PCC's pro-innovation agenda.	Kiani (2025a), Rana (2025)	Demonstrates a deep-seated ideological and institutional policy conflict, creating ambiguity.
Pro-Innovation Shift	Establishment of the Pakistan Crypto Council (PCC) and appointment of a Special Assistant to the PM on Blockchain.	Sherani (2025), Chohan (2025)	Signals a formal, high-level government pivot towards exploring and formalizing the digital asset economy.
	Passing of the Virtual Assets Ordinance 2025, creating the Pakistan Virtual Asset Regulatory Authority (PVARA).	Government of Pakistan (2025), Kiani (2025b)	Represents a landmark attempt to resolve policy disarray by creating a unified regulatory framework, co-opting the informal market.
Scale of Informal Crypto Economy	Pakistan ranks 9th globally in crypto adoption, with an estimated 15-20 million users.	Hussain (2025), ChainaAnalysis (2024)	Quantifies the significant, grassroots-driven market reality that policymakers can no longer ignore.
	Projected revenue in the crypto market to reach US$2.4bn in 2025. Potential to unlock $20-25bn in dormant assets.	Statista (2025), Zeeshan & Hassan (2025)	Highlights the substantial economic incentive for formalization and bringing assets into the tax net.
CBDC Development	SBP is building capacity and plans a pilot program in collaboration with Soramitsu, leveraging R3 Corda blockchain.	Kamiyama (2025), Shahid & Kim (2025)	Shows a methodical, technologically-informed, and phased approach to a state-backed digital currency.
	The CBDC pilot is part of the broader URAAN digital transformation plan.	Blake (2025), Dilawar (2025)	Positions the CBDC as a core component of the national digital infrastructure strategy.
Economic Drivers of Adoption	High inflation and volatile PKR drive adoption of stablecoins (e.g., USDT) as a hedge.	State Bank of Pakistan (2024)	Shows crypto as a rational, pragmatic response to macroeconomic instability and failure of traditional systems.
	High cost of remittances (7.1%) leads to an estimated $10bn/year being channeled through informal crypto networks.	Rehman & Khalil (2024), Zeeshan & Hassan (2025)	Underscores the need for efficient, low-cost cross-border payment solutions that a CBDC or regulated crypto could provide.
Existing Digital Infrastructure	Robust foundation with JazzCash (48M registered users) and EasyPaisa, integrated with state-backed RAAST.	Donegan (2025)	Provides a ready-made ecosystem for CBDC integration and rollout, mirroring successful models like India's UPI.
Cost-Benefit Analysis	The direct cost of cash is estimated at Rs76 billion annually (printing, handling, ATMs).	H. A. Khan & Saeed (2025)	Provides a strong economic rationale for a CBDC to reduce the fiscal burden of a cash-based economy.

Discussion and Analysis

Decentralized Finance In Pakistan

Pakistan's deep seated policy conflicts can be observed through contrasting official pronouncements and institutional actions (Kiani, 2025a). This contradiction is not merely a matter of bureaucratic inefficiency but a reflection of a deeper ideological struggle between a traditional, risk-averse institutional mindset and a modern, entrepreneurial drive for innovation and economic opportunity.

The SBP has long viewed decentralized CCs as a significant threat to the financial stability and monetary sovereignty of the institution and the country. This position is reflected in the BPRD Circular No. 03 of 2018, issued on April 6, 2018, which advised all financial institutions to refrain from processing, using, or investing in virtual currencies. The circular highlighted that such currencies are not legal tender in Pakistan and warned against their potential for high price volatility and use for illicit activities (State Bank of Pakistan, 2018a). Even Federal Investigation Authority (FIA) confiscated a company's mining operation as well (Cheema, 2025). The Securities and Exchange Commission of Pakistan (SECP) mirrored this cautionary approach, publicly advising extreme caution regarding CC investments. The SECP's primary concerns, as outlined in its Directive S.R.O. 795 (I)/2020, were to maintain financial integrity, prevent illicit activities like money laundering and terror financing, and protect consumer interests against speculative fraud and market volatility. The directive instructs all companies and limited liability partnerships to ensure compliance with the SBP's 2018 circular and to report any suspicious transactions to the Financial Monitoring Unit (FMU) (Securities and Exchange Commission of Pakistan, 2020). For these institutions, the primary concerns centered on financial integrity, the prevention of illicit activities such as money laundering and terror financing, and the protection of consumer interests against speculative fraud and market volatility. (Muhammad Arif Saeed & Sial, 2023).

However, this institutional caution had met with powerful counter-narrative, and a series of aggressive, pro-cryptocurrency moves from other government factions. Adding to this complex picture, the Khyber Pakhtunkhwa (KP) Provincial Assembly on December 2, 2020 unanimously passed a resolution urging the federal government to legislate in favor of CC and crypto-mining. This move highlighted a push for legislative progress in the world of digital currencies and assets, particularly within the province of Khyber Pakhtunkhwa. A Crypto Advisory Committee was also formed for subsequent legislation, but in March 2021, the KP assembly dissolved the committee, recognizing that the federal government holds exclusive authority over digital currency (Khyber Pakhtunkhwa Provincial Assembly, 2020).

The Federation of Pakistan Chambers of Commerce & Industry (FPCCI) policy brief also offered a different viewpoint by recommending that CC be formalized as an "asset class" rather than a legal tender to capture speculative gains and attract foreign investment. This perspective adds a crucial business-focused argument to the conversation, suggesting a path to economic benefit through regulation rather than outright prohibition (Federation of Pakistan Chambers of Commerce & Industry (FPCCI), 2021)

After years of "strategic ambiguity," a formal policy shift occurred in Pakistan with the establishment of the Pakistan Crypto Council (PCC) in March 2025. This government-backed platform signals a move toward formalizing and regulating digital assets and blockchain technologies. While it reflects an ambition to modernize the financial infrastructure and attract new investment, the initiative faces significant risks (Chohan, 2025). The appointment of Bilal bin Saqib, the PCC's CEO, as a special assistant to the Prime Minister on blockchain and cryptocurrency, with the status of a state minister, and announcement of establishment of Pakistan Crypto Council signaled a serious shift in the government's priorities (Sherani, 2025). This faction had announced to actively pursue ambitious projects, including the exploration of bitcoin mining using the country's surplus energy, and to unveil a government-led Strategic Bitcoin Reserve following Bhutan, Central African Republic and El Salvador who already have Government owned Cryptocurrency Reserves (Al Jazeera Staff, 2025; Krause, 2025). The appointment of Changpeng Zhao, the founder and CEO of Binance, which is the world largest CC exchange, as a strategic adviser to the PCC further underscored this assertive pivot toward embracing the global digital asset economy(Hussain, 2025).

The tension between these two opposing views—the SBP's risk-averse stance and the PCC's innovation-driven agenda has been a defining characteristic of Pakistan's digital currency policy. This friction came to a head during a National Assembly Finance Committee meeting on May 30, 2025, where Finance Secretary Imdadullah Bosal and SBP Executive Director Sohail Jawad insisted that CC use is illegal and subject to investigation. This stance directly contradicted the government's promotional activities, particularly those led by Bilal Bin Saqib, the CEO of the PCC. These dynamics reveal that the policy contradiction is a manifestation of a deeper ideological struggle, with regulatory bodies focused on monetary stability and control, while the newly formed PCC operates with an entrepreneurial perspective aimed at positioning Pakistan as a digital innovation hub (Rana, 2025).

However, Government of Pakistan has recently passed the Virtual Assets Ordinance 2025, which represents a landmark attempt to resolve this policy disarray by creating a unified regulatory framework. The legislation establishes the Pakistan Virtual Asset Regulatory Authority (PVARA), an autonomous federal body empowered to license, regulate, and supervise all entities dealing in virtual assets (Kiani, 2025b). The aim of PVARA is to align Pakistan's digital asset ecosystem with international standards, particularly those of the Financial Action Task Force (FATF), to prevent illicit activities and ensure financial integrity. A key feature of the ordinance is the establishment of a Shariah Advisory Committee, a move that incorporates Islamic financial principles into the regulatory framework (Mian Zafar Iqbal Kalanauri, 2025).This new authority, which will include the SBP governor and the heads of other key financial institutions, is a crucial step toward creating a cohesive policy that balances the need for innovation with the imperative of institutional readiness and public safeguards. The creation of the PVARA, which is not controlled by the SBP alone, represents a strategic compromise, signaling that the pro-innovation faction has successfully pushed for a new, formalized path (Government of Pakistan, 2025).

This strategic shift is largely a response to a pre-existing market reality and continuous scholarly discussion on the regulation of CC, which shows that the informal cryptocurrency

economy has reached to 4.06 Trillion US Dollars with Bitcoin trading at 123000 USD and Ethereum has surpassed 4000 USD, and total Cryptocurrency owners around 659 million in December 2024 with around 20 Million users belongs to Pakistan (R. U. Khan et al., 2024)(Crypto.com, 2025; H. A. Khan, 2025).

By establishing PVARA, the government is essentially acknowledging that it cannot stop this movement and is instead seeking to co-opt and control it, with the crucial goal of bringing billions of dollars in virtual assets into the tax net.

Central Bank Digital Currency (CBDC) In Pakistan

Against the backdrop of a burgeoning, yet informal, virtual assets sector, Pakistan is actively pursuing a parallel, state-controlled digital currency initiative as well. This CBDC pathway is driven by the SBP's strategic objective to modernize the nation's financial infrastructure and harness the benefits of digitalization in a secure and regulated manner. Unlike CC, a CBDC is designed to be a direct extension of the central bank's authority, mirroring the value of the national fiat currency while leveraging new technologies (Shahid & Kim, 2025).

The SBP's strategy is well-defined and progressing through a phased approach. The institution is "building up its capacity on the central bank digital currency" and plans to roll out a pilot program in the near future in collaboration with Japanese blockchain technology developer Soramitsu leaverging R3 Corda Blockchain a platform known for its enterprise grade smart contracts capabilities and privacy first design. (Kamiyama, 2025). The SBP hopes to complete this CBDC pilot project under its flagship national digital transformation plan named URAAN till the end of current fiscal year (Blake, 2025). This phased approach and international collaborations with CEO of Binance and Soramitsu R3 Corda Blockchain is a testament to the cautious methodology being adopted, which involves learning from the experiences of other countries before fully committing to a full-scale launch (BR Web Desk, 2025). The CBDC will be designed to maintain a one-to-one parity with the Pakistani Rupee, ensuring its value remains stable and trustworthy. This stability is a foundational difference from the volatile nature of private cryptocurrencies, making the CBDC suitable for everyday transactions and a secure store of value. The potential economic and social benefits of a CBDC for Pakistan are manifold, addressing some of the country's most persistent financial challenges.

Pakistan already possesses an interoperable digital payment infrastructure, including private initiatives like EasyPaisa and JazzCash, as well as the state-backed RAAST system. These platforms have a wide user base, comprising millions of daily users. This existing ecosystem provides a crucial, unified foundation upon which a CBDC could be built. It would ensure seamless transfers and reduce the need for customers to hold multiple accounts, similar to India's Unified Payments Interface (UPI) (Mujawar & Shinde, 2025).

Collaboration with Distributed Ledger Technology (DLT) platform providers like Corda could supply the technical backbone for a Pakistani CBDC just like Sweden's e-krona (Tsareva & Komarov, 2024). Research is already exploring how Corda's and Hyperledger Permissioned blockchain can enhance transparency and efficiency in the taxation system (Louvieris et al., 2024). The literature reveals that Permissioned Blockchain like Corda and Hyperledger are designed for high-value transactions in regulated environments, making it a suitable platform

for developing the secure, scalable, and interoperable infrastructure required for a CBDC (Zhang & Huang, 2022). These potential partnerships, combined with the foundation laid by EasyPaisa, JazzCash, and RAAST, create a comprehensive roadmap for Pakistan to transition into a more digitally integrated and inclusive economy.

A well-designed mobile based offline enable, interoperable CBDC with RAAST, JazzCash and Easypaisa can mirror the success of India's offline UPI payments and the Reserve Bank of India's (RBI) e-rupee pilot. India's UPI infrastructure processes over **10 billion monthly transactions**. India's experience demonstrates how offline-capable digital payment systems can bridge financial inclusion gaps, particularly where internet access is unreliable (Bhadade & Deogaonkar, 2025).

This strategy would extend the proven success of Pakistan's mobile financial platforms like JazzCash and EasyPaisa, JazzCash alone has 48 million registered users with 19.7 million active users and it's total transaction in a year is equivalent to 9% of total GDP of Pakistan, with a retail network of 350,000 active merchants and have pioneered accessible digital services in rural areas through extensive agent networks (Donegan, 2025). Their experience demonstrates that interoperable, mobile-first solutions can overcome infrastructural gaps, a critical foundation for CBDCs targeting financial inclusion. Unlike traditional banking, a CBDC would require minimal documentation and no physical branches, directly addressing key adoption hurdles such as low financial literacy and infrastructure gaps. For women in particular, who face additional socio-cultural restrictions on financial access in Pakistan (Razzaq et al., 2024), a CBDC could provide discreet and accessible financial tools to promote economic participation.

However, the experience with current Private digital financial services highlights critical lessons for CBDC implementation. Despite offering lower interest rates (9% annually compared to 15-25% monthly from informal lenders) and instant mobile-based approvals, platforms like JazzCash and EasyPaisa face low rural adoption due to persistent barriers. Trust remains a critical hurdle, with 35% of potential users citing concerns over fraud and hidden fees, compounded by low digital literacy (affecting 45% of non-users) and unreliable internet infrastructure in remote areas (Uddin & Zaman, 2025). A successful CBDC rollout must therefore incorporate robust consumer protections, targeted financial education programs, and infrastructure investments to build trust and ensure accessibility.

While the benefits are significant, the CBDC pathway is not without its risks and challenges, which the SBP is actively working to mitigate. The CBDC will be built on a Distributed Ledger Technology (DLT) platform Corda, which is recognized for its robust security features and resilience against single points of failure. This platform uses multi-signature wallets, which require multiple authorized signatures to validate transactions, thereby creating a crucial additional layer of security (Indira et al., 2025). It shows that Pakistan is adopting a privacy-centric approach for its CBDC. This Platform is designed to collect only the data necessary for its operation and fraud prevention, and it will incorporate anonymization techniques for low-value transactions to make it difficult to trace specific financial activity back to individuals.

Pakistan has a documented history of pervasive corruption and politically influenced use of accountability mechanisms (Azeez & Bhatti, 2025); the existence of a fully traceable financial record could be misused for political favoritism or a pervasive surveillance state. This inherent tension between transparency and privacy is a significant challenge that the SBP must address to build public trust. The CBDC, as designed, is a tool to reinforce the existing financial system, not to disrupt it. While it could improve efficiency and lower costs, its design must carefully balance the need for innovation with the stability of the commercial banking sector. The potential for a CBDC to "crowd out bank deposits" and raise banks' funding costs is a real policy tradeoff that the SBP must manage, likely through careful restrictions on CBDC balances and transactions.

A retail CBDC could simultaneously address Pakistan's pressing financial inclusion challenges. With approximately 100 million adults currently unbanked or underbanked (mirroring the global trend of 1.7 billion excluded individuals identified by the World Bank), a digital currency would provide direct access to formal financial services (Asghar et al., 2025).

CBDC in Cross-Border Payments:

A well-designed CBDC has the potential to streamline cross-border transactions and make international commerce more accessible and cost-effective. Pakistan currently faces high remittance costs of 7.1% of the transfer amount. The introduction of a CBDC could reduce this cost. This reduction could save an estimated $1.28 billion annually, which would directly benefit the low-income households that depend on remittances. Lower remittance costs would also encourage people to use formal digital channels instead of informal ones, which would increase foreign exchange inflows and improve Pakistan's foreign exchange reserves (Rehman & Khalil, 2024). Furthermore, Literature argues that the use of CBDC for trade could cut the settlement time for cross-border payments from 2-3 days to just minutes. This would improve cash flow for importers and exporters, allowing them to reinvest capital more quickly and enhance their competitiveness in the global market

Boosting E-commerce

E-commerce in Pakistan faces significant challenges despite a large youth population, high internet penetration, and a substantial increase in mobile broadband coverage. Approximately 81% of the adult population lives in areas with 3G and 4G coverage (Hasan, 2024). A major impediment is a lack of consumer trust, which is a global issue, particularly in developing countries (Okat et al., 2025). This distrust stems from an inadequate regulatory framework, data privacy concerns, and cybersecurity threats. The country ranks among the least cyber-secure nations, and online financial frauds have seen a 600% increase between 2020 and 2021. The fear of online scams and security risks is so prevalent that even digitally literate individuals often prefer cash-on-delivery, which accounts for 55% of payments (Hasan, 2024).

The introduction of CBDC could be a transformative opportunity to address some of these challenges. By providing a stable, government-issued digital payment method, CBDC could significantly enhance consumer trust and security in online transactions. This would help mitigate the fear of online fraud and build confidence in digital payments, which are currently major barriers to e-commerce adoption. A CBDC would also offer a secure and efficient

alternative to cash-on-delivery, helping to move Pakistan's economy away from its cash-based nature. By streamlining transactions and reducing costs, a CBDC could stimulate further growth in the e-commerce sector and empower digital entrepreneurs.

CBDC and E-Governance

CBDC can significantly enhance e-governance by increasing transparency and reducing corruption. Unlike traditional financial systems, CBDCs provide an immutable digital ledger that records every transaction in real time. Literature reveals that real-time reporting mechanisms applied to stimulus programs like the U.S. CARES Act have enhanced oversight and mitigated mismanagement (Petrosky-Nadeau & Valletta, 2021). With CBDCs, citizens and auditors can track fund flows in real time, which will hold governments accountable for their expenditures. This traceability ensures that the funds allocated for social welfare programs, subsidies, or emergency relief reach their intended recipients transparently without being siphoned off through corrupt practices. Chain's digital RMB Consumption Voucher and Singapore's RedeemSG System are the prime examples. (Li & Shen, 2024). The most promising applications of CBDC identified in the literature are its ability to automate, bypass intermediaries and condition welfare payments . Pakistan can use this feature to strength it's Benazir Income Support Programme (BISP) just like China's Precise Poverty Alleviation Program which demonstrates how a digital currency can be used to bypass intermediaries and directly transfer funds to beneficiaries, thereby significantly reducing the risk of embezzlement, maximizing the impact of aid and accelerating progress toward poverty reduction (Xie, 2023). Pakistan's CBDC can also leverage from Smart Contracts to subsidize disbursements like Hong Kong's (Dordal Carreras et al., 2024). Transparency in CBDC operations not only deters corruption but also strengthens public trust in government institutions. Existing literature emphasizes the need for robust legal frameworks that mandate disclosure of how programmable money is allocated and spent. (Li & Shen, 2024).

CBDC and Bank Disintermediation

The widespread use of a CBDC also poses risks to the traditional banking system. One major concern is **bank disintermediation**, where a shift of deposits from commercial banks to the CBDC could affect banks' liquidity and credit creation. This could be particularly risky for smaller banks during a financial crisis. Pakistan can draw several valuable lessons from India's e-Rupee experience to ensure the successful implementation of its own CBDC (Kumar & Shanker Gupta, 2024). The first and the foremost lesson Pakistan can learn is that the e-Rupee pilot has shown that widespread adoption could lead to a shift in deposits away from commercial banks. Pakistan's central bank should carefully design its CBDC and regulatory framework to mitigate this risk and ensure the stability of the financial system. To mitigate this, the SBP could impose carefully calibrated restrictions on CBDC balances, ensuring the digital currency complements the existing financial system rather than competing with it for deposits. This approach would allow the CBDC to achieve its goals of efficiency and financial inclusion without destabilizing the commercial banking sector.

CBDC and Cost of Cash

The direct costs associated with managing Pakistan's cash-based economy are substantial and continue to increase annually. According to an analysis utilizing publicly available data, the direct cost of cash is estimated to be about **Rs76 billion**. This figure includes the **Rs31.3 billion** spent by the State Bank of Pakistan on currency printing in FY24, an estimated **Rs23 billion** for cash handling and transportation by banks, and an estimated **Rs22 billion** in annual operational costs for the country's over 18,700 ATMs. The literature reveals that CBDC could significantly reduce these expenses by displacing physical currency and encouraging digital transactions (H. A. Khan & Saeed, 2025).

The Decentralized Cryptocurrency Phenomenon in Pakistan

In stark contrast to the SBP's methodical, top-down approach to a CBDC, Pakistan is home to a vibrant, grassroots CC market, which was estimated to be around 9 million Pakistani in 2022 around 4.1% of total population of Pakistan (Triple A Technologies Pte, 2022), which is now estimated to be around 15-20 million in 2025 (Hussain, 2025), that has flourished from the bottom up, largely outside the purview of formal regulation (State Bank of Pakistan, 2018b). This unofficial digital revolution is a powerful force of economic resilience, driven by millions of citizens who have found in decentralized virtual assets a compelling solution to some of the nation's most pressing financial challenges.

The scale of informal crypto adoption in Pakistan is significant. Despite the SBP's historical ban and official warnings, Pakistan ranks 9th for global crypto adoption and 5th in Central & South Easia Asian Countries (CSAO) (ChainaAnalysis, 2024). Industry estimates place the number of active crypto users at between 15 million and 40 million, with a notable portion of these registered on global platforms like Binance. This widespread adoption is a direct challenge to the government's previous prohibitive stance and indicates that crypto is not a fringe activity but a core financial tool for a large segment of the population. This widespread use is not accidental; it is a rational response to deep-seated economic and institutional issues. The drivers of crypto adoption are multi-faceted:

The government's establishment of the PCC and Virtual Assets Ordinance represents a tacit acknowledgment of the informal CC market reality. By formalizing this informal sector through the PCC's multi-stakeholder approach, the government aims to transform a perceived systemic challenge into a regulated economic opportunity, unlocking an estimated $20-25 billion in dormant CC assets (Zeeshan & Hassan, 2025). The establishment of a regulatory sandbox is a key feature of this new framework, offering a controlled environment for testing emerging technologies and business models under supervisory oversight.

Although Literature also points out that Pakistani Regulators lacks technical capacity and real time monitoring tools to fully oversee this informal CC market and the dynamic nature of digital assets demands technologically proficient regulatory body; Therefore it requires a significant investment in human capital and technological infrastructure (Dilawar, 2025).

Inflation and Cryptocurrencies

Pakistan's economy has long struggled with inflationary pressures that frequently exceed sustainable levels. Recent research, analyzing data from 1991 to 2024, highlights this macroeconomic sensitivity by identifying a critical interest rate threshold of 11% for Pakistan's

GDP (Shoukat & Shahzada, 2025). In this unstable macroeconomic environment, where inflation has often surpassed the harmful threshold, traditional financial systems have failed to preserve purchasing power. Consequently, Pakistan's tech-savvy younger generation has turned to CC, especially stablecoins like Tether (USDT), as a hedge against the rupee's depreciation. Stablecoins are preferred over volatile assets like Bitcoin because they provide a crucial digital dollar peg, offering a degree of stability amid severe currency fluctuations (Auer et al., 2025)

However, this inclination of Users on stablecoins also introduces risks, such as regulatory gaps and centralized control. Their rapid adoption reflects a pragmatic response to systemic failures but simultaneously underscores the need for broader reforms to address the root causes of inflation in the country (Auer et al., 2025).

Remittances and Cross-Border Payments through Cryptocurrency:

CC presents a transformative alternative, enabling faster and more cost-effective cross-border transactions. Estimates indicate that up to $10 billion in annual remittances may already be channeled through crypto networks, circumventing formal banking systems. This trend highlights the urgent need for regulatory frameworks to integrate such innovations into Pakistan’s financial ecosystem. PCC aims to address these challenges by promoting blockchain-based solutions that could reduce transaction costs to as low as 1–3%, saving millions for expatriates and their families while enhancing financial inclusion(Zeeshan & Hassan, 2025)

Bitcoin and Volatility Spillover

This variety in approaches and outcomes demonstrates that there is no one-size-fits-all solution. A study by Henrik Seikku examined whether Bitcoin are effective in isolating it from the financial system by comparing volatility spillovers to stock markets in 19 countries between 2013 and 2024. The research found that bans may have a slight effect in reducing Bitcoin's volatility spillovers to stock markets, as countries like China, Russia, Turkey, and Nigeria showed decreased exposure to Bitcoin's volatility after their bans were implemented. However, the study also found contrary evidence in other countries, such as India and Vietnam, where spillovers seemed to increase post-ban. The analysis of the full sample showed no significant difference in volatility spillovers between countries with and without bans. The findings indicate that while bans might play a role, conclusions for policymaking should be made with caution, as each country has unique economic and political nuances that complicate the analysis (Seikku, 2024).

Lessons From International Precedents

China's e-CNY

The People's Bank of China has been a pioneer in CBDC space, initiating its two-tier Digital Currency Electronic Payment (DCEP) system, or e-CNY, in 2014 (Xu, 2022). The domestic retail payments were the primary focus of this pilot which was later expanded to many cities. A key feature of the e-CNY is its ability to facilitate offline transactions, which is a crucial design choice for a country with a large rural population that may lack reliable internet access.

The e-CNY has been successfully integrated into public services, such as public transportation, with cities like Chengdu, Beijing, and Suzhou enabling payments on their entire bus and subway networks. This integration is a powerful mechanism for encouraging adoption. Strategically, the e-CNY is seen not only as a tool for domestic financial modernization but also as a way to enhance state control and potentially challenge the dominance of the US dollar in international finance (Allen et al., 2022).

While China's government has presented the e-CNY as a complement to existing payment platforms like Alipay and WeChat Pay, there is a strong perception that it is a competitor designed to regain centralized control over the payment system. The e-CNY is considered a public sector innovation, whereas the e-payment platforms were private sector creations that grew organically from their respective ecosystems. A significant difference is that the e-CNY and existing e-payment systems use separate QR codes, although the central bank is pushing for a universal, interoperable QR code system (Zeng et al., 2025). Pakistan should therefore learn from this complex dynamic and ensure its CBDC strategy is designed to either integrate with existing digital payment systems like Easypaisa and JazzCash or provide a clear, compelling advantage over established digital payment habits to drive adoption

Nigeria's eNaira

Nigeria's e-Naira, a digital form of the country's fiat currency, was launched on October 25, 2021. The Central Bank of Nigeria (CBN) introduced the e-Naira to serve as a secure and efficient digital payment alternative, with the goals of promoting financial inclusion, lowering cash processing costs, and enhancing monetary policy effectiveness(IDISI et al., 2024). Like China’s digital renminbi, the e-Naira can be purchased by the public and transferred to e-wallets, maintaining parity with the physical naira. It is a government-controlled digital currency that uses blockchain technology, but with strict access controls enforced by the central bank (Akanbi, 2024).

However e-Naira has faced many challenges that have led to low adoption rates of less then 0.5% country’s population in its first year (Ogwuegbu, 2025). A primary issue is a profound lack of public trust. Many Nigerians view the e-Naira's design, which allows the CBN to monitor all transactions, as a tool for government surveillance and a breach of privacy rights. This perception, coupled with the fact that Nigeria was placed on the Financial Action Task Force's (FATF) grey list for insufficient measures against money laundering and terrorist financing, has made many potential users skeptical (Okoro & Ndukwe, 2025).

This trust deficit was exacerbated by the government's approach to private cryptocurrencies. On February 5, 2021, the CBN prohibited dealing in cryptocurrencies and facilitating cryptocurrency exchanges, citing concerns over anonymity, illicit activities, and the need to protect Nigerians from fraud and investment risks(Anyamele, 2024; IDISI et al., 2024). However, this action, followed months later by the launch of the e-Naira, was seen as contradictory and contributed to a negative public perception.

Furthermore, the e-Naira has not offered a compelling value proposition to the public. Its functionalities do not significantly surpass existing mobile payment systems. The e-Naira also presents risks such as potential bank disintermediation, cybersecurity risks, and operational

risks due to Nigeria's low internet and electricity access rates. The lack of reliable infrastructure, with over 92 million people lacking electricity and a 55.4% internet penetration rate in 2023, is a major obstacle to its widespread adoption(IDISI et al., 2024).

Nigeria's evolving cryptocurrency regulatory framework offers valuable lessons to PCC which legally recognizes digital assets like cryptocurrencies as securities to foster investor confidence while mitigating risks like fraud and money laundering. Pakistan can also mirror the success of Nigeria to attract foreign investment and enhance financial inclusion However, Nigeria's experience also highlights challenges, including regulatory fragmentation between agencies like the SEC and Central Bank. To avoid such pitfalls, the PCC should prioritize inter-agency coordination and robust AML/KYC measures, as seen in Nigeria's *Money Laundering Act 2022* (Yahaya & Omoarebu, 2025).

India's Digital Rupee

India's Central Bank Digital Currency (CBDC), the e-Rupee, was introduced to advance the country's transition to a digitized payments economy, with the primary goals of lowering the operational costs of a cash-reliant economy and improving payment efficiency. The e-Rupee is a liability of the central bank and is considered legal tender, holding the same status as physical currency. The Reserve Bank of India (Central Bank) initiated pilot testing for the e-Rupee in two stages:

- **Wholesale Pilot (e-W):** Began on November 1, 2022, primarily for settling secondary market transactions involving government securities.
- **Retail Pilot (e-R):** Launched on December 1, 2022, for Person to Person (P2P) and Person to Merchant (P2M) transactions. The pilot runs across 13 banks in 26 cities and as of August 31, 2023, it involved approximately 1.46 million customers and 0.31 million merchants. By March 2024, circulation had grown to ₹234.1 crore, with about 4.0-4.6 million users and 400,000-420,000 merchants(Kasana & Singh, 2024).

The e-Rupee operates on a permission blockchain using Distributed Ledger Technology (DLT) (Rafee & Kumar, 2024). It functions as a non-interest-bearing, cash-like token in a two-tier model: the RBI issues the currency, and commercial banks distribute it to the public. Users can make transactions via a digital wallet on their mobile phones, using QR codes for payments to other users or merchants (Maggio et al., 2024).

A key difference between the e-Rupee and existing payment systems like the Unified Payments Interface (UPI) is that the e-Rupee can be used for transactions without a linked bank account and offers an offline capability for areas with limited or no internet connectivity. The e-Rupee is also a "programmable" currency, which allows for conditional payments, such as restrictions on usage or expiry dates

Despite its potential, the e-Rupee faces significant challenges. Its adoption has been slower compared to UPI, which processes over 300 million transactions daily. The e-Rupee's daily transactions peaked at 1 million in December 2023 but dropped to around 100,000 by mid-2024. Public awareness and trust remain hurdles, as many users are concerned about privacy due to the traceable nature of transactions(IBJ Bureau, 2024).

Conclusion and Recommendation

In short, this article argues that after a period of policy confusion, Pakistan has adopted a dual-track strategy to harmonize a CBDC with regulated cryptocurrencies. This approach can create a secure, inclusive, and forward-looking financial ecosystem that mitigates threats while capitalizing on immense economic potential.

The strategy's first pillar, the proposed PCC, is projected to unlock an estimated $20–25 billion in dormant cryptocurrency assets. This capital injection would be highly beneficial for Pakistan’s depleting foreign exchange reserves and constrained economy. The second pillar, the Digital Pakistani Rupee, aims to reduce physical currency circulation by 30% by 2027.

While the CBDC provides a state-backed foundation for financial inclusion and systemic efficiency, the PCC framework seeks to formalize Pakistan’s resilient but informal crypto economy. This shadow economy has thrived among the country’s tech-savvy youth (63% of the population is under 30) as a hedge against inflation and traditional banking inefficiencies. This dual approach is particularly relevant given FY23's economic realities: eroded consumer purchasing power, a significant contraction in large-scale manufacturing (-8.11% YoY), and a reliance on stringent fiscal measures, including drastic subsidy cuts (-50.75%), to meet IMF conditions.

The potential socioeconomic benefits of this integrated model are substantial. Regulated CC under the PCC’s phased roadmap (2025–2027) could generate $500 million in tax revenue by 2025, rising to $2.1 billion by 2030. Concurrently, the policy is projected to attract foreign direct investment into blockchain startups, with investments growing from $220 million to $1.8 billion. Furthermore, blockchain-based solutions could optimize remittance efficiency, targeting 28% in savings—a crucial advantage for a country heavily reliant on inflows. The strategy also aims to create thousands of jobs in fintech and cybersecurity while expanding financial inclusion for Pakistan’s 100 million unbanked citizens. Collectively, these measures could help mitigate the effects of a declining per capita income (-11.1% in FY23) and reduce long-term dependence on IMF support

Policy Recommendations

Policy Harmonization and Unified Messaging

The government must move past the contradictory policy signals that have characterized the past(Shahzad et al., 2025). A unified policy framework, with transparent and consistent messaging from all key institutions, is paramount. Learning from Nigeria's experience, which suffered from a "failure of branding" by banning crypto while promoting a CBDC(IDISI et al., 2024), Pakistan must clearly articulate the distinct roles of the CBDC as a stable, regulated foundation and the virtual assets market as an innovation-friendly, yet supervised, ecosystem. This is essential for building public confidence and trust.

A Privacy-First CBDC Implementation

The State Bank of Pakistan (SBP) should proceed with a cautious, phased rollout of its CBDC pilot, with an explicit and demonstrable focus on user privacy and security. The SBP's commitment to minimized data collection and anonymization techniques must be a central

feature of its public relations and technical design. A robust public education campaign is needed to improve digital literacy and build widespread awareness of the CBDC's benefits, security protocols, and privacy safeguards, thereby countering the prevailing distrust of centralized institutions.

Fostering a Regulated Crypto Ecosystem

The newly established PVARA should develop a streamlined and transparent licensing regime for Virtual Asset Service Providers (VASPs). The goal should be to formalize the existing informal market by lowering barriers to entry, thereby encouraging compliance and attracting both domestic and foreign investment. The regulatory sandbox feature of the Virtual Assets Act is a crucial tool for this, allowing the PVARA to work with the private sector to test new business models and technologies under controlled conditions. Public-private collaboration with fintechs, banks, and the crypto community is vital for leveraging their expertise and fostering a truly dynamic ecosystem.

Author Contributions

Dr. Hassan Raza was responsible for the data collection and drafting of the manuscript. Dr. Danish Ahmed Siddiqui served as the supervisor. He has conceptualized this article as well and has provided critical review, intellectual guidance, and final approval of the manuscript. Both authors have read and approved the final version of the manuscript.

Conflicts of Interest

The authors declare that there are no conflicts of interest, financial or otherwise. This research was conducted as part of the first author's doctoral thesis under the supervision of the second author.

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