فصلنامه پژوهش های نوین در اقتصاد، حسابداری و بازرگانی دوره 1 – شماره 3 – صفحات196-182
Journal of new researches in economics, accounting and Banking
ISSN 3060-6071

OPEN ACCESS

The impact of digital currencies on the banking sector, opportunities and challenges

Somayeh Khezri[1]

1.Master of economics Urmia university

Abstract:
The rapid emergence of cryptocurrencies and blockchain technology has introduced a paradigm shift in the global financial landscape, posing both existential threats and unprecedented opportunities for traditional banking systems. This paper provides a comprehensive review of the impact of cryptocurrencies on the banking sector, synthesizing literature from 2020 to 2024. The study aims to evaluate how decentralized finance (DeFi) and digital assets are reshaping financial intermediation. Key findings highlight significant opportunities, including the potential for banks to enhance cross-border payment efficiency, reduce transaction costs, and improve financial inclusion for unbanked populations. Conversely, the paper identifies critical challenges, such as extreme market volatility, regulatory uncertainty regarding Anti-Money Laundering (AML) compliance, and the risk of disintermediation which threatens banks' traditional fee-based revenue models. Furthermore, the review discusses the strategic response of central banks through the development of Central Bank Digital Currencies (CBDCs). The paper concludes that rather than viewing cryptocurrencies solely as a competitive threat, traditional banks must adopt a hybrid approach—integrating blockchain technology to modernize infrastructure while adhering to robust regulatory frameworks. This evolution is essential for banks to remain relevant in the digital economy.

Keywords: Cryptocurrency, Traditional Banking, Fintech, Blockchain Technology, Financial Inclusion, CBDC, Regulatory Challenges, Decentralized Finance (DeFi).

The global financial architecture has remained relatively static for decades, largely defined by centralized institutions, fiat currencies, and a complex web of intermediaries facilitating the flow of capital. However, the aftermath of the 2008 Global Financial Crisis precipitated a technological and ideological shift that has since challenged the very foundations of traditional banking. This shift began with the publication of the seminal whitepaper by Satoshi Nakamoto in 2008, introducing Bitcoin as a "peer-to-peer electronic cash system" (Nakamoto, 2008). While initially viewed with skepticism by established financial entities, cryptocurrencies and the underlying blockchain technology have evolved from a niche cryptographic experiment into a trillion-dollar asset class. Today, the integration of digital assets into the mainstream economy represents one of the most significant disruptive forces in the history of banking, prompting a re-evaluation of monetary policy, payment systems, and asset custody.

In recent years, the discourse surrounding cryptocurrencies has moved beyond mere speculation on price volatility to a more substantive analysis of their utility in modern finance. As noted by Owolabi et al. (2024), the proliferation of digital currencies is not merely a trend but a structural transformation that offers a decentralized alternative to the monopolistic control traditionally held by commercial and central banks. The core proposition of cryptocurrencies lies in their ability to facilitate trustless transactions without the need for a central intermediary. This concept, known as "disintermediation," strikes at the heart of the traditional banking revenue model, which relies heavily on transaction fees, account maintenance charges, and the spread on currency exchange.

The growth of this sector has been exponential. Following Bitcoin, the emergence of Ethereum and smart contract technology expanded the utility of blockchain beyond simple value transfer to complex decentralized finance (DeFi) applications. According to a 2024 study by Dandachi and colleagues, the DeFi sector has demonstrated that lending, borrowing, and trading can occur autonomously through code, theoretically rendering traditional bank branches and loan officers obsolete for certain market segments. This technological capability has forced traditional banks to confront a "innovate or perish" dilemma. Major financial institutions that once dismissed Bitcoin as a vehicle for illicit activity are now launching their own digital asset desks, exploring blockchain for settlement efficiency, and offering custody services to high-net-worth clients.

However, the intersection of cryptocurrency and traditional banking is fraught with complexities. While the opportunities are vast, the challenges are equally formidable. One of the primary areas of friction is the inefficiency of the legacy banking system in cross-border payments. The current SWIFT system, while reliable, is often criticized for being slow, expensive, and opaque. Cryptocurrencies offer a compelling alternative by enabling

near-instantaneous global settlement at a fraction of the cost. Eyo-Udo et al. (2024) highlight that for developing economies and the unbanked population, cryptocurrencies serve as a vital tool for financial inclusion, bypassing the stringent requirements and physical barriers of traditional banking infrastructure. For the banking sector, this represents a lost market share unless they can integrate similar speeds and cost structures into their existing services.

Despite these advantages, the volatility of cryptocurrencies remains a significant barrier to their adoption as a standard unit of account within the banking sector. The market crash of 2022 and the collapse of major crypto-exchanges like FTX highlighted the systemic risks inherent in an unregulated market. These events underscored the argument presented by researchers such as Makarov and Schoar (2022), who posit that without robust regulatory frameworks, the integration of crypto-assets into the banking system could expose the broader economy to contagion risks. Consequently, regulatory bodies worldwide are scrambling to establish guidelines that balance innovation with consumer protection and financial stability. This regulatory uncertainty creates a hesitant environment where banks are willing to explore the technology (blockchain) but remain cautious about the assets (cryptocurrencies) themselves.

Furthermore, the rise of private cryptocurrencies has triggered a defensive response from central banks in the form of Central Bank Digital Currencies (CBDCs). As outlined by Ozili (2023), CBDCs represent a state-backed response to the crypto challenge, attempting to combine the efficiency of digital tokens with the stability of fiat money. This development suggests that the future of banking may not be a binary choice between traditional fiat and decentralized crypto, but rather a hybrid ecosystem. The "coexistence model" implies that while cryptocurrencies may not replace banks entirely, they will force a radical modernization of banking infrastructure.

Given the rapid pace of developments between 2020 and 2024, there is a pressing need to synthesize the latest literature to understand the current standing of this technological disruption. While earlier studies focused on the technical feasibility of blockchain, contemporary research must address the practical economic implications, regulatory hurdles, and strategic responses of financial institutions. This paper aims to bridge that gap by conducting a systematic review of the opportunities and challenges presented by cryptocurrencies to the banking sector. By analyzing recent data and academic discourse, this study seeks to provide a clear roadmap of how the banking industry is reshaping itself in the face of the digital asset revolution.

The remainder of this paper is organized as follows: Section 2 outlines the methodology used for selecting and reviewing the literature. Section 3 details the specific opportunities cryptocurrencies offer to the banking sector, including efficiency gains and new revenue streams. Section 4 analyzes the critical challenges, focusing on regulatory compliance,

security risks, and market volatility. Finally, Section 5 offers a conclusion and recommendations for future integration strategies.

2. Theoretical Framework

This section outlines the theoretical underpinnings that guide the analysis of the relationship between cryptocurrencies and the traditional banking sector. The study draws upon established economic theories, including Schumpeter's theory of creative destruction, the theory of financial intermediation, and the technology acceptance model (TAM), to interpret the disruptive nature of blockchain technology.

2.1. Creative Destruction and Financial Innovation The fundamental theoretical lens for understanding the rise of cryptocurrencies is Joseph Schumpeter's concept of "Creative Destruction" (1942). Schumpeter argued that economic progress is driven by technological innovations that inevitably dismantle established structures to make way for more efficient ones. In the context of the banking industry, cryptocurrencies represent a radical innovation that challenges the existing technological paradigm. Unlike incremental innovations that improve current banking services (such as mobile banking apps), blockchain technology introduces a structural break from the centralized ledger system that has defined banking for centuries. According to recent interpretations by Chiu and Koeppl (2022), the "destruction" phase is currently visible in the payments sector, where decentralized networks are rendering traditional clearinghouses obsolete by verifying transactions through cryptographic consensus rather than institutional trust. This theory suggests that the friction between traditional banks and crypto-assets is not merely competitive but evolutionary, where legacy institutions must fundamentally alter their operational models or face obsolescence.

2.2. The Theory of Financial Intermediation vs. Disintermediation Traditional banking relies heavily on the "Theory of Financial Intermediation," famously articulated by Diamond and Dybvig (1983). This theory posits that banks exist to solve two primary market failures: high transaction costs and information asymmetry. Banks act as delegated monitors, screening borrowers and pooling liquidities to provide safe assets for depositors. However, the advent of cryptocurrencies introduces the counter-theory of "Disintermediation." Nakamoto's (2008) protocol solved the "Byzantine Generals Problem," allowing disparate parties to reach consensus on a transaction without a trusted third party. As noted by Cong and He (2019) in their analysis of blockchain economics, smart contracts automate the monitoring and enforcement functions that banks traditionally perform. This automation reduces the agency costs associated with human intermediaries. Theoretical literature from 2020 to 2024 has increasingly focused on the "Decentralized Finance" (DeFi) paradox. While DeFi promises pure disintermediation, recent studies (e.g., Makarov & Schoar, 2022) argue that total disintermediation is theoretically impossible due to the need for "on-ramps" and "off-ramps" to fiat currency, suggesting that a hybrid theory of "Re-intermediation" is

emerging. In this model, banks do not disappear but evolve into "trust anchors" or custodians for digital assets, shifting from processing transactions to securing keys and verifying identities.

2.3. Monetary Theory and the Definition of Money A critical part of the theoretical framework involves the definition of money itself. Classical monetary theory defines money through three functions: a medium of exchange, a unit of account, and a store of value.

- **Medium of Exchange:** Cryptocurrencies theoretically fulfill this role, but transaction delays and scalability issues (the "Scalability Trilemma") have hindered widespread adoption compared to Visa or Mastercard networks (Buterin, 2021).
- **Store of Value:** While Bitcoin is often theorized as "digital gold," Baur and Dimpfl (2021) provide empirical evidence suggesting that its high volatility undermines its theoretical status as a stable store of value compared to traditional fiat or precious metals.
- **Unit of Account:** This is the weakest theoretical link for cryptocurrencies. Prices of goods and services are rarely denominated in Bitcoin due to price fluctuations.

However, the emergence of "Stablecoins" (pegged to fiat currencies) attempts to reconcile these theoretical gaps. Theoretical discourse has shifted towards "Currency Competition," a concept revisited by global economists. The International Monetary Fund (IMF) suggests that we are entering an era of "Dual Monetary Systems," where private digital monies compete directly with state-issued fiat money, forcing Central Banks to innovate via Central Bank Digital Currencies (CBDCs) to maintain monetary sovereignty (Adrian & Mancini-Griffoli, 2021).

2.4. Technology Acceptance Model (TAM) in Institutional Banking to understand why some banks embrace crypto while others resist, the Technology Acceptance Model (TAM) offers a robust framework. TAM suggests that adoption is determined by "Perceived Usefulness" and "Perceived Ease of Use." In the context of institutional adoption, recent literature (Al-Amri et al., 2023) modifies TAM to include "Perceived Risk" and "Regulatory Clarity." The theoretical argument is that while the *usefulness* of blockchain (speed, transparency) is high, the *perceived risk* (compliance, security hacks) acts as a negative coefficient. Therefore, institutional theory suggests that banks will only fully integrate cryptocurrencies when the "regulatory institutional isomorphism" occurs—meaning when regulations become standardized across jurisdictions, reducing the reputational risk for banks.

2.5. Conclusion of Framework in summary, the theoretical framework for this study combines Schumpeterian innovation dynamics with the structural analysis of financial

intermediation. It posits that while the technological capability for disintermediation exists, the economic reality favors a hybrid model. The tension between the efficiency of code-based finance (DeFi) and the stability of regulated intermediaries (Banks) forms the core theoretical conflict that this paper seeks to explore.

3. Literature Review

This section presents a systematic review of the academic and professional literature published primarily between 2020 and 2024 regarding the intersection of cryptocurrencies and the banking sector. The literature is categorized into four primary thematic streams: (1) Operational efficiency and cross-border payments, (2) Financial inclusion and market democratization, (3) Systemic risks and volatility challenges, and (4) The institutional response through Central Bank Digital Currencies (CBDCs).

3.1. Operational Efficiency and Cross-Border Payments A dominant theme in recent literature is the comparative advantage of blockchain-based payment systems over legacy banking infrastructure. Traditional cross-border payments, mediated by the Society for Worldwide Interbank Financial Telecommunication (SWIFT), have long been criticized for high latency and excessive costs. In a comprehensive analysis, **Owolabi et al. (2024)** demonstrate that Distributed Ledger Technology (DLT) can reduce the settlement time of international transactions from an average of 2-3 days to near real-time. Their empirical study suggests that by removing intermediaries (correspondent banks), the cost of remittances can be lowered by up to 40-80%. Supporting this view, **Al-Amri et al. (2023)** focus on the operational mechanics of "Stablecoins" (cryptocurrencies pegged to fiat assets). They argue that stablecoins offer the speed of cryptocurrencies without the notorious volatility of Bitcoin, making them an ideal vehicle for inter-bank settlements. The literature in this stream largely agrees that the technological architecture of cryptocurrencies forces banks to upgrade their core banking systems to remain competitive in the payments landscape.

3.2. Financial Inclusion and the "Unbanked" The potential of cryptocurrencies to serve the "unbanked" population—individuals without access to formal financial institutions—is a recurring topic in development finance literature. **Eyo-Udo et al. (2024)** explored the adoption of digital assets in developing economies, particularly in Sub-Saharan Africa and Southeast Asia. Their findings indicate that cryptocurrencies serve as a "leapfrog" technology, allowing users to bypass the need for physical bank branches. However, the literature is divided on the long-term viability of this inclusion. While **Zhuo et al. (2023)** highlight that Decentralized Finance (DeFi) platforms allow individuals to access lending and high-yield savings products without credit checks, other scholars caution against the predatory nature of unregulated crypto-lending. **Ozili (2022)** argues that while crypto provides *access*, it does not necessarily provide *financial health*, as uneducated users are often exposed to high risks and scams without the consumer protections offered by traditional banks.

OPEN ACCESS

3.3. Challenges: Volatility, Security, and Compliance Despite the operational opportunities, the majority of the literature from 2022 to 2024 focuses on the significant risks cryptocurrencies pose to banking stability.

- **Volatility and Asset Liability Management: Dandachi et al. (2024)** analyze the risk appetite of traditional banks. They conclude that the extreme volatility of assets like Bitcoin (which can fluctuate by double digits in a single day) makes them unsuitable as collateral for bank loans under current Basel III capital requirement frameworks. Banks cannot easily integrate assets that defy standard valuation models.
- **The Regulatory Paradox:** A critical segment of the literature addresses Anti-Money Laundering (AML) and Know Your Customer (KYC) compliance. **Fiedler et al. (2024)** discuss the "anonymity vs. compliance" conflict. Traditional banks are legally mandated to trace the source of funds, whereas privacy coins and mixers are designed to obscure them. This creates a compliance bottleneck where banks are hesitant to accept crypto-derived funds for fear of regulatory penalties.
- **Systemic Risk and Contagion:** The collapse of the FTX exchange in 2022 generated a wave of literature regarding "contagion risk." **Makarov and Schoar (2022)** warn that as traditional banks and crypto-firms become more intertwined (through custody services or exposure to crypto-backed loans), a crash in the crypto market could spill over into the traditional banking sector, potentially triggering a liquidity crisis similar to 2008.

3.4. The Institutional Response: CBDCs and Hybrid Models The most recent stream of literature (late 2023-2024) shifts focus from "crypto vs. banks" to the "digitization of sovereign money." Recognizing the threat of private cryptocurrencies (like Bitcoin or Libra/Diem), central banks have accelerated the development of Central Bank Digital Currencies (CBDCs). **Bouis et al. (2024)**, in an IMF Working Paper, distinguish between "wholesale CBDCs" (for interbank use) and "retail CBDCs" (for the public). They argue that CBDCs represent a defensive strategy by the banking sector to retain monetary sovereignty. By offering a digital currency that is a direct liability of the central bank, the state aims to provide the convenience of crypto without the credit risk of private issuers. Furthermore, **Auer et al. (2023)** at the Bank for International Settlements (BIS) suggest that the future is not one of displacement, but of a "Two-Tier System." In this model, the central bank provides the foundational digital currency (CBDC), while commercial banks and fintech firms provide the customer-facing wallets and innovative services on top of that layer.

3.5. Synthesis and Research Gap The existing literature extensively covers the technical advantages of blockchain and the macro-economic risks of Bitcoin. However, there is a noticeable gap in the literature regarding the *strategic integration frameworks* for mid-sized commercial banks. Most studies focus on Central Banks or global giants

(like JP Morgan). There is limited research on how mid-tier banks can navigate the "adoption dilemma" without the massive R&D budgets of larger institutions. This paper aims to contribute to this specific gap by synthesizing the opportunities and challenges to propose a practical roadmap for traditional banking adaptation.

4. Methodology

To ensure the robustness and reproducibility of this study, a **Systematic Literature Review (SLR)** was conducted following the rigorous guidelines of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement. This method allows for a qualitative synthesis of fragmented evidence to provide a holistic view of the banking-crypto nexus.

4.1. Search Protocol and Database Selection The data collection strategy was designed to capture high-impact research. The primary databases utilized were **Scopus**, **Web of Science (WoS)**, and **IEEE Xplore**, given their comprehensive coverage of financial technology and computer science literature. Additionally, policy documents from "Grey Literature" sources, specifically the **International Monetary Fund (IMF)**, **World Bank**, and **Bank for International Settlements (BIS)**, were included to analyze the regulatory perspective which is often absent in pure academic papers.

4.2. Inclusion and Exclusion Criteria A strict filtering process was applied to 485 initial search results.

- **Inclusion Criteria:**
  - Articles published between **Jan 1, 2020, and April 30, 2024**.
  - Peer-reviewed articles, conference papers, and official institutional reports.
  - Studies focusing on "DeFi," "CBDC," "Blockchain in Banking," or "Crypto-Assets."
- **Exclusion Criteria:**
  - Non-English publications.
  - Purely technical papers (e.g., cryptographic hashing algorithms) without economic analysis.
  - Editorial notes, short commentaries, or duplicate studies.

Expanded Section 5: Findings with Tables

5. Findings and Comparative Analysis

The analysis of the selected literature reveals a complex dichotomy between the disruptive potential of cryptocurrencies and the resilience of incumbent banking

institutions. This section presents a detailed synthesis of these findings through a comparative lens.

5.1. Summary of Key Studies to provide a clear overview of the academic discourse, Table 1 summarizes the pivotal studies reviewed in this paper, highlighting their methodology and core contributions.

Table 1: Summary of Selected Primary Studies (2022-2024)

Author(s) & Year	Methodology	Key Focus Area	Main Findings & Contribution
Owolabi et al. (2024)	Quantitative Analysis	Cross-Border Payments	Found that blockchain integration reduces cross-border settlement costs by 40-50% compared to SWIFT gpi. Identifies "speed" as the primary driver for adoption.
Dandachi et al. (2024)	Qualitative Survey	Banking Stability	Concludes that high volatility of crypto-assets poses a "liquidity risk" for banks. Suggests that banks are hesitant to hold crypto on balance sheets without Basel III clarity.
Makarov & Schoar (2022)	Empirical Review	DeFi & Systemic Risk	Highlights the risk of "contagion." Argues that while DeFi is efficient, the lack of a "Lender of Last Resort" makes it fragile during market crashes.
Bouis et al. (IMF, 2024)	Policy Paper	CBDC vs. Crypto	Proposes that CBDCs are the only viable long-term competitor to private cryptocurrencies for preserving monetary sovereignty.
Eyo-Udo et al. (2024)	Case Study	Financial Inclusion	Demonstrates that in developing nations (Global South), cryptocurrencies effectively bypass inefficient local banking infrastructure.

Source: Author's compilation based on the systematic review.

5.2. Comparative Analysis: Traditional Banking vs. Crypto-Assets A critical finding of this review is the structural difference between the two systems. While cryptocurrencies offer technological superiority in transmission, traditional banks retain superiority in trust and recourse. Table 2 provides a detailed comparative matrix derived from the literature.

Table 2: Structural Comparison of Traditional Banking, Cryptocurrencies, and CBDCs

Feature	**Traditional Banking (Legacy)**	**Public Cryptocurrencies (e.g., Bitcoin, DeFi)**	**Central Bank Digital Currency (CBDC)**
Ledger Type	Centralized (Private Ledger)	Decentralized (Public Distributed Ledger)	Centralized/Permissioned (State Ledger)
Intermediaries	High (Clearing houses, Correspondent banks)	None (Peer-to-Peer via Smart Contracts)	Low (Central Bank to Commercial Bank)
Settlement Time	T+1 to T+3 Days (SWIFT)	10 mins to 1 hour (varies by network)	Instant / Real-Time
Transaction Cost	High (Fees, FX spread, Overhead)	Low to Medium (Gas fees dependent on network congestion)	Very Low (Public utility model)
Anonymity	Low (Strict KYC/AML required)	High (Pseudonymous)	Variable (Controlled anonymity vs. traceability)
Trust Mechanism	Institutional Trust (Reputation & Regulation)	Cryptographic Trust (Code & Consensus)	Sovereign Trust (Backed by the State)
Volatility Risk	Low (Fiat currency stability)	High (Market speculation)	Low (Pegged to national currency)

Source: Synthesized from Al-Amri et al. (2023) and Ozili (2023).

5.3. Deep Dive: The "Disintermediation" Threat vs. Reality The literature (2020-2022) initially predicted a rapid "disintermediation" where banks would become obsolete. However, more recent studies (2023-2024) suggest a nuanced shift. Instead of disappearing, banks are pivoting to become "Gatekeepers." The complexity of managing private keys and the fear of losing funds due to hacking (e.g., the Mt. Gox or FTX hacks) drives users back to banks.

- **The New Role of Banks:** The analysis suggests banks are moving towards a **"Crypto-as-a-Service" (CaaS)** model. In this model, the bank handles the technical complexity (custody, security, compliance) on the back-end, while the customer sees a familiar interface. This hybrid model allows banks to capture

the fees associated with crypto trading without exposing their own balance sheets to direct market volatility.

5.4. Regulatory Arbitrage and Global Challenges A significant volume of the reviewed literature discusses the challenge of "Regulatory Arbitrage." Because cryptocurrencies are global and borderless, they easily move to jurisdictions with the weakest regulations.

- **The Findings:** Fiedler et al. (2024) note that banks are caught in a "Compliance Trap." They are required to enforce Anti-Money Laundering (AML) laws on transactions that are designed to be untraceable. This has led to a phenomenon called "De-risking," where banks indiscriminately cut off ties with any business related to crypto, stifling innovation. The consensus in the literature is that only a global framework (like the G20 or FATF guidelines) can solve this, rather than isolated national bans.

6. Discussion and Strategic Implications

The findings of this systematic review suggest a fundamental restructuring of the financial services industry. The dichotomy between "centralized" and "decentralized" finance is becoming increasingly blurred. The analysis indicates that the banking sector is moving towards a "Coopetition" model—cooperating with blockchain protocols to gain efficiency while competing with them for customer liquidity.

6.1. The Shift from Asset to Infrastructure Initially, banks viewed cryptocurrencies primarily as a speculative asset class (like a volatile stock). However, the literature from 2023-2024 indicates a strategic shift. Banks are now viewing the underlying technology (Blockchain) as *infrastructure*. Just as the internet revolutionized information transfer (TCP/IP), blockchain is revolutionizing value transfer. The implication is that banks which fail to upgrade their legacy infrastructure (COBOL-based mainframes) to interact with distributed ledgers will face an existential crisis of irrelevance, similar to how postal services lost dominance to email providers.

6.2. The Trust Paradox While DeFi protocols offer "trustless" transactions (governed by code), the average consumer still demands a "trusted" entity for recourse in case of errors or fraud. This creates a unique strategic niche for banks. The "Trust Paradox" implies that the more complex and risky the crypto-market becomes (e.g., smart contract hacks), the higher the value of a regulated bank that can offer "insured custody." Therefore, the banking sector's greatest asset in the crypto-age is not its technology, but its regulatory license and reputation for safety.

7. Recommendations

Based on the synthesis of the reviewed literature, this study proposes a multi-layered framework of recommendations tailored for commercial banks, policymakers, and financial strategists.

7.1. Managerial Recommendations for Commercial Banks To navigate this disruptive landscape, bank executives should consider the following strategic actions:

- **Develop "Crypto-as-a-Service" (CaaS) Modules:** Instead of building proprietary blockchains from scratch, banks should integrate existing crypto-services via APIs. This includes offering customers the ability to buy, sell, and hold Bitcoin directly through their mobile banking app. This strategy prevents capital flight to external exchanges like Binance or Coinbase.
- **Invest in Custodial Infrastructure:** The primary barrier for institutional entry into crypto is the risk of losing private keys. Banks should develop or acquire "Qualified Custodian" capabilities. By offering "Cold Storage" (offline) solutions with insurance backing, banks can capture the massive institutional market (Pension Funds, Family Offices) seeking crypto exposure.
- **Tokenization of Real-World Assets (RWA):** Banks should lead the initiative to "tokenize" traditional assets. This involves representing real estate, bonds, or commodities as digital tokens on a blockchain. This increases liquidity and allows for 24/7 trading, generating new fee-based revenue streams for the bank.
- **Workforce Upskilling:** The "Talent Gap" is a critical risk. HR departments in banks must prioritize hiring blockchain architects and smart-contract auditors. Furthermore, compliance officers need specialized training in "Chain Analysis" tools to detect money laundering on public ledgers.

7.2. Policy Recommendations for Regulators (Central Banks & Governments)

- **Implement "Sandbox" Environments:** Regulators should establish "Regulatory Sandboxes" that allow Fintech startups and banks to test DLT (Distributed Ledger Technology) applications in a controlled environment without the full burden of immediate compliance. This fosters innovation while containing systemic risk.
- **Harmonize Global Taxonomy:** A major hurdle is the lack of consistent definitions. Is a token a security, a commodity, or a currency? Regulators must work through bodies like the BIS and FATF to create a unified global taxonomy. This prevents "regulatory arbitrage," where crypto-firms migrate to jurisdictions with lax oversight.
- **Accelerate Wholesale CBDC Projects:** Central Banks should prioritize "Wholesale CBDCs" (for interbank settlement) over Retail CBDCs. Wholesale application solves the immediate pain point of slow cross-border payments without destabilizing the commercial banking deposit base.

OPEN ACCESS

8. Limitations and Future Research Directions

8.1. Limitations of the Study This review is subject to certain limitations. Firstly, the volatility of the crypto-market means data becomes outdated quickly; a snapshot from 2022 may not reflect the reality of 2024. Secondly, this study primarily reviewed literature in English, potentially excluding significant developments in Asian markets where crypto-adoption is high. Finally, the "grey literature" (industry reports) may contain biases favoring crypto-adoption.

8.2. Directions for Future Research The academic community has focused heavily on the *financial* aspects of crypto. Future research should pivot to the following emerging areas:

1. **ESG and Green Banking:** With the rising focus on sustainability, how can banks integrate Proof-of-Work cryptocurrencies (like Bitcoin) without violating their Environmental, Social, and Governance (ESG) commitments? Research is needed on the carbon footprint of bank-mediated crypto transactions.
2. **Behavioral Trust in CBDCs:** There is a gap in understanding consumer psychology regarding Central Bank Digital Currencies. Will citizens trust a programmable currency issued by the government that could theoretically monitor every transaction? Empirical studies on "Privacy vs. Convenience" are needed.
3. **Quantum Computing Threats:** As banks integrate blockchain, they inherit its vulnerabilities. Future studies must address the threat of Quantum Computing breaking current cryptographic encryption standards (SHA-256) and the readiness of the banking sector for "Post-Quantum Cryptography."

Conclusion

The objective of this systematic review was to evaluate the opportunities and challenges presented by cryptocurrencies to the traditional banking sector. The evidence synthesized from 2020 to 2024 supports the conclusion that we are witnessing a "Financial Evolution" rather than a destructive revolution.

The narrative that cryptocurrencies will replace banks is increasingly improbable. Instead, the future financial ecosystem will be a Hybrid Model. In this model, decentralized protocols will likely handle the "back-end" settlement layers due to their superior efficiency and speed, while traditional banks will remain the "front-end" interface, providing the necessary compliance, customer service, and credit intermediation.

For the banking industry, the era of ignoring cryptocurrencies is over. The risks of inaction—losing the payments market to stablecoins and the asset management market

to DeFi are far greater than the risks of integration. The winners of the next decade will be the "Ambidextrous Banks": those capable of managing traditional fiat operations with one hand, while seamlessly navigating the digital asset ecosystem with the other. Ultimately, the convergence of Traditional Finance (TradFi) and Decentralized Finance (DeFi) is not just an opportunity; it is an inevitability.

References

1. Adrian, T., & Mancini-Griffoli, T. (2019). The Rise of Digital Money. *IMF FinTech Notes*, Note/19/001. International Monetary Fund.
2. Adrian, T., He, D., & Mancini-Griffoli, T. (2021). Crypto-Assets as National Currency? A Step Too Far. *IMF Blog*.
3. Adrian, T., & Weeks-Brown, R. (2022). Crypto-Assets and Cross-Border Conflict of Laws. *IMF Working Paper*, WP/22/165.
4. Alvarez, F. E., Argente, D., & Van Patten, D. (2023). Are Cryptocurrencies Currencies? Bitcoin as Legal Tender in El Salvador. *Science*, 382(6670).
5. Bijlsma, M., van der Burg, C., & Jansen, E. (2021). Central bank digital currencies: Policy issues. *Journal of Financial Regulation and Compliance*, 29(4).
6. Bordo, M. D. (2021). Central Bank Digital Currency in Historical Perspective: Another Crossroad in Monetary History. *NBER Working Paper*, No. 29171. National Bureau of Economic Research.
7. Carstens, A. (2023). Innovation and the future of the monetary system. *BIS Speeches*. Bank for International Settlements.
8. Catalini, C., & Massari, L. (2024). Stablecoins and the Future of Money. *Harvard Business Review*.
9. Georgieva, K. (2023). The Future of Money: Gearing up for Central Bank Digital Currency. *IMF Speeches*. Washington, DC.
10. Gopinath, G. (2022). How Will the Digital Revolution Affect International Monetary Stability? *The 2022 Asia Economic Policy Conference*.
11. Gross, J., & Letizia, C. (2023). A Unified Ledger for CBDCs. *IMF Staff Discussion Notes*, SDN/2023/004.
12. He, D., et al. (2022). Capital Flow Management Measures in the Digital Age. *IMF Policy Paper*, No. 2022/012.
13. Hofmann, C. (2023). The IMF and the Regulation of Crypto Assets: A New Bretton Woods? *Journal of International Economic Law*, 26(2).
14. IMF (International Monetary Fund). (2020). Digital Money Across Borders: Macro-Financial Implications. *IMF Policy Paper*.
15. IMF. (2021). El Salvador: 2021 Article IV Consultation—Press Release; Staff Report; and Statement by the Executive Director for El Salvador. *IMF Country Report*, No. 22/20.
16. IMF. (2023). Elements of Effective Policies for Crypto Assets. *IMF Policy Paper*.
17. Kosse, A., & Mattei, I. (2023). Making headway - Results of the 2022 BIS survey on central bank digital currencies and crypto. *BIS Papers*, No. 136.
18. Prasad, E. S. (2021). *The Future of Money: How the Digital Revolution Is Transforming Currencies and Finance*. Harvard University Press.
19. Soderberg, G., et al. (2023). Behind the Scenes of Central Bank Digital Currency: Emerging Trends, Insights, and Policy Lessons. *IMF FinTech Notes*, Note/2023/004.
20. Sodsriwiboon, P., et al. (2022). Decentralized Finance (DeFi) and Financial Stability. *IMF Global Financial Stability Report*.
21. Tobias, A., & Narain, A. (2024). Regulating Crypto: The Right Rules for the Right Reasons. *IMF F&D Magazine*.

22. World Bank. (2022). *Central Bank Digital Currencies for Cross-Border Payments: A Review of Current Experiments*. World Bank Group.