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BLOCKCHAIN IN THE INDIAN FINANCIAL SECTOR: LEGAL CHALLENGES, REGULATORY GAPS, AND OPPORTUNITIES FOR INNOVATION

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Abstract

Blockchain technology has emerged as a transformative innovation in the financial sector, enabling decentralized, secure, and transparent transaction systems. In India, its application within banking and financial services presents significant opportunities for cost savings, efficiency, and financial inclusion. However, the decentralized nature of blockchain raises complex legal and regulatory challenges. Current Indian laws—including the Reserve Bank of India Act, 1934, the Banking Regulation Act, 1949, the Payment and Settlement Systems Act, 2007, and the Information Technology Act, 2000—do not yet provide a comprehensive legal framework for blockchain adoption. Issues surrounding scalability, cybersecurity, anti-money laundering compliance, and cross-border regulation further complicate blockchain's integration into existing financial systems. This paper explores the definition, features, and working mechanisms of blockchain, examines its financial applications and legal implications, and evaluates the regulatory challenges and opportunities it presents. The study underscores the urgent need for a unified and adaptive legal framework to ensure blockchain's alignment with India's financial regulatory architecture while harnessing its full potential.

INTRODUCTION

Blockchain technology is a decentralized and tamper-proof ledger system intended to safely record transactions on a distributed network. It does away with the intermediaries, facilitating peer-to-peer transactions with greater transparency and security. The building blocks of blockchain are cryptographic methods, consensus protocols, and distributed ledger technology, and hence it is a revolutionary technology in the financial industry.²⁴⁴ The use of blockchain in banks and financial institutions has attracted regulatory interest, calling for a legal framework that is consistent with current banking legislation, data protection laws, and financial security requirements. India's

regulatory environment under the Reserve Bank of India Act, 1934, Banking Regulation Act, 1949, and the Payment and Settlement Systems Act, 2007 has not fully developed a framework of law covering blockchain use in banking. Blockchain's ongoing expansion beyond cryptocurrency poses regulatory issues in terms of security, data protection, anti-money laundering, and compatibility with existing banking systems.²⁴⁵

DEFINITION, FEATURES, AND WORKING MECHANISM OF BLOCKCHAIN

Blockchain has been described as a distributed digital book that records transactions sequentially and irreversibly. Every entry, or

²⁴⁴ “What is Blockchain? - Blockchain Technology Explained - AWS,” Amazon Web Services, Inc. available at: <https://aws.amazon.com/what-is/blockchain/> (last visited March 30, 2025).

²⁴⁵ Manavi Jain, Anup Kumar and Arjun Khurana, “Fintech Laws and Regulations INdia 2024-2025” International Comparative Legal Guides International Business Reports, 11 July 2024.

"block," is connected to the next, creating an uninterrupted "chain" protected by cryptographic hashing. The system functions on a network with a number of participants (nodes), which authenticate transactions using consensus protocols. In contrast to traditional centralized books maintained by financial institutions, block chain offers a trustless system, removing the necessity for third-party authentication.

Immutability is a fundamental feature of blockchain technology that ensures a transaction cannot be altered or removed once it has been committed. Section 17 of the Information Technology Act of 2000, which addresses the legal enforceability of electronic records, makes this particularly relevant. Additionally, blockchain transactions' transparency and auditability enhance compliance with the Prevention of Money Laundering Act, 2002 (PMLA), which requires financial institutions to maintain transparent transaction records in order to implement anti-money laundering laws. Decentralisation reduces the danger of fraud and cyberattacks by preventing any one authority from controlling the network. However, as financial institutions must adhere to strict compliance standards set forth in the Securities and Exchange Board of India Act of 1992 and the Reserve Bank of India Act of 1934, decentralisation also raises regulatory concerns.²⁴⁶

BLOCKCHAIN APPLICATIONS IN THE FINANCIAL SECTOR

Blockchain technology has transformed the financial industry by providing a decentralized, transparent, and secure platform for transactions. Centralized institutions like banks and clearinghouses are used in conventional financial systems, which results in inefficiencies, costliness, and regulatory issues. Blockchain

offers a choice by facilitating peer-to-peer financial transactions, automatic contract enforcement, and digital asset management, coupled with ensuring financial regulation compliance. The Reserve Bank of India Act of 1934, the Banking Regulation Act of 1949, the Payment and Settlement Systems Act of 2007, and the Foreign Exchange Management Act of 1999 (FEMA) are among the key pieces of legislation that support the development of the Indian legal framework pertaining to the use of block chain. Additionally, financial institutions that use block chain technology place a high premium on compliance with the Information Technology Act of 2000 and the Prevention of Money Laundering Act of 2002 (PMLA). The most important applications of block chain technology in the financial industry, together with their legal ramifications, are examined in the sections that follow.

CHALLENGES AND OPPORTUNITIES FOR BLOCKCHAIN IN FINANCIAL INSTITUTIONS

The adoption of blockchain technology by financial institutions offers challenging prospects as well as promising possibilities. While blockchain provides a decentralized, open, and secure way of making financial transactions, its implementation in conventional banking and financial services means overcoming legal, regulatory, and technical hurdles. The banking sector is regulated by a detailed body of legislation, consisting of the Banking Regulation Act, 1949, the Reserve Bank of India Act, 1934, the Payment and Settlement Systems Act, 2007, and the Prevention of Money Laundering Act, 2002 (PMLA). These legislations place very high compliance thresholds that need to be met prior to the broad implementation of blockchain. Moreover, financial institutions need to take into account scalability issues, cybersecurity threats, interoperability, and regulatory risks while tapping into the efficiency, transparency, and cost-saving potential of blockchain. A clear legal framework is required to ensure that blockchain technology supports financial

²⁴⁶ Eugenia Politou et al., "Blockchain Mutability: Challenges and Proposed Solutions" IEEE (Institute of Electrical and Electronics Engineers), 2019 available at: https://www.researchgate.net/publication/336822518_Blockchain_Mutability_Challenges_and_Proposed_Solutions (last visited March 30, 2025).

services while being in line with current financial and banking legislation.²⁴⁷

SCALABILITY, SECURITY, AND REGULATORY HURDLES

One of the main issues for financial institutions in implementing blockchain technology is scalability. Blockchain networks, particularly public blockchains, are characterized by slow transaction processing times and high computational needs. Compare this with traditional centralized banking systems that process transactions in milliseconds, and the performance constraints of blockchain become a major issue for large-scale banking operations. Efficient and secure processing of financial transactions is a requirement of the Payment and Settlement Systems Act, 2007, which governs electronic payments in India. Blockchain-based payment systems may not be used unless they are as quick and effective as existing electronic fund transfer systems like RTGS (Real-Time Gross Settlement) and NEFT (National Electronic Funds Transfer).²⁴⁸

Another significant challenge is security threats related to the implementation of blockchain. Blockchain technology itself is secure because of its cryptographic nature, but there are potential vulnerabilities in smart contracts, private keys, and consensus protocols. Cybersecurity threats like hacking of digital wallets, improper access to private keys, and tampering with smart contracts threaten financial institutions. The Information Technology Act, 2000, that regulates cybersecurity and data protection in India is responsible for ensuring that blockchain systems adhere to data security standards and encryption requirements. The lack of explicit legal provisions dealing with blockchain security risks, however, leads to regulatory uncertainty.

²⁴⁷ Jeevesh Sharma, "Blockchain Technology Adoption in Financial Services: Opportunities and Challenges" unknown, 2023 available at: https://www.researchgate.net/publication/372541461_Blockchain_Technology_Adoption_in_Financial_Services_Opportunities_and_Challenges (last visited March 30, 2025).

²⁴⁸ "A review of Blockchain Technology applications for financial services," 2 BenchCouncil Transactions on Benchmarks, Standards and Evaluations.

One of the biggest barriers to blockchain implementation in banks and other financial institutions is regulatory barriers. The Reserve Bank of India (RBI) has periodically released circulars and instructions pertaining to digital financial transactions, demonstrating a cautious attitude to blockchain and cryptocurrency legislation. The Foreign Exchange Management Act, 1999 (FEMA) governs cross-border financial transactions, hence blockchain-enabled cross-border payments and remittances must adhere to strict compliance guidelines. Additionally, financial institutions are required to comply with anti-money laundering (AML) regulations under the Prevention of Money Laundering Act, 2002 (PMLA), which requires them to maintain thorough records of financial transactions and identify clients through Know Your Customer (KYC) processes. AML and KYC compliance are crucial regulatory requirements because blockchain networks rely on anonymous or pseudonymous transaction mechanisms hurdle.

Furthermore, regulatory bodies such as the Securities and Exchange Board of India (SEBI) oversee the securities market, ensuring compliance with the Securities Contracts (Regulation) Act, 1956. Blockchain-based securities trading and tokenization of financial assets must adhere to SEBI's regulatory framework, including rules related to investor protection, market integrity, and financial disclosures. The lack of specific laws governing blockchain-based asset tokenization creates uncertainties for banks and financial institutions seeking to adopt blockchain for securities trading.

Another legal complexity arises from cross-border blockchain transactions, which must comply with multiple jurisdictional regulations. Blockchain's decentralized nature means that transactions can involve multiple legal systems, making enforcement and compliance challenging. Financial institutions must navigate differing legal definitions of digital assets, smart contracts, and decentralized finance

(DeFi) platforms in various jurisdictions. The Financial Action Task Force (FATF) has published guidelines that mandate financial institutions to adopt AML and counter-terrorism financing (CFT) for blockchain transactions, but national laws are very different. Legal clarity in India is lacking in order to bring blockchain adoption in line with global AML standards of compliance.

OPPORTUNITIES FOR EFFICIENCY, TRANSPARENCY, AND COST SAVINGS

In spite of the issues, blockchain presents high potential for increasing efficiency, transparency, and cost savings in financial organizations. Blockchain's most revolutionary feature is that it can do away with middlemen in financial transactions, lowering transaction processing costs, reconciliation, and compliance costs. The Banking Regulation Act, 1949, makes it necessary for financial organizations to maintain transaction records, have audits, and adhere to regulatory reporting requirements. Blockchain's unalterable ledger system allows real-time tracking of transactions, lowering the administrative cost and enhancing financial clarity.

Blockchain's capability to execute contracts automatically by using smart contracts has the potential to bring down the cost and time of loan approvals, insurance claims, and trade finance transactions. The Indian Contract Act, 1872 that regulates contractual agreements does not specifically mention smart contracts, but certain provisions dealing with electronic agreements in the Information Technology Act, 2000 have a legal basis for enforcing them. Through the automation of financial contracts, blockchain diminishes the potential for fraud, makes contractual clarity clearer, and augments legal certainty in financial contracts.

Another major benefit of blockchain is enhanced cross-border payment efficiency. Current SWIFT-based cross-border transactions involve clearinghouses and several banks, causing delays, exorbitant fees, and regulatory complications. Cross-border payment systems

on the blockchain offer real-time settlement, reduced cost of transactions, and increased traceability, which ensures Foreign Exchange Management Act, 1999 (FEMA) and the Payment and Settlement Systems Act, 2007 compliance. Blockchain's capability for real-time tracking makes it easier for regulators to monitor foreign exchange transactions, thereby lowering risks from fraud and illegal remittances.²⁴⁹

Blockchain also improves financial inclusion through the provision of banking services to underbanked and unbanked communities. Conventional banking demands physical branch infrastructure and large documentation for account opening, which excludes many people from accessing financial services. Blockchain-based decentralized finance (DeFi) platforms allow peer-to-peer lending, microfinance, and digital identity verification, which assists marginalized communities in accessing financial services without the use of traditional banking institutions. The RBI's financial inclusion initiatives, including Pradhan Mantri Jan Dhan Yojana (PMJDY) and Digital India, align with blockchain's potential to extend financial services to rural and underserved areas. However, regulatory clarity is needed to integrate blockchain-powered DeFi services into India's formal financial system while ensuring compliance with consumer protection laws and anti-fraud measures. Besides, blockchain increases transparency in reporting finances and compliance with regulations. Corporate entities, under the Companies Act, 2013, need to keep correct financial records and adhere to audit rules. Financial reporting systems on blockchain can avail real-time information on finances to regulators and auditors, increasing accountability and lowering the prospect of financial fraud, misreporting, and non-compliance.

²⁴⁹ Jesse Anglen, "Transforming Global Transactions: How Blockchain is Shaping the Future of Cross-Border Payments in 2024?" Rapid Innovation, 6 December 2024.

Case Laws

National:

Shreya Singhal v. Union of India, (2015) 5 SCC 1

Relevance: This case emphasized the protection of freedom of speech and clarified the scope of the Information Technology Act, 2000. It is relevant when considering legal oversight on digital platforms, including blockchain networks.

Trimex International FZE Ltd. v. Vedanta Aluminium Ltd., (2010) 3 SCC 1

Relevance: Recognized the validity of contracts formed via electronic means, laying foundational legal support for smart contracts under the IT Act, 2000.

Anvar P.V. v. P.K. Basheer, (2014) 10 SCC 473

Relevance: Clarified the admissibility of electronic records as evidence under the Indian Evidence Act, supported by Section 65B. Relevant for blockchain's evidentiary value.

Relevant International Case Laws

SEC v. Ripple Labs Inc., No. 1:20-cv-10832 (S.D.N.Y. 2023)

Relevance: U.S. federal court addressed whether Ripple's XRP token was a security. Important for understanding international treatment of digital assets and its implications for Indian regulators like SEBI.

United States v. Coinbase Inc. (Ongoing)

Relevance: Involves regulatory scrutiny over crypto trading platforms and wallet services. Useful for discussing global compliance expectations and FATF guidelines.

R (Bridges) v. Chief Constable of South Wales Police, [2020] EWCA Civ 1058

Relevance: Although about facial recognition, it addresses public interest vs. personal data privacy. Relevant for blockchain's role in identity verification and KYC compliance.

Conclusion

Blockchain technology holds transformative potential for India's financial sector by offering

enhanced transparency, security, cost efficiency, and financial inclusion. Its decentralized nature and immutable ledger system introduce a trustless mechanism that reduces dependency on intermediaries and ensures transaction integrity. However, the integration of blockchain into mainstream banking and financial services faces considerable legal, regulatory, and technical challenges. Existing laws such as the *Reserve Bank of India Act, 1934*, the *Banking Regulation Act, 1949*, the *Information Technology Act, 2000*, and the *Prevention of Money Laundering Act, 2002* provide partial guidance but lack a comprehensive legal framework tailored to the complexities of blockchain systems. Issues of scalability, cybersecurity, AML compliance, and cross-border legal harmonization remain key obstacles. At the same time, opportunities abound in areas such as smart contracts, cross-border payments, real-time auditability, and financial inclusion. For blockchain to realize its full potential in India's financial industry, a clear, forward-looking regulatory and legal framework is essential—one that balances innovation with financial stability, consumer protection, and regulatory compliance.

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