



# FUSION OF AI AND BLOCKCHAIN IN INDIA'S FINANCIAL SECTOR: 2025 CASE STUDIES AND FUTURE OUTLOOK

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## Abstract

Artificial Intelligence (AI) and blockchain are playing a pivotal role in reshaping the landscape of financial services globally. In the Indian context, these technologies are being rapidly adopted to drive improvements in automation, transparency, and operational efficiency particularly in sectors such as payments, regulatory compliance, and decentralized finance (DeFi). This paper provides analysis of significant case studies from 2025. The realtime blockchainbased payment solution developed by Axis Bank and J.P. Morgan, Zeta's Web3integrated banking platform, ONDC's dataintegrated lending framework, and Neurofin's compliance automation framework powered by generative AI. The analysis highlights how the fusion of AI and blockchain is being implemented, the underlying technical models, and their business and regulatory implications. The findings suggest that this integration is not only enabling financial innovation but also laying the groundwork for a smarter, more secure, and inclusive financial infrastructure in India.

**Key words:** Artificial Intelligence (AI), Blockchain, Financial Services in India, Regulatory Compliance, Decentralized Finance (DeFi), Web3 Banking Platforms, ONDC's dataintegrated lending.

## 1. Introduction

India's financial industry is experiencing a significant transformation furlled by advancements in digital infrastructure, supportive regulatory frameworks, and the rise of cutting-edge technologies like Artificial Intelligence (AI) and blockchain. While AI contributes by enhancing automation, improving risk analysis, and enabling fraud prevention and customer personalization, blockchain ensures data integrity through decentralization and transparency. Together, these technologies present a powerful means to improve financial service delivery and operational robustness. By 2025, this integration has moved beyond theory into practice. Numerous Indian banks and fintech companies have begun implementing AI and blockchain in tandem. This paper explores such notable implementations to assess how the convergence of these technologies is redefining the future of financial services in India

## 2. Literature Review

Existing research identifies Artificial Intelligence (AI) as a key enabler of efficiency in financial operations, with prominent use cases including algorithmic trading, automated financial advisory services, and credit risk assessment (Goodfellow et al., 2023). Blockchain technology, introduced through Nakamoto's seminal work in 2008, has fundamentally changed how trust is established in digital financial systems by offering decentralized and tamperproof data recording.

More recent scholarship (Sharma & Patel, 2022) suggests that the integration of AI's analytical and decision-making capabilities with the secure and transparent nature of blockchain has the potential to transform digital financial ecosystems. Despite this growing interest, there remains a gap in empirical studies focusing on how this integration is being practically implemented in India especially within the rapidly evolving, digitally focused environment emerging in the era of 2025.

## 3. Methodology

This study adopts a qualitative case study approach, utilizing data from publicly accessible sources such as news articles, industry reports, and white papers published in 2025. The case studies were selected based

on their technological relevance, degree of innovation, and impact within the Indian financial sector. Each case is analysed across key dimensions:

- The integration of AI and blockchain technologies
- The nature and extent of business innovation
- Compliance with financial regulations

#### **4. Case Studies Overview**

##### **4.1 Axis Bank & J.P. Morgan -Blockchain for RealTime Global Payments**

Axis Bank partnered with J.P. Morgan to implement a realtime USD clearing and settlement system based on blockchain. The solution, hosted within the GIFT City framework, allows businesses to conduct international transactions 24/7 without traditional cutoff constraints. AI components are integrated for fraud detection and liquidity optimization. This solution enables corporate clients to process dollar payments at any time of the day, including on weekends, by utilizing blockchainbased infrastructure. It minimizes transaction delays and supports better liquidity flow across global markets. This development represents a significant step forward for international payments powered by blockchain. By eliminating restrictions tied to traditional banking hours and cutting down on foreign exchange settlement times, the partnership offers faster, more secure, and programmable crossborder transactions. (J.P. Morgan's Onyx DLT + AI/ML surveillance tools) the solution leverages J.P. Morgan's Onyx distributed ledger technology (DLT) in combination with AI and machine learningbased surveillance tools, while fully adhering to Reserve Bank of India (RBI) regulations and operating within the GIFT City regulatory sandbox framework.

##### **4.2 Zeta - Web3 Banking and Regulated DeFi Access**

Zeta launched a Web3compatible banking platform enabling Indian financial institutions to offer decentralized finance (DeFi) services such as staking and yield farming (DeFi)trading. The platform integrates blockchain (e.g., Polygon) for asset handling, and AI for identity verification, credit assessment, and personalized financial recommendations. The platform significantly democratizes access to decentralized financial tools by providing them through a regulated and secure channel. It leverages blockchain technologies such as Ethereum and Polygon to ensure transparency and efficiency, while employing AI-driven solutions for identity verification and customer profiling to enhance user experience and security. Furthermore, the system is fully integrated with India Stack and complies with the Reserve Bank of India's KYC and AML guidelines, ensuring adherence to national regulatory standards.

##### **4.3 Neurofin- Generative AI for Compliance Automation**

Neurofin is a fintech startup offering an AI-driven compliance engine that automates regulatory reporting and customer profiling using generative AI. Blockchain is employed to maintain verifiable, tamperproof logs of AI decisions, thereby enhancing transparency and auditability. Enables financial institutions to scale compliance functions with high accuracy and explainability. This combination not only automates complex regulatory processes but also ensures comprehensive audit trails, enhancing transparency and accountability. Designed with regulatory requirements in mind, the system supports data traceability and facilitates adherence to compliance standards, thereby strengthen the overall governance framework within financial organizations.

##### **4.4 ONDC's Pilot: Financing Framework with Data Integration**

The Open Network for Digital Commerce (ONDC), a governmentsupported initiative, has launched a pilot program that integrates financing solutions directly into the digital commerce ecosystem. By utilizing a comprehensive network of public digital infrastructureincluding Aadhaar, Digi Locker, Account Aggregator, and eSign APIs. ONDC facilitates realtime data sharing to enable rapid credit evaluation and loan disbursement, often within minutes. The integration of AI-powered data analytics with blockchainbased secure data exchange ensures that credit underwriting processes are both transparent and efficient, significantly reducing reliance on traditional paperbased assessments. This initiative highlights the transformative potential of combining AI and blockchain technologies to modernize financing for Micro, Small, and Medium Enterprises (MSMEs)and thereby enhancing financial inclusion and fostering the expansion of India's digital economy. ONDC's embedded finance model serves as a leading example of how layered technologies, aligned with regulatory frameworks, can create scalable and usercentric financial solutions.

#### **6. Discussion**

The case studies examined in this research illustrate how Indian financial institutions and fintech startups are actively exploring the intersection of Artificial Intelligence and blockchain to develop forwardthinking solutions. Axis Bank's adoption of a blockchainbased infrastructure facilitates seamless global transactions, Zeta's platform provides users with regulated access to decentralized finance tools, and Neurofin offers a

scalable framework for automating compliance in heavily regulated financial environments, ONDC's embedded finance model serves as a leading example of how layered technologies aligned with regulatory frameworks, can create scalable and usercentric financial solution. A key observation is the strategic use of AI for delivering customized, datadriven insights and automation, complemented by blockchain's ability to provide secure, tamperproof records and transaction histories. While the potential benefits are significant, several challenges continue to hinder widespread adoption. These include the technical complexity of integrating AI and blockchain systems, limited regulatory clarity around DeFi applications, and concerns regarding the transparency and accountability of AI decisionmaking processes. For these technologies to realize their full potential, financial institutions must ensure that innovation remains aligned with evolving regulatory standards. As the financial landscape in India becomes more programmable and interconnected, striking a balance between agility and compliance will be critical to fostering longterm growth and trust.

## 7. Conclusion

The case studies examined in this paper reveal that the convergence of AI and blockchain technologies within India's financial sector is both impactful and strategically grounded. This integration is driving advancements in digital payments, enhancing regulatory compliance, and expanding access to decentralized financial services, all while operating within the country's legal and regulatory frameworks. Looking ahead, India has the potential to emerge as a global frontrunner in the development and implementation of regulated AI&blockchain financial solutions. Continued collaboration between fintech startups, established financial institutions, regulators, and policymakers will be essential to unlock the full potential of these technologies, ensuring a secure, inclusive, and resilient financial future. Achieving this, however, will require addressing key challenges related to scalability, regulatory governance, and public trust in emerging technologies.

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