PAHAL HORIZON
An International Research Journal
Homepage: www.pahalhorizon.com

AI, Blockchain and FinTech-Driven Credit Transformation for MSME Modernization in India

CA Ashmit Agarwal [1], Dr. Meenakshi Chawla [2]

1. INTRODUCTION

Micro, Small and Medium Enterprises (MSMEs) constitute a main part of India's economic development. These sectors help in increasing exports, industrial output, generating employment and facilitating regional development. Therefore, MSMEs are particularly important in emerging economies towards development and can be said to be a main pillar of an economy, without which no economy can sustain.

Despite this, these Msme have to struggle and have to face a cash crunch due to money being stuck in stock and debtors. Also, the limited availability of finance through the formal financial system not only affects them but also the economy. The traditional system of lending involves collateral and heavy documentation, which is an impossible situation for Msme to deal with under working pressure. Due to this, these MSMEs fall prey to informal credit and struggle with higher interest rates. Which result these MSMEs being excluded from these lending markets, from where they can get loans and have to depend on informal sources of finance.

The fast change of digital finances, especially in India, has, however sustain to address these challenges and created a wider range of opportunities for these Msme. For example, we have seen how over the last 10 years, e-invoicing, multiple digital payments, e – tax reporting have created more authentic data trails which can be used to easily assess the creditworthiness of these msmes. This process not only saves time and the documentation process but also makes a transparent decision-making process on reliable and relevant data. This not only leads to alternative ways to assess data but also gives new techniques like PSB

loans in 59 minutes. Here, no human interference made the system automatically assess and can give sanctions of up to 5 crores collateral-free.

With technological development, the use of Artificial Intelligence (AI) has emerged as a powerful analytical tool capable of processing large volumes of structured and unstructured financial data. This AI can make a transparent decision on the basis of the algorithms and training provided. And can easily identify patterns and trends that provide insightful data for borrower creditworthiness. Blockchain technology, on the other hand, introduces a decentralized system for recording financial transactions in a secure and immutable format. The integration of blockchain systems in financial services can enhance transparency, reduce fraud risk, and improve the reliability of financial documentation

Parallel to these technological developments, Government Banks and FinTech lending platforms have transformed the operational dynamics of credit markets. We can take the example of the Government-made Jan Samarth portal, where you can easily access different schemes on the basis of technology without human interference. These platforms use digital interfaces and automated decision-making systems to streamline loan applications, reduce processing time, and expand access to finance for underserved businesses.

The convergence of Artificial Intelligence, blockchain technology, and FinTech lending models presents a significant opportunity to modernize MSME financing systems. By integrating advanced data analytics, decentralized financial infrastructure, and digital lending mechanisms, financial institutions can create a more inclusive and efficient credit ecosystem.

This study examines how these emerging technologies collectively influence MSME financing structures in India. It evaluates the role of AI-driven credit scoring models, blockchain-based financial verification systems, and digital lending platforms in improving credit accessibility, operational efficiency, and financial transparency.

2. LITERATURE REVIEW

2.1 National Review

Research within the Indian context has increasingly focused on the role of financial technology in improving credit accessibility for small enterprises.

Darji (2025)1 examined the application of artificial intelligence in credit scoring models designed for underserved borrowers. The study highlighted that traditional credit evaluation methods often fail to capture the financial behaviour of small businesses operating outside formal documentation systems. AI-based models that utilise alternative financial data sources, such as digital transactions and tax records, were found to significantly improve credit assessment accuracy.

Saxena (2024)2 explored the adoption of AI-powered analytics in FinTech lending platforms. The study concluded that machine learning algorithms enable lenders to evaluate borrower risk more efficiently by analyzing large volumes of financial data in real time. Such systems reduce reliance on collateral-based lending and enable credit institutions to serve previously excluded borrowers.

Sharma and Gupta (2021)3 investigated the role of digital financial footprints in credit evaluation. Their research suggested that transaction data from digital payment platforms, tax filings, and supply chain systems can serve as valuable indicators of financial behaviour and business stability.

Kumar and Sharma (2021)4 analyzed the broader role of FinTech innovations in promoting financial inclusion in India. Their findings indicated that digital lending platforms have significantly reduced barriers to credit access by simplifying loan application processes and reducing transaction costs.

Reddy and Patil (2022)5 studied the impact of machine learning-based lending models on MSME financing. The research demonstrated that predictive analytics can enhance risk evaluation accuracy and improve the efficiency of credit allocation.

2.2 International Studies

International literature provides additional insights into the transformative role of financial technologies in credit markets.

Roy and Vasa (2024)1 conducted a comprehensive review of artificial intelligence applications in credit risk assessment. Their research

concluded that AI-driven credit scoring models outperform traditional statistical techniques in predicting borrower default probabilities.

Ayari et al. (2025)2 evaluated the effectiveness of machine learning techniques in credit scoring systems. The study demonstrated that advanced analytical models such as neural networks and ensemble learning methods significantly improve predictive accuracy in financial risk evaluation.

Bahlool et al. (2026)3 examined issues related to fairness and transparency in automated credit scoring systems. Their research emphasized the importance of regulatory frameworks to ensure ethical implementation of algorithmic decision-making in financial services.

Chen (2025)4 analyzed the global expansion of FinTech lending platforms and their impact on credit market efficiency. The study highlighted that digital lending systems reduce information asymmetry and enhance borrower evaluation processes.

Agustina and Benardi (2024)5 explored the role of FinTech platforms in improving credit access for small businesses. Their findings suggested that technology-driven lending models enable financial institutions to extend credit to previously underserved market segments

3. RESEARCH GAP

Although extensive research has examined the individual contributions of Artificial Intelligence, blockchain technology, and FinTech lending platforms in financial services, limited attention has been given to their integrated application within MSME credit ecosystems.

Existing literature largely focuses on isolated technological solutions such as AI-based credit scoring or digital lending platforms. However, the potential benefits of combining AI-driven analytics with blockchain-based verification systems and FinTech lending infrastructure remain underexplored.

Additionally, the Indian MSME sector presents unique structural characteristics, including high levels of informal business activity and diverse regional economic conditions. These factors create specific challenges for implementing advanced financial technologies that have not been adequately addressed in previous studies.

This research seeks to address these gaps by examining the combined impact of AI, blockchain, and FinTech innovations on MSME credit systems while also considering the institutional and technological constraints associated with their implementation.

4. RESEARCH OBJECTIVES

The study is designed to achieve the following objectives:

To analyze the role of Artificial Intelligence in enhancing credit risk assessment for MSMEs.

To examine the impact of blockchain technology on financial transparency and transaction security.

To evaluate the contribution of FinTech lending platforms in improving credit accessibility for small enterprises.

To identify the technological and regulatory challenges associated with the adoption of digital financial infrastructure.

5. RESEARCH METHODOLOGY

The study adopts a qualitative research methodology based on secondary data analysis. Data has been collected from academic journals, government publications, financial industry reports, and policy documents related to MSME financing and digital financial technologies.

The research methodology includes the following stages:

Comprehensive review of academic literature on MSME credit systems

Analysis of technological developments in artificial intelligence and blockchain applications

Evaluation of FinTech lending models and their operational frameworks

Comparative assessment of traditional and digital credit delivery mechanisms

This analytical approach provides insights into the structural transformation occurring within MSME financing systems.

6. CONCEPTUAL FRAMEWORK

The conceptual framework of this study proposes that three technological drivers collectively influence MSME credit transformation. Artificial Intelligence improves the efficiency of credit risk assessment by analyzing alternative financial data sources and identifying patterns in business transactions. Blockchain technology enhances financial transparency and security by providing decentralized and tamper-resistant transaction records. FinTech lending platforms streamline credit delivery processes through digital loan application systems and automated decision-making mechanisms. The interaction of these technologies contributes to improved credit accessibility, enhanced operational efficiency, and greater transparency in MSME financing systems.

7. HYPOTHESIS

H1: Artificial Intelligence-based credit scoring models significantly improve the accuracy of MSME credit risk assessment.

H2: Blockchain technology enhances transparency and security in MSME financial transactions.

H3: FinTech lending platforms increase the accessibility of institutional credit for MSMEs.

H4: The integration of AI, blockchain, and FinTech technologies improves operational efficiency in MSME lending systems.

8. DISCUSSION

The integration of digital financial technologies has the potential to reshape the structural dynamics of credit markets. AI-based analytical tools enable financial institutions to evaluate borrower creditworthiness using diverse financial indicators. Blockchain systems provide secure and transparent transaction records that reduce the risk of fraud and data manipulation.

FinTech lending platforms complement these technologies by simplifying loan processing procedures and enabling faster credit

disbursement. Together, these innovations create a more inclusive financial ecosystem that supports the growth and sustainability of small enterprises.

9. POLICY IMPLICATIONS

Government agencies and financial regulators must develop supportive policy frameworks to facilitate the adoption of digital financial technologies. Regulatory sandboxes can encourage innovation while ensuring financial stability. Capacity-building programs should also be implemented to improve digital literacy among MSME owners.

10. CONCLUSION

The convergence of Artificial Intelligence, blockchain technology, and FinTech lending platforms represents a transformative development in MSME financing systems. These technologies provide innovative solutions to long-standing challenges related to credit accessibility, financial transparency, and operational efficiency.

While technological adoption presents certain challenges, including regulatory uncertainty and cybersecurity risks, the long-term benefits of digital financial transformation are substantial. With appropriate policy support and institutional collaboration, these technologies can significantly strengthen the MSME sector and contribute to sustainable economic development.

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