Int. J. Sci. R. Tech., 2026 3(5)
A Multidisciplinary peer-reviewed Journal
www.ijsrtjournal.com [ISSN: 2394-7063]

Original Article

AI-Driven Fintech Solutions For Risk Assessment And Credit Scoring: Enhancing Efficiency In The MSME Sector

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ABSTRACT

Micro, Small, and Medium Enterprises (MSMEs) constitute the foundational engine of macroeconomic resilience, employment generation, and industrial diversification across emerging and developed economies. Despite their systemic utility, MSMEs experience persistent financial exclusion due to asymmetric information, lack of institutional collateral, and rigid underwriting protocols of traditional banking ecosystems. This paper investigates the transformative role of Artificial Intelligence (AI) and Financial Technology (FinTech) in optimizing risk assessment and credit scoring frameworks for the MSME sector. AI-enabled platforms utilize machine learning algorithms, predictive analytics, and alternative data sources such as GST filings, banking APIs, and digital transaction histories to develop dynamic credit profiles. The study adopts a descriptive and analytical methodology based on secondary institutional data. Findings reveal that AI-driven FinTech systems reduce loan turnaround time, enhance predictive accuracy, lower operational costs, and improve financial inclusion for underserved enterprises. The study concludes that AI-centric FinTech frameworks represent a sustainable and scalable solution for strengthening MSME financing ecosystems.

Keywords: Artificial Intelligence, FinTech, MSME Finance, Credit Scoring, Risk Assessment, Machine Learning, Financial Inclusion.

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are recognized globally as key contributors to employment generation, industrial growth, innovation, and regional economic development. However, MSMEs frequently encounter severe barriers in accessing formal credit due to traditional banking systems that depend heavily on collateral-based lending and extensive documentation. Such rigid mechanisms create structural inefficiencies and widen the global MSME credit gap. In recent years, Artificial Intelligence (AI) integrated with Financial Technology (FinTech) has emerged as a disruptive innovation capable of transforming the credit underwriting process. AI-driven platforms utilize predictive analytics and machine learning models to evaluate risk through alternative digital data streams. This transition from static, historical evaluation to dynamic, real-time credit analysis significantly improves accessibility, efficiency, and financial inclusion.

2. OBJECTIVES OF THE STUDY

To investigate the role of AI-driven FinTech platforms in MSME financing.

To analyze the limitations of traditional banking systems in MSME credit assessment.

To evaluate the use of alternative data sources in predictive credit scoring.

To assess the impact of AI integration on operational efficiency and turnaround time.

To examine regulatory and privacy challenges associated with AI-driven lending systems.

3. RESEARCH METHODOLOGY

The study adopts a descriptive and analytical research methodology based on secondary data. Relevant information has been collected from journals, reports published by the Reserve Bank of India (RBI), Ministry of MSME, World Bank publications, and

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

FinTech industry reports. The collected data was comparatively analyzed to identify the shift from traditional banking models to AI-enabled algorithmic underwriting systems.

4. TECHNICAL CORE: AI ARCHITECTURE AND KEY ALGORITHMS

Supervised Learning Models such as Random Forest and XGBoost are used to process alternative financial data and predict credit risk.

Natural Language Processing (NLP) converts unstructured documents, invoices, and digital records into measurable credit indicators.

Artificial Neural Networks (ANNs) detect fraudulent patterns and monitor transaction anomalies in real-time digital payment systems.

5. RESULTS AND DISCUSSION

The findings indicate that AI-driven FinTech frameworks significantly improve the efficiency of MSME financing. Traditional loan approval mechanisms often require weeks of manual verification, whereas AI-enabled systems can process and approve loans within hours. Predictive analytics also improves risk mitigation by identifying early indicators of financial distress. Furthermore, algorithmic underwriting reduces operational costs and minimizes human bias in decision-making. The study also reveals that AI-based systems contribute substantially to financial inclusion by enabling access to credit for previously underserved and data-thin enterprises.

Dimension	Traditional Banking	AI-Driven FinTech
Data Source	Audited balance sheets and collateral	Real-time APIs, GST data, POS transactions
Turnaround Time	2–6 weeks	Within 24 hours
Risk Assessment	Historical and static	Predictive and dynamic
Operational Cost	High	Low through automation
Financial Inclusion	Limited	High and scalable

Table 1: Comparative Analysis of Traditional Banking and AI-Driven FinTech

6. REGULATORY AND CYBER CHALLENGES

Lack of transparency in complex AI algorithms creates the 'Black Box' problem.

Large-scale data collection increases cybersecurity and privacy risks.

Algorithmic bias may unintentionally discriminate against specific groups or regions.

Regulatory compliance under frameworks such as the DPDP Act and GDPR remains essential.

CONCLUSION

AI-driven FinTech solutions represent a transformative evolution in the MSME credit ecosystem. By leveraging machine learning, predictive analytics, and alternative digital data, modern underwriting systems overcome the limitations of traditional banking models. These technologies improve operational efficiency, accelerate loan processing, reduce default risks, and promote financial inclusion. However, effective implementation requires robust regulatory frameworks, cybersecurity safeguards, and transparent AI governance. The future of MSME financing lies in scalable, explainable, and inclusive AI-enabled financial systems.

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HOW TO CITE: Arpita Rajput[1]*, Ummehani Shaikh[2], AI-Driven Fintech Solutions For Risk Assessment And Credit Scoring: Enhancing Efficiency In The Msme Sector, Int. J. Sci. R. Tech., 2026, 3 (6), 973-975. https://doi.org/10.5281/zenodo.20717636