



Fin Tech Credit Scoring Systems and Financial Accessibility for Small Businesses

Sukant Kumar
Assistant Professor, Sage University Indore (MP), India.

Received On: 04/04/2026 Revised On: 03/05/2026 Accepted On: 10/05/2026 Published On: 17/05/2026

Abstract: *With the advent of rapid growth of FinTech technologies, traditional practices regarding the processes of credit scoring and loan making have been transformed, particularly focusing on providing financial inclusion for SMEs. Historically, banks and other financial organizations would use collateral, documentation procedures, and financial records for the purpose of loan granting, which made it impossible for some companies to get access to funds. To solve this problem, credit scoring mechanisms through FinTech started to apply new methods, including such approaches as AI, ML, Big Data, blockchain, and alternative data. This work is going to explore the issue of credit scoring via FinTech and will examine its development and evolution. In addition, the paper will review AI-based credit scoring algorithms that include Random Forest, Logistic Regression, Neural Networks, and XAI. Lastly, the paper will examine the incorporation of alternative data into credit scoring in the context of improving information transparency and financial inclusion among financially excluded borrowers. In addition, the paper examines some of the major obstacles faced in the FinTech lending ecosystem, including cybersecurity, privacy issues, algorithmic bias, lack of transparency, and regulatory challenges. The paper is based on the literature review and employs a critical analysis approach, coupled with theories of Information Asymmetry, Financial Inclusion, Technology Acceptance Model (TAM), and Diffusion of Innovation to explore the existing situation. It can be concluded from the findings that FinTech credit scoring surpasses traditional financing models with regard to performance, efficiency, financial inclusion, and predictive ability. However, for its sustainability, better governance frameworks, transparency, regulations, and cybersecurity measures must be put in place.*

Keywords: *FinTech, Credit Scoring, Financial Accessibility, Small Businesses, Artificial Intelligence, Machine Learning, Big Data Analytics, Blockchain, Financial Inclusion, Digital Lending.*

1. Introduction

Small businesses are necessary players in today's world economy for promoting growth, employment, creativity, and entrepreneurial endeavors [1]. Small and medium scale enterprises have been vital contributors in terms of creating wealth and developing industries in both economically developed and developing nations. MSMEs in India have been regarded as the backbone of the economy due to the numerous jobs they have created along with making commerce easy in rural and urban settings. In addition to this, despite the fact that small businesses are highly beneficial for the economy, there have been various hurdles for small businesses in acquiring bank loans. The traditional techniques in assessing credit risk and credit lending are primarily based on factors such as security, prior credit history, accurate financial statements, and banking connections. It becomes difficult for small businesses, especially new ones, to meet these strict criteria [2]. It makes financial institutions consider them risky borrowers, hence denying them loan facilities. Financial exclusion impedes growth, innovation, efficiency, and sustainability in business operations.

The fast development of FinTech technology has revolutionized the banking industry, offering new digital technologies that can be used for lending and credit evaluation

purposes. For example, FinTech credit scoring technologies make use of AI, ML, BDA, cloud computing (CC), and alternative data [3]. While the Traditional credit scoring approach takes into account only one's personal credit history, FinTech credit scoring technologies evaluate one's ability to repay loans based on digital transactions, mobile payments, e-commerce, utility bills, social media usage, and even online business performance. Such innovations had a positive impact on improving financial accessibility for small businesses, as they have helped to minimize information asymmetry, reduce costs, facilitate quick loan approval procedures, and allow inclusive lending [4]. Innovative technologies used by Fintech companies to perform digital loans and utilize AI scoring models have allowed for improving the availability of finances to underprivileged and previously excluded from banking business entities [5].

1.1. Research Question

- How do FinTech credit scoring systems differ from traditional credit evaluation methods?
- How does alternative data improve financial accessibility for SMEs?
- What role do AI and Machine Learning play in credit risk assessment?

- What ethical and cybersecurity concerns arise in AI-driven lending systems?
- What regulatory frameworks are required for sustainable digital finance?

1.2. Problem Statement

It should be understood that Small and Medium Enterprises (SMEs) are important actors in terms of economic development and employment opportunities; nevertheless, small business entities continue to face problems with obtaining financial services provided through conventional banking structures because of the necessity for collateral, credit score, and required documentation. While the FinTech credit score system uses such modern technologies as AI and ML along with alternative data in order to facilitate the process of making financial services more available, the mentioned problems related to cybersecurity, data protection, biases in algorithms, and other factors have been among the major ones to overcome.

1.3. Aim

This study is focused on critiquing the part that FinTech credit scoring models play in boosting financial inclusivity of small businesses, and analyzing the challenges associated with the use of technology, ethics, legal framework, and cyber-security in AI-driven credit provision.

1.4. Objective

- To study the evolution of FinTech credit scoring systems.
- To analyze the role of AI, ML, Big Data, and Blockchain in SME financing.
- To examine the impact of alternative data on financial inclusion.
- To identify ethical, cybersecurity, and regulatory challenges in digital lending.
- To suggest measures for sustainable and transparent FinTech systems

2. Evolution of Credit Scoring

Credit scoring is the mechanism through which financial organizations determine the creditworthiness and capability of the loan repayment among potential borrowers. Credit scoring has been changing tremendously with time due to the introduction of technology, digital transformation, and the increasing need for financial inclusion. The traditional approach of credit scoring considered mostly the financial history of a person and collaterals, while the new system of alternative credit scoring uses technological aspects [6].

3. Theoretical Framework

3.1. Information Asymmetry Theory

Information Asymmetry Theory addresses the difference in knowledge between creditors and debtors. Conventional banks usually find it challenging to assess the credibility of small business owners because of the lack of financial information. The fintech companies use alternative sources of information, AI, and online transactions to make the

evaluation easier.

3.2. Financial Inclusion Theory

Financial Inclusion Theory emphasizes making finance available at affordable prices to people and organizations that are underserved. FinTech credit scores facilitate financial inclusion through quicker access to credit by SMEs, particularly those without any bank records.

3.3. Technology Acceptance Model (TAM)

The TAM outlines how perceived ease of use and usefulness determine the adoption of technology. When used in FinTech loans, the TAM model is helpful in explaining the reasons behind the adoption of credit scoring systems and digital financial services by businesses and individuals.

3.4. Diffusion of Innovation Theory

The Diffusion of Innovations Theory is used to analyze how innovations diffuse within society and sectors. The Diffusion of Innovations Theory provides insights into the increasing popularity of FinTech and AI-based lending systems.

Critically the theoretical approaches provide an insight into how FinTech credit scoring mechanisms affect SMEs and financial inclusivity. In accordance with the theory of Information Asymmetry, digital technology minimizes information gaps within lending alternatives, although dependency on the use of alternative information may lead to privacy violations and misuse. In light of Financial Inclusion Theory, FinTech advances financing for underprivileged enterprises, yet low levels of digital literacy and access to technology may lower inclusion rates. According to the TAM, digital lending platforms acceptance is contingent upon perceived usefulness and usability, although TAM may overlook the dangers associated with cybersecurity, lack of trust in technology and law. Innovation Diffusion Theory is used to explain the adoption of FinTech throughout financial markets. Nevertheless, acceptance of digital lending platforms utilizing AI relies on the current state of the economy, readiness and understanding of technology amongst other factors.

4. Role of Technology in the Evolution of Credit Scoring

FinTech means the use of digital technology for providing financial services that can increase efficiency, availability, innovation, and customer satisfaction. It includes different kinds of services like digital payments, online banking, blockchain, crowdfunding, robo-advisory, and digital lending. Credit scoring refers to the procedure whereby banks assess the creditworthiness of their borrowers. It enables the lender to ascertain if the borrower can pay back the borrowed money within the agreed period. Credit scoring uses numerical figures in assessing the behavior and other risk elements relating to the borrowing process [7]. The Traditional system of credit scoring typically includes the following components: Credit history, Bank account history, Earnings, Employment status, Debts, and Collateral availability.

4.1. FinTech Credit Scoring Systems

A FinTech credit scoring system refers to an online credit analysis model that applies technological advancements to establish whether a loan applicant has the capacity to repay a loan [8]. As opposed to Traditional credit scoring systems whose basis lies in the examination of bank statements, collateral and past credit records, FinTech systems apply a more diversified approach.

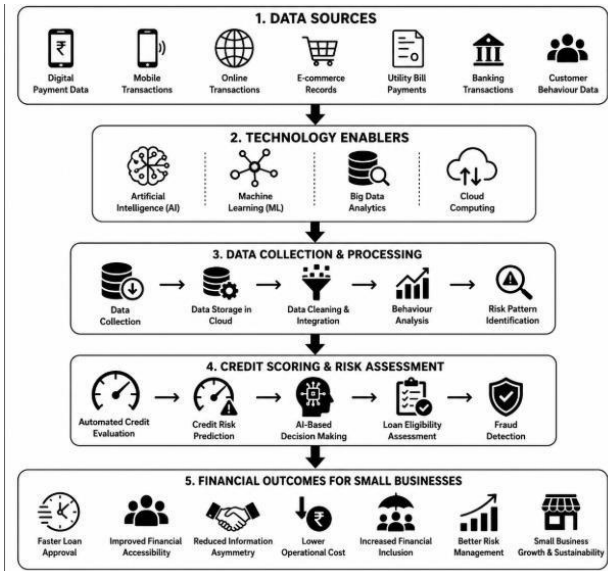


Fig 1: Digital Financial Inclusion Framework

The above Fig. 1 describes the FinTech Credit Scoring System framework that enhances financial inclusion among small enterprises. It starts with diverse sources of information like digital payment history, mobile and online transaction details, electronic commerce data, utility bills, bank transactions, and customer behavior information. Technology enablers used in this model include AI, ML, BDA, and CC. The accumulated data is analyzed via cloud storage, data cleansing, behavioral analysis, and risk patterns identification [9][10]. Following the analysis, the process involves credit scoring and risk assessment through automation credit evaluation, decision making, loan eligibility evaluation, and fraud prevention [11]. The results of this framework include positive financial impact on small enterprises, such as accelerated loan processing, minimized operation expenses, effective risk management, greater business expansion and sustainability.

4.1.1. Artificial Intelligence (AI)

AI makes the process of credit assessment automated by performing quick and precise analysis of the huge amount of information on borrowers. AI programs can find certain hidden patterns and predict the repayment behavior depending on the borrower's actions. For instance, the use of AI will help determine the stability of operations of a particular small business. Innovative systems have helped enhance financial inclusivity for small businesses, especially through the elimination of information asymmetry, reduction in operating costs, faster loan processing, and inclusion lending models [12]. Technology-based loaning applications and algorithms

have increased the reach of finance to those small businesses that were not being served effectively before. FinTech has been responsible for fostering online lending environments, P2P lending sites, embedded finance solutions, and even mobile-based financial services.

4.1.2. Machine Learning

ML is a sophisticated form of AI that helps machines learn from data, recognize patterns, and predict outcomes based on that learning without being explicitly programmed for each action [13]. In FinTech credit scoring systems, ML has a vital role to play when it comes to making credit scoring more accurate, efficient, and speedy for small business owners. ML algorithms learn from vast amounts of data to predict the ability of individuals to repay loans. The FinTech platforms powered by ML algorithms analyze the transaction information of such companies via their mobile devices and online presence, allowing them to gain loans and financial aid [14].

4.2. Random Forest

Random Forest is an ML model that uses a variety of decision trees to enhance the accuracy of credit risk assessment. This enables financial institutions to accurately predict and assess loan defaults and minimize erroneous lending practices in SMEs financing.

4.3. Logistic Regression

Logistic Regression is one type of predictive analysis model that helps calculate the probability of payment and non-payment of a loan by an individual. Logistic regression is popularly applied in credit risk assessment for its simplicity, interpretability, and effectiveness in classifying outcomes like approval or rejection.

4.4. Neural Networks

Neural Networks are intelligent ML systems based on the way the human brain operates. They help in the accurate credit evaluation of applicants by detecting patterns and connections present within large data sets.

4.5. Explainable AI (XAI)

Explainable AI (XAI) is the term for AI systems that give visible and intelligible explanations for automated credit judgments. XAI enhances fairness, accountability and customer confidence for AI-driven financing models.

4.5.1. Big Data Analytics

BDA means that a huge amount of data is collected, processed, and analyzed to make decisions based on its patterns and trends. For example, BDA is vital when trying to improve access to finance and increase credit opportunities for SMEs [15]. This will help lenders detect possible risk factors and also make predictions about the future repayment behavior of the borrower. The other critical advantage of BDA is that of increased financial inclusiveness.

4.5.2. Cloud Computing

CC involves using Internet technology rather than physical technology to deliver services such as storage space,

software, databases, networks, and processing power [16]. CC makes a difference in enhancing the effectiveness, adaptability, scalability, and access of financial services to small businesses by playing an important role in FinTech credit scoring systems [17]. Financial institutions and FinTech firms are able to collect and analyze large amounts of data on borrowers in real-time through CC. Small firms have a problem accessing funds because Traditional banking processes demand lots of paperwork, visiting bank branches in person, and lengthy loan processing times. FinTech gather data from different sources including digital payments, banking transactions through mobile applications, e-commerce, utility bills payment, and online business operations. CC technology offers an adequate platform for storing and analyzing data in a safe and effective way. It enables lenders to evaluate small businesses' creditworthiness in real-time mode [18].

4.5.3. Financial Inclusion and Blockchain Technology

Blockchain technology represents significant innovations in ensuring economic inclusion, particularly among small businesses, lower-income groups, rural entrepreneurs, and people who have been marginalized in the formal financial sector. It is defined as delivering affordable, accessible, and efficient financial services, including banking, loans, savings, insurance, and payment systems, to all segments of society. The traditional banking system cannot adequately cater to many small businesses and marginalized groups due to inadequate credit history, absence of collateral, inadequate financial records, and a

lack of bank infrastructure. A blockchain refers to a decentralized digital ledger technology used to record and store information about financial transactions in various systems connected to each other. In contrast to centralized banking systems, blockchain functions by distributing networks where all transactions are verifiable and immutable, thus ensuring high security and transparency in financial transactions [19]. Through blockchain technology, there is minimal reliance on third parties like banks and financial institutions, hence offering direct access to financial services through online platforms.

5. Traditional Vs Fintech Credit Scoring

Below Table I: illustrates how traditional lending processes are typically dependent on documentation, collateral, and verification processes, thus making it difficult for small businesses and borrowers to access finances. Conversely, FinTech lending is based on innovative applications of technology like AI, ML, Big Data, and Blockchain in evaluating information on digital transactions, utility payments, and online businesses activities. FinTech lending has several advantages, such as providing fast lending processes, high efficiency, low cost of operation, and increased inclusiveness. Despite having various strengths, FinTech lending is not without its weaknesses, especially when it comes to issues of cyber security, data protection, algorithmic biases, and ethical considerations.

Table 1: Comparative Table of Traditional Vs Fintech Credit Scoring

Basis of Comparison	Traditional Credit Scoring	FinTech Credit Scoring
Data Source	Credit history, collateral, bank records	Alternative data, digital payments, utility bills, online transactions
Evaluation Method	Manual assessment	AI and ML-based automated assessment
Processing Speed	Slow and time-consuming	Fast and real-time processing
Documentation	Heavy paperwork required	Minimal digital documentation
Accessibility	Limited access for SMEs and rural borrowers	Wider access for underserved and unbanked businesses
Cost of Operations	High operational cost	Lower operational cost through automation
Risk Assessment	Based on limited financial history	Based on behavioural and transactional data
Financial Inclusion	Lower financial inclusion	Higher financial inclusion
Major Challenges	Limited reach and slow processing	Cybersecurity, data privacy, and algorithmic bias

6. Challenges Affecting the Digital Financial Technology

6.1. Cybersecurity and Data Protection Challenges

A major challenge faced by the cybersecurity of FinTech applications is that of cyberattacks. The FinTech platform is a common target of cyberattacks as it holds sensitive customer information such as banking details, electronic records of transactions, identity documents, passwords, and financial history. Financial systems may be compromised through various forms of cyberattacks, which include but are not limited to hacking, phishing, malware attacks, ransomware attacks, and identity theft. Small-scale businesses tend to

suffer greatly due to lack of adequate cybersecurity infrastructure and resources [20]. Another area of concern in FinTech ecosystems involves data breaches.

6.2. Ethical Issues with Artificial Intelligence

One of the ethical concerns is that there is no transparency in the use of for credit scoring. Most of the procedures operate under the "black box" approach, whereby the clients and even financial institutions themselves might not have an idea about how the decisions on the loans were made. In cases where loan applications are turned down, the applicants do not always know the rationale behind the decision taken. Privacy and ethics concerning the usage of customer data are other

important issues when considering financial services [21]. In some cases, the massive amount of data collected could raise concerns of data theft and abuse. The customers would worry about how their information is used and where and in what form it is stored [22].

6.3. Regulatory and Compliance Challenges in FinTech

The problem associated with the regulation in FinTech is that there is no standardization of legal frameworks. The traditional regulations were developed with a focus on the banking sector and do not necessarily cater to the operations of modern digital financial technologies and loan products, as well as alternative scoring techniques. Financial regulations are not uniform between different countries, which makes the process difficult due to the differences that arise in terms of FinTech business operations. Yet another major issue for FinTech firms is financial regulations compliance. It is tricky because there are so many different things that need fixing, including consumer protection, data security, know-your-customer (KYC) regulations, financial reporting, anti-money laundering (AML), and so on.[23]. In order to comply with all these regulations, the firm should have advanced monitoring technology along with robust data protection. This is particularly difficult for FinTech start-ups.

7. Opportunities

7.1. Financial Empowerment of Small Businesses

Financial empowerment of small businesses means that small firms are capable of accessing, managing, and using their financial assets appropriately to support their development and prosperity. It allows businesses to achieve economic independence, enhance efficiency, become more competitive, and contribute to economic development[24]. The contemporary economy requires financial empowerment more than ever since small businesses are actively involved in generating employment, developing innovations, promoting industry development, and reducing poverty levels therefore it also improves the economic standing of the business but also boosts entrepreneurship, fosters innovation, raises productivity, and encourages the integration of the business into the formal economy.

7.2. Boosting Entrepreneurial Growth

Financial empowerment assists in entrepreneurship growth through provision of funds to operate a business, embrace technology, engage in marketing, develop infrastructural facilities, and hire employees. Financial resources can be used to enhance product quality, increase production capabilities, and explore new markets [25]. Digital financial systems can also help in innovation and modernization of business operations. Small-scale businesses can embrace e-commerce, online payment systems, CC systems, and online marketing strategies to gain competitive advantage and improve efficiency [26].

7.3. Strengthening Economic Participation

Economic participation is characterized by participation by individuals and groups in activities like production, trade, investments, labor, and financial transactions. Economic empowerment promotes economic participation

by enabling small businesses to join the formal economy and participate in economic ventures. Exclusion from finance prevents them from growing and participating in online business and thus joining the process of economic development. Financial services enable small businesses to increase efficiency, make investments for growth, and gain wider market opportunities [27].

7.3.1. Conceptual Framework

The conceptual framework (show in Fig. 2) explains the process by which FinTech credit scoring systems use contemporary digital technology to help SMEs access finances. Because of collateral, credit history, documentation, and human confirmation, conventional banks may become obstacles to SMEs. In addition, FinTech uses digital transactions, mobile money transactions, utility bills, e-commerce activities, and online business records to overcome these constraints. The information is then used via AI and ML to evaluate borrowing behavior and predict creditworthiness. The process assists financial institutions in assessing credit risks and making automated decisions on granting loans. As such, this approach makes the loan-granting process much faster for underserved companies.



Fig 2: FinTech Credit Inclusion Framework

8. Literature Review

Pooja V (2025) examined The impact of AI and ML on alternative credit scores in the context of FinTech lending, particularly how alternative data contributes to financial inclusion and building trust in AI/ML-based credit scores. The sample size of the survey undertaken for the study was 384, while the methodology involved in conducting the research was quantitative through SPSS and SEM. The researchers highlighted the necessity of establishing ethical frameworks and governance policies to ensure fair usage of credit assessments. Traditional methods of credit scoring were unable to consider borrowers with little credit history, but AI/ML methods could take into account the borrowers' online behavior, utility bills, and other behaviors to conduct a thorough credit score. The results of the study suggested that alternative data plays a considerable role in boosting trust in AI/ML-based credit scores [28].

Alessandro Bitetto, Paola Cerchiello and Stefano Filomeni (2024) studied How FinTech lending has provided new avenues for financing small businesses through smart algorithms for credit assessment. This research investigated the capability of ML models in assessing credit risk scores for small businesses. The study utilized a unique private dataset for investigating the performance of ML models compared with the traditional credit scoring techniques such as probit models in evaluating the credit risk of invoice financing business. The findings indicate that ML technologies perform better than the traditional techniques especially where the lender had little information regarding the borrower. Smart AI-based credit scoring models proved to be efficient in improving financing decisions for small businesses [29].

The Nimbark Hardik (2024) studied the use of digitization, soft information and Big Data by Indian banks to increase funding to SMEs. The researchers used a qualitative multi-case study to examine the use of digital technologies and the part soft information plays in the credit assessment procedures for SMEs. Participants presented views on how customer ties, supplier relationships, company strategies and managerial succession information might be used to determine SME creditworthiness. The results indicated that banks increased SME funding activities through digitization and IT-based verification procedures. The results also demonstrated that soft information helps to minimize the opacity of information in SME lending and to improve the efficiency of credit evaluation procedures. Also, the report suggested that banks engage with industry groups and internet B2B trade platforms to get publicly available soft information for

better lending choices. The report also highlighted the need for SME agreement to access private financial information through digital channels [30].

The research Nigar Karimova, (2024) addresses the application of a machine learning algorithm random forest in order to improve the accuracy and precision of the Delphi model. The study took place within the framework of Azerbaijani SMEs. For this study, data were provided by a financial institution that had gathered the data from firms (as the data for local SMEs is not publicly available, the possibility of independent verification of data was impossible). The comparison of the models used accuracy, precision, recall, and F-1 scores for each of the models as well as running the code in Python. As a result, it can be concluded that the increase in accuracy, precision, recall, and F-1 score was significant. Thus, the use of AI algorithms in credit risk models will enable the organizations to better identify those potential defaulters, thereby decreasing their credit risks. Besides, it will help decrease the number of unjustified refusals to provide SMEs with funds which will positively impact the economic growth of the country. Finally, it is important to consider ethical issues associated with the openness of algorithms and biases present in the historical data when relying on AI algorithms in order to avoid the purely mechanical approach to decision-making [31].

The following literatures are summarized in Table II mentioned below.

Table 2: Comparative Analysis of Literature Review

Author(s) & Year	Research Focus	Methodology / Data Used	Technologies / Models Used	Key Findings	Contribution to SME Financing & Financial Inclusion	Limitations / Concerns
Pooja V (2025)	Influence of AI and ML on alternative credit scoring in FinTech lending	Quantitative research using SPSS and Structural Equation Modelling (SEM) with a sample size of 384	AI, ML, Alternative Data Analytics	Alternative data improved the perceived accuracy of AI and ML-based credit assessment and increased trust in automated lending systems	Enhanced financial inclusion for borrowers with limited credit history through digital footprints, utility payments, and behavioural data	Ethical governance, transparency, and accountability issues in AI-driven credit evaluation
Alessandro Bitetto, Paola Cerchiello & Stefano Filomeni (2024)	Use of FinTech lending and ML-based credit assessment for small firms	Analysis of proprietary invoice financing dataset comparing ML models with traditional probit models	ML-driven Credit Scoring Models	ML techniques outperformed traditional credit scoring methods, especially with limited borrower information	Improved reliability and accuracy of lending decisions for small businesses in FinTech ecosystems	Dependence on limited proprietary datasets and technological reliability concerns

Nimbark Hardik (2024)	Role of digitalization, soft information, and Big Data in SME financing by Indian banks	Qualitative multi-case study involving SME credit evaluation practices	Big Data, Digitalization, IT-based Verification Systems	Digitalization improved SME financing operations and soft information reduced information opacity in lending	Strengthened SME financing through digital tools, customer relationships, supplier information, and online trade platforms	Privacy concerns related to accessing private financial data through digital channels
Nigar Karimova (2024)	Application of AI-based Random Forest model in SME credit risk assessment	Comparative analysis using Delphi model and Random Forest algorithm with Python implementation	Random Forest Model, AI Algorithms, Credit Risk Modelling	Accuracy, precision, recall, and F1-scores significantly improved after integrating AI models	Improved detection of potential loan defaulters and reduced unfair loan rejection for SMEs	Ethical concerns regarding algorithm transparency, historical bias, and overdependence on automated systems
Comparative Observation	FinTech-driven credit scoring and SME financial accessibility	Quantitative, qualitative, and comparative analytical approaches	AI, ML, Big Data, Alternative Data, Random Forest Algorithms	Advanced technologies enhanced credit assessment accuracy, lending efficiency, and financial inclusion	FinTech systems improved access to finance for SMEs and underserved borrowers	Common challenges included ethical concerns, transparency, data privacy, algorithmic bias, and governance issues
Overall Comparative Analysis	Technology-based transformation of SME credit scoring systems	Multi-method research designs across different countries and financial systems	AI-driven Credit Scoring, Big Data Analytics (BDA), Alternative Data Systems	AI and ML-based systems consistently outperformed traditional lending models in risk assessment	Digital financial technologies promoted inclusive lending and operational efficiency for SMEs	Need for stronger ethical frameworks, regulatory compliance, and transparent AI governance

Research Gap: Existing studies on FinTech credit scoring systems are mainly on technological advancement, predictive accuracy and financial inclusion. But there is a lack of thorough research studies that focus on the relationship between fairness, transparency, explainability, cybersecurity, and ethical governance in AI-based financing platforms. It remains unclear what the effects of alternative credit scoring systems have been on the development and sustainability of small enterprises in rural settings and in developing nations. Additionally, there is a lack of standard legal mechanisms and specific measures suggested by existing scientific literature for the integration of innovations in credit scoring technology into consumer protection, data privacy, and responsible financing practices. Future research should focus on ways of constructing FinTech credit scoring systems that would reflect technological innovations and financial inclusiveness and be ethical, transparent, and secure, especially for small businesses.

8.1. Recommendation

To make FinTech credit scoring more effective and

sustainable, it is important for financial institutions to concentrate on building reliable AI-powered lending solutions based on high levels of transparency, security, and ethics. The adoption of XAI should be promoted to make automated decision-making processes more accountable and gain the trust of consumers. It is essential to apply solid cybersecurity strategies and data protection measures that will eliminate possible risks related to digital lending solutions. The implementation of standardized regulatory frameworks aimed at providing fairness and transparency within AI-powered financial services by governments and regulatory agencies can significantly contribute to making lending more effective. Financial institutions need to encourage SMEs' digital literacy and understanding of new technologies.

9. Conclusion

AI credit score solutions in FinTech have revolutionized the traditional lending system by enhancing financial inclusiveness, increasing efficiency, and improving access to credit facilities for small businesses. Using AI, ML, BDA, blockchain technology, and alternate data sources, FinTechs

provide advanced and fast credit assessment through AI systems that are far superior to the lending systems used in traditional banking institutions. The study shows how AI has reduced information asymmetry, increased inclusiveness, and enhanced the growth of SMEs by giving access to credit to previously underserved financially-excluded firms. However, important obstacles, including the issues of cybersecurity, data protection, ethics in governance, algorithmic bias, and regulation, continue to represent significant barriers for the sustainability of AI applications in loan origination[32]. In this regard, future success of FinTech credit scoring systems will largely depend on the creation of safe, regulated, and ethically-governed AI-enabled financial ecosystems.

Future Scope

Aspects on which future research should focus regarding credit scoring in FinTech include devising fairer, ethical, and safer AI lending algorithms that help foster the development of small enterprises. Alternative credit scoring can be researched to determine its impact on fostering the growth and sustainability of SMEs, especially those in rural or developing nations. Studies can also assess the impact of using Explainable Artificial Intelligence (XAI), Blockchain technology, and advanced ML algorithms in making lending systems more fair, accurate, and effective. Comparative studies on a cross-country basis and sector-specific studies can also shed light on the efficacy of regulatory policies, cybersecurity, and digital financial inclusion.

References

- O. M. Bolanle and A. O. Ademola, "Financial Literacy and Credit Accessibility for Small Scale Business Sustainable Growth," *Int. J. Bus. Manag. Rev.*, vol. 12, no. 8, pp. 51–66, Jul. 2024, doi: 10.37745/ijbmr.2013/vol12n85166.
- S. Kyeong and J. Shin, "Two-stage credit scoring using Bayesian approach," *J. Big Data*, vol. 9, no. 1, p. 106, Nov. 2022, doi: 10.1186/s40537-022-00665-5.
- J. R. Bhat, S. A. AlQahtani, and M. Nekovee, "FinTech enablers, use cases, and role of future internet of things," *J. King Saud Univ. - Comput. Inf. Sci.*, vol. 35, no. 1, pp. 87–101, Jan. 2023, doi: 10.1016/j.jksuci.2022.08.033.
- A. K. Pillai, "The Impact of Fintech on Traditional Lending Practices," *Interantional J. Sci. Res. Eng. Manag.*, vol. 09, no. 04, pp. 1–9, Apr. 2025, doi: 10.55041/IJSREM44880.
- L. M. Palladino, "The impacts of fintech on small business borrowing," *Journal of Small Business & Entrepreneurship*, vol. 33, no. 6, pp. 639–661, Nov. 2021, doi: 10.1080/08276331.2020.1796110.
- N. A. Khamitdkhanovich, C. Senthilkumar, V. O. Kavitha, and E. R. S. Ugli, "The evolution of open banking: Transforming financial services with data-driven technologies," in *AIP Conference Proceedings*, 2025, p. 030026, doi: 10.1063/5.0277721.
- M. Tigges, S. Mestwerdt, S. Tschirner, and R. Mauer, "Who gets the money? A qualitative analysis of fintech lending and credit scoring through the adoption of AI and alternative data," *Technological Forecasting and Social Change*, vol. 205, p. 123491, Aug. 2024, doi: 10.1016/j.techfore.2024.123491.
- M. Bazarbash, "FinTech in Financial Inclusion: Machine Learning Applications in Assessing Credit Risk," *IMF Working Papers*, vol. 2019, no. 109, p. 1, May 2019, doi: 10.5089/9781498314428.001.
- J. Hu, Y. Huang, and J. Liu, "The changing face of consumer credit: Evidence from a big tech platform in China," *Pacific-Basin Finance Journal*, vol. 83, p. 102254, Feb. 2024, doi: 10.1016/j.pacfin.2024.102254.
- S. A. Pushkala, "Hybrid Rule-Based and Deep Learning System using GNNs to Detect Credit Card Fraud," in *SoutheastCon 2026*, IEEE, Feb. 2026, pp. 1–6, doi: 10.1109/SoutheastCon63549.2026.11476208.
- D. Patel, "Explainable Risk Decision Systems Using Artificial Intelligence Models for Payment Fraud Identification with Mitigation," in *2026 14th International Symposium on Digital Forensics and Security (ISDFS)*, IEEE, Mar. 2026, pp. 1–6, doi: 10.1109/ISDFS69419.2026.11459006.
- J. G. M., "Study on Usage of Artificial Intelligence in FinTech Industry," *International Journal for Research in Applied Science and Engineering Technology*, vol. 12, no. 8, pp. 520–549, Aug. 2024, doi: 10.22214/ijraset.2024.63938.
- S. Irfan, "AI-Driven Credit Scoring: A Study of Machine Learning Algorithms for Enhanced Risk Assessment," in *2026 IEEE International Conference on AI Engineering and Innovations (AIEI)*, IEEE, Mar. 2026, pp. 1–6, doi: 10.1109/AIEI69164.2026.11496824.
- H. Kumar, "AI and Machine Learning Integration into Cloud-Based Fintech Platforms," *International Journal of Scientific Research in Engineering and Management*, vol. 8, no. 10, pp. 1–8, Oct. 2024, doi: 10.55041/IJSREM37825.
- D. M. Parthiban, "Big Data Analytics in Fintech: A Review of Credit Risk Assessment and Fraud Detection," *Educational Administration: Theory and Practice*, pp. 3676–3684, May 2024, doi: 10.53555/kuey.v30i5.3514.
- T. Ali, M. Al-Khalidi, and R. Al-Zaidi, "Information Security Risk Assessment Methods in Cloud Computing: Comprehensive Review," *Journal of Computer Information Systems*, vol. 66, no. 1, pp. 123–150, Jan. 2026, doi: 10.1080/08874417.2024.2329985.
- P. Parida and N. Senguttuvan, "Responsible Utilization of Cloud in Retail Banking Ecosystem," *International Journal of Computer Applications*, vol. 187, no. 49, pp. 34–39, Oct. 2025, doi: 10.5120/ijca2025925835.
- M. Attaran and J. Woods, "Cloud Computing Technology: Improving Small Business Performance Using the Internet," *Journal of Small Business & Entrepreneurship*, vol. 31, no. 6, pp. 495–519, Nov. 2019, doi: 10.1080/08276331.2018.1466850.
- J. Nwoke, "Digital Transformation in Financial Services and FinTech: Trends, Innovations and Emerging Technologies," *International Journal of Finance*, vol. 9, no. 6, pp. 1–24, Sep. 2024, doi: 10.47941/ijf.2224.
- S. AlBenJasim, T. Dargahi, H. Takruri, and R. Al-Zaidi, "FinTech Cybersecurity Challenges and Regulations:

- Bahrain Case Study,” *Journal of Computer Information Systems*, vol. 64, no. 6, pp. 835–851, Nov. 2024, doi: 10.1080/08874417.2023.2251455.
21. S. K. Abbas, M. Hussain, and Y. N. Rimal, “Machine Learning-Based Analysis of Technology Acceptance in FinTech: A Behavioral Study Using Digital Wallet Data,” *SN Computer Science*, vol. 6, no. 6, p. 674, Jul. 2025, doi: 10.1007/s42979-025-04214-8.
 22. A. K. Kashyap, “Rethinking FinTech Regulation Under the Indian Data Protection Framework,” *Juridical Tribune – Review of Comparative and International Law*, vol. 14, no. 3, pp. 363–383, Oct. 2024, doi: 10.62768/TBJ/2024/14/3/02.
 23. N. Singh, “Data Security and Consumer Trust in Fintech Innovations Using Technology Adoption Method,” *International Journal of Scientific Research in Engineering and Management*, vol. 8, no. 5, pp. 1–5, May 2024, doi: 10.55041/IJSREM33015.
 24. J. Majid, “Financial Technology: Meningkatkan Inklusif Financial EMKM di Era Pandemi Covid-19,” *AKUA: Jurnal Akuntansi dan Keuangan*, vol. 1, no. 1, pp. 111–121, Jan. 2022, doi: 10.54259/akua.v1i1.155.
 25. K. S. Skandalis, “From Credit Fear to Competitive Edge: The Interplay of Entrepreneurship, FinTech and SME Performance,” *Journal of Economic and Administrative Sciences*, pp. 1–16, Sep. 2025, doi: 10.1108/JEAS-06-2025-0386.
 26. F. Ben Bouhenni, M. Tewari, A. Salamon, P. Johnston, and K. Hopkins, “Credit Sales and Risk Scoring: A FinTech Innovation,” *FinTech*, vol. 4, no. 3, p. 31, Jul. 2025, doi: 10.3390/fintech4030031.
 27. M. Tang, Y. Hu, Y. (Greg) Hou, L. Oxley, and J. W. Goodell, “Fintech Development, Corporate Tax Avoidance and Firm Value,” *International Review of Financial Analysis*, 2025, doi: 10.1016/j.irfa.2024.103765.
 28. Pooja V., “The Role of AI and ML in Alternative Credit Scoring in Fintech Lending,” *Journal of Information Systems Engineering and Management*, vol. 10, no. 31s, pp. 16–22, Apr. 2025, doi: 10.52783/jisem.v10i31s.4956.
 29. A. Bitetto, P. Cerchiello, S. Filomeni, A. Tanda, and B. Tarantino, “Can We Trust Machine Learning to Predict the Credit Risk of Small Businesses?,” *Review of Quantitative Finance and Accounting*, vol. 63, no. 3, pp. 925–954, Oct. 2024, doi: 10.1007/s11156-024-01278-0.
 30. N. Hardik, “Digitalisation Promotes Adoption of Soft Information in SME Credit Evaluation: The Case of Indian Banks,” *Digital Finance*, vol. 6, no. 1, pp. 23–54, Mar. 2024, doi: 10.1007/s42521-023-00078-w.
 31. N. Karimova, “Application of AI in Credit Risk Scoring for Small Business Loans: A Case Study on How AI-Based Random Forest Model Improves a Delphi Model Outcome in the Case of Azerbaijani SMEs,” *arXiv Preprint*, pp. 1–22, 2024.
 32. C. Duan, “Discovering Current Trends and Forecasting Future Research Directions in FinTech by Way of Co-Word-Burst Analyses,” *Industrial Management & Data Systems*, vol. 125, no. 2, pp. 458–482, Jan. 2025, doi: 10.1108/IMDS-03-2023-0190.