Fin Tech And Artificial Intelligence In Micro Finance: Transforming Financial Inclusion And Credit Accessibility In India

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Abstract

Microfinance institutions are essential for advancing financial inclusion by offering financial services to underserved and low-income populations. In recent times, technological progress, including financial technology (FinTech), digital financial services, and artificial intelligence, has greatly altered the financial sector, presenting new possibilities for enhancing microfinance operations. This study investigates the effects of adopting fintech, digital financial services, and artificial intelligence on financial inclusion and credit access within microfinance institutions in India. This study relies on primary data gathered from 120 participants involved in microfinance services, such as microfinance borrowers and small business owners in Maharashtra, India. Data were collected using a structured questionnaire, and the responses were analyzed using statistical methods, including descriptive statistics, correlation analysis, and regression analysis, using Jamovi software. The results indicate that digital financial services have a statistically significant positive effect on financial inclusion. However, the adoption of FinTech and artificial intelligence did not show a significant impact on financial inclusion and credit access, respectively. These findings highlight the need to expand digital financial services to bolster financial inclusion in microfinance institutions. This study recommends that policymakers and financial institutions concentrate on enhancing digital financial infrastructure and promoting digital literacy to improve the success of technology-driven financial inclusion efforts.

Keywords:- Microfinance, financial inclusion, fintech adoption, digital financial services, artificial intelligence.

1. Introduction

In developing nations, financial inclusion has emerged as a crucial element for sustainable economic progress, as many people do not have access to formal financial services. Microfinance institutions are essential in closing this gap by offering financial services, such as microcredit, savings options, and insurance, to low-income individuals and small business owners, who are often excluded from conventional banking systems(Ebirim & Odonkor, 2024). By making financial services more accessible, these institutions help reduce poverty, empower the economy, and promote inclusive growth.

In recent times, the financial services industry has undergone significant transformation because of technological progress. Financial technology (FinTech), digital financial services, and artificial intelligence have become influential tools that can boost the efficiency, accessibility, and

transparency of financial services(Ebirim & Odonkor, 2024). Innovations in FinTech allow financial institutions to offer services via digital platforms, mobile applications, and online payment systems, which helps lower operational expenses and enhance service delivery.(Sanyaolu et al., 2024)

Digital financial services, such as mobile banking, digital wallets, and online lending platforms, have significantly contributed to enhancing financial inclusion by allowing people to access financial services without relying on physical bank branches. These technologies are particularly advantageous in rural and underserved areas, where conventional banking services may be scarce(Goswami et al., 2022).

Artificial intelligence is beginning to make its mark on the financial industry by being used in areas such as automated credit scoring, risk evaluation, fraud detection, and automated customer service. In microfinance, AI holds the promise of enhancing credit evaluation methods and enabling quicker and more effective lending decisions(Omokhoa et al., 2024).

Although financial technologies are increasingly being adopted, there is still a scarcity of empirical data on their effects on financial inclusion and credit access within the microfinance sector(Omowole et al., 2024). Numerous studies have examined the influence of fintech on banking and financial services; however, relatively few have specifically investigated the impact of fintech, digital financial services, and artificial intelligence on microfinance institutions.

This study investigates the influence of fintech, digital financial services, and artificial intelligence adoption on financial inclusion and credit access within microfinance institutions. By examining primary data gathered from individuals involved in microfinance services, this study aims to reveal the ways in which technological advancements can improve financial accessibility and promote inclusive financial growth.

2. Review of Literature

Financial inclusion has become a focal point for policymakers, financial institutions, and researchers because of its crucial role in fostering economic growth and alleviating poverty. Microfinance institutions are acknowledged as key tools for delivering financial services to underserved groups, especially in developing nations (K & Aithal, 2024). Numerous studies have investigated how technological innovations can enhance financial inclusion. Globally, digital financial services have greatly improved access to financial services, notably through mobile banking and digital payment systems. These technologies lower transaction costs and extend financial access to populations that were previously unbanked. Likewise, financial innovation and technological progress have revolutionized financial intermediation by allowing financial institutions to provide services more effectively and reach underserved areas(Al Rifai & Albaker, 2025). The rise of financial technology (FinTech) has further propelled the advancement of digital financial services. Innovations in FinTech, such as peer-to-peer lending, digital payments, and online financial platforms, have significantly enhanced financial accessibility and efficiency in financial markets. Research has also delved into the connection between FinTech and financial inclusion. Digital financial services and mobile banking have been pivotal in boosting financial inclusion, particularly in developing regions where traditional banking infrastructure is scarce.(Ebirim & Odonkor (2024) found that artificial intelligence is beginning to reshape the financial sector by enabling financial institutions to enhance decision-making through advanced data analytics, automated credit scoring, and risk assessment systems. In the realm of microfinance institutions, technological innovations hold the potential to boost operational efficiency and reduce credit risk. Digital technologies can streamline loan processing, improve credit evaluations, and enhance service delivery to low-income borrowers(Chatterjee, 2025). However, despite the growing significance of financial technologies, empirical research on the combined impact of FinTech adoption, digital financial services, and artificial intelligence on financial inclusion and credit accessibility within microfinance institutions is still limited(Nwoke, 2024). Most existing studies primarily focus on digital banking and financial technology within traditional banking systems rather than microfinance institutions.

Consequently, this study seeks to fill this research gap by exploring the influence of FinTech adoption, digital financial services, and artificial intelligence on financial inclusion and credit accessibility in microfinance institutions.

3. Objectives of the Study

The primary objective of this study is to examine the role of technological innovation in improving financial inclusion and credit accessibility within microfinance institutions. Specifically, this study aims to achieve the following objectives:

1. To examine the impact of FinTech adoption on financial inclusion in microfinance institutions
2. To analyze the role of digital financial services in enhancing financial inclusion among microfinance users.
3. To evaluate the influence of artificial intelligence adoption on credit accessibility in microfinance institutions
4. To explore the relationship between technological innovation and financial inclusion outcomes in the microfinance sector.

4. Research Hypotheses

Based on the objectives of the study and the proposed conceptual framework, the following hypotheses were formulated to examine the relationship between technological innovations and financial outcomes in microfinance institutions.

Hypothesis 1

H_{01}: FinTech adoption has no significant impact on financial inclusion.
H_{11}: FinTech adoption has a significant impact on financial inclusion.

Hypothesis 2

H_{02}: Digital financial services do not significantly influence financial inclusion.
H_{12}: Digital financial services significantly influence financial inclusion.

Hypothesis 3

H_{03}: AI adoption does not significantly influence credit accessibility.
H_{13}: AI adoption significantly influences credit accessibility.

5. Conceptual Framework

The conceptual framework illustrates links between technological progress and financial outcomes in microfinance institutions. The research identifies FinTech, digital financial services, and artificial intelligence as independent variables, with financial inclusion and credit accessibility as dependent variables. FinTech adoption involves using financial technologies to enhance efficiency and delivery of financial services within microfinance institutions through digital platforms and payment systems. Digital financial services include mobile banking, digital wallets, and online transactions, enabling access to financial services without conventional banking systems. These services improve financial inclusion by making services more accessible to underserved populations. The integration of artificial intelligence uses automated credit scoring and predictive analytics to assist institutions in refining decision-making and managing credit risk. The framework posits that technological advancements can enhance financial inclusion by broadening service access and improving credit accessibility through better evaluation and loan processing. The framework delineates connections between technological factors and financial outcomes, examined empirically using statistical methods.

Figure 1: Conceptual Framework of the Study
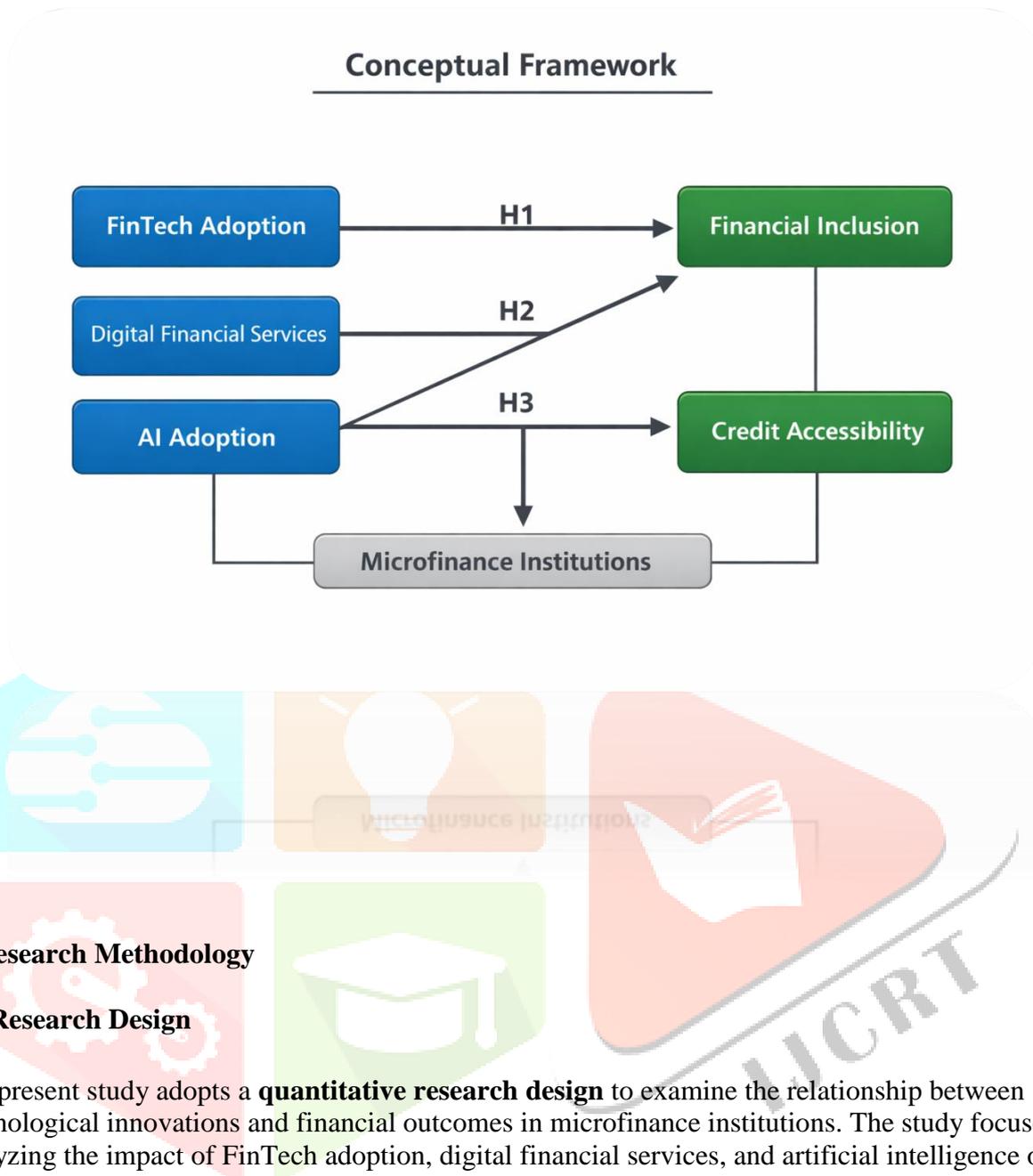
7. Research Methodology

7.1 Research Design

The present study adopts a **quantitative research design** to examine the relationship between technological innovations and financial outcomes in microfinance institutions. The study focuses on analyzing the impact of FinTech adoption, digital financial services, and artificial intelligence on financial inclusion and credit accessibility.

7.2 Data Collection

The study is based on **primary data** collected through a structured questionnaire. The questionnaire was designed to capture respondents' perceptions regarding the adoption of financial technologies and their influence on financial inclusion and credit accessibility within microfinance institutions.

7.3 Sample Size and Respondents

The study collected responses from **120 respondents** associated with microfinance services, including microfinance borrowers and small entrepreneurs. The respondents were selected from individuals familiar with microfinance activities in **Maharashtra, India**.

7.4 Sampling Technique

The study employed a **convenience sampling method** to collect data from respondents who were accessible and willing to participate in the survey.

7.5 Measurement Scale

The questionnaire consisted of multiple statements measured using a **five-point Likert scale**, where:

1 – Strongly Disagree
2 – Disagree
3 – Neutral
4 – Agree
5 – Strongly Agree

This scale was used to measure respondents' perceptions of FinTech adoption, digital financial services, artificial intelligence adoption, financial inclusion, and credit accessibility.

7.6 Variables of the Study

Independent Variables

- FinTech Adoption
- Digital Financial Services
- Artificial Intelligence Adoption

Dependent Variables

- Financial Inclusion
- Credit Accessibility

7.7 Data Analysis Techniques

The collected data were analyzed using statistical techniques such as **descriptive statistics, correlation analysis, and regression analysis**. These analyses were performed using Jamovi to examine the relationships between the study variables and to test the proposed hypotheses.

8. Data Analysis and Results

8.1 Descriptive Statistics

Descriptive statistics were conducted to summarize the characteristics of the study variables. The analysis provides information regarding the mean values, standard deviation, minimum values, and maximum values of the variables included in the study.

Table 1: Descriptive Statistics of the Study Variables

	FinTech_Adoption	Digital Finance	AI_Adoption	Financial Inclusion	Credit Accessibility
N	120	120	120	120	120
Missing	0	0	0	0	0
Mean	4.24	3.90	4.20	3.98	4.28
Standard deviation	0.469	0.289	0.289	0.383	0.341
Minimum	3.00	3.00	3.00	3.00	3.00
Maximum	5.00	5.00	5.00	4.50	5.00

The descriptive statistics indicate that respondents generally have positive perceptions regarding technological innovations in microfinance services. Credit accessibility recorded the highest mean value (4.28), suggesting that respondents believe technological innovations improve access to credit. FinTech adoption and AI adoption also recorded relatively high mean values, indicating favorable perceptions of technology adoption in microfinance institutions.

8.2 Correlation Analysis

Correlation analysis was conducted to examine the relationships among the study variables.

Table 2: Correlation Matrix

		FinTech Adoption	Digital Finance	AI_ Adoption	Financial Inclusion	Credit Accessibility
FinTech_ Adoption	Pearson's r	—				
	df	—				
	p-value	—				
Digital Finance	Pearson's r	0.516	—			
	df	118	—			
	p-value	<.001	—			
AI_Adoption	Pearson's r	0.245	0.179	—		
	df	118	118	—		
	p-value	0.007	0.051	—		
Financial Inclusion	Pearson's r	0.299	0.367	0.197	—	
	df	118	118	118	—	
	p-value	<.001	<.001	0.031	—	
Credit Accessibility	Pearson's r	-0.291	-0.062	0.060	0.167	—
	df	118	118	118	118	—
	p-value	0.001	0.503	0.518	0.068	—

The correlation analysis indicates a significant positive relationship between FinTech adoption and digital financial services (r = 0.516, p < 0.001). Furthermore, FinTech adoption is positively associated with financial inclusion (r = 0.299, p < 0.001). Digital financial services also demonstrate a significant positive relationship with financial inclusion (r = 0.367, p < 0.001). However, AI adoption shows no significant relationship with credit accessibility (r = 0.060, p > 0.05).

Model 1: Financial Inclusion

Table 3: Regression Results for Financial Inclusion

Predictor	Coefficient	p-value
FinTech Adoption	0.122	0.135
Digital Financial Services	0.384	0.004

$R^2 = 0.151$

The regression results indicate that digital financial services have a statistically significant positive effect on financial inclusion ($p = 0.004$). However, FinTech adoption does not show a statistically significant influence on financial inclusion ($p = 0.135$).

Model 2: Credit Accessibility

Table 4: Regression Results for Credit Accessibility

Predictor	Coefficient	p-value
AI Adoption	0.070	0.518

$R^2 = 0.0035$

The regression results indicate that artificial intelligence adoption does not have a statistically significant effect on credit accessibility.

8.4 Hypothesis Testing Summary

Table 5: Summary of Hypothesis Testing

Hypothesis	Relationship	Result
H_1	FinTech Adoption → Financial Inclusion	Not Supported
H_2	Digital Financial Services → Financial Inclusion	Supported
H_3	AI Adoption → Credit Accessibility	Not Supported

9. Discussion of Findings

The study examined the impact of FinTech adoption, digital financial services, and artificial intelligence on financial inclusion and credit accessibility in microfinance institutions. The descriptive statistics indicated that respondents generally hold positive perceptions regarding the role of technological innovations in improving financial services.

The correlation results showed significant positive relationships between FinTech adoption, digital financial services, and financial inclusion. This suggests that technological innovations contribute to expanding access to financial services. However, regression analysis revealed that only digital financial services have a statistically significant positive effect on financial inclusion.

FinTech adoption did not show a significant influence on financial inclusion, indicating that the adoption of technology alone may not be sufficient unless it is effectively integrated into financial service delivery. Similarly, artificial intelligence adoption did not demonstrate a significant impact on credit accessibility, which may reflect the limited use of AI technologies in microfinance institutions at present.

Overall, the findings highlight the importance of digital financial services as a key driver of financial inclusion in the microfinance sector.

10. Conclusion and Policy Recommendations

This research explored how technological advancements can enhance financial inclusion and improve credit access within microfinance institutions. The study's results reveal that digital financial services play a significant role in boosting financial inclusion, whereas the adoption of FinTech and artificial intelligence does not exhibit statistically significant impacts in the current dataset. The findings highlight that the growth of digital financial platforms, including mobile banking, digital payments, and online lending systems, is vital for expanding access to financial services for underserved communities. Based on these insights, several policy recommendations emerge. Firstly, policymakers and financial institutions should prioritize the enhancement of digital financial infrastructure to foster financial inclusion. Secondly, microfinance institutions are encouraged to promote digital financial services by offering user-friendly platforms and conducting awareness campaigns. Thirdly, initiatives to improve digital literacy among microfinance clients could further facilitate the adoption of digital financial technologies. Lastly, regulatory backing and technological investments might assist microfinance institutions in gradually incorporating advanced technologies like artificial intelligence for credit evaluation and risk management. In summary, while technological innovation holds the potential to revolutionize microfinance services, the successful implementation of digital financial services remains the key factor in advancing financial inclusion.

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