

Fintech Adoption and Financial Inclusion among Indian MSMEs: A Conceptual Framework for Digital Financial Capability and Trust

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Abstract: *Financial technology (FinTech) is changing how enterprises make payments, manage financial records, access credit, and interact with formal financial institutions. For micro, small, and medium enterprises (MSMEs), digital payments, online banking, digital accounting, and technology-enabled lending may reduce transaction frictions and create new routes to financial services. However, technology use does not necessarily produce meaningful financial inclusion. Benefits depend on affordability, service suitability, digital financial literacy, trust, connectivity, and protection from fraud and inappropriate lending. This conceptual paper develops a framework for examining the relationship between FinTech adoption and financial inclusion among Indian MSMEs. It draws on technology-acceptance and technology-organization-environment perspectives and synthesizes selected scholarly and institutional sources. The framework treats FinTech adoption as a multidimensional construct encompassing the breadth, frequency, and business integration of digital financial services. Financial inclusion is considered through access to suitable formal services, regular use, affordability, and perceived accessibility. Digital financial literacy, trust, and perceived barriers are proposed as explanatory factors, while firm characteristics are treated as potential controls. Five testable hypotheses and a quantitative survey design are presented for future research. No primary dataset has been collected or analysed for this manuscript; therefore, it reports no empirical findings. The paper contributes a context-sensitive research model and practical guidance for evaluating whether FinTech adoption supports substantive, responsible financial inclusion rather than merely increasing digital transactions.*

Keywords: FinTech; financial inclusion; MSMEs; digital financial services; digital financial literacy; trust; India

1. Introduction

Micro, small, and medium enterprises are important participants in employment, local entrepreneurship, industrial activity, and supply chains. Their ability to operate and grow depends partly on access to reliable payment services, working capital, credit, savings, insurance, and usable financial information. Smaller firms may nevertheless encounter barriers to formal finance, including limited collateral, incomplete financial records, information asymmetry, transaction costs, and lengthy application processes. Digital financial technologies have created alternative channels through which enterprises can make and receive payments, maintain records, and apply for financial products.

FinTech is not a single intervention. It includes digital payment acceptance, mobile and online banking, electronic invoicing, digital bookkeeping, technology-enabled credit assessment, and online lending. These services differ in purpose, cost, risk, provider arrangements, and regulatory treatment. Digital payments may improve convenience and generate transaction records, whereas digital credit may offer faster application processes while also raising questions about total borrowing cost, repayment capacity, transparency, and data use. It is therefore necessary to examine specific forms of adoption and the outcomes associated with them rather than assume that all FinTech services have uniform effects.

Financial inclusion also requires a multidimensional interpretation. Access to an account or a digital application is not sufficient if services are unaffordable, unsuitable, unreliable, or not used when needed. An MSME may accept

digital payments while remaining unable to secure appropriate working capital. Another enterprise may be offered a digital loan but reject it because the terms are unclear or the repayment schedule is inconsistent with its cash flow. Meaningful inclusion should therefore consider access, actual use, affordability, suitability, and the capacity to use services safely.

The research problem addressed here is that FinTech adoption is often discussed as a route to financial inclusion, yet adoption and inclusion are conceptually distinct. Firms with stronger records, greater digital capability, and better connectivity may be more likely both to adopt FinTech and to access formal finance. This creates a risk of attributing outcomes to technology without considering the organizational and contextual conditions that influence both. The purpose of this paper is to develop a conceptual framework for examining the relationship between FinTech adoption and financial inclusion among Indian MSMEs, with digital financial literacy, trust, and adoption barriers as important contextual factors.

The paper addresses four research questions:

- RQ1: Which digital financial services are used by Indian MSMEs, and how extensively are they used?
- RQ2: Is broader and more frequent FinTech adoption associated with greater access to suitable formal financial services?
- RQ3: How are digital financial literacy and trust associated with adoption and sustained use?
- RQ4: Which perceived barriers may constrain FinTech adoption and its potential contribution to financial inclusion?

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2. Scope and Approach

This paper is a conceptual article based on a focused synthesis of selected scholarly and institutional sources identified in the underlying research draft. It is not presented as a systematic literature review: no exhaustive database search, predefined screening protocol, or formal risk-of-bias assessment was conducted. The cited sources provide a theoretical and contextual basis for defining the constructs and developing propositions for future testing. The Technology Acceptance Model is used to explain how perceived usefulness and ease of use may relate to technology acceptance (Davis, 1989), while the technology–organization–environment perspective directs attention to technological readiness, organizational capabilities, and external conditions (Tornatzky & Fleischer, 1990).

The proposed setting is Indian MSMEs across manufacturing, trading, and service activities. A later empirical study should define eligibility using the official MSME classification in force during data collection and specify the geographic coverage and sampling frame. The present paper does not claim to represent all Indian MSMEs or to establish causal effects.

3. Literature Synthesis

3.1 FinTech and Digital Financial Services

FinTech combines financial services with digital technologies and can change the way firms execute transactions, maintain financial information, and interact with providers. For MSMEs, relevant applications include digital payments, online banking, electronic invoices, digital accounting, online credit applications, and technology-enabled cash-flow tools. These services may lower administrative friction and improve the visibility of transactions, but the value created depends on reliability, interoperability, usability, service costs, and fit with daily business routines. The OECD's discussion of SME digital transformation emphasizes that the ability to benefit from digital tools depends on capabilities and enabling conditions, not simply access to technology (OECD, 2021).

Adoption is therefore best measured as a set of related behaviours rather than a single yes/no item. A firm may use digital payments every day but never use online credit or digital accounting. Measures should distinguish the number of service types used, frequency of use, duration of use, and integration into business processes. These dimensions can reveal differences between superficial access and substantive adoption.

3.2 Financial Inclusion: Access, Usage, and Quality

Financial inclusion refers to access to and effective use of appropriate financial services. For enterprises, this may involve transaction accounts, payment services, formal credit, insurance, savings, and financial-management tools. The Global Findex work documents the growing importance of digital payments and account use in broader financial inclusion, although household-level findings should not be assumed to describe MSMEs directly (Demirgüç-Kunt et al.,

2022). In an enterprise study, inclusion should be measured through indicators appropriate to the firm and its financial needs.

Access and usage should be separated from quality. An enterprise may have access to a product but find it too expensive, difficult to use, or poorly matched to its cash-flow cycle. Perceptual measures such as convenience and affordability can complement factual indicators such as account access, use of digital payments, application for formal credit, or receipt of a loan. Combining these dimensions into one index requires a transparent rationale and evidence that the measures form a coherent construct.

3.3 Technology Adoption Perspectives

The Technology Acceptance Model proposes perceived usefulness and perceived ease of use as central factors associated with acceptance of information technology (Davis, 1989). Applied to FinTech, usefulness may reflect whether a service saves time, supports reconciliation, improves payment convenience, or facilitates financial management. Ease of use may reflect whether owners and staff can understand the interface and complete transactions without excessive effort. These perceptions may be especially relevant for smaller enterprises that have limited specialist support.

The technology–organization–environment framework broadens the analysis beyond individual perceptions. Technological factors include compatibility, reliability, security, and complexity; organizational factors include resources, staff skills, recordkeeping, and managerial readiness; and environmental factors include provider support, customer expectations, competition, infrastructure, and regulation (Tornatzky & Fleischer, 1990). Together, these perspectives suggest that FinTech adoption reflects both perceived value and the enterprise's ability to implement and sustain use.

3.4 Digital Financial Literacy and Trust

Digital financial literacy includes the knowledge and skills required to use digital financial services safely and effectively. Relevant capabilities may include verifying transactions, understanding fees and credit terms, protecting authentication credentials, identifying fraud attempts, and using complaint or dispute procedures. Limited capability may discourage adoption or increase the likelihood of errors. A future study should distinguish self-reported confidence from demonstrated knowledge where feasible.

Trust is also important because digital financial services involve money, identity, business records, and sometimes credit obligations. Trust may be associated with provider reputation, reliability, clear pricing, data protection, and effective complaint handling. It should not be treated as a substitute for objective service quality or regulatory safeguards; rather, it is a user perception that may influence willingness to adopt and continue using a service.

3.5 FinTech, Formal Credit, and MSME Constraints

Digital transaction records and alternative data may provide financial providers with additional information about some enterprises. However, digital lending does not automatically eliminate information asymmetry or affordability constraints. Data quality, model transparency, repayment capacity, pricing, privacy, and responsible collection practices remain important. The Reserve Bank of India's work on digital lending highlights the need to consider consumer protection and the governance of digital credit arrangements (Reserve Bank of India, 2022). Any empirical study should avoid treating credit access as beneficial without considering suitability and cost.

MSMEs vary by size, sector, age, location, business formality, and digital infrastructure. These differences can affect both FinTech adoption and financial inclusion. A firm with stable connectivity and organized records may be better positioned to use digital services than a firm facing unreliable internet access or limited documentation. Such characteristics should be measured and considered when interpreting observed relationships.

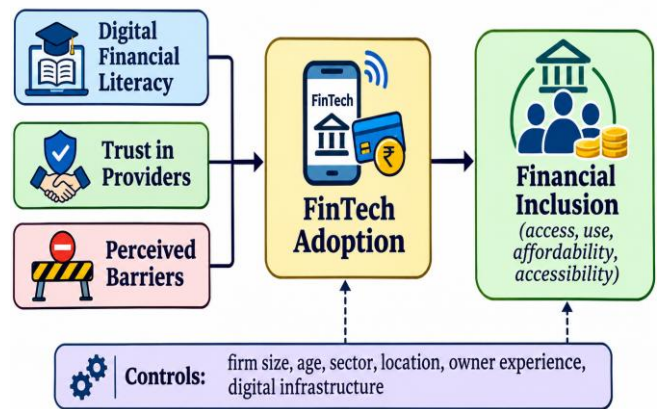
3.6 Research Gap and Proposed Contribution

The conceptual gap addressed by this paper is the need to distinguish the breadth and intensity of FinTech adoption from the quality and outcomes of financial inclusion among MSMEs. A narrow focus on digital payment use may overlook whether firms can access suitable formal credit, afford the services they use, or sustain use when required. The proposed framework integrates adoption breadth and frequency with several dimensions of inclusion and considers digital financial literacy, trust, and perceived barriers as relevant explanatory factors. The precise novelty of the framework must be confirmed through an updated and reproducible review of recent empirical studies before journal submission.

4. Conceptual Framework and Propositions

The proposed model treats FinTech adoption as the principal predictor and financial inclusion as the main outcome. FinTech adoption is conceptualized through breadth, frequency, and integration of digital financial services into business activities. Financial inclusion is conceptualized through access to suitable services, regular use, perceived affordability, and perceived accessibility. Digital financial literacy and trust are proposed as explanatory factors associated with adoption and sustained use, while cost, connectivity, complexity, and security concerns are treated as potential barriers. Firm size, age, sector, location, owner experience, and digital infrastructure may be included as controls.

Conceptual Model (Proposed)



4.1 Proposed Hypotheses

- H1: FinTech adoption is positively associated with financial inclusion among Indian MSMEs.
- H2: The breadth and frequency of FinTech use are positively associated with access to suitable formal financial services.
- H3: Digital financial literacy is positively associated with FinTech adoption among Indian MSMEs.
- H4: Trust in digital financial service providers is positively associated with regular FinTech use.
- H5: Perceived barriers, including cost, connectivity, complexity, and security concerns, are negatively associated with FinTech adoption.

These hypotheses are theoretically motivated expectations, not findings. A cross-sectional design can estimate associations but cannot establish temporal precedence or causal effects. Reverse causality and unobserved differences between firms remain plausible.

5. Proposed Research Methodology for Future Testing

5.1 Research Design and Sampling

A quantitative, cross-sectional survey is proposed. The target respondents should be owners, proprietors, partners, directors, or managers who are familiar with the enterprise's financial practices. The population should include eligible MSMEs across relevant sectors and regions in India. Where a reliable sampling frame is available, stratified or probability-based sampling would improve coverage of firm sizes, sectors, and locations. If purposive or convenience sampling is used, the manuscript must acknowledge the resulting limits on generalizability.

Sample size should be justified through an a priori power analysis based on the planned model, number of predictors, expected effect size, desired statistical power, and significance level. The study should define inclusion and exclusion criteria, the data-collection period, the handling of incomplete responses, and procedures for preventing duplicate submissions before recruitment begins.

5.2 Construct Operationalization

FinTech adoption may be measured using factual items on service types, frequency, duration, and business integration. Financial inclusion should be operationalized using distinct indicators of access, actual use, affordability, and suitability. Digital financial literacy may be measured through self-reported and, where practical, knowledge-based items. Trust may cover perceived reliability, clarity of terms, data protection, and complaint handling. Perceived barriers may cover cost, connectivity, complexity, security concerns, lack of awareness, and documentation requirements.

Validated measures should be used where suitable, with any adaptations documented. Questionnaire items should be reviewed by subject experts, pilot-tested with MSME respondents, and translated and back-translated if more than one language is used. A five-point agreement scale may be appropriate for perceptual items, but factual usage questions should be kept separate. Composite scores should be calculated only after checking item direction, missingness, reliability, and construct validity.

5.3 Proposed Measurement Summary

Construct	Proposed indicators	Model role	Measurement note
FinTech adoption	Service breadth, frequency, duration, business integration	Predictor	Include factual usage measures
Financial inclusion	Access, regular use, affordability, accessibility, suitability	Outcome	Keep dimensions distinguishable
Digital financial literacy	Transaction verification, fee/credit understanding, fraud awareness, dispute knowledge	Explanatory factor	Separate confidence from knowledge where feasible
Trust	Reliability, transparency, data protection, complaint handling	Explanatory factor	Perceptions do not replace objective safeguards
Perceived barriers	Cost, connectivity, complexity, security, awareness, documentation	Barrier factor	Measure barriers experienced by the firm
Control variables	Firm size, age, sector, location, owner experience, digital infrastructure	Controls	Predefine controls based on theory

5.4 Data Analysis Plan

- Screen responses for eligibility, missingness, duplicates, inconsistent answers, and unusual response patterns.
- Use descriptive statistics to summarize firm characteristics, service adoption, usage frequency, and financial inclusion indicators.
- Assess internal consistency and construct validity before forming multi-item scales.
- Use correlation analysis to examine preliminary associations among adoption, inclusion, literacy, trust, and barriers.

- Estimate regression models appropriate to the outcome scale and include theoretically justified firm-level controls.
- Where sample size and measurement quality permit, conduct robustness checks or subgroup analysis by firm size, sector, location, or digital capability.
- Report effect sizes, confidence intervals, assumptions, model diagnostics, and non-significant findings rather than relying only on p-values.

The analytical model must match the measurement scale. A continuous inclusion score may be examined using linear regression if assumptions are reasonably met; binary outcomes, such as whether a firm obtained formal credit during a defined period, may require logistic regression. Ordinal responses may require an ordinal model. Statistical significance should not be interpreted as practical importance.

5.5 Ethics and Transparency

The study should obtain institutional ethics approval where required and provide clear participant information and informed consent. Participation should be voluntary. Researchers should avoid collecting account numbers, passwords, payment credentials, tax identifiers, or unnecessary sensitive transaction details. Data should be securely stored, access should be restricted, and results should be reported in aggregate. Funding, conflicts of interest, data availability, author contributions, and any AI-tool use should be disclosed in line with the target journal's requirements.

6. Discussion

The framework emphasizes that digital financial access and meaningful financial inclusion are related but distinct. FinTech adoption may be associated with improved convenience and more organized transaction records, yet these benefits do not guarantee access to suitable formal credit or affordable financial services. The proposed model therefore treats inclusion as multidimensional and recommends separating service access, use, affordability, and suitability in measurement.

The inclusion of digital financial literacy and trust reflects the possibility that technology adoption depends not only on service availability but also on whether users understand the service and have confidence in the provider. If future evidence supports these relationships, training, transparent terms, reliable complaint channels, and accessible support may be relevant to sustained use. If the expected relationships are not observed, explanations may include weak service fit, costs, infrastructure gaps, or the use of digital services without improvements in access to other financial products.

Selection effects remain an important alternative explanation. MSMEs with better records, stronger digital capabilities, or greater formalization may be more likely both to adopt FinTech and to access formal financial services. Statistical controls can reduce, but not eliminate, this concern. Longitudinal data or a credible quasi-

experimental design would provide stronger evidence about whether adoption precedes changes in inclusion.

7. Managerial Implications

- Select services around defined business needs, such as receiving payments, reconciling transactions, managing invoices, or exploring appropriate credit.
- Compare fees, settlement times, provider support, data practices, interoperability, and total costs before adopting a service.
- Strengthen digital financial literacy through practical training on transaction verification, fraud prevention, credit costs, repayment terms, and dispute procedures.
- Maintain reliable financial records and separate business and personal transactions where feasible; digital records may support applications but do not guarantee credit approval.
- Evaluate digital credit by reviewing the total cost of borrowing, repayment schedule, penalties, permissions for data use, and consequences of missed payments.
- Protect business data with strong authentication, restricted access, secure devices, backups, and clear procedures for suspicious transactions.

8. Policy Implications

Financial institutions and FinTech providers can support more inclusive outcomes by designing services around MSME cash-flow patterns, explaining pricing and eligibility in accessible language, providing reliable complaint channels, and accommodating users with different levels of digital capability. Digital credit products should communicate total borrowing costs, repayment obligations, and data-use practices clearly. Providers should also consider interoperability and service continuity for enterprises that use multiple platforms.

Policymakers, industry bodies, and MSME support organizations can strengthen inclusion through practical digital financial education, cybersecurity awareness, accessible information about regulated providers, and proportionate consumer protection. Programme evaluation should focus on outcomes such as sustained use, access to suitable formal finance, affordability, and user confidence—not merely registrations, downloads, or transaction counts. Regulatory references should be checked against current official guidance before submission because rules and implementation requirements can change.

9. Limitations and Future Research

This manuscript is conceptual and contains no original primary data or statistical results. The focused source synthesis is not a systematic review and may not capture all relevant empirical studies. The proposed hypotheses have not been tested, and the framework should not be interpreted as evidence of causal effects. Self-reported survey measures may be affected by recall and social-desirability bias, while a convenience sample may not represent the diversity of Indian MSMEs.

Future research should conduct an updated and reproducible literature review, pilot-test measurement instruments, and collect data from a clearly defined MSME population. Longitudinal designs could assess whether adoption precedes changes in financial inclusion. Qualitative interviews could explore why firms adopt, reject, or discontinue particular services. Studies should also distinguish digital payments, digital lending, accounting tools, and insurance-related services, as their potential benefits and risks differ. Further analyses may examine variation by firm size, sector, geography, business age, and digital capability.

10. Conclusion

FinTech may create opportunities for Indian MSMEs to improve payment convenience, maintain financial records, and interact with formal financial providers. However, technology adoption alone does not establish meaningful financial inclusion. Service suitability, affordability, digital financial literacy, trust, connectivity, and data security may influence whether digital services meet enterprise needs. This paper develops a conceptual framework linking FinTech adoption with financial inclusion and proposes five hypotheses for future empirical testing. It outlines a survey design, measurement approach, and analysis plan while explicitly avoiding unsupported empirical claims. The next step is to validate the framework through a transparent field study and assess the extent to which different forms of FinTech adoption are associated with appropriate, affordable, and sustained financial service use.

Declarations

- Funding: No external funding was reported for preparation of this manuscript; the author should verify this statement before submission.
- Conflict of interest: The author should confirm whether any competing interests exist.
- Ethics approval and consent: Not applicable to this conceptual paper, which reports no original human-participant data. This statement must be revised if primary data are collected.
- Data availability: No dataset was generated or analysed for this conceptual paper.
- Author contribution: The author should verify and amend the contribution statement according to the target journal's requirements.

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