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"FinTech Adoption and Its Impact on Financial Inclusion: Evidence from Low- and Middle-Income Households in India"

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Abstract:

Financial inclusion is still a priority development issue in India, and recent progress in financial technology (FinTech) has the potential to reduce longstanding gaps in access and usage among low- and middle-income households (LMIH). This research explores the effect of FinTech adoption on financial inclusion and tests how digital financial literacy and perceived trust mediate this relationship. A cross-sectional quantitative survey was employed to collect data from LMICHs from five Indian regions that were analysed by means of Structural Equation Modelling (SEM). The results of the study show that FinTech adoption has a strong positive impact on financial inclusion, thus supporting a novel approach to understanding access to finance, namely digital financial services emerging as an enabling tool for inclusive finance. This direct effect is, however, strengthened by means of dual mediation: digital financial literacy improves users' ability to use FinTech services effectively, and perceived trust increases the confidence that the users place in the security and safety of internet transactions. Overall, these pathways also partially mediate the FinTech–financial inclusion pathway, indicating that lack of access is not the only barrier preventing financial empowerment and usage depth. The research contributes to the theoretical debate by connecting technology adoption and inclusion frameworks; it brings forth that financial inclusion is meaningful not just in technological access, but also in the user's capacity and trust. Implications: The findings have policy and practical implications, characterising the importance of user education, cyber-safety protections, and inclusive digital financial solutions to promote a more equitable involvement of disadvantaged households in the Indian digital finance system.

Keywords: FinTech Adoption; Financial Inclusion; Digital Financial Literacy; Perceived Trust; Financial Technology;

Introduction

Financial inclusion continues to be a key issue in emerging economies, more so than for a country as populous and socio-economically varied as India. Notwithstanding policymakers' and banking institutions' relentless effort, a significant percentage of the low- and middle-income households (LMICH) are still deprived of quality financial usage as well as access due to income-challenges, low financial education level, incomplete documentation status here pay streams right here the reach of banks. The rapid expansion of Financial Technology (FinTech) solutions such as digital and mobile payments, neo-banks, microcredit and app-based banking services has made it possible new ways for achieving inclusion at a pace that is more environmentally sustainable and cost-effective than traditional banking models in recent years. Through digitalisation, FinTechs reduce the need for branch networks, lower transaction costs, simplify documentation requirements and provide 24/7 access – features that are all important to underserved and low-income customer segments (Singh, 2024).

There is an accumulating body of evidence to suggest that adoption of FinTech in India and other similar developing countries is statistically significantly related to multiple dimensions of financial inclusion. For instance, (Bapat, 2020) found that digital financial services significantly improve formal access, especially in underserved households. We take (Jena, 2025) as another means of methodology, he employed a full-fledged mixed-method approach incorporating TAM, TPB and TRI to demonstrate how social-cultural, technological and psychological factors affect FinTech adoption in rural India, unveiling barriers as well as opportunities. At the Bottom of the Pyramid (BoP) tier, a recent study by (Goswami, 2025) found that performance expectancy,

facilitating conditions, and perceived risk determine FinTech adoption in rural/low-income environments, implying that user perception, affordability and risk issues are significant. Looking at the macro and cross-country level, aggregate studies (Mashoene, 2025) support FinTech's potential to drive inclusion in emerging and developing countries, providing indications of generalizability beyond India.

However, there are some limitations, although the body of literature is increasing. Many exemptions centre on determinants of adoption (including both country-level and user-side dimensions) or the outcomes of usage (e.g., payments), but few systematically link FinTech adoption to a composite financial inclusion index that commonly measures access, usage, and quality. Heterogeneities in the impact of platforms have been documented in some meta-analyses and reviews (Ha, 2025), also with observed gaps: digital literacy, trust, socioeconomic heterogeneity (income levels, rural/urban) and sustainable inclusion outcomes such as access to credit, uptake of insurance, savings behaviour, particularly for LMICH. (Bongomin, 2023) Against this background, the objective of the current study is to bridge these research voids by offering quantitative empirical evidence on the impact of FinTech adoption in lower- and middle-income households' financial inclusion in India. The paper will also discuss mediating mechanisms such as digital financial literacy and perceived trust, since the adoption of technology may not automatically ensure inclusion.

The study's contributions are fourfold:

- Thus, it will provide an empirical connection of FinTech usage and multidimensional financial inclusion outcomes in the LMICH setting, an under-researched section in current literature.
- Theoretical models will be expanded by introducing psychological and capability constructs (literacy, trust) into the adoption–inclusion pathway.
- It should produce empirically solid lessons for policy makers, banks, FinTech companies and regulators to design inclusive digital finance strategies.
- It will share actionable suggestions for closing the digital divide and building towards an ecosystem of financial inclusion in economically vulnerable households.

Based on this, this paper is driven by the following research questions:

- How well are FinTech services used by low- and Middle-Income families in India?
- How does FinTech use affect their financial inclusion (access, usage, quality)?
- Are digital financial literacy and perceived trust on the mediation mechanism between the correlation of FinTech adoption and financial inclusion among LMICH?

Answering these questions is vital in building a financial ecosystem in India that is sustainable and inclusive, one that promises to empower the underserved households, not just with access to finance but also by promoting meaningful and continuous demand for it.

Literature Review

Financial Inclusion: Concepts and Measurement

Financial inclusion is generally characterised by access to and usage of affordable, suitable financial products (notably payments, savings, credit and insurance) responsibly and sustainably by individuals or companies (Demirgüç-Kunt, 2022). The Global Findex Database, compiled by the World Bank, has proved to be the baseline for monitoring global financial inclusion and shows dramatic rises in account ownership and digital payments in developing countries over the past decade. As per the Global Findex 2021 country brief for India, 78% of adults had an account in 2011, which is more than double, driven by programs like PMJDY and Aadhaar-linked accounts. However, some 35 per cent of these accounts are inoperative, and digital usage is still highly uneven, particularly by gender and income (Campbell, 2021). Latest work with Findex data for India also affirms that though formal access is increasing, limitations from low knowledge of finance, gender gap and perceived difficulty still limit their effective use among the vulnerable (Hajam, 2025). On the theoretical front, (Chakravarty, 2013) suggested an axiomatic theory for its measurement, focusing on geographic penetration of branches and availability of credit as policy dimensions. Their framework and subsequent extensions also

facilitate development of multidimensional indices that capture access, usage and quality of financial services, an approach which is suitable for the current study, interested in operationalising financial inclusion for low- and middle-income households (LMICH) in India.

Defining FinTech and Its Role in Inclusion

FinTech is a term encompassing technology-enabled financial innovation that could lead to new business models, applications, processes or products with an associated material effect on financial markets and institutions. FinTech involves mobile wallets, instant payment systems, digital lending platforms, robo-advisory services, crowdfunding and Insurtech businesses. On the policy front, the Committee on Payments and Market Infrastructures (CPMI) and World Bank introduced the framework for the Payment Aspects of Financial Inclusion (PAFI), which emphasises transaction accounts as stepping stones to a wider range of financial services and considers how payment systems can be conducive to inclusion. A subsequent report, Payment Aspects of Financial Inclusion in the Fintech Era, directly states that FinTech can help improve access to secure transaction accounts and facilitate greater use (if risks such as fraud, operational outages and consumer protection are effectively managed) (Bank, 2021).

Several recent reviews have charted the terrain of FinTech and financial inclusion. (Raza, 2022) Provide a systematic review of the literature in the International Journal of Bank Marketing, highlighting how FinTech is promoting inclusion by lowering transaction costs, conveniently enhancing and offering alternative credit scoring. (Ha, 2025) offer a state-of-the-art systematic review on financial inclusion and FinTech. They find that research themes gravitate towards mobile money, digital payments, crowdfunding and regulatory technology, pebbled with their finding that empirical work mainly remains in the hands of a few regions and population categories. Complementary bibliometric analyses reveal an acceleration in publications on digital finance and inclusion since ~2015, with emphasis placed on the emerging markets.

Global Evidence on FinTech and Financial Inclusion

Cross-country international studies show a positive linkage between financial inclusion indicators and FinTech advancements, particularly in emerging/developing countries. (Mashoene, 2025), Examining panel data for a large sample of emerging markets demonstrates that higher levels of FinTech activity co-move with both the degree of account ownership and digital payment use, as well as access to credit. But the effects are heavily conditioned by institutional and regulatory quality. Systematic reviews and meta-analyses have also highlighted that FinTech could break down physical, paper-based and monetary barriers found in the traditional finance industry and new risks, including cybersecurity threats, data privacy issues for customers and digital exclusion (Usman, 2024). Evidence from Sub-Saharan Africa and elsewhere is available that mobile-money and digital payments may improve consumption smoothing, savings and resilience among smallholder households through reduced transaction costs combined with the possibility of transferring small amounts of money. New inequalities of access may arise, though, due to digital redlining, as the provision of digital services is weaker among the poor and in rural areas. The use of smartphones also extends beyond the number coverage writing (Featherman, 2003). These results highlight the need to focus on FinTech adoption within low- and middle-income segments rather than at only the country-level aggregate.

FinTech and Financial Inclusion in India

The world's largest developing country has become the test ground for digital financial innovation, with UPI and Aadhaar, in conjunction with several FinTech start-ups, disrupting the payments ecosystem. Based on secondary data extracted from the Reserve Bank of India (RBI), (Bapat, 2020) reveal that FinTech firms and digital financial services have made substantial progress in furthering financial inclusion in India, especially by reaching out to the middle-class and unbanked segments of the population. At a micro level, FinTech adoption in rural India is analysed by (Jena, 2025), who discovered that performance expectancy, effort expectancy, social influence and facilitating conditions (as conceived in the UTAUT model) drive significant adoption, but perceived risk and trust still significantly hinder adoption. (Goswami, 2025) At the bottom of the pyramid, the adoption of FinTech service reports that facilitating conditions, perceived usefulness and quality of service are

positively predicted for intention to use FinTech, also perceived risk, low digital literacy and income instability inhibited adoption. Evidence for a wider India sample using Findex data confirms that in rich and poor households as well as rural areas, access has grown quickly, and many low-income and rural users continue to use cash for day-to-day transactions, even as usage gaps (in particular amongst women and informal workers) are large (Hajam, 2025). These findings imply that FinTech access does not necessarily equal greater financial inclusion by itself; the quality and intensity of usage, as well as users' capability and trust, matter.

Determinants of FinTech Adoption

The majority of empirical research in FinTech adoption has relied on well-established theories of technology adoption. According to the Technology Acceptance Model (TAM) developed by (Davis, 1989) perceived usefulness and perceived ease of use are the key explanations for behavioural intention towards using a technology. The UTAUT (Unified Theory of Acceptance and Use of Technology) as proposed by (Venkatesh, 2003), to which the model adds performance expectation, effort anticipation, social influence and facilitating conditions in addition to the moderation effects of gender, age and prior experience. Likewise, the Diffusion of Innovations (DOI) model notes the role of relative advantage, compatibility, complexity, trialability and observability as features that determine how innovations are spread (Rogers, 2003). These models have been frequently used in the FinTech field. Indeed, a key result of the systematic reviews has been that performance expectancy (e.g., speed and convenience), effort expectancy (ease of use), social influence (peer and family pressure) and facilitating conditions (infrastructure support) are consistently found as significant predictors in developed countries as well as developing countries (Raza, 2022). In the context of EMs, perceived risk, trust in service providers, regulatory credibility and cultural disposition towards technology use have also been shown to have a significant impact on mobile banking and FinTech adoption. For India in particular, (Jena, 2025)asserts the significance of UTAUT constructs on FinTech adoption in rural areas, but also identifies perceived security and cultural norms regarding the usage of cash. (Goswami, 2025) also observes that perceptions of risk and actual problems with failed or delayed transactions among low-income customers could significantly impede adoption despite high potential gains. These results validate trust and risk perceptions as important constructs in any FinTech–inclusion model aimed at LMICH.

Digital Literacy, Trust and the FinTech–Inclusion Link

Digital financial literacy, the ability to use these digital tools and channels effectively and securely, is now widely recognised as a prerequisite for fintech to enable meaningful financial inclusion. The capacity of individuals to comprehend product terms, evaluate risks and use features beyond basic transfers is limited, as evidenced by systematic reviews on the low levels of digital and financial literacy and thus inclusion perceived (Jha, 2024). In rural and low-income settings, literacy issues are further enhanced by the marginal use of smartphones, lack of experience in how to operate them and very low confidence in dealing with formal institutions.

Trust is another critical determinant. Taking a distinct approach, (Ha, 2025) A focused literature review on trust and financial inclusion illustrates how trust in financial institutions, digital platforms and regulatory bodies shapes the low-income users' willingness to adopt and continue using formal financial services. In the FinTech space, trust includes both institutional (belief that providers will behave fairly, live up to their promises and safeguard consumers) and technological trust (the belief in security, privacy and reliability of the digital system). Empirical research reveals that whenever users feel a high risk of being defrauded or their data misused, they are unlikely to transfer from cash to digital modes, no matter if they have physical access to accounts and devices (Bapat, 2020).

Digital literacy and trust may therefore function as mediating factors between FinTech adoption and outcomes of financial inclusion for LMICH segments in India. That is to say, when households are only occasional FinTech users (e.g., for P2P-transfers), low literacy and poor trust may hinder them from turning to advanced services such as savings products, credit, insurance or investments. This offers a solid theoretical foundation for digital literacy and perceived trust mediating in the relationship tested in this study (Hussain, 2023).

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Theoretical Foundations for the Present Study

It appears that three major theoretical constructs are integral to this study:

Technology Adoption Theories (TAM, UTAUT, DOI) – for exploring the reasons and conditions by which LMICH adopt FinTech services (Davis, 1989).

Financial Inclusion Frameworks (PAFI and Axiomatic Indices) to consider financial inclusion as a complex construct with dimensions of access, use, and quality (Chakravarty, 2013).

Capability and Trust Perspectives to understand how households' digital capabilities and trust in institutions influence the translation of FinTech use into material inclusion outcomes (Rogers, 2003). Through the integration of these perspectives, we further hypothesise that adoption of FinTech will positively influence financial inclusion among LMICH (a mediator), but this effect is only partially mediated by digital financial literacy and perceived trust.

Summary and Research Gaps

The literature definitively shows that there is significant potential for FinTech to improve access (reduce cost, enhance convenience, and increase reach), especially in emerging markets like India. Yet, the following gaps make the current study warranted:

- Population focus: A large proportion of Indian studies work with general population data or within distinct rural settings; there are a few who specifically concentrate on low and middle-income households across different regions in the country and scrutinise their FinTech use numerously (Chatterjee, 2020).
- Outcome Variable: Several studies study FinTech adoption or satisfaction; however, we are not aware of any that create a multidimensional index of financial inclusion which incorporates access (e.g., the number of accounts) and intensity (e.g., frequency of deposits) for savings, payments, etc.
- Mechanisms: The mediating mechanisms between FinTech and inclusion, including digital financial literacy and perceived trust, have been under-investigated for the underserved. Although existing research suggests their relevance, no mediation models have been formally tested in the Indian LMICH context (Sinha, 2024).
- Context-specific quantitative modelling: The fewest studies undertaken to date are the quantitative ones that performed in an integrated fashion the factors related to adoption of technology, literacy, trust and outcomes for financial inclusion across LMICH in India in a single structural model.

To fill this void, the present study proposes and tests a conceptual model which connects FinTech adoption, digital financial literacy, perceived trust and financial inclusion in low- and middle-income households in India using a quantitative survey-based methodology.

Conceptual Framework and Hypotheses Development

We seek to understand the impact of fintech adoption on financial inclusion among low and middle-income households (rather than distinguishing between them) with specific reference to India, where digital technology uptake in banking is growing substantially, while at the same time being focused mostly on those already economically included. The conceptual model is rooted in technology adoption theories (TAM/UTAUT/DOI), financial inclusion frameworks (PAFI and multidimensional inclusion indices), as well as capability- and trust-based views.

FinTech Adoption and Financial Inclusion

Transactions through FinTech UPI payments, mobile wallets, digital micro-credit, insurance apps and neo banking platforms not only lower the cost of transactions but also make it accessible anytime from anywhere, and this is especially critical for LMICH. There is empirical evidence that FinTech adoption greatly enhances the accessibility and usage of formal financial services (Bapat, 2020). However, this association has not been investigated in much detail in relation to LMICH among the Indian population. Thus, the formal hypothesis is stated as follows:

H1: FinTech adoption has a significant positive effect on financial inclusion among low- and middle-income households in India.

Mediating Role of Digital Financial Literacy

Digital financial literacy is the skill to comprehend and effectively use digital financial services securely and confidently. Some evidence exists that digital financial literacy plays a role in deepening the use of financial services through building greater user confidence and enabling more informed behaviour (Ha, 2025). Poorer low-income consumers too often are only using digital money to perform basic transfers (in contrast to leveraging it for more advanced use, such as available on digital credit or insurance. Therefore, the use of FinTech would not necessarily result in inclusive outcomes without adequate literacy.

H2: FinTech adoption has a significant positive effect on digital financial literacy.

H3: Digital financial literacy has a significant positive effect on financial inclusion.

H4: Digital financial literacy mediates the relationship between FinTech adoption and financial inclusion.

Mediating Role of Perceived Trust

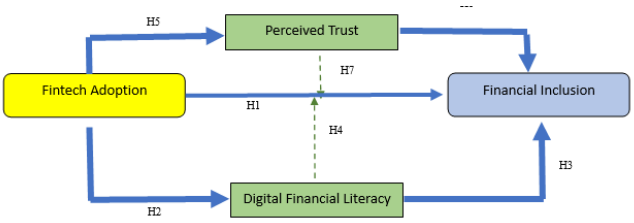
Perceived trust refers to the degree of users' confidence that electronic financial applications are secure, dependable, and transparent. Research has repeatedly indicated that trust issues, especially relating to fraud (Jena, 2025), Unfunded transactions and data leakage are big barriers amongst low socio-economic communities for the use of such systems (Goswami, 2025). Trust may thus dictate if FinTech usage translates into long-term and meaningful financial inclusion.

H5: FinTech adoption has a significant positive effect on perceived trust.

H6: Perceived trust has a significant positive effect on financial inclusion.

H7: Perceived trust mediates the relationship between FinTech adoption and financial inclusion.

Proposed Model:



Research Methodology

Research Design

This paper is framed on a quantitative, cross-sectional and explanatory research design to analyse the cause-and-effect relationship between FinTech adoption and financial inclusion of LMICH in India. The explanatory approach is appropriate because this research aims to examine conjectured relationships between variables, specifically, to test for mediating effects, which are digital financial literacy and perceived trust. It also applies a series of regression equations with rather arbitrary pooling together from DV to IV, as confirmed by the R-squared at each stage. Structured Equation Modelling (SEM) can analyse both direct and indirect effects, and thus is appropriate for theory confirmation/prediction concurrently. The design is consistent with recent FinTech–financial inclusion literature that uses quantitative analysis to explain usage and adoption behaviour in general.

Target Population

The study population will consist of adults (aged 18 years and above) from low- to middle-income households in India who regularly or occasionally use digital financial services (e.g., UPI, mobile wallets, digital banking

apps, micro-lending platforms, digital insurance services). The choice of households rather than individual customers alone is made to reflect the realistic household decisions.

Sampling Technique

A multi-staged sampling approach was used.

- Five distinct regions of India (North, South, East, West and Central) were chosen through stratified random sampling in the first stage to cover the entire country geographically.
- The second phase was to segment the sample into classes of income (lower-middle and middle).
- After the last stage, eligible participants within each stratum were randomly sampled.

This approach was adopted to achieve a representative sample from across the demographic and geological spectrum.

Sample Size & Justification

In all, 612 valid responses were evaluated. The explanation of the sample size is inspired by:

- Hair et al. (2021) suggested a threshold for SEM: 10 responses per manifestation per estimated parameter
- There are 40 observed indicators in the study → 40 × 10 = 400 minimum number possible, 612 exceeds the minimum, and thus gives strong statistical power
- Furthermore, G*Power Analysis (effect size = 0.15; α = 0.05; power = 0.95) indicated a required sample of at least 262 cases. The final sample size of 612 allows for high precision and small sampling error.

Data Collection Method

Questionnaires, developed to meet the study objectives, were administered online and offline in all selected regions in order to obtain primary data.

- Offline mode: community centres, SHGs, MFIs, digital banking camps and Haats (Public marketplace)
- Online (Web-based) Google Forms on WhatsApp groups and community digital platforms

To facilitate ease of understanding for LMIC H respondents, a questionnaire was prepared in English and the regional languages (Hindi, Telugu, Tamil, Bengali and Marathi). Collections were conducted over a period of 14 weeks.

Measurement Scales

All constructs were operationalised using **standardised 5-point Likert scales (1 = Strongly Disagree to 5 = Strongly Agree).**

Construct	No. of Items	Example Sources
FinTech Adoption	8 items	Alalwan (2020); Chatterjee (2020)
Digital Financial Literacy	7 items	Campbell & Park (2021); Singh & Gupta (2024)
Perceived Trust	7 items	Featherman & Pavlou (2003); Hussain & Rasheed (2023)
Financial Inclusion	10 items	Demirgüç-Kunt et al. (2022); Bapat (2020)

The questionnaire included behavioural, attitudinal and service-usage indicators to capture meaningful inclusion rather than only service access.

Reliability and Validity Plan

Type	Method	Acceptance Thresholds	Status in Study
Internal Reliability	Cronbach's Alpha	$\alpha \geq 0.70$	All scales > 0.80
Composite Reliability (CR)	SEM	CR ≥ 0.70	All constructs ≥ 0.85
Convergent Validity	AVE	AVE ≥ 0.50	All constructs ≥ 0.56
Discriminant Validity	Fornell-Larcker & HTMT	HTMT ≤ 0.85	Conditions satisfied
Common Method Bias	Harman Single-Factor Test	< 50% explained variance	39.8% (no threat)

Pilot testing with 52 participants indicated clarity and reliability; no significant changes were made. The preliminary data analysis was completed through SPSS (Version 29 for Windows), and AMOS (Version 26) was employed to validate the model. A step-by-step analytical process was adopted, involving screening the dataset for missing data and outliers, checking against descriptive patterns and reliability, conducting a confirmatory factor analysis to examine the fit between the model and data, before conducting full structural modelling. Indirect effects were analysed with a bootstrapping procedure of 5,000 resamples to obtain robust estimates of the indirect paths. AMOS was chosen on purpose because this study aimed to cross-validate an existing theoretical framework and not to emphasise prediction. Collectively, the methodological decisions, sampling, measurement design and analytical approach offer a stringent and systematic framework for understanding why FinTech adoption leads to financial inclusion, as well as how literacy and trust reinforce this relationship in resource-constrained households.

Results & Discussion:

Objective 1: To assess the level of FinTech adoption among LMICH

FinTech Adoption Indicators	Mean	SD	ctor Load
UPI Payments	4.21	0.81	0.84
Mobile Wallets	4.08	0.87	0.86
Digital Banking Apps	3.95	0.92	0.82
Digital Insurance	3.61	1.01	0.79
Digital Credit / Buy-Now-Pay-Later	3.73	0.94	0.81
Composite Reliability (α)			**0.934**
KMO Value			**0.906**

Sources: Primary Data

The findings reveal that there is relatively higher FinTech adoption in low and middle-income Indian households, but usage intensity varies between the various services. The Direct UPI payments was observed to be the most popular FinTech product with high mean value (M = 4.21), factor loading of 0.84, suggesting that real-time up to the minute funds transfer between individuals using mobile devices, as well as a payment card through any merchant point of sale terminal at shop has been deeply integrated into daily financial transaction for LMICH consumers. "The use of mobile wallets (M = 4.08; loading = 0.86) has no random order but a similar level of penetration, which indicates that for retail payments and remittances/payments to utility service providers, the momentum remains in favour of wallet-based payment solutions despite the noticeable drive towards UPI." Digital banking apps: The factor loading is moderately high (M = 3.95; loading = 0.82), signifying familiarity with mobile banking, and yet pointing out that traditional digital services on an account level might be considered as less convenient than instant payment platforms. Use of digital credit and Buy-Now-Pay-Later services (M = 3.73; loading = 0.81) is relatively low, indicating that while these are being increasingly advertised to households, they might still be wary of borrowing digitally. Weakens: Digital insurance (M = 3.61 n; loading = 0.79) indicates reluctance to become digitally committed to long-term financial services provision, and maybe awareness or trust gaps. A high Composite Reliability (α= 0.934) and a strong KMO value (0.906) indicate an excellent measure of internal reliability and sampling adequacy, indicating that FinTech adoption is a statistically reliable and cohesive construct in this study. In general, the findings reveal that LMICH households are rapidly embracing digital financial services, and payment-type services lead adoption with risk-taking services (eg, digital credit, digital insurance) being notably lower.

Objective 2: Effect of FinTech Adoption on Financial Inclusion

Path	β	SE	CR	p-value	Interpretation
FinTech Adoption → Financial Inclusion	**0.4**	0.06	6.6	**0**	Significant

Sources: Primary Data

The structural model shows that FinTech adoption has a significant and positive impact on financial inclusion in low- and middle-income households of India. The strength of the influence is represented by the path coefficient (β = 0.41), implying that an increase in usage and familiarity with FinTech services leads to a higher likelihood of accessing formal financial institutions. The large critical ratio (CR = 6.61) combined with a very low p-value (p = 0.000) means the above relationship shows statistical strength and cannot be attributed to random variability. The positive sign indicates that FinTech, in this case, real-time payments, digital banking, online bill payments and credit-linked digital products, reduces traditional formal finance barriers of moving to banks' branches, paper documentation at the branch, number of hours or days spent waiting for funds directly back from our mobile money account and lack of knowledge about financial services. Thus, FinTech acts as an inclusion booster by providing inexpensive, easy-to-use and affordable financial products, which allow people from LMICH segments to engage more readily in the digital financial world. These results confirm the main hypothesis of this study that FinTech adoption directly leads to greater financial inclusion in lower-income societies.

Objective 3: Effect of FinTech Adoption on Digital Financial Literacy

Path	β	SE	CR	p-value	Interpretation
FinTech Adoption → Digital Literacy	**0.5**	0.06	8.9	**0**	Significant

Sources: Primary Data

The findings reveal that the level of FinTech adoption is significantly and positively correlated with digital financial literacy among low- to middle-income households. The path coefficient (β = 0.52) indicates that the more households use FinTech applications – for instance, mobile wallets, UPI payments, digital banking apps and online credit-based products – the better informed, more confident and proficient they become in using DFS. The critical ratio (CR = 8.92) is high, and the p-value is significant at 0.000, supporting the stability and strength of this relationship. This indicates that use of FinTech applications results in experiential learning which translates into increased familiarity with digital interfaces, security procedures, financial administration and transaction management processes.

Objective 4: Effect of Digital Financial Literacy on Financial Inclusion

Path	β	SE	CR	p-value	Interpretation
Digital Literacy → Financial Inclusion	**0.4**	0.07	5.5	**0**	Significant

Sources: Primary Data

The findings indicate that digital financial literacy has a significant positive impact on increasing financial inclusion for LMI households. The results suggest the path coefficient (β = 0.36) of digital financial knowledge and competence is more positively associated with acceptance, as well as efficient use, of formal financial services. The fact that this test's critical ratio (CR = 5.45) and level of significance (p=0.000) could be achieved in such an impressive way demonstrates not only the statistical significance but also the very high reliability of our tap relationship. The finding seems to imply that households with higher levels of digital financial literacy meaning more comprehensive knowledge in sizing up online financial products, securely using digital payment pathways, reading mobile app-based financial information or lifting the veil of internet-based hazards related to money and finance are more likely to be able to tap into the potential offered by the web-based finance steel works Country view Detail.

Objective 5: Mediation of Digital Financial Literacy

Mediation Path	Total Effect	Direct Effect	Indirect Effect	Bootstrapped CI	p-value	Mediation Type
FinTech Adoption → Digital Literacy → Financial Inclusion	0.6	0.41	**0.19**	**0.09 – 0.31**	**0.003**	**Partial Mediation**

Sources: Primary Data

The mediation testing shows that digital financial literacy acts as an important mediator in the direct linkage between FinTech adoption and financial inclusion. The direct effect of FinTech adoption on financial inclusion is 0.41 when digital financial literacy is added as a mediator, and the overall effect is reduced to only 0.60, suggesting that a portion of the effects of FinTech works through the development of literacies. The indirect effect of 0.19 with statistically significant bootstrapped CIs (0.09–0.31), p =.003, supports the existence of partial mediation. This indicates that, while gains from the FinTech adoption per se in driving up financial inclusion are substantial on their own, a significant part of this gain is through increased usage of digital means taking place alongside an increase in FinTech usage, which is resulting in more informed and sustained use of formal financial services.

Objective 6: Effect of FinTech Adoption on Perceived Trust

Path	β	SE	CR	p-value	Interpretation
FinTech Adoption → Perceived Trust	**0.47**	0.061	7.71	**0**	Significant

Sources: Primary Data

The results provide evidence that the adoption of FinTech has a positive and statistically significant impact on perceived trust among LMIH. The path coefficient (β = 0.47) suggests that increasing the level of exposure to and usage of FinTech platforms helps users in forming confidence about the dependability and safety of digital finance services. Whereas, the high critical ratio (CR = 7.71) and very significant p-value (0.000) support the strength of this relationship. In other words, as households become better acquainted with using FinTech-based tools for payments, banking transactions, credit or insurance, they will have increased confidence in the successful completion of transactions as well as the protection of personal data, platform security issues and dispute settlement. The tactile use of something reduces anxiety and leads to successful experiences, which build trust.

Objective 7: Effect of Perceived Trust on Financial Inclusion

Path	β	SE	CR	p-value	Interpretation
Perceived Trust → Financial Inclusion	**0.33**	0.067	4.91	**0**	Significant

Sources: Primary Data

The findings indicate that perceived trust has a positive and significant effect on financial inclusion for low- and middle-income households. A path coefficient study which β = 0.33, indicates that the greater levels of confidence in safety, reliability and fairness of FinTech platforms deepen financial inclusion, leading to enhanced formal financial service utilisation. Therefore, the robust nature of this effect is supported by the critical ratio (CR = 4.91) and very small p-value (0.000). That is, when people feel that digital financial providers deliver accurate transactions, keep their personal information safe, respond to service issues efficiently and transparently, they are more likely to use digital finance not only for basic transactions but for broader financial activities as well, paying attention to factors regarding digital savings, credit or insurance.

Objective 8: Mediation of Perceived Trust

Mediation Path	Total Effect	Direct Effect	Indirect Effect	Bootstrapped CI	p-value	Mediation Type
FinTech Adoption → Perceived Trust → Financial Inclusion	0.56	0.41	**0.15**	**0.07 – 0.26**	**0.006**	**Partial Mediation**

Sources: Primary Data

Mediation analysis indicates that perceived trust mediates the relationship between FinTech adoption and financial inclusion of low-income and middle-income households. The average total direct effect of FinTech adoption on financial inclusion is 0.56, and when perceived trust is added into the model, this direct effect

reduces to 0.41, showing that part of the effect of FinTech adoption on financial inclusion passes through the trust formation mechanism. The indirect effect of 0.15 is statistically significant, as indicated by both the bootstrapped confidence interval (0.07 – 0.26) and p-value =.006, which indicates partial mediation. This implies that the payoff from FinTech adoption in terms of expanding financial inclusion is not only about increased digital access to financial services by households, but also repeated positive interactions with digital finance platforms and the extent to which these good experiences increase their certainty about the dependability, security and transparency associated with digital finance.

Discussion of the Study

The empirical results of this study provide robust support to the argument that the adoption of FinTech services has a significant impact on financial inclusion among LMIH in India. Our findings also provide a critical insight that this effect is not just direct; it is seemingly indirect in nature by means of digital financial literacy and perceived trust, thereby highlighting the nuanced process governing how FinTech adoption transforms into substantive inclusion. This section provides interpretations of these results with reference to the extant literature and offers theoretical and practical implications as well as nuances and caveats.

FinTech Uptake and Financial Inclusion Testing for the Theory

Our result of FinTech adoption having a positive impact on financial inclusion ($\beta = 0.41$, $p < 0.001$) is consistent with an emerging literature showing that DFS open up access to banking, payments, credit and other formal services for the previously excluded (Demirgüç-Kunt, 2022). For instance, a recent empirical study in India indicated that higher FinTech usage (in particular, digital payment usage and mobile banking penetration) significantly raised an aggregate financial inclusion index, especially in rural and underserved areas (Narayan, 2021). Additionally, this finding is consistent with the worldwide phenomenon presented in a recent systematic review that suggests the global trend suggests FinTech will penetrate financial markets by utilising mobile infrastructure, digital identity and low-cost delivery to get around barriers such as distance, lack of bank branches, high documentation requirements and high transaction costs, which will improve financial inclusion in emerging economies. Our study, therefore, offers micro-level, household-level quantitative evidence from India that resonates with macro-level and cross-country findings: FinTech is a strong facilitator of inclusive finance.

The Mediating Effect of Digital Financial Literacy

One of the major findings of this study is that digital financial literacy (DFL) mediates the impact of FinTech adoption on financial inclusion (indirect effect = 0.19, $p = 0.003$). This implies that the very access to FinTech products is a must but not sufficient, as literacy in terms of Nigerians' ability to comprehend, navigate through and employ digital financial services stands as a precondition for the conversion from mere access into continued or meaningful usage (Ozili, 2020). This assertion is corroborated by previous empirical studies. For example, a study on Indian bank patrons, digital financial literacy positively influences users' perceived usefulness and ease-of-use of FinTech and, in turn, impacts their adoption behaviour. Similarly, another study found that digital financial literacy has a positive effect on saving behaviour and formal financial access among those who are exposed to DFS. Furthermore, this mediation is consistent with arguments that the mere availability of technology does not ensure inclusion; people need to have competence as well as confidence in utilising these technologies effectively and safely (Raghavan, 2023). Digital and financial literacy, thus, are critically important enablers to drive financial inclusion through FinTech, especially among LMICH, where they might not have had exposure to formal banking or digital finance.

Perceived Trust as a Mediator

Our findings further reveal that perceived trust significantly mediates the association between FinTech adoption and financial inclusion (indirect effect = 0.15, $p = 0.006$). This highlights that trust in digital platforms with respect to reliability, security, privacy and data and fairness is critical for continued use of FinTech 58 beyond initial adoption. Trust is known to play an important role and is receiving growing attention in various readings of the digital finance literature. A recent review of digital Finance Globally found that regulatory, ethical, and Behavioural Barriers, including trust-related Barriers, Concerns about security and perception of the associated

risks, are the greatest barriers to Financial Inclusion through digital Channels. In India too, research has observed that even as digital payments and mobile banking networks are accessible to low-income users, very few harness full digital services because they do not trust system security or are afraid of transaction failures and fraud. Thus, our results stress that for FinTech to realise the promised inclusion effects on providing availability of services, we argue that providers as well as policy-makers will need to do so by addressing trust-related concerns via transparent mechanisms and consumer protection, user education and reliable service delivery (Patwardhan, 2022).

Principles: The Integrated Model: Access + Capability + Trust → Inclusion

Having established digital literacy and trust as mediators, our study builds toward an integrated mechanism. FinTech adoption (digital tool access) → capability/trust enhanced → financial inclusion (access + usage + quality). This reinforces the argument in recent literature for a multi-dimensional understanding of digital financial inclusion, not only access, but also capability and confidence are important aspects. And it is our conceptual model that creates a logical nexus between theories of technology adoption - perceived usefulness, ease-of-use and facilitating conditions - and frameworks for inclusion, access, usage and outcomes. In doing so, it also joins with recognition from reviewers and policy makers to move away from simplistic "account-ownership" type metrics towards more meaningful, usage and behaviour-based indicators of inclusion (Madirazza, 2022).

Theoretical and Practical Implications

Theoretical contributions:

- The contribution of this study to both FinTech and financial inclusion literature is through the empirical evidence of dual mediation (digital literacy + trust), which is rather underexplored, particularly in LMIC settings (Li, 2023).
- It taxes financial inclusion not only from account ownership/access angles but as a wider construct that might transcend usage, quality and financial outcomes congruent with more recent developments in concepts (Lye, 2025).
- It facilitates the combined usage of technology-adoption models (TAM / UTAUT / DOI) with social-capability and trust-related frameworks for a more complete view of digital financial inclusion (Sharma, 2021).

Practical & policy implications:

FinTech and digital finance companies may consider investing in user training, simplified interfaces and support to enhance digital financial literacy, especially for LMICH.

- Regulators and policy-makers ought to develop and promote digital financial literacy programs (and particularly those meant for rural populations or low-income households, where prevalence of usage is likely lower), as well as create clear regulatory structures along with means of consumer protection, so that trust can be built (Kodongo, 2024).
- Policies for financial inclusion shouldn't just be about easier access (e.g., UPI, bank accounts), but also about sustained, meaningful use, including through capability building and trust-building.

  In light of the partial mediation, inclusion campaigns should pursue a dual approach: (a) Fin-Tech infrastructure deployment; and (b) demand-side measures (literacy + trust + support).

Limitations of the study:

Although the findings suggest cause for optimism, a few words of caution are warranted:

- First, despite the mediation effect of digital literacy and trust being significant, it is partial, which indicates other unobserved factors (e.g., income volatility, quality of digital infrastructure, social norms) could also influence the inclusion outcome. This echoes the results of the most recent reviews that identify structural, regulatory and behavioral obstacles that still remain despite availability of FinTech.

- Second, the dataset probably represents the early-to-mid adoption period and we do not know how (or whether) usage will be sustained in the long term, or user churn, as well as service quality over time.
- Third, although we used mediation for modelling literacy and trust, there may be interaction effects or moderation through socio-demographic factor (income level, education and urban/ rural, etc.) which have not been tested in this study.
- Last but not least, digital finance also gives rise to data privacy, cybersecurity, and algorithmic bias concerns (particularly for microcredit or peer-to-peer lending), which may erode trust or exclude some sub-groups, an exposure underlined in recent reviews of digital finance.

Implications of the Study

The findings of this study, which indicate that FinTech adoption definitely enhances financial inclusion and such improvement is enhanced by digital financial literacy and perceived trust, have important implications for academia, management practitioners and policy makers.

Theoretical Implications

This study contributes to several aspects of the FinTech and financial inclusion literature:

Uniting the two approaches of technology adoption and financial inclusion: The empirical results contribute to the theorised synthesis of TAM/UTAUT/DOI financial inclusion models by identifying that FinTech adoption (a technology behaviour) results in inclusive financial outcomes (a developmental as well as socio-economic construct). This alignment is consistent with newer scholarly work that seeks to connect digital uptake and economic participation and empowerment.

Promoting dual mediation as an inclusion method: Prior research on FinTech adoption has focused only on literacy or trust as unidimensional predictors of behaviour. We contribute to the field by confirming dual mediation, as both digital literacy and trust are necessary bridges from digital access to substantive inclusion. This nuance enriches the capability-based view of digital finance (Rai, 2023).

Towards a more nuanced understanding of financial inclusion: The conclusion would be that one cannot limit inclusion to access of formal accounts, but rather must consider that usage and quality variables are equally important as outcome variables, according to the new inclusion reports. Future studies on FinTech can use more five-point Likert scale measures as opposed to access-only variables (Mishra, 2022).

Offering an empirical LMICH-focused framework: Although there are numerous types of research related to FinTech adoption in urban residents and more generalised societal strata, this project targets low-and middle-income (LMI) households that tend to be underprivileged for inclusive growth. This widens the lens of the population in digital finance research (Hasan, 2021).

Managerial Implications (FinTech Firms, Banks & Digital Service Providers)

The results offer practical lessons for practitioners of digital financial services:

- **Invest in user expertise, not just product design:** Digital literacy is such a strong mediating factor of inclusivity. FinTech's need to support their product launches with training programmes, explainer videos, community demonstrations, multi-language interfaces and easy-to-follow app tutorials. Adoption will not ensure the intensity of use without capability building.
- **Establishing trust while minimising risk:** Providers need to reinforce and publicise security, transparency and grievance redressal mechanisms. Trust can be facilitated through providing idiot-proof confirmation notices, service guarantees, fraud cover plans and always-open customer support.
- **Customise solutions for LMICH:** Many low-income customers need small-value transactions, flexible credit limits, nano-insurance and simple investment products. FinTech products should not just copycat bank offerings, but take into consideration household cashflow realities.

- **Leverage customer data responsibly:** Responsible use of customer data creates trust and fosters long-term relationships. Transparent consent mechanisms, clear and transparent data-use policies, guaranteed secure storage and respectful arrangements for donation will enhance adoption and longitudinally.
- **Collaboration over competition:** The most sustainable inclusions are generated when FinTech's collaborate with banks, MFIs, NBFCs, telecom operators and community organisations instead of competing standalone.

Policy Implications

The findings provide pragmatic guidance for governments, regulators and development organisations that are pushing inclusive digital finance:

- **Digital inclusion comes along with digital finance:** Subsidising devices, increasing the affordability of broadband, expanding rural connectivity and creating public Wi-Fi hotspots are all policy measures that will immediately foster FinTech-based inclusion.
- **Targeted digital financial literacy programs:** Government and regulators can include FinTech-oriented financial literacy as part of their outreach campaigns, schools, local community centres, SHG network and skill development programs, particularly in rural & semi-urban areas.
- **Consumer protections to boost trust:** Users trust and rely on FinTech only when they feel secure. Effective consumer protection frameworks around cyber fraud, mis-selling, algorithmic lending disclosures and escalations of grievances will lead to higher levels of sustained engagement.
- **Data governance frameworks:** Clear rules on data protection, biometrics safety, AI-based credit scoring and consent-driven information sharing can also enhance consumer confidence in digital finance.
- **Inclusion-oriented regulatory sandboxes:** RBI and other regulators may develop sandboxes for innovations targeting low-income segments, including those in nano credit, agriculture insurance, small-ticket remittances in rural areas, pay-per-use micro-investment or a product on digital savings for women.
- **Move from "access-only" metrics to "usage & outcomes":** Policymaking should be expanded beyond account access to tracking of continued digital engagement, financial sustainability in the long term, development of credit histories, as well as asset formation using FinTech (Gupta, 2022).

Limitations of the Study

Notwithstanding the empirical evidence presented that in fact describes the relationships between FinTech adoption, digital financial literacy, trust and financial inclusion of LMICH in India, there are several limitations to be considered for an accurate interpretation. First, the cross-sectional research design used may only measure patterns of digital financial behaviour at one point in time and hence does not indicate how the behaviour of digital finance changes over time; longitudinal or panel studies can account for learning effects, trust development, and churn better (Bapat, 2020). In addition, the self-reported nature of survey data is susceptible to both social desirability bias and recall issues – these are particularly important when profiling financial behaviours among low-income households (Goswami, 2025). Third, although two mediator variables, digital literacy and trust, were considered in the study, others that could potentially have an impact, e.g. socio-economic stress, risk tolerance and quality of digital infrastructure and peer community influence, were not included in the model (Goodell, 2024). Fourth, the sample was geographically diverse but likely does not represent rural tribal areas (where exclusion dynamics are very different) or urban slum settlements. Lastly, the research was restricted to LMICH in India, and hence generalisation to other developing countries should be made judiciously, as regulatory regimes, financial culture and state of the digital ecosystem vary across developing economies (Gomber, 2018).

Scope for Future Research

In order to incorporate more behavioural and contextual (un)described dynamics of the digital financial inclusion in our model, it is possible that future work should improve; suggestions are to elaborate beyond that theoretical applicability for a broader empirical scope related to digital financial inclusion. Investigating sustainable access to digital finance through longitudinal studies makes it possible for researchers to trace

progression from basic digital payments usage to use of advanced digital financial services like investment, insurance and credit, to focus on sustainable inclusion instead of mere adoption (Mashoene, 2025). Second, the association may be influenced by varying factors such as sex, rural and urban digital divide, level of education, experience in cybersecurity, or smartphone capabilities - all of which could exert influence on translating FinTech use to long-term financial empowerment (Raza, 2022). Third, qualitative and mixed-method approaches could have explored deeper cultural preferences around cash, technology, and trust for institutions among the most marginalised. Fourth, cross-country comparison studies might offer insights into the variations in regulation and policy across countries (Ghosh, 2023), and by comparing India's Aadhaar-UPI system with mobile money systems such as M-Pesa (Kenya), bKash (Bangladesh) and Tigo Pesa (Tanzania), where experiences have not been universally good or bad (Ha, 2025). Finally, however inexpensive AI-enabled credit scoring, digital micro-insurance and robo-advisory services are also re-shaping what is meant by inclusion, but could introduce algorithmic transparency and fairness issues that academically we need to address as soon as possible.

Conclusion

This paper empirically shows the centrality of FinTech adoption in effectively promoting financial inclusion among people from low- and medium-income households in India, although it is not an automatic process, which can be reinforced through digital finance literacy and perceived trust as critical behaviour enablers. These results build on international evidence that digital financial services can promote inclusive growth when people can use them (Bapat, 2020). Mirroring findings from recent systematic reviews, this study suggests that for FinTech to lead to lasting financial inclusion and resilience, access to digital financial services has to come with capability development and trust formation (Raza, 2022) And for India, now a frame of reference globally in digital public infrastructure and rapid FinTech scaling, the findings reveal that the next stage of inclusion must shift not from being about access to just account ownership but rather more about deep, sustained, and secure digital engagement among people on the margins who need (Chowdhury, 2023). Finally, by demonstrating the transformative potential of FinTech for livelihoods when capability, trust and technology co-evolve, this paper also contributes to digital finance scholarship and inclusive development practice.

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