



Understanding the Role of Financial Literacy in UPI and Digital Banking Adoption

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Abstract. *The rapid diffusion of the Unified Payments Interface (UPI) and other digital banking channels has repositioned India as one of the world's leading real-time payment markets, yet uneven adoption across demographic and geographic segments persists. This paper examines the role of financial literacy and, more specifically, digital financial literacy as a determinant of UPI and digital banking adoption. Drawing on an integrative review of recent Scopus- and Web of Science-indexed literature, the paper synthesizes theoretical perspectives from the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT/UTAUT2), the Theory of Planned Behavior (TPB), and the Diffusion of Innovations (DOI) framework to explain how financial knowledge, digital skills, trust, and self-efficacy jointly shape adoption behavior. The review indicates that financial literacy operates both as a direct antecedent of adoption intention and as a moderator of the relationship between perceived risk and usage behavior, with digital literacy, trust in technology, and socio-demographic factors (age, gender, income, education, and rural–urban location) consistently emerging as significant covariates. A conceptual model linking financial literacy, digital financial literacy, and perceived usefulness/ease of use, trusts, and behavioral intention to adopt UPI/digital banking is proposed. The paper concludes with theoretical contributions, policy implications for regulators (RBI, NPCI) and financial institutions, and directions for future empirical research.*

Keywords: Financial Literacy, Digital Financial Literacy, UPI, Digital Banking, Technology Adoption, Financial Inclusion.

Introduction

The global financial services landscape has undergone a profound digital transformation over the last decade, with mobile-first payment infrastructures replacing cash and card-based transactions in many emerging economies (Klapper et al., 2025). India's Unified Payments Interface (UPI), launched by the National Payments Corporation of India (NPCI) in 2016, has become a globally referenced case of large-scale digital payment adoption, enabling real-time, interoperable, low-cost peer-to-peer and peer-to-merchant transactions (Haque et al., 2025). Alongside UPI, mobile banking applications, internet banking, digital wallets, and neo banking platforms collectively constitute what is broadly termed "digital banking."

Despite the scale of this transformation, adoption remains uneven. Empirical studies consistently report that younger, urban, more educated, and higher-income individuals are significantly more likely to adopt UPI and digital banking than older, rural, and less-educated populations (Haque et al., 2025). A recurring



explanation offered in the literature is the gap in financial literacy — the knowledge, skills, attitudes, and confidence required to make sound financial decisions (Lusardi & Mitchell, 2014) — and, more specifically, digital financial literacy, defined as the ability to safely and effectively use digital financial products and services (OECD, 2025). According to the OECD/INFE 2023 International Survey of Adult Financial Literacy, roughly 40% of adults across 39 economies who purchased goods and services online did not reach the minimum target digital financial literacy score, underscoring a persistent global gap between digital payment usage and the literacy required to use such tools safely (OECD, 2025).

In the Indian context, government-led programs such as Digital India, the Pradhan Mantri Jan Dhan Yojana (PMJDY), and Aadhaar-enabled payment systems have sought to close this gap by expanding both financial access and financial education (Chavan & Kamra, 2019). However, scholars argue that access alone does not translate into meaningful usage; financial literacy is the mediating capability that converts access into informed, confident, and sustained adoption (Tyagi, 2025). This paper therefore investigates the following central question: What role does financial literacy play in shaping the adoption of UPI and digital banking services, and through which mechanisms does this influence operate?

The paper is structured as follows. Section 2 outlines the theoretical frameworks underpinning technology and financial-service adoption. Section 3 reviews the empirical literature on financial literacy, digital financial literacy, and UPI/digital banking adoption. Section 4 identifies research gaps and objectives. Section 5 proposes a conceptual model and hypotheses. Section 6 outlines a suggested research methodology. Sections 7–9 discuss implications, limitations, and conclusions.

Theoretical Framework

2.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model, developed by Davis (1989), posits that perceived usefulness and perceived ease of use are the primary determinants of an individual's intention to adopt a new technology. TAM has been extensively applied to digital banking and mobile payment research, with financial literacy frequently introduced as an antecedent or moderator that strengthens the perceived ease of use of digital financial products (Patnaik et al., 2023, as cited in Bărbulescu, 2025).

2.2 Unified Theory of Acceptance and Use of Technology (UTAUT/UTAUT2)

Venkatesh et al. (2003) synthesized eight prior technology-acceptance theories into UTAUT, which identifies performance expectancy, effort expectancy, social influence, and facilitating conditions as determinants of behavioral intention. UTAUT2 (Venkatesh et al., 2012) extended this model with hedonic motivation, price value, and habit — constructs particularly relevant to discretionary use of UPI apps. Rahi et al. (2018) applied UTAUT to internet banking adoption and found that facilitating conditions, closely tied to users' financial and digital competence, significantly predicted adoption behavior.

2.3 Theory of Planned Behavior (TPB)

Ajzen's (1991) Theory of Planned Behavior, building on the earlier Theory of Reasoned Action (Fishbein & Ajzen, 1975), explains behavior as a function of attitudes, subjective norms, and perceived behavioral control. Financial literacy enhances perceived behavioral control by increasing an individual's confidence in managing digital transactions, thereby strengthening adoption intention.

2.4 Diffusion of Innovations (DOI) Theory

Rogers's (2003) Diffusion of Innovations theory characterizes adoption as a process influenced by an innovation's relative advantage, compatibility, complexity, trialability, and observability. UPI's design — low transaction cost, interoperability, and simplicity — aligns closely with these diffusion attributes, but



the "complexity" dimension remains contingent on users' financial and digital literacy levels (Bărbulescu, 2025).

2.5 Self-Efficacy Theory

Bandura's (1977) self-efficacy theory and its digital extension, computer self-efficacy (Compeau & Higgins, 1995), provide a psychological lens for understanding why financially literate individuals report higher confidence in using digital banking tools, independent of objective ability.

Collectively, these frameworks suggest that financial literacy does not operate as an isolated variable but interacts with perceived usefulness, trust, self-efficacy, and social/regulatory facilitating conditions to shape adoption behavior — a proposition explored further in the empirical literature below.

Literature Review

3.1 Conceptualizing Financial Literacy and Digital Financial Literacy

Financial literacy is broadly defined as "a combination of awareness, knowledge, skill, attitude, and behavior necessary to make sound financial decisions" (Atkinson & Messy, 2012). Huston (2010) distinguishes financial literacy from financial knowledge, arguing that literacy additionally requires the application of knowledge to real financial decisions. Lusardi and Mitchell (2014) demonstrate, across multiple countries, that financial literacy is strongly correlated with retirement planning, debt management, and participation in formal financial markets, and that literacy gaps are systematically wider among women, the young, the elderly, and less-educated populations.

Digital financial literacy extends this construct to the online and mobile environment. Lyons and Kass-Hanna (2021) define digital financial literacy as encompassing knowledge of digital financial products, awareness of digital financial risks, knowledge of consumer rights and redress mechanisms, and the skills to use digital financial services. The OECD (2025) similarly emphasizes that digital financial literacy must include an understanding of cybersecurity risks — phishing, account hacking, and fraud — given that a growing share of consumers now transact primarily through mobile applications.

3.2 UPI and India's Digital Payment Ecosystem

UPI transaction volumes have grown from approximately 0.09 million transactions in July 2016 to several billion transactions per month within less than a decade, driven by NPCI's interoperable architecture and government promotion (Haque et al., 2025). Scholars frame UPI's success along microeconomic, macroeconomic, and political dimensions: at the microeconomic level, UPI has improved financial inclusion, merchant accessibility, and consumer convenience, but has also raised concerns around overspending, fraud exposure, and residual digital-literacy gaps (Bose, 2025). Macroeconomically, UPI has been linked to improved tax compliance and formalization of previously cash-based economic activity (Bose, 2025).

Globally, the Findex 2025 database indicates that the share of adults in developing economies who made or received a digital payment rose from 55% to 62% between 2021 and 2024, compared with 96% in OECD countries (Klapper et al., 2025; OECD, 2025), suggesting that while digital payment infrastructure has scaled rapidly, literacy and trust gaps continue to constrain deeper and safer usage in emerging markets such as India.

3.3 Financial Literacy as a Determinant of UPI/Digital Banking Adoption

A growing body of Scopus-indexed research directly links financial literacy to UPI and digital payment adoption. Using structural equation modeling, one study found that UPI usage positively influences



financial literacy, which in turn significantly predicts financial inclusion and, subsequently, economic development, with the financial-literacy-to-financial-inclusion path partially mediated by financial stability (Tyagi, 2025). Similarly, in a systematic literature review employing Scopus and Web of Science data (2018–2024), enhanced financial literacy was found to facilitate the adoption of digital payments by fostering trust and familiarity with financial technologies, particularly when examined through an extended TAM framework (Bărbulescu, 2025).

Using logistic regression on primary survey data from rural Aligarh district, Haque et al. (2025) identified younger age, male gender, higher education, and higher income as significant positive predictors of UPI adoption, while caste, religion, and marital status were statistically insignificant. The authors concluded that targeted financial literacy programs, combined with gender-specific and youth-focused interventions, could meaningfully close the rural digital divide (Haque et al., 2025). Complementary studies on UPI-driven financial inclusion similarly report that digital illiteracy, infrastructure gaps, and trust deficits remain the primary barriers to deeper adoption, even where physical access to smartphones and bank accounts already exists (European Economic Letters, 2025).

3.4 Financial Literacy, Digital Literacy, and Mobile/Internet Banking Adoption

Beyond UPI specifically, a substantial literature examines financial and digital literacy as determinants of mobile and internet banking adoption more broadly. Montazemi and Qahri-Saremi's (2015) meta-analytic structural equation model of online banking adoption found that perceived usefulness, trust, and self-efficacy were consistently significant predictors across studies. Shaikh and Karjaluoto's (2015) literature review of mobile banking adoption similarly identified perceived ease of use, relative advantage, and consumer readiness — proxies closely tied to digital literacy — as recurrent adoption determinants.

In the Pakistani youth market, digital literacy was found to significantly moderate the relationship between user perceptions (perceived usefulness and ease of use) and mobile banking adoption intention, strengthening the TAM pathway when digital literacy was high (Pakistan Business Review, 2025). Onay et al. (2023) similarly demonstrated that financial literacy helps overcome resistance barriers to mobile banking adoption, particularly among traditionally risk-averse consumer segments. Consumers' intention to adopt mobile payment and mobile banking services has also been shown to depend jointly on financial skills — the ability to find, process, and execute financial decisions — and digital literacy, defined as the ability to appropriately use digital tools to access, manage, and evaluate digital resources (Consumers' Intention to Adopt m-Payment/m-Banking, 2022).

Tuli's (2024) bibliometric and systematic review of digital banking adoption across developing Asian economies found that trust, risk perception, and digital/financial literacy consistently emerged as central constructs across the reviewed literature, with literacy operating as both a direct predictor and an indirect enabler of trust formation. A related systematic review integrating trust, risk, digital literacy, and innovativeness into a behavioral framework for virtual banking adoption in emerging economies similarly concluded that literacy-driven trust is central to sustainable digital banking ecosystems (Multidisciplinary Reviews, 2026).

3.5 Trust, Risk, and Cybersecurity Awareness as Mediating Mechanisms

Financial literacy's influence on adoption is not purely cognitive; it operates substantially through trust and risk-perception channels. Vafaei-Zadeh et al. (2025) found that cybersecurity awareness and fear of cyberattacks significantly shape online banking usage among Malaysian consumers, with more digitally literate users reporting greater confidence in identifying and avoiding fraud. The OECD (2025) similarly stresses that digital financial literacy is essential not only for adoption but for the safe use of digital



payments, given rising risks of phishing, account hacking, and data theft as digital payment volumes increase globally.

3.6 Fintech Adoption and Institutional Trust

At the institutional level, financial literacy and technological savviness have been shown to jointly drive fintech adoption within traditional banking contexts, with trust in technology acting as a significant mediating variable (Role of Financial Literacy and Technology Savviness on Fintech Adoption, 2024). This reinforces the broader theoretical proposition that literacy operates through — rather than independently of — trust-building mechanisms in shaping digital financial behavior.

Research Gap and Objectives

Although the reviewed literature converges on financial literacy as a significant predictor of UPI and digital banking adoption, three gaps remain evident:

1. Conceptual fragmentation — studies vary in whether they treat financial literacy as an antecedent, moderator, or mediator of adoption, limiting cross-study comparability (Bărbulescu, 2025).
2. Under-theorized digital financial literacy — much of the UPI-specific literature uses general financial literacy measures rather than the more contextually relevant digital financial literacy construct emphasized by Lyons and Kass-Hanna (2021) and the OECD (2025).
3. Limited attention to post-adoption safety behavior — most studies examine adoption intention rather than continued, safe usage behavior in the presence of fraud and cybersecurity risk (Vafaei-Zadeh et al., 2025).

Accordingly, this paper's objectives are to: (a) synthesize theoretical and empirical evidence on the financial-literacy–adoption relationship; (b) propose an integrative conceptual model distinguishing financial literacy from digital financial literacy as parallel but interacting antecedents; and (c) generate testable hypotheses and policy-relevant implications.

Proposed Conceptual Model and Hypotheses

Based on the reviewed literature, the following conceptual model is proposed, integrating TAM, UTAUT2, and TPB constructs with financial and digital financial literacy as dual antecedents:

Constructs: Financial Literacy (FL) → Digital Financial Literacy (DFL) → Perceived Usefulness (PU) / Perceived Ease of Use (PEOU) → Trust (TR) → Behavioral Intention (BI) → Actual Adoption/Usage (AU), with Perceived Risk (PR) and Self-Efficacy (SE) as moderators, and Age, Gender, Education, Income, and Rural/Urban Location as control variables.

Proposed hypotheses:

- H1: Financial literacy positively influences digital financial literacy.
- H2: Digital financial literacy positively influences perceived usefulness and perceived ease of use of UPI/digital banking.
- H3: Financial literacy positively influences trust in digital financial platforms (Vafaei-Zadeh et al., 2025).
- H4: Trust positively influences behavioral intention to adopt UPI/digital banking (Onay et al., 2023).
- H5: Perceived risk negatively moderates the relationship between behavioral intention and actual adoption (OECD, 2025).



- H6: Self-efficacy positively moderates the relationship between digital financial literacy and behavioral intention (Compeau & Higgins, 1995).
- H7: Demographic factors (age, gender, education, income, location) significantly influence financial literacy levels and, indirectly, adoption behavior (Haque et al., 2025; Lusardi & Mitchell, 2014).

Suggested Research Methodology

Future empirical validation of the proposed model could adopt a quantitative, cross-sectional survey design, consistent with the dominant methodological approach identified in the reviewed Scopus/Web of Science literature (Bărbulescu, 2025). A structured questionnaire — incorporating validated financial literacy scales (Atkinson & Messy, 2012), digital financial literacy scales (Lyons & Kass-Hanna, 2021), and TAM/UTAUT2 constructs (Venkatesh et al., 2012) — could be administered to a stratified sample of UPI/digital banking users across urban and rural India. Partial Least Squares Structural Equation Modeling (PLS-SEM) or covariance-based SEM would be appropriate for testing the multi-construct, moderated-mediation model proposed above, following precedents in the reviewed literature (Tyagi, 2025). Logistic regression, as employed by Haque et al. (2025), offers a complementary approach for modeling binary adoption/non-adoption outcomes against demographic predictors.

Discussion

The synthesized evidence indicates that financial literacy exerts both direct and indirect effects on UPI and digital banking adoption. Directly, literate consumers are better equipped to understand fee structures, transaction limits, and account security features, reducing perceived complexity (Rogers, 2003). Indirectly, financial literacy strengthens trust and self-efficacy, which in turn drive behavioral intention and sustained usage (Bandura, 1977; Vafaei-Zadeh et al., 2025). Importantly, the relationship is bidirectional in some studies: UPI usage itself appears to enhance financial literacy through repeated exposure and transaction experience, suggesting a reinforcing cycle between usage and literacy (Tyagi, 2025).

The literature also converges on the finding that literacy gaps are not evenly distributed. Rural populations, women, older adults, and lower-income groups consistently exhibit lower financial and digital literacy, and correspondingly lower UPI/digital banking adoption (Haque et al., 2025; Lusardi & Mitchell, 2014). This reinforces the policy argument that financial inclusion strategies must be paired with targeted, demographically tailored literacy interventions rather than infrastructure expansion alone (Chavan & Kamra, 2019).

Finally, the growing emphasis on cybersecurity-related digital financial literacy (OECD, 2025; Vafaei-Zadeh et al., 2025) suggests that future adoption research must move beyond intention-based models toward frameworks that capture safe and sustained usage, particularly as fraud and phishing risks scale alongside transaction volumes.

Theoretical and Practical Implications

Theoretical implications: This review contributes to adoption theory by explicitly separating financial literacy and digital financial literacy as distinct but interacting constructs within TAM/UTAUT2-based models, addressing the conceptual fragmentation noted in prior systematic reviews (Bărbulescu, 2025).

Policy implications: Regulators such as the Reserve Bank of India and NPCI, alongside financial institutions, should integrate digital financial literacy modules — covering fraud recognition, grievance



redress, and safe transaction practices — into existing programs such as PMJDY and Digital India (OECD, 2025). Targeted, demographically segmented literacy campaigns (rural, elderly, and female populations) are likely to yield greater marginal impact on adoption than generic awareness campaigns (Haque et al., 2025).

Managerial implications: Fintech and banking providers should design onboarding experiences that actively build users' digital financial literacy and self-efficacy — for instance, through simplified interfaces, contextual security nudges, and vernacular-language education — to convert first-time usage into sustained adoption (Onay et al., 2023; Shaikh & Karjaluo, 2015).

Limitations and Future Research Directions

This paper is a conceptual/integrative review rather than a primary empirical study, and its proposed model requires empirical validation across diverse Indian regions and demographic segments. Future research should: (a) empirically test the proposed moderated-mediation model using PLS-SEM; (b) examine longitudinal adoption trajectories to capture the literacy–usage reinforcement cycle identified by Tyagi (2025); (c) extend the model to compare UPI adoption with other digital banking modalities (mobile wallets, neobanking, CBDC/digital rupee) as suggested by emerging RBI initiatives; and (d) investigate cross-cultural generalizability by comparing Indian findings with other emerging markets referenced in the global literature (Klapper et al., 2025; Tuli, 2024).

Conclusion

Financial literacy — and increasingly, digital financial literacy — emerges from the reviewed literature as a central determinant of UPI and digital banking adoption in India and comparable emerging economies. Its influence operates through multiple theoretical pathways: reducing perceived complexity (DOI), enhancing perceived usefulness and ease of use (TAM), strengthening perceived behavioral control (TPB), and building the trust and self-efficacy required for sustained, safe usage. While UPI's infrastructural success has been remarkable, the persistence of adoption gaps among rural, older, female, and lower-income populations underscores that access alone is insufficient. Bridging India's remaining digital financial divide will require literacy-centered interventions delivered alongside continued infrastructure investment — a conclusion with direct relevance for regulators, financial institutions, and future researchers alike.

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