

Challenges Faced in Digital Payments: A Review of Adoption, Security, Inclusion, and Infrastructure Issues

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Abstract

Digital payments have become a central component of contemporary financial systems, particularly in India, where mobile payments and the Unified Payments Interface (UPI) have expanded rapidly. Despite this progress, the transition from cash to digital payment systems remains constrained by technological, behavioural, financial, institutional, and socio-economic challenges. This review synthesizes recent peer-reviewed research and authoritative policy evidence on the major challenges faced by consumers and merchants in adopting and continuously using digital payments. The literature indicates that cybersecurity threats, fraud, perceived risk, lack of trust, digital and financial literacy gaps, inadequate connectivity, transaction failures, grievance-redressal difficulties, privacy concerns, cost considerations, merchant-side incentives and rural-urban disparities remain important barriers. Recent studies also show that availability of infrastructure alone does not guarantee adoption; perceived usefulness, customer demand, ease of use, trust and confidence in dispute resolution shape actual usage. The paper organizes these challenges into an integrated framework and proposes implications for policymakers, banks, payment service providers and researchers. It concludes that the next phase of digital-payment growth requires a shift from expanding access alone toward strengthening safety, reliability, literacy, inclusion, consumer protection and sustainable payment economics.

Keywords: Digital Payments, UPI, Cybersecurity, Digital Financial Literacy, Trust, Perceived Risk, Financial Inclusion, India

1. Introduction

Digital payment systems have transformed the manner in which individuals and businesses transfer money, purchase goods and services, settle bills and participate in formal financial markets. Mobile banking, cards, digital wallets, instant bank transfers and UPI have reduced transaction time and made payments increasingly convenient. In India, the expansion of digital public infrastructure and mobile-based payments has produced a substantial shift in retail-payment behaviour.

The scale of this transformation is evident in official data. The Reserve Bank of India (RBI) reported that its Digital Payments Index increased from a base value of 100 in March 2018 to 465.33 in September 2024, reflecting growth in payment infrastructure and payment performance (Reserve Bank of India, 2025a). RBI research also notes widespread awareness of digital payments while emphasizing that user-level gaps remain important for policy (Reserve Bank of India, 2024).

Rapid adoption, however, should not be interpreted as the disappearance of barriers. Digital payment systems depend on reliable telecommunications, secure devices, trusted platforms, financial and digital capabilities, effective grievance redressal and confidence that funds will reach the intended recipient. Failures in any of these areas can discourage adoption or continued usage. The RBI has itself identified fraud protection, information security, data protection, customer-friendly dispute resolution, affordability, availability and customer retention as continuing payment-system challenges (Reserve Bank of India, 2022).

Academic research similarly demonstrates that digital-payment adoption is shaped by more than technological availability. Systematic reviews identify trust, security, perceived usefulness and ease of use as important adoption drivers, while perceived risk, complexity, privacy concerns, cost and resistance to change operate as inhibitors (Kajol et al., 2022; Chawla & Kumar, 2026). Accordingly, this paper reviews the principal challenges faced in digital payments, with particular attention to the Indian context.

2. Objectives

1. To identify and synthesize the major technological, behavioural, financial, institutional and socio-economic challenges associated with digital payments.

2. To examine how security, trust, digital literacy, infrastructure, perceived risk, merchant conditions and inclusion influence adoption and continued usage of digital payment systems.

3. Review Method

This paper adopts a structured narrative review approach. Priority was given to peer-reviewed journal articles, systematic reviews and empirical studies dealing with digital-payment adoption, UPI, mobile payments, perceived risk, cybersecurity, rural accessibility, consumer experience and merchant adoption. Recent literature was supplemented with authoritative RBI publications to provide policy and payment-system context. The synthesis emphasizes studies with clearly identifiable authors, publication outlets and DOI or publisher records. The literature was organized thematically rather than statistically because the reviewed studies use heterogeneous populations, payment modes, theoretical models and analytical methods.

4. Literature on Digital-Payment Challenges

1. Chawla and Kumar (2026) systematically reviewed 56 Scopus-indexed studies on barriers to digital-payment adoption. Their review shows that adoption barriers are multidimensional and that prior research has relied heavily on established technology-adoption theories. The study is important because it consolidates barriers across different payment settings and highlights the need for broader methodological approaches to understand non-adoption and discontinuance.

2. Jain, Mishra, and Sahu (2026) reviewed the economics of digital payments and developed a future research agenda. Their synthesis demonstrates that digital payments create efficiency and inclusion benefits but also generate questions concerning adoption, market design, costs and broader economic effects. The study supports examining digital payments as an ecosystem issue rather than only as an individual technology-acceptance decision.

3. Aljaradat and Shukla (2026) examined cybersecurity and trust formation in digital-payment use behaviour in North India. The study focused on effort expectancy, grievance redressal, trust, performance expectancy, perceived cybersecurity risk and social influence. It reinforces the argument that secure technology alone is insufficient unless users trust the system and believe that problems can be resolved effectively.

4. Motheram and Buteau (2026) analysed UPI adoption across 711 Indian districts using data from 2020 to 2024. Their supply-side analysis distinguishes merchant-network development from broader digital infrastructure constraints. The study is valuable for showing that adoption conditions differ across districts and that payment acceptance infrastructure and local ecosystem development are important for scaling digital payments.

5. Banerjee and Sinha (2026) examined digital-payment adoption in rural India through a sustainable-development perspective. Their work highlights the importance of financial inclusion and the continued need to understand rural adoption conditions. It supports the view that national growth in digital transactions can coexist with local disparities in infrastructure, capability and effective usage.

6. Kiran and Sailaja (2025) examined UPI adoption and usage using UTAUT-related factors. Their work demonstrates the continuing relevance of performance expectancy, effort expectancy and other behavioural determinants in explaining actual payment usage. The findings imply that technically available services must also be perceived as useful, manageable and socially acceptable to generate sustained adoption.

7. Kiran and Sailaja (2025) also investigated behavioural intentions toward digital-payment services by incorporating perceived risks into the adoption framework. Their analysis emphasizes that risk perceptions can weaken otherwise favourable adoption conditions. The study is particularly relevant to concerns surrounding fraud, security, transaction errors and uncertainty in digital financial environments.

8. Rana and Goel (2025) studied accessibility and challenges of digital-payment methods in rural areas of the National Capital Region using qualitative interviews. They identified a continuing digital divide involving infrastructural, financial and educational constraints. Their findings show that rural users may face overlapping barriers rather than a single adoption problem, making targeted interventions necessary.

9. Jain and Jain (2025) conducted a systematic review and bibliometric analysis of digital-payment adoption using the antecedents-decision-outcome framework. Their review of the expanding literature demonstrates that digital-payment adoption is shaped by interconnected antecedents and

that research has increased sharply in recent years. The study supports an integrated interpretation of technology, trust, risk and user-context variables.

10. Bala and Sharma (2025) reviewed factors influencing digital-payment adoption among Indian consumers from demographic, technological, economic, psychological, social and policy perspectives. Their multidisciplinary approach is useful because it demonstrates that adoption cannot be explained by technology variables alone and must account for user characteristics and institutional conditions.

11. Yadav, Kumar, Mishra, and Kochhar (2024) examined whether perceived risks deter Indian women from sustained mobile-payment use. Using data from 444 existing female users, they found that financial and performance risks negatively affected trust and satisfaction, while self-efficacy supported continuance intention. The study highlights the importance of risk, confidence and gender-sensitive digital inclusion.

12. Kajol, Singh, and Paul (2022) systematically reviewed 106 empirical studies on digital financial transactions. Trust emerged as a major motivator, while perceived risk was a prominent inhibitor. The review also identified cost, complexity, unwillingness to change and privacy concerns as important barriers. It provides a strong theoretical basis for classifying the challenges faced in digital payments.

13. Shree, Pratap, Saroy, and Dhal (2021) examined digital payments and consumer experience in India through a survey-based empirical study. Their work provides user-level evidence on adoption and experience and shows the importance of understanding how consumers perceive and use digital payments rather than relying only on aggregate transaction growth.

14. Ligon, Malick, Sheth, and Trachtman (2019) studied 1,003 small-scale merchants in Jaipur. They found that infrastructure prerequisites alone did not explain low adoption: many merchants had bank accounts, devices and adequate literacy, yet adoption remained limited. Perceived customer demand and concerns related to transaction records and tax liability helped explain adoption decisions, highlighting the importance of demand-side incentives.

15. Gochhwal (2017) reviewed UPI as an advancement in India's payment system and discussed its architecture, security, cost, ease of use and settlement characteristics. The study provides an early account of the technological advantages that supported UPI adoption while also underscoring the central role of secure architecture in real-time digital payments.

5. Major Challenges Faced in Digital Payments

5.1 Cybersecurity, Fraud and Authentication Risk

Security remains one of the most persistent challenges in digital payments. Users face phishing, vishing, smishing, social-engineering attacks, credential theft, account takeover and other forms of payment fraud. The RBI has acknowledged that increasing digital-payment adoption is accompanied by fraud risks and has emphasized stronger authentication, fraud monitoring and customer protection (Reserve Bank of India, 2022, 2025b). Perceived cybersecurity risk can reduce trust even when a payment system is technically secure. Consequently, security must be understood both as an engineering requirement and as a user-confidence issue (Aljaradat & Shukla, 2026).

5.2 Trust and Perceived Risk

Trust determines whether users are willing to initiate, repeat and expand digital transactions. Kajol et al. (2022) identified trust as one of the most frequently cited adoption drivers and perceived risk as a major inhibitor. Risk can be financial, performance-related, privacy-related or psychological. Evidence from Indian women using mobile payments shows that financial and performance risks can reduce trust and satisfaction (Yadav et al., 2024). Therefore, reducing perceived risk requires transparent communication, reliable transaction processing, visible security safeguards and credible redress mechanisms.

5.3 Digital and Financial Literacy

Digital payments require users to understand interfaces, authentication, QR codes, transaction confirmation, fraud warnings and dispute procedures. A user may have access to a smartphone and bank account yet still lack the confidence or knowledge required for safe digital transactions. Digital and financial literacy therefore operate together. Cross-country evidence indicates that digital literacy is strongly associated with use of digital payment tools, while financial literacy remains important for informed financial choices (Morgan et al., 2022). Literacy gaps can be especially consequential among first-time users, older adults and vulnerable populations.

5.4 Infrastructure, Connectivity and Device Constraints

Reliable connectivity, electricity, smartphones, banking access and merchant acceptance infrastructure are prerequisites for seamless digital payments. Rural research identifies infrastructural constraints as part of the digital divide (Rana & Goel, 2025). District-level evidence further suggests

that merchant networks and digital infrastructure influence the depth of UPI adoption (Motheram & Buteau, 2026). Weak connectivity can produce delayed confirmations, failed transactions and uncertainty for both consumers and merchants, reducing confidence in digital modes.

5.5 Transaction Failures, Reliability and Service Quality

Digital payments are expected to be immediate and dependable. Failed, pending or reversed transactions can create anxiety, particularly when the customer's account is debited but the merchant does not receive confirmation. Repeated failures can encourage users to retain cash as a backup. Service reliability therefore affects not only satisfaction but also continued usage. The RBI's payment vision emphasizes availability, speed, efficiency and customer-friendly dispute resolution as essential elements of a trusted payment environment (Reserve Bank of India, 2022).

5.6 Grievance Redressal and Consumer Protection

When a digital transaction fails or fraud occurs, users need clear responsibility, rapid complaint registration, status tracking and predictable resolution. Payment ecosystems often involve banks, payment service providers, third-party applications, merchants and network operators, which can make responsibility appear fragmented to users. Research on trust formation increasingly treats grievance redressal as part of the adoption environment (Aljaradat & Shukla, 2026). Effective consumer protection can therefore reduce both actual losses and perceived uncertainty.

5.7 Privacy and Data-Protection Concerns

Digital transactions create detailed records of spending, location, counterparties and financial behaviour. Although the intensity of privacy concern differs across user groups, systematic evidence identifies privacy concerns as a barrier to digital financial transactions (Kajol et al., 2022). Data protection becomes more important as payment information is integrated with credit, commerce and other digital services. Users need confidence that personal and transactional information will be collected, processed and shared responsibly.

5.8 Rural-Urban and Socio-Economic Digital Divide

Aggregate digital-payment growth can conceal unequal access and usage. Rural residents, low-income users and individuals with limited digital skills may encounter multiple barriers simultaneously. Rana and Goel (2025) identify infrastructural, financial and educational constraints in rural NCR, while Banerjee and Sinha (2026) emphasize the continuing importance of rural

inclusion. The challenge is therefore not merely making a payment option technically available but enabling meaningful, confident and sustained usage across social groups.

5.9 Merchant Adoption, Incentives and Customer Demand

Merchant adoption is essential because consumer usage depends on acceptance at the point of sale. Ligon et al. (2019) found that many Jaipur merchants were technically capable of adopting digital payments, yet adoption remained limited because perceived benefits and customer demand mattered. This finding shows that infrastructure expansion alone may not be sufficient. Merchants evaluate convenience, settlement, customer preference, costs, record keeping and perceived business implications before adopting or intensifying digital-payment use.

5.10 Cost and Sustainability of the Payment Ecosystem

Digital payment systems require continuous investment in infrastructure, cybersecurity, fraud prevention, customer support and innovation. At the same time, users and merchants are sensitive to transaction charges. This creates a policy challenge: payment systems must remain affordable while generating sufficient resources to maintain reliable and secure infrastructure. Recent scholarship on the economics of digital payments emphasizes the importance of studying costs, incentives and sustainable ecosystem design rather than treating adoption as a purely behavioural issue (Jain et al., 2026).

5.11 Complexity, Usability and Resistance to Change

Interfaces that appear simple to experienced users may still be difficult for new users. Complex registration, multiple authentication steps, language barriers, unfamiliar terminology and fear of making irreversible errors can discourage adoption. Kajol et al. (2022) identify complexity and unwillingness to change among the major inhibitors reported in digital-finance research. Ease of use therefore remains important even in markets where digital payments have become widespread.

5.12 Inclusion of Women and Vulnerable Users

Digital-payment inclusion is not automatically gender-neutral or socially uniform. Yadav et al. (2024) show that risk perceptions and self-efficacy matter for sustained mobile-payment use among Indian women. Vulnerable users may also be more exposed to social engineering, dependence on others for digital transactions and difficulty navigating grievance systems. Inclusive design should therefore

address language, accessibility, confidence, safety and digital capability alongside basic account ownership.

6. Thematic Synthesis of Challenges

Challenge Area	Typical Problems	Likely Effect	Key Supporting Literature
Security and fraud	Phishing, social engineering, unauthorized transactions	Lower trust; financial loss; avoidance	Aljaradat & Shukla (2026); RBI (2022, 2025b)
Trust and risk	Fear of loss, uncertainty, performance risk	Lower adoption and continuance	Kajol et al. (2022); Yadav et al. (2024)
Literacy	Low digital/financial capability; difficulty identifying fraud	Unsafe use; dependence on others	Morgan et al. (2022); Rana & Goel (2025)
Infrastructure	Connectivity, device and acceptance gaps	Failed or unavailable transactions	Motheram & Buteau (2026); Rana & Goel (2025)
Reliability	Pending, failed or reversed transactions	Reduced satisfaction; cash fallback	RBI (2022)
Redressal	Unclear complaint pathways; delayed resolution	Loss of confidence	Aljaradat & Shukla (2026); RBI (2022)
Privacy	Data misuse and surveillance concerns	Reluctance to transact digitally	Kajol et al. (2022)

Rural inclusion	Infrastructure, education and financial constraints	Unequal adoption	Banerjee & Sinha (2026); Rana & Goel (2025)
Merchant incentives	Low perceived customer demand; business concerns	Weak acceptance ecosystem	Ligon et al. (2019)
Cost and sustainability	User/merchant price sensitivity; infrastructure cost	Adoption and investment trade-offs	Jain et al. (2026)
Usability	Complexity, unfamiliar interfaces, resistance to change	Non-adoption or limited usage	Kajol et al. (2022)
Gender/vulnerability	Risk perception, low self-efficacy, dependence	Unequal continuance	Yadav et al. (2024)

7. Discussion

The reviewed evidence suggests that digital-payment challenges are best understood as an interconnected system rather than as isolated barriers. For example, weak connectivity can cause transaction failures; repeated failures can increase perceived risk; higher perceived risk can reduce trust; and lower trust can push users back toward cash. Similarly, low digital literacy increases exposure to fraud and can make grievance redressal more difficult.

A second important conclusion is that access and adoption are different. The availability of a bank account, smartphone or payment application does not guarantee active or sustained usage. Ligon et al. (2019) demonstrated this clearly among merchants, while recent district-level and rural studies continue to show that ecosystem conditions matter. The policy focus therefore needs to move beyond the number of accounts, QR codes or applications toward quality of usage, reliability and user confidence.

A third theme is the growing importance of post-adoption experience. As digital payments mature, the central research question is no longer only why individuals intend to adopt. Continued use depends on transaction success, trust, security, complaint resolution and satisfaction. This shift is particularly important in India because digital payments are already deeply embedded in everyday transactions.

Finally, inclusion remains a critical issue. Digital payment growth can support financial inclusion, but poorly designed systems can reproduce existing inequalities. Rural users, older adults, low-literacy populations, women and economically vulnerable users may require differentiated support. A genuinely inclusive payment ecosystem must therefore combine technology with human assistance, accessible design, multilingual communication and effective consumer protection.

8. Implications and Recommendations

- Strengthen fraud prevention and user authentication: Banks and payment service providers should combine secure authentication with real-time fraud analytics, risk-based controls and clear customer alerts.
- Improve grievance redressal: Complaint mechanisms should be simple, time-bound, trackable and coordinated across banks, payment applications and payment-system participants.
- Expand digital and financial literacy: Training should focus on practical payment skills, fraud recognition, safe authentication, transaction verification and complaint procedures rather than awareness alone.
- Improve rural reliability: Policy should address network quality, device access, acceptance infrastructure and assisted digital-payment channels in areas where connectivity remains inconsistent.
- Design for accessibility: Payment interfaces should use simple language, regional-language support, clear confirmation messages and accessible design for older and low-literacy users.
- Support merchant acceptance: Merchant policy should consider settlement reliability, customer demand, onboarding simplicity, business costs and confidence in payment records.
- Protect privacy and data: Payment providers should minimize unnecessary data collection, communicate data practices clearly and maintain strong safeguards around transactional information.

- Measure quality, not only volume: Evaluation should include failed transactions, complaint resolution, fraud experience, active usage, user trust and inclusion outcomes in addition to transaction counts.

9. Research Gaps and Future Research Agenda

- More longitudinal research is required to distinguish initial adoption from continued and intensive use of digital payments.
- Future studies should compare rural, semi-urban and urban users using common measures of trust, fraud exposure, literacy, service quality and grievance experience.
- Merchant-side research should examine how customer demand, costs, settlement experience and formalization concerns influence acceptance decisions.
- Greater attention is needed to older adults, women, low-income households, persons with disabilities and users dependent on assisted digital transactions.
- Research should integrate objective indicators such as transaction failures and fraud exposure with perceptual variables such as trust and perceived risk.
- Future work should examine whether emerging authentication, offline-payment and fraud-detection technologies reduce barriers without creating new privacy or usability problems.
- Cross-regional studies within India can identify whether digital-payment challenges vary with infrastructure, income, literacy and local merchant-network density.

10. Conclusion

Digital payments have created substantial gains in convenience, speed and financial connectivity, but their long-term success depends on resolving challenges that extend beyond basic technological access. The literature consistently identifies cybersecurity, fraud, trust, perceived risk, digital and financial literacy, infrastructure, transaction reliability, grievance redressal, privacy, merchant incentives and social inclusion as central issues. India's experience demonstrates that rapid growth in transaction volumes can coexist with meaningful user-level and regional barriers. The next phase of digital-payment development should therefore prioritize safe and reliable usage, effective consumer protection, inclusive design, stronger literacy and sustainable ecosystem incentives. Addressing these

dimensions together can strengthen confidence and ensure that digital payments contribute to financial inclusion rather than merely replacing one payment instrument with another.

References

- Aljaradat, A., & Shukla, S. (2026). Cybersecurity and trust formation in digital payment use behaviour in North India. *Discover Sustainability*, 7, 498. <https://doi.org/10.1007/s43621-026-02769-x>
- Bala, K., & Sharma, S. (2025). Factors influencing digital payment adoption among Indian consumers: A review. *Research Review Journal of Social Science*, 5(1). <https://doi.org/10.31305/rjss.2025.v05.n01.004>
- Banerjee, S., & Sinha, M. (2026). Assessing the digital payment adoption in rural India through the lens of sustainable development goals. *Discover Sustainability*, 7, 1189. <https://doi.org/10.1007/s43621-026-03133-9>
- Chawla, S., & Kumar, S. (2026). Barriers in the adoption of digital payment services: A systematic literature review. *International Journal of Business Information Systems*, 51(4), 478-502. <https://doi.org/10.1504/IJBIS.2026.152782>
- Gochhwal, R. (2017). Unified Payment Interface-An advancement in payment systems. *American Journal of Industrial and Business Management*, 7(10), 1174-1191. <https://doi.org/10.4236/ajibm.2017.710084>
- Jain, S., Mishra, A. A., & Sahu, J. P. (2026). The economics of digital payments: A systematic literature review and future research agenda. *Journal of Economic Surveys*, 40(3), 1687-1705. <https://doi.org/10.1111/joes.70068>
- Jain, V., & Jain, N. (2025). From cash to clicks: A systematic review of digital payment adoption using the ADO framework. *Global Business Review*, 32(4). <https://doi.org/10.1177/09711023241312523>
- Kajol, K., Singh, R., & Paul, J. (2022). Adoption of digital financial transactions: A review of literature and future research agenda. *Technological Forecasting and Social Change*, 184, 121991. <https://doi.org/10.1016/j.techfore.2022.121991>

- Kiran, K. P., & Sailaja, V. N. (2025a). Assessing Unified Payments Interface (UPI) adoption and usage through the interplay of UTAUT factors. *Humanities and Social Sciences Communications*, 12, 1060. <https://doi.org/10.1057/s41599-025-05313-w>
- Kiran, K. P., & Sailaja, V. N. (2025b). Exploring behavioral intentions of consumers towards different digital payment services through the interplay of perceived risks and adoption factors. *Humanities and Social Sciences Communications*, 12, 1141. <https://doi.org/10.1057/s41599-025-05468-6>
- Ligon, E., Malick, B., Sheth, K., & Trachtman, C. (2019). What explains low adoption of digital payment technologies? Evidence from small-scale merchants in Jaipur, India. *PLOS ONE*, 14(7), e0219450. <https://doi.org/10.1371/journal.pone.0219450>
- Morgan, P. J., Huang, B., & Trinh, L. Q. (2022). Digital and financial literacy as determinants of digital payments and personal finance. *Economics Letters*, 213, 110378. <https://doi.org/10.1016/j.econlet.2022.110378>
- Motheram, A., & Buteau, S. (2026). Supply side drivers of digital payment adoption in India. *Discover Sustainability*, 7, 560. <https://doi.org/10.1007/s43621-026-02901-x>
- Rana, R., & Goel, S. (2025). Accessibility of digital payments methods and challenges faced by users in rural areas of NCR: A thematic map analysis. *Abhigyan*, 43(2), 161-178. <https://doi.org/10.1177/09702385241288322>
- Reserve Bank of India. (2022). Payments Vision 2025. Reserve Bank of India.
- Reserve Bank of India. (2024). Report on currency and finance 2023-24: India's digital revolution. Reserve Bank of India.
- Reserve Bank of India. (2025a, January 29). RBI-Digital Payments Index for September 2024. Reserve Bank of India.
- Reserve Bank of India. (2025b). Annual report 2024-25. Reserve Bank of India.
- Shree, S., Pratap, B., Saroy, R., & Dhal, S. (2021). Digital payments and consumer experience in India: A survey based empirical study. *Journal of Banking and Financial Technology*, 5(1), 1-20. <https://doi.org/10.1007/s42786-020-00024-z>
- Yadav, P., Kumar, A., Mishra, S. K., & Kochhar, K. (2024). Financial equality through technology: Do perceived risks deter Indian women from sustained use of mobile payment services? *International*



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