



Last-Mile Banking Reliability, Digital Adoption, and Gramin Dak Sevak Engagement: A Field-Based Operational Study of India Post Payments Bank

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ABSTRACT :

Payments banks were created in India to extend basic financial services to underserved populations, but inclusion depends on whether services work reliably at the point of delivery. This study examines how India Post Payments Bank (IPPB) operationalizes its doorstep-banking model at the last mile, focusing on infrastructure reliability, digital adoption, and the engagement of Gramin Dak Sevaks (GDS). A descriptive, qualitative design was used, based on field participation during a two-month on-the-job training (15 May–15 July 2026). Data were generated through structured audits of Post Office banking outlets, telephonic follow-ups, observation of customer onboarding and digital-product queries, and GDS-led insurance-awareness visits, and were interpreted through the Technology Acceptance Model, financial-inclusion and last-mile delivery theory, and SERVQUAL. Thematic analysis across four dimensions (technology, infrastructure, human capital, and customer experience) showed that operational efficiency was uneven across outlets. Biometric authentication failures and network connectivity gaps were the most frequent technical frictions; thermal-printer downtime, weak signage, cash-float shortfalls, and slow equipment maintenance recurred across outlets; GDS dual-role workload and infrequent refresher training limited outreach depth; and digital-literacy gaps and loss of confidence after failed transactions constrained independent use. GDS community trust strongly facilitated customer engagement, yet a single awareness visit rarely produced enrolment. The study recommends iris-authentication checks, SMS confirmation as a printer fallback, ageing-based issue tracking, a GDS insurance reference guide, structured referral follow-up, and maintenance service-level standards. Because outlets were convenience-sampled near the host branch, findings are indicative rather than generalizable.

Keywords: payments banks; financial inclusion; last-mile banking; India Post Payments Bank; Gramin Dak Sevak; Aadhaar biometric authentication; technology acceptance; service quality

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Introduction

Background

In 2014 the Reserve Bank of India (RBI) introduced payments banks as a differentiated banking category, following the recommendations of the Committee on Comprehensive Financial Services for Small Businesses and Low Income Households (Reserve Bank of India [RBI], 2014a). Payments banks may accept demand deposits up to a prescribed per-customer ceiling, issue debit cards, provide payment and remittance services, and distribute third-party products such as insurance and pension schemes, but they may not lend from their own balance sheet and must invest the bulk of their deposits in short-dated government securities (RBI, 2014b). Their revenue therefore depends on transaction volumes, government-transfer processing, and distribution commissions rather than on net interest margins.

India Post Payments Bank (IPPB) is the largest of these institutions by reach. Wholly owned by the Department of Posts, Ministry of Communications, it began operations in January 2017 and delivers banking through the existing postal network of more than 1.65 lakh Post Offices and roughly 3 lakh postmen and Gramin Dak Sevaks (GDS), who act as banking access points under the philosophy of “Aapka Bank, Aapke Dwaar” (Your Bank, At Your Doorstep) (India Post Payments Bank [IPPB], n.d.; Indian Masterminds, 2025). Press reporting indicates that by 2024–25 IPPB served about 12 crore customers with deposits approaching ₹20,000 crore, operated with a direct workforce of about 1,250 employees, and reported a net profit of about ₹133.86 crore (Indian Masterminds, 2025). Its model depends on the Aadhaar Enabled Payment System (AePS), Direct Benefit Transfer (DBT), and handheld Micro-ATM devices operated by postal field staff, so the quality of financial inclusion it achieves is determined largely by how reliably these components work at individual rural counters.

Problem Statement

National payment rails and core banking systems may perform well in aggregate while the final link in the delivery chain (a specific biometric device, a specific network connection, a specific GDS with competing postal duties) remains unreliable. When that happens, accounts are opened but not used, and inclusion is superficial rather than real. The distinction between account ownership and active use is central to contemporary financial-inclusion measurement (Demirgüç-Kunt et al., 2022). The problem addressed here is that the operational conditions that determine whether IPPB's doorstep model succeeds at the last mile are rarely documented from direct, ground-level observation.

Research Gap

Existing work on payments banks and technology adoption leans toward either large-sample survey modelling of adoption intention or macro-level analysis of policy and financial performance. Few studies offer a practice-level account of how last-mile equipment and human intermediaries function day to day at the Post Office counter. This study addresses that gap through direct field audits and participant observation, complementing rather than duplicating survey-based evidence.

Significance of the Study

The study is significant on three counts. Academically, it contributes a qualitative, field-based description of last-mile payments-bank delivery that can inform later quantitative work. For IPPB and the Department of Posts, it offers an independent first-hand assessment of infrastructure reliability and GDS engagement that can supplement internal monitoring.

For policy, it shows where the gap between national digital-payments infrastructure and rural customer experience actually opens, and which low-cost operational changes could narrow it.

Literature Review

Payments Banks and Financial Inclusion

Studies of payments banks consistently describe them as instruments for reaching groups poorly served by conventional banks. Sikdar and Kumar (2016) argue that their central value lies in their ability to attract marginalized and migrant populations. Srinivas (2017) concludes that the differentiated licence was designed to widen basic access without exposing the system to the credit risk of full-scale lending, and Gupta (2016) places payments banks within the post-demonetization push toward digital, less-cash transactions. More recently, Ozili (2025), in a broad review of financial-inclusion research, reports that trust in a bank's payment services is a significant predictor of inclusion outcomes among vulnerable and access-constrained populations. Together these studies establish the policy rationale for payments banks, but they say comparatively little about operating conditions at the delivery point.

The Global Findex programme and the RBI's National Strategy for Financial Inclusion both distinguish access to financial services from their sustained use (Demirgüç-Kunt et al., 2022; RBI, 2019). This distinction frames the present study: a Micro-ATM that is present but unreliable satisfies access in a formal sense yet may fail to produce usage.

Technology Acceptance in Rural and Low-Literacy Contexts

The Technology Acceptance Model (TAM) explains adoption through perceived usefulness and perceived ease of use (Davis, 1989). Extensions such as the Unified Theory of Acceptance and Use of Technology (UTAUT) add performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). Applying an extended UTAUT model to mobile-banking adoption among rural, financially included Indian users, Mohapatra et al. (2020) found that performance expectancy, effort expectancy, social influence, and perceived risk shaped adoption intention, whereas facilitating conditions were not statistically significant in their sample. That result sits uneasily with practice in assisted-delivery models such as IPPB's, where a trusted human intermediary is arguably the most important facilitating condition, and it motivates a qualitative check on how such assistance operates in the field.

Biometric Authentication

Miltgen et al. (2013) integrate technology-acceptance constructs with privacy concerns to explain end-user acceptance of biometric authentication, showing that acceptance depends on more than technical performance. In the AePS context, biometric authentication is both the enabling mechanism and a potential barrier, because acceptance by customers is only meaningful if the authentication actually succeeds for them.

Service Quality and Operational Excellence

SERVQUAL conceptualizes service quality through reliability, responsiveness, assurance, tangibles, and empathy (Parasuraman et al., 1988). Complementing it, the Plan–Do–Check–Act (PDCA) cycle offers a simple frame for continuous process improvement. Both were used here as interpretive and organizing devices: equipment and signage condition map to tangibles, follow-up calls to reliability over time, and staff feedback to responsiveness and assurance.

Synthesis

The reviewed literature explains why payments banks exist and what shapes adoption intention, but it leaves under-examined how infrastructure reliability and human intermediaries interact at the counter. This study draws on the above frameworks to interpret field observations rather than to test hypotheses.

Research Methodology

Research Design

The study uses a descriptive, observational, and process-oriented design. It is a field-based operational study rather than a numerically modelled one, because the on-the-job training was structured around qualitative, on-ground activity and not around portfolio or financial-statement analysis.

Research Approach

A qualitative approach was adopted. Observations were recorded systematically using standard templates and then organized thematically, with theory used to interpret patterns rather than to specify hypotheses in advance.

Data Sources

Primary data came from five field activities carried out during the training period of 15 May to 15 July 2026 at the IPPB host branch in Pune and associated Post Offices: (a) customer onboarding and Know Your Customer (KYC) verification; (b) customer-facing exposure to UPI, AePS, DBT, and NEFT/RTGS, including query handling; (c) physical infrastructure and equipment audits at Post Offices; (d) telephonic follow-up of previously audited outlets; and (e) fieldwork with GDS on insurance-policy awareness. Secondary data comprised IPPB's public disclosures, RBI guidelines, NPCI and UIDAI materials, and published academic literature.

Population and Sample

The population of interest is IPPB's network of Post Office banking outlets, the GDS and postal staff who operate them, and the customers they serve. The sample comprised Post Offices located in the vicinity of the host branch, together with the GDS, staff, and customers encountered during audits and field visits. The study does not report outlet-level or respondent-level counts; findings are therefore expressed as qualitative patterns (for example, "most common" or "a minority of outlets") consistent with the field records.

Sampling Method

Outlets and interactions were selected by convenience, constrained by proximity to the host branch, GDS delivery schedules, travel distances, and weather. No probability sampling was used, so the sample is not statistically representative of IPPB's national network.

Data Collection Method

Data were collected with three structured instruments and a learning log. The Post Office Field-Audit Checklist (Appendix A) recorded signage visibility; Micro-ATM presence and power status; biometric-device function, tested live up to three attempts with fingerprint and, where available, iris authentication; thermal-printer function; deposit and withdrawal facilities; and cash float. The Telephonic Follow-Up Log (Appendix B) recorded, for each flagged outlet, whether the issue was resolved, pending, or changed, the days elapsed since the original report, and any escalation. The GDS Insurance-Awareness Interaction Template (Appendix C) recorded the household response as ready to enrol, needs more time, or not interested, along with follow-up needs. Customer onboarding and digital-product interactions were captured through observation and an informal query-and-resolution log. Table 1 summarizes the tasks and their outputs.

Table 1

Fieldwork Tasks, Data Generated, and Outputs

Task	Data generated	Output
1. Onboarding and KYC	Observation of Aadhaar/PAN verification and biometric e-KYC; account-opening turnaround (about 20–40 minutes, depending on connectivity)	Activated accounts and digital credentials; KYC records (not reproduced for privacy)
2. Digital product exposure	Customer queries and transaction walk-throughs (typically 5–15 minutes each)	Resolved-query log; customers able to transact independently

3. Infrastructure audit	Field-Audit Checklist per Post Office (about 30–45 minutes per audit)	Equipment status flags per outlet
4. Telephonic follow-up	Follow-Up Log with status and days elapsed	Resolved/pending status; escalation list
5. GDS insurance awareness	GDS Interaction Template; household response categories	Prospect list with interest level; referrals logged

Data Analysis Method

Logs, checklists, and field notes were consolidated and organized into four thematic dimensions that emerged during consolidation: technology, infrastructure, human capital, and customer experience. Audit findings were cross-checked against follow-up calls so that a one-off equipment glitch could be distinguished from a recurring issue. The themes were then interpreted through TAM/UTAUT, last-mile delivery theory, and SERVQUAL/PDCA. Prevalence is reported descriptively and not statistically.

Ethical Considerations

Customer KYC records were not reproduced, field vignettes are composite and non-identifying, the GDS template records only general household descriptions, and staff and customers took part with the knowledge of the host branch.

Objectives of the Study

The overall aim is to document, from direct field experience, how IPPB translates its doorstep-banking model into ground-level practice and where delivery breaks down. The specific objectives, mapped to the fieldwork tasks in Table 2, are:

1. To follow the Aadhaar–PAN verification and biometric e-KYC process in enabling accurate and timely account onboarding for walk-in and doorstep customers.
2. To assess customer understanding and adoption of IPPB’s digital products (UPI, AePS, DBT, NEFT/RTGS) through query handling and transaction walk-throughs.
3. To evaluate the physical availability and functional reliability of Micro-ATMs, biometric devices, thermal printers, and signage across sampled Post Office outlets.
4. To assess the resolution status and turnaround of previously reported equipment and connectivity issues through structured telephonic verification.
5. To examine the role of GDS in building rural awareness of insurance products and converting that awareness into recorded referral interest.

Table 2

Mapping of Objectives to Tasks and Analytical Lens

Objective	Task	Primary dimension	Interpretive lens
1	Task 1	Technology; customer experience	TAM (ease of use)
2	Task 2	Customer experience	TAM/UTAUT; access vs. usage
3	Task 3	Infrastructure; technology	SERVQUAL (tangibles); last-mile theory
4	Task 4	Infrastructure	SERVQUAL (reliability); PDCA
5	Task 5	Human capital	UTAUT (social influence, facilitating conditions)

Results / Data Analysis

Overall Operating Pattern

Operational efficiency across the audited Post Offices was uneven rather than uniformly poor or strong. A small number of outlets showed consistently reliable equipment and confident staff handling of digital transactions; a larger number showed at least one recurring point of friction, most often

biometric reliability or connectivity; and a smaller subset showed compounded problems across several equipment categories at once. National rails (AePS/NPCI) and IPPB's core systems appeared to work reliably in aggregate, whereas reliability at the last link was materially more variable.

Technology Dimension

Biometric authentication failure was the most common issue seen during visits and follow-up calls. Causes included worn scanners, dust on devices, and difficulty capturing fingerprints of older customers and manual workers whose fingerprint ridges had worn.

When repeated attempts failed, customers were moved to iris authentication where available or referred to another outlet, reducing the convenience of doorstep banking.

Network connectivity was weak or unstable at some outlets, particularly remote ones.

Because Micro-ATM and biometric transactions need real-time connection, poor signal produced delays and timeouts, more noticeably at certain times of day and in poor weather. *Software glitches* such as application freezing and slow processing were reported by staff and were generally handled by restarting the device or application, but caused frustration at busy times.

Infrastructure Dimension

Four infrastructure issues recurred. First, thermal printers at several outlets were non-functional or needed frequent paper replacement, so transactions were completed without a printed receipt. The transaction itself remained valid, but customer confidence fell, particularly among first-time users unfamiliar with SMS confirmation. Second, IPPB/CNG signage was absent, faded, or poorly positioned at a minority of outlets. Third, cash float ran short at certain outlets after high-DBT-disbursement periods such as MGNREGA wage credits, forcing customers to defer withdrawals or return. Fourth, staff at several outlets said hardware faults, once reported through official channels, took longer to resolve than the customer-facing disruption warranted, pointing to a gap in maintenance service-level structure.

Human-Capital Dimension

Because GDS carry both postal and banking-correspondent duties, banking tasks, including proactive insurance outreach, were in several cases secondary to mail delivery, especially in busy postal periods. Most GDS were operationally comfortable with the Micro-ATM and application for routine transactions, but a smaller number were less confident troubleshooting errors and relied on telephonic support from the branch or on the intern and mentor during visits. Several staff said refresher training on new product features was infrequent, which, combined with workload, appeared to limit the depth and accuracy of product explanation.

Customer-Experience Dimension

A meaningful share of rural customers, especially older customers and first-time account holders, needed substantial hand-holding to grasp biometric authentication, SMS balance alerts, or the difference between a Micro-ATM transaction and a passbook entry. Customers who experienced a failed or delayed transaction, most often because of biometric failure, in several instances hesitated to try again and preferred to wait for the next in-person visit by a trusted GDS. Before the GDS-led interactions, a significant proportion of contacted households reported limited or no awareness of the insurance products available through IPPB and Department of Posts channels, despite general familiarity with the postal system.

GDS Engagement and Insurance Outreach

Households were noticeably more willing to discuss insurance substantively when approached with a GDS they already knew and trusted. Engagement did not always become enrolment: several prospects wanted time to consult family or assess affordability, which were recorded as context and not as rejection. A single awareness interaction was therefore necessary but often insufficient for conversion.

Illustrative Composite Vignettes

Three composite, non-identifying vignettes, constructed from patterns across multiple interactions, illustrate the themes. In the first, an elderly pension customer's fingerprint failed twice; the GDS, who knew him, switched to iris authentication, which succeeded, and showed him the SMS confirmation because the printer had no paper. The customer said he "always worries" whether the machine will work. In the second, a hesitant household became

comfortable discussing a social-security insurance scheme because the GDS was well known in the village, yet the primary earner asked for a return visit the following week to decide with his spouse. In the third, a remote Post Office had usable signal only near one window, so staff informally carried the Micro-ATM there for each transaction, an undocumented workaround that added time and effort.

Table 3*Summary of Thematic Results by Dimension*

Dimension	Recurring observation	Effect on service
Technology	Biometric failures (worn scanners, worn fingerprints); unstable connectivity; occasional application freezing	Failed or delayed transactions; reduced doorstep convenience
Infrastructure	Printer downtime; signage gaps; cash-float shortfalls after DBT cycles; slow maintenance turnaround	No receipts, lower discoverability, deferred withdrawals, partially functional outlets
Human capital	GDS dual-role workload; uneven troubleshooting confidence; infrequent refresher training	Secondary priority for banking outreach; shallower product explanation
Customer experience	Digital-literacy gaps; hesitancy after failed transactions; low insurance awareness	Dependence on GDS; slower move to independent digital use

Note. Prevalence descriptors in the text reflect field records, not statistical counts.

Findings

The results support six principal findings.

1. Reliability at the last link is uneven. Outlets differ widely, and a minority combine several faults at once, even though upstream payment systems appear to perform reliably.
2. Biometric authentication is the single most consequential technical bottleneck, and it disproportionately affects older customers and manual workers.
3. Connectivity, printer, signage, and cash-float problems are individually modest but collectively erode service quality, and slow maintenance prolongs their effect.
4. GDS dual-role workload and infrequent refresher training constrain the proactive banking and insurance outreach that the model relies on.
5. Failed transactions reduce customer confidence and repeat use, so infrastructure unreliability directly compounds adoption barriers.
6. GDS community trust is a powerful enabler of engagement, but conversion to enrolment typically needs structured follow-up beyond a single visit.

Discussion

Reliability as a Precondition for Adoption

Under TAM, ease of use shapes adoption (Davis, 1989). The field evidence suggests that, at the last mile, ease of use is partly an infrastructure outcome and not only a user attribute: a customer who fails authentication through no fault of their own experiences the service as hard to use and less trustworthy. The observed reluctance to retry digital transactions after a failure indicates that reliability shortfalls compound adoption barriers. This is consistent with the view that trust in payment services matters for inclusion outcomes (Ozili, 2025) and illustrates why account access does not automatically yield usage (Demirgüç-Kunt et al., 2022).

Facilitating Conditions Revisited

Mohapatra et al. (2020) found facilitating conditions statistically insignificant in a survey of rural mobile-banking users. The present observations do not contradict that result, since those respondents were self-directed mobile users, but they suggest that in an assisted-delivery model the human intermediary functions as a decisive facilitating condition. GDS accompanying customers, switching authentication methods, and showing SMS confirmations repeatedly rescued transactions and engagement. The comparison is suggestive only, given the qualitative design and different populations, and it is a candidate hypothesis for quantitative testing.

Biometric Inclusion

Miltgen et al. (2013) emphasize privacy and acceptance in biometric adoption. The field data surface a different barrier: physiological. Worn fingerprints in manual workers and older customers mean the technology can fail the very populations that financial inclusion targets, regardless of their willingness to use it. Iris authentication, where devices support it, functioned as a practical fallback, which is why its availability should be verified systematically.

Service Quality Lens

Table 4 maps the observations onto SERVQUAL dimensions (Parasuraman et al., 1988). The strongest service-quality shortfalls lie in tangibles and reliability, whereas empathy and assurance, largely supplied by GDS, were comparative strengths.

Table 4

SERVQUAL Dimensions Applied to Field Observations

Dimension	Field observation	Assessment
Tangibles	Signage gaps; non-functional printers; worn scanners	Shortfall at a minority of outlets
Reliability	Biometric and connectivity failures; slow repair of reported faults	Main shortfall; variable across outlets
Responsiveness	Prompt workarounds by staff; slow formal maintenance response	Mixed
Assurance	Trusted GDS reassurance; SMS confirmation when receipts fail	Comparative strength
Empathy	Patient hand-holding of first-time and elderly customers	Comparative strength

Structural Implications of the Shared-Infrastructure Model

IPPB depends on the Department of Posts for physical outlets and for GDS, who are not directly bank employees. This structure is what gives the bank unmatched reach, but it also explains why training, incentive alignment, and maintenance responsibility are diffuse. The findings on dual-role workload, refresher gaps, and maintenance turnaround are the operational expression of that structural feature, not isolated lapses.

Awareness Versus Conversion

The insurance-outreach observations show that trust opens the conversation but does not close the decision. Households needed time and family consultation, so conversion metrics based on a single contact would understate the potential of the GDS channel and could mislead management about its effectiveness.

Conclusion

This study examined how IPPB's doorstep-banking model operates at the last mile through field audits, follow-ups, and GDS-led outreach. The central conclusion is that the reach IPPB has built through the postal network is real, but its value is realized only where equipment works, connectivity holds, and frontline staff have the time and training to assist. Biometric failure, connectivity gaps, printer downtime, slow maintenance, GDS workload, and low digital literacy together determine whether an account becomes an actively used one. GDS trust is IPPB's distinctive asset, and it is most effective when supported by reliable devices and structured follow-up. The study offers qualitative, practice-level evidence that complements survey-based literature and points to concrete, low-cost operational improvements.

Recommendations / Implications

Operational Recommendations

The following recommendations follow directly from the findings (Table 5).

Table 5

Recommendations Linked to Findings

Recommendation	Addresses	Expected benefit
Include iris-authentication checks in the field-audit checklist	Finding 2 (biometric failure)	Confirms a working fallback where fingerprints fail
Standardize SMS confirmation as backup proof when printers fail	Findings 3 and 5	Preserves customer confidence without receipts
Add a "Days Pending" field to the follow-up log	Finding 3 (slow maintenance)	Makes ageing issues visible for timely escalation
Provide GDS with a quick insurance reference guide	Findings 4 and 6	More accurate, confident product explanation
Add planned follow-up date and outcome to the insurance-awareness log	Finding 6	Continuity and tracking of referrals

Management Implications

Beyond these operational steps, the findings suggest four directions for IPPB management and the Department of Posts: defining maintenance service-level standards with a stated repair turnaround and escalation path; reviewing GDS workload and incentive design so that banking outreach is not systematically subordinated to mail delivery; introducing refresher training whenever product features change; and planning network-fallback arrangements and cash-float provisioning around known DBT disbursement cycles. These implications are proposed as extensions of the observed patterns and would need validation before adoption.

Theoretical Implications and Future Research

The study suggests that adoption models should treat device and network reliability, and human facilitation, as explicit explanatory factors in assisted-delivery settings. Future research could measure outlet-level failure rates over larger, probability-based samples, track conditions across seasons, survey customers on repeat use after failed transactions, and test the effect of structured follow-up on insurance conversion.

Limitations of the Study

Several limitations qualify the findings. Coverage was geographically limited to the vicinity of the host branch and selected by convenience, so results should not be generalized to IPPB's national network. The sample was small and time-bound, adequate for identifying qualitative patterns but not for statistically robust prevalence estimates. Field observation involves observer judgment, for example in labelling a device "intermittently" or "frequently" faulty. The observations reflect specific weeks; seasonal factors such as monsoon connectivity problems and post-DBT cash pressure may change conditions at other times. Findings on maintenance turnaround and training frequency rely partly on self-reported staff accounts rather than verified maintenance records. Finally, the study is deliberately qualitative and operational, and it does not analyse IPPB's financial statements or portfolio.

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