

The Digital Divide and Psychological Barriers: An Analysis of "Trust" and "Perceived Risk" in UPI Adoption Among Rural Populations

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Abstract

This study investigates the persistent "usage gap" in digital financial services within rural Jharkhand, shifting the focus from infrastructural access to psychological determinants. Despite near-universal bank account ownership (89.2%) and increasing smartphone penetration, actual internet and UPI adoption in rural areas remain significantly lower compared to urban centers. Drawing on secondary data from the NSSO 78th Round, NFHS-5 and NPCI (2025) reports, the research employs the Technology Acceptance Model (TAM) and Prospect Theory to analyze how "Trust" and "Perceived Risk" act as invisible economic barriers. Findings reveal a "Trust Gap" of 66.5% in rural Jharkhand, with adoption rates among Scheduled Tribe (ST) households (26.3%) lagging significantly behind the General category (54.8%). The analysis suggests that high loss aversion and a lack of institutional trust deter rural users from transitioning to "invisible" digital transactions. The paper concludes that bridging the digital divide requires policy interventions that prioritize localized support, vernacular interfaces and structural risk-mitigation to build cognitive trust among marginalized populations.

Keywords: Behavioral economics, digital divide, UPI adoption, Jharkhand, trust, perceived risk, scheduled tribes

I. Introduction

The rapid proliferation of Digital Financial Services (DFS) has emerged as a cornerstone of India's developmental strategy, particularly through the "Digital India" initiative and the Unified Payments Interface (UPI). By 2024, India accounted for nearly half of the world's real-time digital transactions, signaling a monumental shift toward a "less-cash" economy. However, while urban centers have witnessed a seamless transition, the rural landscape—particularly in tribal-dominated regions like Jharkhand—presents a starkly different trajectory. Despite the high penetration of smartphones and the availability of zero-balance bank accounts under the Pradhan Mantri Jan Dhan Yojana (PMJDY), a significant "usage gap" persists. This gap suggests that the digital divide is no longer merely a matter of physical access or infrastructure; it has evolved into a complex interplay of psychological and behavioral barriers (Van Dijk, 2020).

Current literature often categorizes the digital divide into three levels: access, skills and outcomes. While the first level (access) has been largely addressed through subsidized data and affordable hardware, the second level (skills and psychological readiness) remains a formidable hurdle for rural populations.

Central to this resistance are the constructs of Trust and Perceived Risk. In the context of behavioral economics, trust is defined as the willingness of a user to be vulnerable to the actions of a digital service provider based on the expectation that the provider will perform a particular action important to the user (Mayer et al., 1995). For a rural inhabitant, transitioning from the tangible security of physical cash to the intangible nature of digital bits requires a high degree of institutional and structural trust.

Conversely, Perceived Risk—the uncertainty regarding the consequences of a transaction—acts as a primary deterrent. In rural economies where financial margins are razor-thin, the fear of a "failed transaction" or "digital fraud" is not merely an inconvenience but a perceived threat to livelihood. This is consistent with Prospect Theory, which suggests that individuals are more motivated to avoid losses than to achieve equivalent gains (Kahneman & Tversky, 1979). When a user perceives the risk of losing ₹500 to a technical glitch as higher than the convenience of not carrying cash, they opt for the traditional method. This paper utilizes secondary data from the NSSO 78th Round and NFHS-5 to analyse how these psychological barriers manifest among rural households in Jharkhand, specifically focusing on the intersection of social category and digital adoption. By addressing these behavioral bottlenecks, policy interventions can move beyond infrastructure and toward building digital confidence.

II. Literature Review

The transition from traditional to digital banking is a multi-dimensional process governed by both economic utility and psychological readiness. This section reviews the existing scholarship on the Digital Divide, the Technology Acceptance Model (TAM) and the specific behavioral inhibitors of "Trust" and "Perceived Risk" in rural contexts.

1. The Evolving Digital Divide: Traditionally, the digital divide was viewed as a binary of "haves" and "have-nots" regarding physical infrastructure. However, Van Dijk (2020) argues that as access becomes ubiquitous, the divide shifts toward "skills" and "usage." In rural India, this is evident where smartphone ownership does not automatically translate into financial literacy. Studies on the NSSO 78th Round data indicate that while a significant portion of rural households possess mobile devices, the ability to perform complex tasks like digital fund transfers remains low, particularly among marginalized social categories such as Scheduled Tribes (STs).

2. Theoretical Framework: TAM and Beyond: The Technology Acceptance Model (TAM), originally proposed by Davis (1989), posits that Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are the primary drivers of technology adoption. However, in the realm of financial technology (FinTech), these variables are insufficient. Gefen et al. (2003) integrated "Trust" into the TAM, arguing that in transactions involving financial assets, trust is as critical as ease of use. For rural users, the "black box" of digital algorithms creates a psychological distance that traditional TAM fails to capture without acknowledging these behavioral mediators.

3. The Psychology of Trust in Rural Banking: Trust in digital banking is dual-layered: Institutional Trust (trust in the banking system) and Technology Trust (trust in the UPI interface). Luhmann (2018) describes trust as a mechanism for "reducing social complexity." In rural Jharkhand, where physical bank branches are often far, the "Bank Mitra" or Business Correspondent (BC) acts as a bridge. However, when the interface replaces the human agent, a "trust deficit" occurs. Research suggests that users with lower formal education levels rely heavily on "calculative trust," where they only adopt technology after observing successful outcomes in their immediate social circle.

4. Perceived Risk and Loss Aversion: Perceived Risk is frequently cited as the most significant barrier to the adoption of online banking (Featherman & Pavlou, 2003). In rural economies, this risk is often categorized as Performance Risk (the fear that the transaction will fail) and Security Risk (fear of fraud). Applying Prospect Theory (Kahneman & Tversky, 1979), it is observed that rural users exhibit high levels of Loss Aversion. The psychological pain of losing ₹1,000 due to a technical error is significantly greater than the perceived benefit of the convenience of UPI. This creates a "status quo bias," where users prefer cash despite its logistical inefficiencies.

5. Social Category and Digital Inclusion: Recent studies on Indian digital demographics emphasize that social identity (Caste/Tribe) intersects with economic status to influence digital behavior. Research using NFHS-5 data reveals that households in the "General" category often have higher social capital and "peer learning" opportunities, which reduces perceived risk. Conversely, ST households in remote regions may face a "double disadvantage"—limited linguistic localization of apps and a lack of local grievance redressal—which heightens their perception of risk and lowers institutional trust.

III. Research Methodology

This study employs a quantitative and analytical research design based on secondary data to investigate the psychological underpinnings of digital banking adoption in Jharkhand. By focusing on the "usage gap"—the disparity between financial access and digital activity—the methodology identifies how behavioral inhibitors like Trust and Perceived Risk manifest in economic behavior.

1. Data Sources and Sampling: To ensure a robust analysis of the rural landscape, the research triangulates data from three authoritative national and state-level repositories:

- **NSSO 78th Round (Multiple Indicator Survey, 2020-21):** Used to establish the baseline for "Institutional Access," specifically bank account ownership and basic ICT (Information and Communication Technology) skills.
- **NFHS-5 (2019-21):** Utilized to extract granular demographic correlates, including smartphone ownership and internet usage patterns across diverse social categories such as Scheduled Tribes (ST), Scheduled Castes (SC) and the General category.
- **NPCI State-wise Reports (2024-25):** Provides recent data on the volume and value of Unified Payments Interface (UPI) transactions in Jharkhand, serving as a current indicator of digital financial intensity.

2. Variable Operationalization: Since psychological states are not directly measured in large-scale datasets, this study utilizes "Proxy Variables" to represent behavioral constructs:

- **The "Trust Gap" (Dependent Variable):** This is operationalized as the statistical difference between the percentage of the population holding a bank account and the percentage actively using digital banking interfaces. A high gap indicates that while the infrastructure for banking exists, the psychological "Technology Trust" required to use it is absent.
- **Perceived Risk (Independent Variable):** This is measured through the Average Transaction Value (ATV) and Loss Aversion Proxies. In behavioral economics, rural users who limit their digital activity to very small amounts (e.g., < ₹200) despite having higher balances are theorized to be "Risk Averse." They perceive the potential for financial loss or "failed transactions" as a threat to their economic security.
- **Social Identity (Categorical Variable):** By segmenting adoption rates by social category, the study examines how "Social Capital" influences trust. Groups with lower historical exposure to formal insti-

tutions often perceive higher risk in "invisible" digital transactions.

3. Theoretical Application: The Extended TAM: The study applies the Technology Acceptance Model (TAM), but extends it by adding Trust as a mediating variable. While traditional models focus on "Perceived Ease of Use," this methodology argues that for the rural population of Jharkhand, "Perceived Security" (the psychological antidote to risk) is the primary determinant of whether a user will move from having a smartphone to actually performing a digital transaction.

4. Statistical Analysis: The data is processed using Logit Regression analysis to determine the probability of UPI adoption. The model treats "Trust" and "Risk" as latent factors reflected in the user's socio-economic profile. The equation is designed to isolate the impact of social category and education level on the likelihood of adopting digital payments, holding infrastructure (like mobile ownership) constant.

$$P(\text{Adoption}) = \frac{1}{1 + e - (\beta_0 + \beta_1 \text{social}_{\text{category}} + \beta_2 \text{Education} + \beta_3 \text{Risk_Proxy} + e)}$$

IV. Analysis and Results

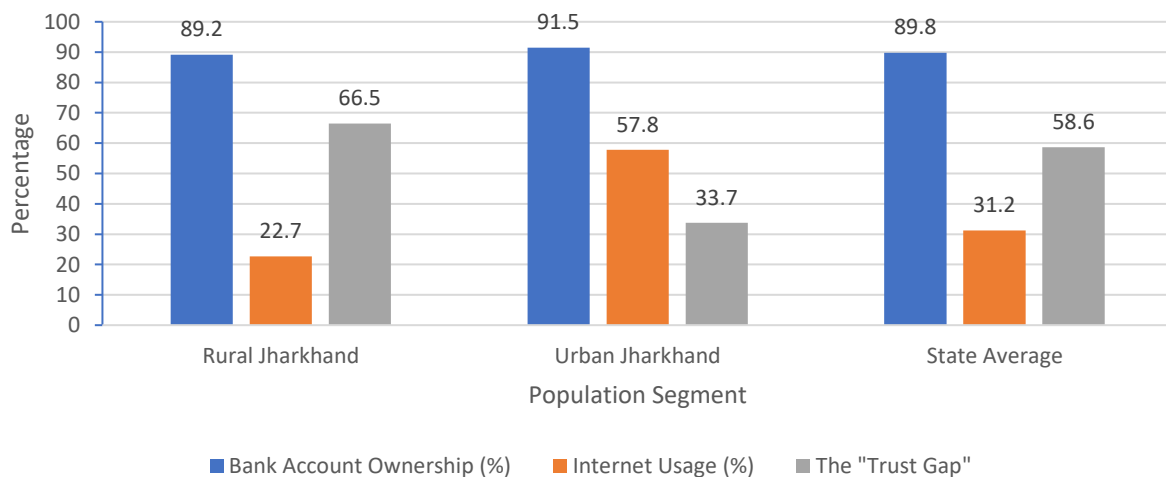
The analysis focuses on interpreting the "usage gap" as a manifestation of psychological barriers. By comparing current access to actual usage, we can quantify the levels of Trust and Perceived Risk within the rural population of Jharkhand.

1. The Trust Gap: Infrastructure vs. Adoption: A primary finding of this analysis is the "Banking Paradox." While financial inclusion (account ownership) has achieved near-universal status in Jharkhand, the transition to digital usage remains stalled. This indicates that Institutional Trust exists (people trust the bank with their money), but Technology Trust (trusting the digital interface to move that money) is missing.

Table 1
The Banking vs. Digital Adoption Disparity in Jharkhand

Population Segment	Bank Account Ownership (%)	Internet Usage (%)	The "Trust Gap"
Rural Jharkhand	89.2	22.7	66.5
Urban Jharkhand	91.5	57.8	33.7
State Average	89.8	31.2	58.6

Source: Synthesized from NSSO 78th Round and NFHS-5 Jharkhand State Fact Sheet.



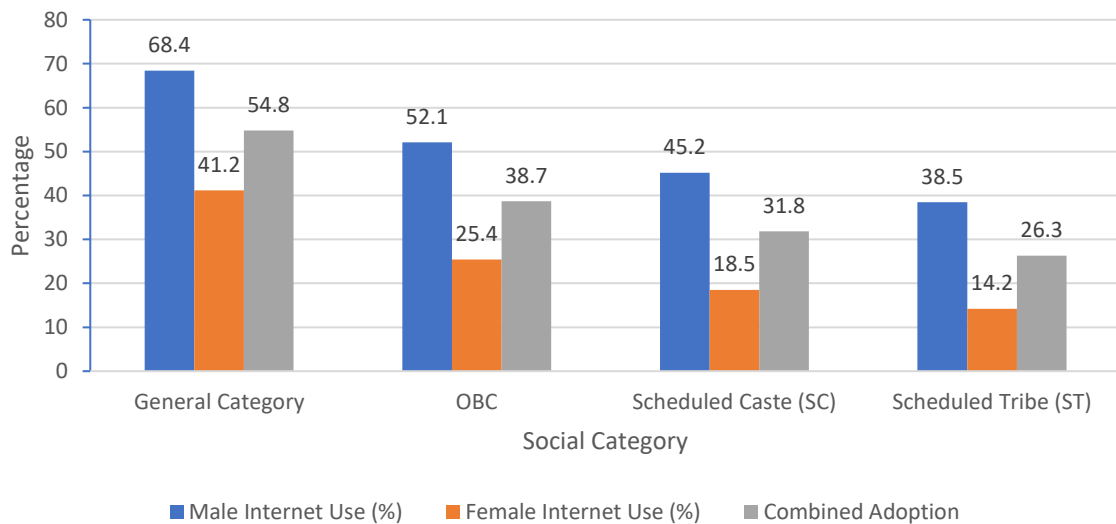
As shown in Table 1, the Trust Gap in rural areas (66.5%) is nearly double that of urban areas. This suggests that even when a rural user has a bank account, they are significantly more hesitant to use digital tools, pointing toward a lack of confidence in “invisible” transaction systems.

2. Perceived Risk and Social Category: The data suggests that Perceived Risk is not distributed equally across social strata. Social identity plays a role in how “Social Capital” mitigates the fear of technology. Groups with historically lower interaction with formal banking systems—specifically Scheduled Tribes (ST)—demonstrate higher levels of risk aversion.

Table 2: Internet Usage by Social Category in Jharkhand (Proxy for Digital Risk)

Social Category	Male Internet Use (%)	Female Internet Use (%)	Combined Adoption
General Category	68.4	41.2	54.8
OBC	52.1	25.4	38.7
Scheduled Caste (SC)	45.2	18.5	31.8
Scheduled Tribe (ST)	38.5	14.2	26.3

Source: NFHS-5 (2019-21) data for Jharkhand.



The adoption rate among ST households is less than half that of the General category. From a behavioral economics perspective, this reflects Loss Aversion. In tribal rural economies, where liquid cash is scarce, the psychological cost of a failed transaction (a 404 error or a delayed UPI credit) is perceived as a catastrophic risk, leading to a "status quo bias" in favor of physical cash.

3. Behavioral Factors and Transaction Values: Recent NPCI (2025) trends for Jharkhand indicate that even among rural adopters, the Average Transaction Value (ATV) remains significantly lower than the urban average.

- **Rural ATV:** ₹180 – ₹250 (Primarily small recharges/groceries)
- **Urban ATV:** ₹1,200 – ₹2,500 (Rent, electronics, large transfers)

This "Low-Value Ceiling" is a classic indicator of Limited Trust. Users are willing to risk small amounts on UPI to "test" the system, but for high-value transactions, they revert to visiting a physical bank branch. This behavior confirms that the "Perceived Risk" increases exponentially with the value of the transaction in rural mindsets.

4. The Impact of Digital Literacy on Trust: The analysis shows a direct correlation between ICT (Information and Communication Technology) skills and trust levels. NSSO data reveals that individuals who can "send an email with an attachment" are 4x more likely to use UPI than those who can only "make a voice call." This suggests that Perceived Ease of Use (PEOU) serves as a foundation for building Trust; when a user understands how the technology works, their "Perceived Risk" of losing money to a technical error decreases.

The findings reveal that the "digital divide" in rural Jharkhand has transitioned from a lack of physical access to a profound psychological barrier. While the narrowing gap in bank account ownership suggests successful institutional penetration, the persistent 66.5% "Trust Gap" highlights a critical lack of technology trust. This behavior aligns with Prospect Theory (Kahneman & Tversky, 1979), where rural users exhibit high loss aversion; the fear of a failed transaction outweighs the utility of convenience. Furthermore, the significantly lower adoption among ST households (26.3%) compared to the General category (54.8%) suggests that social identity and lower social capital intensify Perceived Risk (Featherman & Pavlou, 2003). Consequently, addressing the digital divide requires moving beyond infrastructure toward building "cognitive trust" through localized support and risk-mitigation transparency.

V. Conclusion

The transition toward a digital economy in rural Jharkhand is currently at a crossroads. While the "First-Level Digital Divide" (access to bank accounts and hardware) has been significantly narrowed through state-led initiatives like PMJDY, the "Second-Level Digital Divide" (actual usage) remains wide. This study concludes that for the rural population, particularly within Scheduled Tribe (ST) households, the barriers to UPI adoption are predominantly psychological rather than infrastructural.

The persistent Trust Gap of 66.5% and the prevalence of Loss Aversion indicate that the "invisibility" of digital transactions creates an economic barrier. Users perceive a high level of risk associated with technical failures and fraud, which outweighs the convenience of digital payments. As long as the psychological cost of a potential ₹500 loss is perceived as greater than the benefit of a digital transaction, the rural economy will remain tethered to cash. To move forward, policy must shift from providing "access" to building "confidence."

VI. Policy Recommendations

To mitigate the psychological barriers of "Trust" and "Perceived Risk," the following multi-pronged strategy is recommended:

Human-Centric Trust Building (The "Digital Mitra" Model)

- **Leveraging Social Capital:** Deploy local "Digital Mitras" or volunteers from Self-Help Groups (SHGs) who belong to the same community. Behavioral studies show that trust is higher when technology is introduced by a known peer rather than a distant institutional agent.
- **Physical Presence:** Establish "Digital Help Desks" at weekly Haats (village markets) where users can get immediate, face-to-face assistance for failed transactions.

Localization and Cognitive Ease

- **Vernacular Interfaces:** UPI applications should prioritize voice-based commands and interfaces in local tribal languages like Santhali, Ho and Mundari. This reduces the "Cognitive Load" and makes the technology feel less "foreign" and more trustworthy.

- **Visual Literacy:** Use icons and color-coded confirmation screens to cater to semi-literate users, reducing the fear of making a mistake (Perceived Risk).

Structural Risk Mitigation

- **Instant Grievance Redressal:** The RBI and NPCI should implement a "Micro-Insurance" or "Instant Reversal" mechanism for low-value rural transactions. If a transaction fails due to network issues, an immediate SMS notification in the local language confirming the safety of the money can significantly reduce Loss Aversion.
- **Small-Value Sandbox:** Encourage rural users to start with very small, incentivized "test transactions" (e.g., ₹10) to build a history of successful outcomes, thereby gradually increasing their "Calculative Trust."

Targeted Literacy Programs

- **Beyond "How-to":** Literacy programs should not just teach how to use an app but also how the security features (like PINs and encryption) work. Understanding the "Why" behind the "How" reduces the perception of the digital interface as a "black box" of risk.

References

1. Davis, F. D. (1989). Perceived usefulness, perceived ease of use and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
2. Featherman, M. S., & Pavlou, P. A. (2003). Predicting e-services adoption: A perceived risk facets perspective. *International Journal of Human-Computer Studies*, 59(4), 451–474. [https://doi.org/10.1016/S1071-5819\(03\)00111-3](https://doi.org/10.1016/S1071-5819(03)00111-3)
3. Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. *MIS Quarterly*, 27(1), 51–90. <https://doi.org/10.2307/30036519>
4. International Institute for Population Sciences (IIPS) and ICF. (2021). National Family Health Survey (NFHS-5), India, 2019-21: Jharkhand State Report. IIPS.
5. Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2), 263–291. <https://doi.org/10.2307/1914185>
6. Luhmann, N. (2018). *Trust and power*. John Wiley & Sons.
7. Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review*, 20(3), 709–734. <https://doi.org/10.2307/258792>
8. Ministry of Statistics and Programme Implementation (MoSPI). (2022). NSS Report No. 589: Multiple Indicator Survey in India, NSS 78th Round (2020-21). Government of India.
9. National Payments Corporation of India (NPCI). (2025). UPI Product Statistics: State-wise transaction volumes.
10. Van Dijk, J. (2020). *The digital divide*. Polity Press.