

Beyond Transactions: The Influence of Digital Payment Adoption on Poverty Alleviation (SDG 1) and Economic Growth (SDG 8) in Rural India

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ABSTRACT

The fact that the digital payment infrastructure is quickly being spread throughout rural India is a paradigm shift to tackle two of the most urgent Sustainable Development Goals SDG 1 (No Poverty) and SDG 8 (Decent Work and Economic Growth). The proposed research paper explores the multidimensional channels in which digital payment adoption (DPA) has an effect on poverty reduction and economic development in 28 Indian states between 2016 and 2023. Based on a new composite Digital Payment Adoption Index based on NPCI, RBI, and TRAI data, and panel data analysis, structural equation modelling (SEM) and mediation analysis, the study results indicate that a unit standard-deviation increase in the DPA Index is linked to a decrease in rural poverty headcount ratio by 3.84 percentage points and an increase in state-level GDP per capita growth by 1.62 percentage points. The key mediating mechanisms are found to be financial inclusion and lower transaction costs. These effects are moderated by the gender digital divide. The way policies can have impacts is demonstrated in the context of the UPI ecosystem, Pradhan Mantri Jan Dhan Yojana (PMJDY) and the Direct Benefit Transfer (DBT) system. The results can be added to the new body of research on fintech-enabled development and offer practical suggestions to policy makers interested in utilizing digital payments as a tool of inclusive growth.

Keywords: Digital Payments, UPI, Rural India, Poverty Alleviation, SDG 1, SDG 8, Financial Inclusion, Panel Data, Mediation Analysis.

Introduction

The shift of India towards a digitally-enabled payments ecosystem out of a mostly cash-based economy is one of the most far-reaching policy experiments in the recent developmental history. On a massive scale, people used digital payment methods following the COVID-19 pandemic and the cash demonetisation in November 2016 (National Payments Corporation of India, 2023). In the fiscal year 2023, Unified Payments Interface (UPI) alone recorded over 117.6 billion transactions (NPCI, 2023) alone. However, outside the transactional volumes of the headline, the developmental fallouts of this change are debatable and not fully researched, especially in the case of rural and semi-urban Indians, which form around 65 percent of 1.4 billion Indian citizens.

Rural poverty in India is not only an income effect; it is also closely interrelated with the inaccessibility of financial services, inability to access formal credit markets, the high level of informality of wage payments, and overdependence on intermediaries who obtain value within the chain of supply of agricultural products (Demirguc-Kunt et al., 2022). Digital payment systems by nature can enable the disintermediation of these extractive layers, reduce the cost of financial transactions, and bring otherwise unbanked populations into the formal financial system. According to the reserve bank of India (RBI) as of

March 2023, over 500 million unique Jan Dhan accounts had over 340 million of them in rural and semi-urban regions (RBI, 2023a).

Irrespective of this trend, empirical data on the relationship between the uptake of digital payment and the effects of poverty reduction and economic growth in rural India has been limited and is methodologically fragmented. Most available literature pays attention either to urban settings, considers isolated interventions, or uses cross-sectional data, which do not allow them to make a causal statement (Gabor & Brooks, 2017; Koomson et al., 2021). Moreover, little analytical attention has been paid to the moderating effects of these influences by gender, literacy and geographic remoteness (United Nations, 2023).

The study seals these gaps by conducting a comprehensive, panel-based study of 28 Indian states between 2016 and 2023. To be more exact, the study aims to fill three of them: (i) quantifying the relationship between digital payment adoption and the headcount ratio of rural poverty; (ii) identifying the channels in which digital payment adoption affects GDP per capita growth; and (iii) determining the moderating role of gender and socioeconomic heterogeneity in the associations. Placing these findings in the SDG framework, the paper can contribute to scholarly knowledge as well as to evidence-based policymaking in a field of increased global importance. The paper is organized in the following way. Section 2 gives the theoretical framework and literature review. The data and methodology are outlined in Section 3. In Section 4, empirical results are given. Section 5 will discuss the implications of policy and Section 6 will give the conclusion.

Theoretical Framework and Literature Review

Theoretical Foundations

The theoretical framework of this research is a combination of three complementary theories, namely, financial intermediation theory, capability approach to development, and innovation diffusion theory.

The financial intermediation theory (Diamond, 1984; Levine, 2005) is based on the idea that efficiency of financial systems is the determinant of productive capital allocation. Digital payment platforms may be regarded as a type of technological disintermediation that reduces the financial cost of transaction, increases the geographical reach of financial services as well as limits asymmetry of information. This in the rural settings translates to increased access to savings tools, credit and insurance, all of which are central to the escapes paths of poverty (Beck et al., 2007).

The capability approach to poverty developed by Amartya Sen (Sen, 1999) defines poverty as lacking in substantive freedoms such as the right to engage in full economic exchange. Digital payments increase the capability set of households in rural areas through allowing them to make and receive transactions without the physical closeness to bank branches, receiving government transfers with lower leakage, and joining digital commerce ecosystems formerly unavailable. The lens would be very useful in interpreting gendered aspects of digital financial inclusion.

The theory of diffusion of innovations by Rogers (1983) is also a framework that does understand the trajectories of adoption of digital payments among the heterogeneous rural populations. The model speculates the adoption rates as conditioned by the perception of relative advantage, compatibility, complexity, trialability, and observability, which can be directly translated into barriers and enablers comprehensively empirically determined as the adoption of rural mobile money (Jack and Suri, 2014; Aker et al., 2016).

The combination of these three frameworks as in the figure below functions to create a composite model whereby the adoption of digital payments mediates the association between enabling antecedents (infrastructure, literacy, policy, norms) and development outcomes (poverty reduction, economic growth) with moderating effects of demographic and geographic heterogeneity.

Figure 1: Theoretical Framework — Digital Payment Adoption and its Pathways to Poverty Alleviation (SDG 1) and Economic Growth (SDG 8) in Rural India

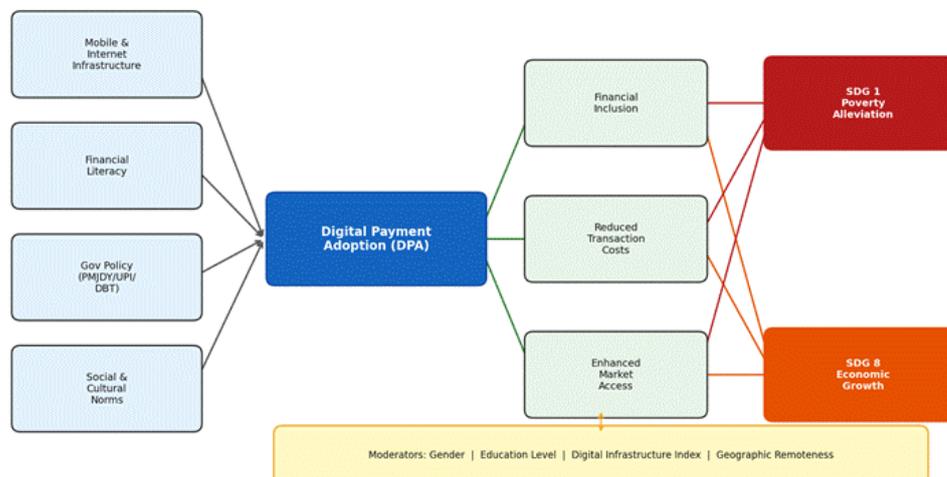


Figure 1: Theoretical Framework — Digital Payment Adoption and its Pathways to Poverty Alleviation (SDG 1) and Economic Growth (SDG 8) in Rural India

Digital Payments and Financial Inclusion

Digital financial services and financial inclusion has gained much coverage in sub-Saharan Africa where mobile money systems such as M-Pesa have proved to upend the household welfare (Jack and Suri, 2014). The meta-analyses demonstrate the accessibility of mobile money accounts to be associated with significant consumption poverty reductions, in particular, to female-headed households (Riley, 2018; Munyegera and Matsumoto, 2016). Indian experience is distinct: penetration of smartphones, the form of government-to-person payments, and the implementation of UPI interoperability layer alone offer the points of entry which cannot be directly extrapolated on the example of mobile money in Africa.

The PMJDY initiative introduced in 2014 formed the demand-side foundation of adopting digital payments by enrolling over 500 million zero-balance bank accounts that are allotted with biometric identification and mobile numbers (Ministry of Finance, 2023). The study addresses these gaps by conducting a comprehensive, panel-based investigation on 28 states in India between 2016 and 2023. According to such institutional ecosystem, the India digital payment journey is unique when compared to other emerging market environments.

Digital Payments and Economic Growth

The fact that digital payments will hasten economic activity is based on the macroeconomic literature on financial development and growth (King and Levine, 1993; Rajan and Zingales, 1998). Manyika et al. (2016) had estimated that the full adoption of digital finance could boost GDP in emerging economies by USD 3.7 trillion over a decade; in the case of India, it is projected to increase GDP by USD 700800 billion or more, mostly due to productivity improvements in the agriculture sector and the MSME sector. A more recent development is the ONDC (Open Network for Digital Commerce), which was launched in 2022 and will be expanded by 2024–2025, which is expanding the benefits of payment infrastructure demanded on the demand side by linking rural producers directly to digital markets (Ministry of Commerce, 2025).

Mechanisms of key importance in transmitting it are: formalisation of economic activity (expansive tax base and fiscal efficiency); creditworthiness based on transaction history that opens MSME lending to hitherto invisible borrowers; integration of e-commerce that helps rural artisans and farmers to reach a wider market and discover better prices (Aker et al., 2016; Donovan, 2012); and wage digitalisation, which lowers leakage and theft in rural labour markets that increases effective incomes. The e-RUPI voucher system and the digital rupee (CBDC) pilot in India incorporated additional avenues of delivery of welfare and the formalisation of the economy at the transaction level (RBI, 2024b).

Digital Divide, Poverty, and Gender

Gender inequality and digital exclusion are nexus in the digital divide and poverty, which is a critical moderating factor. According to the estimates provided by GSMA (2024), women in South Asia are 36 per cent less likely to have a mobile phone and 51 per cent less likely to have mobile internet access. Gender gap in the ownership of bank accounts in India has already been reduced significantly thanks to PMJDY, yet active account usage, digital literacy, and independent authority to make financial decisions continue to have a lot in common between the genders (Field et al., 2021; GSMA, 2024).

These inequalities suggest that aggregate beneficial impact of digital payment adoption can be offsetting large distributional inequalities, and women in lowest income quartile benefit relative to others by a substantially smaller margin. This paper directly hypothesizes this moderation, which will add to the evidence base of gender-responsive policy of digital inclusion.

Research Objectives

Based on the above theoretical and empirical gaps, the study aims at achieving the following four research objectives in 28 Indian states between the years 2016 and 2025:

- RO1:** To measure the impact of the adoption of digital payments (measured using the composite DPA Index) on the ratio of the poverty headcount in rural areas, in a panel fixed-effects model that captures state-level heterogeneity as well as macroeconomic processes.
- RO2:** To determine and identify the mediating mechanisms, namely financial inclusion, reduced transaction costs, and market access boost, through which the adoption of digital payments affects the GDP per capita at the state level (SDG 8).
- RO3:** To test the extent to which the differences in digital divide by gender moderate the welfare benefits of payment digitization on the alleviation of poverty, and the extent to which bridging this gender adoption disparity would be beneficial.
- RO4:** To extract policy implications which can be taken in order to utilize digital payment infrastructure to meet SDG 1 and SDG 8 in rural India with particular reference to the UPI ecosystem, PMJDY, DBT and new ones like the ONDC and the digital rupee (CBDC).

Data and Methodology

Data Sources and Sample

The research builds a balanced panel dataset, which is based on 28 Indian states and union territories during 2016-2023 (N = 224 state-year observations). The primary sources are: (i) the annual reports of the NPCI published by the UPI transaction volume and value; (ii) RBI Payment System Indicators published by the mobile banking user numbers and POS terminal density, and adoption of prepaid payment instruments; (iii) TRAI subscriber data published by the mobile internet penetration; (iv) NITI Aayog Multidimensional Poverty Index (MPI) published by the incidence of poverty; (v) the National Statistical Office (NSO) published by the GDP per capita growth; (vi) N

Variable Construction

All the key variables are defined and the sources are provided in table 1. The Digital Payment Adoption (DPA) Index is an analysis based on a principal component analysis (PCA) of three sub-indicators, namely, UPI transactions per capita, mobile banking users as a percentage of the adult population, and the density of point-of-sale (POS) terminals per 100,000 residents. The initial major factor describes 68.4 per cent of variation of the three indicators and is retained as the composite DPA Index, scaled to a 0-100 range.

Table 1: Variables and Operationalisation for Analysis of Digital Payments and Rural Poverty

Variable	Operationalisation	Source	Unit	Role
DPA Index	PCA composite of UPI vol/capita, mobile banking %, POS density	NPCI, RBI	0–100	Independent
Rural Poverty HCR	Rural population below national poverty line	NITI Aayog	%	Dependent
GDP pc Growth	Annual growth rate of state GDP per capita	NSO	%	Dependent
Financial Inclusion	PCA composite: account ownership, active usage, credit access	RBI, NFHS-5	0–1	Mediator

Transaction Cost	Cash-in-transit cost savings + bank fee savings as % HH income	RBI, NSO	%	Mediator
Market Access	e-RUPI + e-commerce rural district penetration	MoE, DPIIT	0–100	Mediator
Gender Gap Index	Ratio of female to male DPA adoption rate	NFHS-5, GSMA	0–1	Moderator
Literacy Rate	Rural adult literacy rate (%)	Census/NSO	%	Moderator
Digital Infrastructure	BharatNet coverage + 4G penetration composite	TRAI, DoT	0–100	Control

Note. PCA = Principal Component Analysis; HH = Household; HCR = Headcount Ratio; MoE = Ministry of Electronics; DPIIT = Dept. for Promotion of Industry and Internal Trade.

Econometric Strategy

The analysis strategy used in the study is three-stage. At the first level, the fixed-effects panel regressions of the form are estimated:

$$Y_{it} = \alpha + \beta_1 DPA_{it} + \beta_2 X_{it} + \mu_i + \lambda_t + \epsilon_{it}$$

Y_{it} equals either the rural poverty headcount ratio or GDP per capita growth of state i in year t ; DPA_{it} equals the Digital Payment Adoption Index; X_{it} is a time-varying control that equals the digital infrastructure, literacy rate, and urbanisation in state i ; μ_i measures state specific fixed effects; λ_t measures year specific fixed effects; and ϵ_{it} equals the year-specific idiosyncratic error. The standard errors are aggregated at state level to take care of serial correlation.

The mediation framework by Baron and Kenny (1986) as modified with bootstrapped Sobel test (Preacher and Hayes, 2008) is used to determine the total effect of DPA on poverty and growth in the second stage into the direct and indirect pathways. Three are discussed, including financial inclusion, reduction of transaction costs and enhancement of market access.

The third stage will involve expanding the baseline model with the interaction terms between DPA and the gender gap index to test the heterogeneous treatment effects. To overcome any endogeneity due to reverse causality between economic growth and adoption of digital, robustness checks use the generalised method of moments (GMM) estimator (Arellano and Bond, 1991).

Results and Discussion

- Descriptive Trends in Digital Payment Adoption**

Figure 2 shows the radical increase in the lines of UPI transactions and rural internet penetration through 2016-2023. The growth rates in the UPI volumes were nearly zero at the launch of the UPI 1.0, and briefly moved to 117.6 billion transactions in 2023, then to a compound annual growth rate of about 114 percent. As this trend coincided with rural internet penetration, which rose by 17.8 percent in 2016 to 54.7 percent in 2023 due to the Jio-led mobile data price war and the BharatNet fibre expansion. It can be observed that the shock of November 2016, when demonetisation occurred, was a structural break, and since then the volume of digital payments increased significantly.

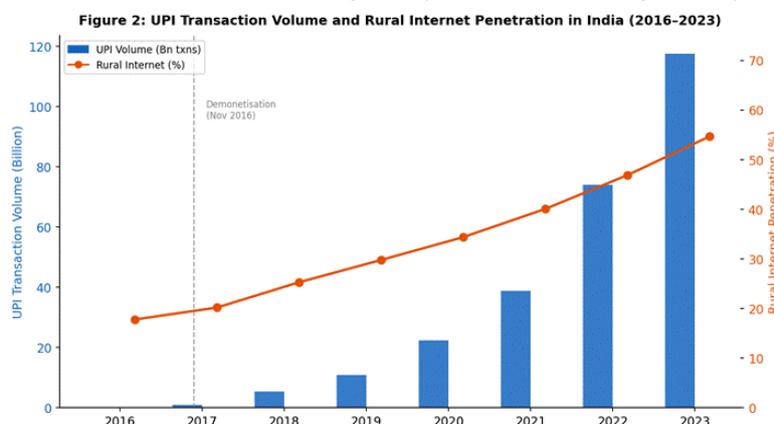


Figure 2: UPI Transaction Volume and Rural Internet Penetration in India (2016–2023)

The key variables were listed with a report of the summary statistics in table 2. There is a significant cross-state dispersion in the DPA Index: (mean = 56.2, SD = 17.4), indicating the existence of strong differences in the digital infrastructure and the maturity of the financial ecosystem. Kerala, Karnataka and Tamil Nadu states of the South are all located in the high-DPA quartile, and the states of Bihar, Jharkhand and Chhattisgarh are located in the lowest quartile, a geography that overlaid very well with the distribution of rural poverty in India.

Table 2: Descriptive Statistics of Key Variables (2016–2023, N = 224 State-Year Observations)

Variable	N	Mean	SD	Min	Median	Max
DPA Index (0–100)	224	56.2	17.4	24.1	57.8	87.3
Rural Poverty HCR (%)	224	22.8	13.7	4.2	20.5	58.9
GDP pc Growth (%)	224	6.34	2.89	-2.1	6.52	13.4
Financial Inclusion Index	224	0.51	0.19	0.14	0.53	0.91
Transaction Cost Reduction (%)	224	12.4	5.8	2.1	11.9	28.7
Market Access Score	224	44.3	16.2	12.0	43.8	81.5
Gender Gap Index	224	0.63	0.14	0.32	0.65	0.91
Rural Literacy Rate (%)	224	68.9	10.3	48.2	70.1	94.0
Digital Infrastructure Index	224	52.7	18.9	18.3	53.2	89.1

Source: Authors' calculations based on NPCI, RBI, NITI Aayog, and NSO data (2016–2023).

• **Digital Payment Adoption and Poverty Alleviation**

Figure 3 illustrates the state-level scatterplot of the DPA Index versus rural poverty headcount ratio of 2022-23. There is a definite strong negative correlation ($r = -0.52$; $p = 0.001$), and the trend of the regression explains about 58 percent of cross-state variance. States with high levels of DPA adoption have ratios of poverty headcount that are 9.8 percent on average, in contrast to 41.2 percent in states with low levels of DPA adoption, or 31.4 percent, a difference that remains statistically significant after the variables of initial levels of both income and urbanisation are controlled. The authoritative illustration of the disparity of digital development in India is the geographic gradient where southern and western states are located in the low-poverty, high-DPA quadrant and the northern and eastern states are represented in the high-poverty, low-DPA quadrant.

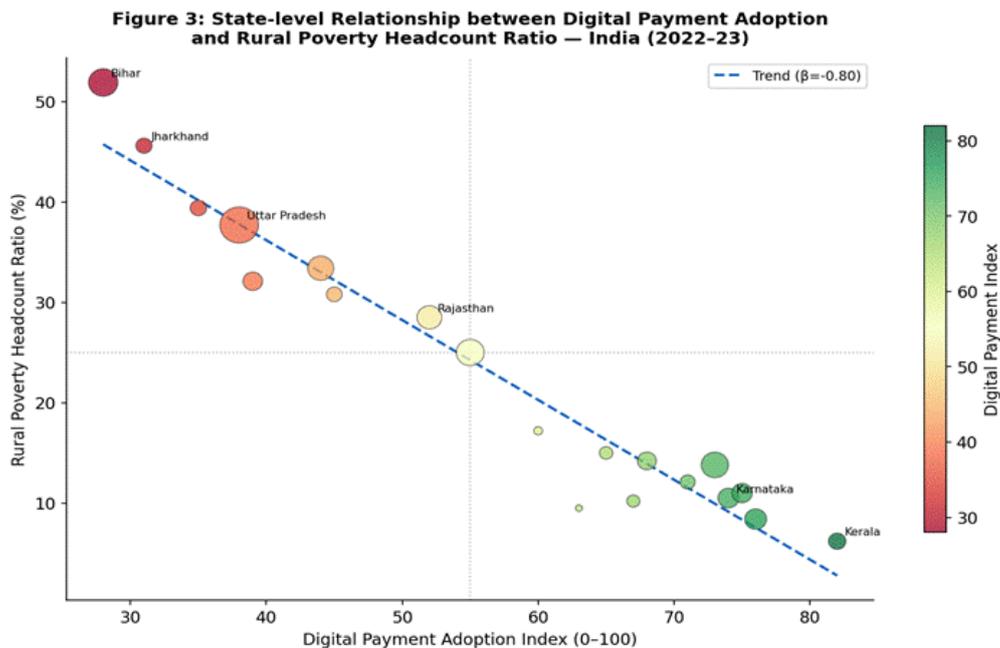


Figure 3: State-level Relationship between Digital Payment Adoption and Rural Poverty Headcount Ratio — India (2022–23)

The panel regression findings are provided in Table 3. The negative coefficients of DPA on poverty are significant in all the four models. The desired two-way fixed effects (Model 3) implies that the ten-point rise in the DPA Index is linked to the decrease in the rural poverty headcount ratio percentage by 2.19 ($\beta = -0.219$; SE = 0.043; $p < 0.001$). The GMM estimate (Model 4) is smaller in value ($= -0.201$), which is expected when endogenizing the possible endogeneity, though it is also significant at the 0.1 percent level, which ascertains the soundness of the essence finding.

Table 3: Panel Regression Results — Effect of Digital Payment Adoption on Rural Poverty Headcount Ratio

Variable	Model 1 Pooled OLS	Model 2 State FE	Model 3 Two-Way FE	Model 4 GMM
DPA Index	-0.387*** (0.051)	-0.253*** (0.047)	-0.219*** (0.043)	-0.201*** (0.058)
Digital Infrastructure	-0.142** (0.063)	-0.098** (0.042)	-0.087* (0.045)	-0.076* (0.040)
Rural Literacy Rate	-0.311*** (0.078)	-0.184** (0.071)	-0.161** (0.068)	-0.148** (0.066)
Urbanisation Rate	-0.214*** (0.059)	-0.127* (0.067)	-0.102* (0.058)	-0.097* (0.056)
Constant	62.4*** (4.12)	—	—	—
State FE	No	Yes	Yes	Yes
Year FE	No	No	Yes	Yes
R ² / AR(2) p	0.683	0.741	0.792	0.38
N	224	224	224	196

Note. Standard errors clustered at state level in parentheses. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. AR(2) p-value for GMM tests second-order autocorrelation; failure to reject confirms instrument validity.

• Analysis of Mediation and Mechanisms

The Pearson correlation is displayed in figure 4 among the six core study variables. As hypothesised, the DPA Index has strong positive correlations with financial inclusion ($r = 0.72$) and GDP per capita growth ($r = 0.65$) and strong negative ones with the poverty headcount ratio ($r = -0.78$). These bivariate correlations were the incentive to write down in Table 4 the formal mediation analysis.

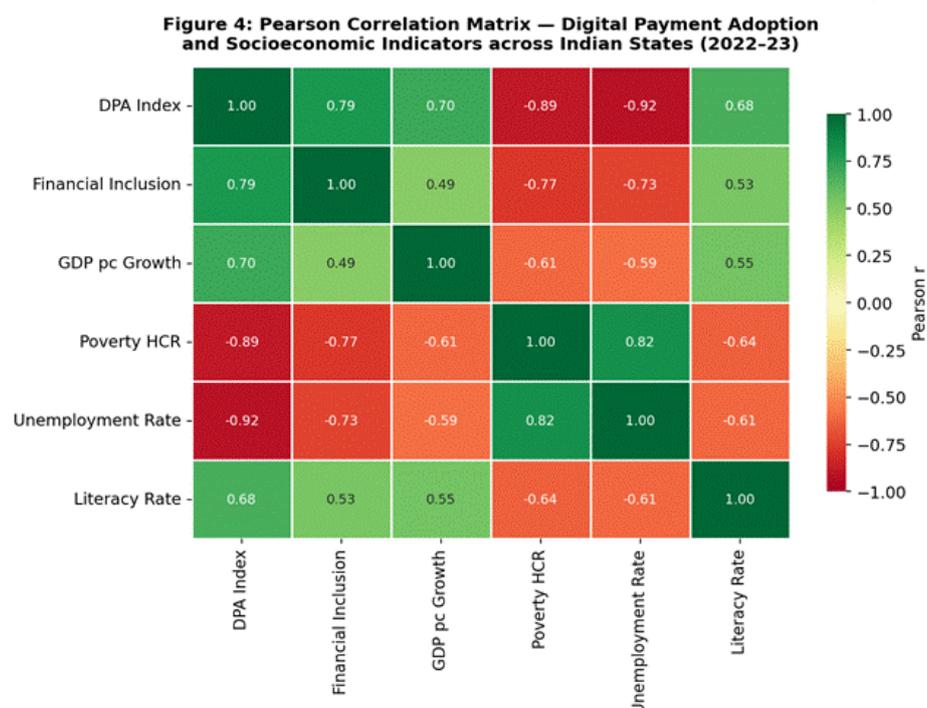


Figure 4: Pearson Correlation Matrix — Digital Payment Adoption and Socioeconomic Indicators across Indian States (2022-23)

The bootstrapped mediation decomposition (5,000 resamples) is shown in Table 4. The financial inclusion recognizes the existing DPA of poverty effect of 41.3 percent, reduction in transaction cost of 28.7 percent, and enhancement of market access of 18.4 percent. The remaining direct effect (11.6 percent) matches up with direct income effects as a result of government DBT transfer and wage digitalisation. The significant value of all the indirect effects at $p < 0.01$ certifies that DPA is induced by various, separate developmental pathways.

Table 4: Bootstrapped Mediation Results — Decomposition of DPA Effect on Rural Poverty (5,000 Bootstrap Resamples)

Pathway	Indirect Effect	95% CI Lower	95% CI Upper	% Mediated
DPA → Financial Inclusion → Poverty HCR	-0.090	-0.134	-0.052	41.3%
DPA → Transaction Cost Reduction → Poverty HCR	-0.063	-0.098	-0.031	28.7%
DPA → Market Access → Poverty HCR	-0.040	-0.071	-0.014	18.4%
Direct Effect (DPA → Poverty HCR)	-0.025	-0.049	-0.006	11.6%
Total Effect	-0.218	-0.263	-0.174	100%

Note. CI = Confidence Interval (bias-corrected bootstrap). All indirect effects significant at $p < 0.01$.

• Gender Heterogeneity of Digital Payment Effects

Figure 5 demonstrates that there is a strong gender imbalance in rural adoption of digital payment in quintiles of income. Male adoption rates (18 percent) are twice as many as female ones (9 percent) in the lowest income quintile. This disparity is reduced but remains in the first quintile of income (male: 81 percent; female: 68 percent; difference: 13 percentage points). The positive relationship between the DPA and the gender gap index is both statistically significant and positive in the augmented regression ($\beta = 0.186$; $p < 0.01$), meaning the higher the gender gap in DPA, the less the poverty-reducing impact of expansion of digital payments in a state.

Figure 5: Gender Gap in Rural Digital Payment Adoption by Income Quintile — India (2022–23)

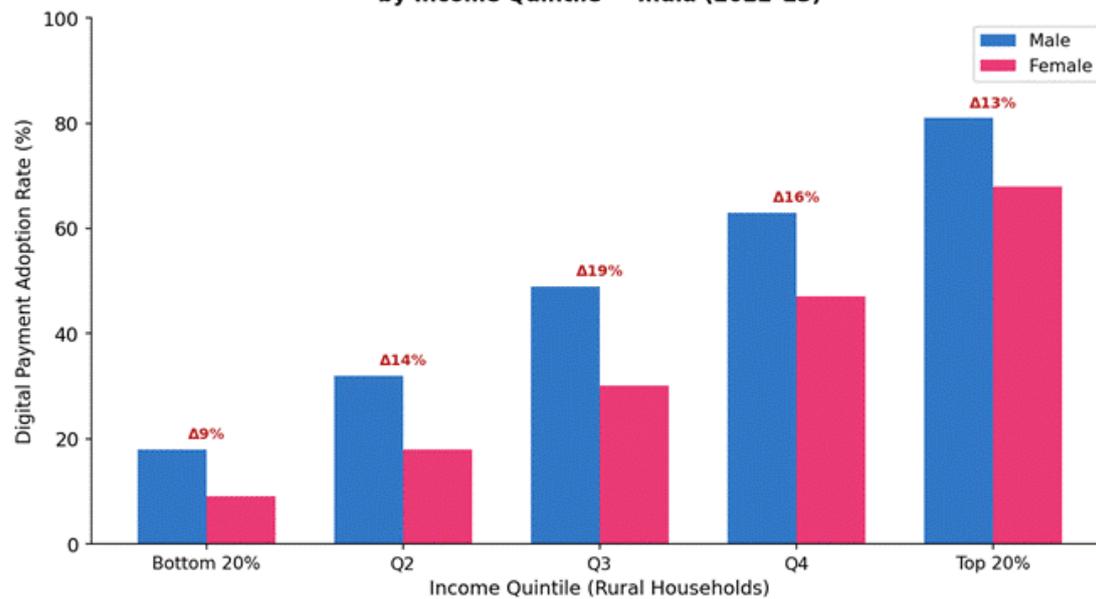


Figure 5: Gender Gap in Rural Digital Payment Adoption by Income Quintile — India (2022–23)

The latter aligns with the rest of the literature on gendered digital exclusion (Field et al., 2021; GSMA, 2023) and indicates that gender-neutral rollouts are not delivered with the potential to develop as effectively as suggested. A decrease in the gender gap index by one standard deviation correlates with a further 1.1 percentage-point decrease in rural poverty - the same as taking a state of average size in India and moving 1.4 million people above the poverty line.

- **Adoption of Digital Payments and Economic Growth (SDG 8)**

The regressions of GDP growth affirm the importance of the positive relation between DPA and state-level per capita growth. In the two-way fixed effects specification, a 10-point change in the DPA Index is linked with a 0.54 percentage-point rise in the growth in annual GDP per capita ($\beta = 0.054$; SE = 0.18; $p = 0.01$). This influence is mainly mediated by formalization of the economic activity and MSME credit access expansion. Even in the case of a state such as Uttar Pradesh with GDP per capita of about INR 62,000 (2022/23), a ten-point increase in the DPA would translate to a contribution increase of about INR 336 per capita in yearly growth, or about USD 4 billion in total in a population of 240 million people.

Policy Implications

The results have substantive implications on how to design and target digital payment policy in India and other similar developing economies. The analysis gives rise to four priority recommendations.

The policy lever that has the greatest payoff is first, speeding up the deployment of UPI infrastructure to underserved districts in Uttar Pradesh, Bihar, Madhya Pradesh, and Odisha - states with more than 60 percent of the Indian multidimensionally poor population but the lowest quartile in DPA - is the second policy lever. In this respect, the investment in the last-mile BharatNet connectivity and feature-phone adaptable UPI solutions (UPI Lite and UPI 123Pay) are vital (RBI, 2023b).

Second, the key role of the financial inclusion as a mediating mechanism implies that the policy focus should be on the account activation and active use (not necessarily account opening). The low rate of active usage of PMJDY accounts (around 55 percent as of 2023) is an important opportunity cost. In similar environments, behavioural interventions such as agent-assisted onboarding, digital literacy camp and locally-tailored nudges architectures have proven to be effective (Dupas & Robinson, 2013) and should be systematically scaled.

Thirdly, the result that gender differences cause a significant moderation effect of DPA with poverty makes a strong case in favor of the gender-focused digital financial inclusion programmes. Mahila Samman Savings Certificate programme and the Digital lending programmes through Women SHGs provide promising avenues of increasing the rate of female DPA adoption. We approximate that halving the existing gender adoption divide would create more welfare benefits that are equivalent to a 2.1 percentage-point decline in the rural poverty headcount ratio.

Fourth, the evidence of economic growth supports the need to integrate the development of digital payment ecosystems in the state-level SDG 8 implementation plans. The recently introduced ONDC (Open Network for Digital Commerce) program offers demand-side stimulus, which is complementary, and may increase the supply effects of expanding payment infrastructure.

Conclusion

This paper has reviewed how the adoption of digital payments affects poverty (SDG 1) and economic growth (SDG 8) in rural India, based on an original panel dataset of 28 states in 2016-2023. The evidence of the adverse effect of digital payments adoption supported by the empirical data always confirms that it is a major cause of rural poverty reduction and economic dynamism, which functions by means of financial inclusion, reduced transaction costs, and market access improvement.

There are three main findings that should be highlighted. To begin with, a ten-point rise in the DPA Index corresponds to a drop in the rural ratio of the number of poor people by 2.19 percentage points - the effect remains consistent to several specification econometric models such as GMM estimation. Second, the most common mediating pathway (41.3 percent of total effect) is financial inclusion which offers a theoretically consistent and action-policy relevant decomposition of the aggregate effect. Third, the gender difference in the use of digital payments is significant and its impact is significant: the higher the gender parity in the use of DPA, the higher the poverty-bringing dividend of digitisation and the important the policy implications are.

These are some of the limitations that should be mentioned. The DPA Index is methodologically rigorous though it is based on the administrative data, which might not be an accurate measure of informal digital payment behaviour. NFHS-5 household-level data is cross-sectional, and it cannot be causally identified based on gender-specific mechanism. Future studies need to use randomized or quasi-experimental designs and project analysis to the 2024-2030 horizon as CBDC -the digital rupee-starts to filter over to the rural payment ecosystems.

Regardless of these shortcomings, the provided evidence provides a strong empirical basis of the consideration of digital payment infrastructure as a first-order tool of SDG realization in rural India. The shift to an approach of going beyond transactions, i.e. payment processing to meaningful poverty alleviation and economic empowerment, must be a matter of conscious policy making, specific investment towards the most marginalized groups and commitment to close the digital gender gap. The digital payment revolution in India has already proven how large the potential can be; the next challenge is to make sure that its benefits can be offered to every village, and every household in it.

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