



Beyond the Interface: Internet Penetration, Human Agency, and Structural Determinants of the Gender Gap in Financial Inclusion across Indian States

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Abstract

Background/Objective Despite the rapid strides in financial inclusion in India under Pradhan Mantri Jan Dhan Yojana (PMJDY), there is a continued gender gap in the utilization of the accounts, not just in ownership. This study attempts to answer the questions of what extent the internet penetration and per capita Gross State Domestic Product (GSDP) explains the state level adoption of female PMJDY and how digital literacy plays as a mediation between internet and financial autonomy of women. **Methods** The research method adopted was mixed methods. The secondary data for women's PMJDY accounts, wireless internet subscribers, and per capita GSDP were obtained from government sources for Indian states and union territories and analyzed with the help of Ordinary Least Squares regression in Stata for the reference period (2022-2023). This was complemented by thematic analysis of informal discussions that were conducted with 15 women beneficiaries of digital literacy interventions. **Results** Internet penetration had a significant positive effect on the adoption of female PMJDY accounts ($\text{Beta} = 70.09, p = .026$), and per capita GSDP had a significant negative effect ($\text{Beta} = -0.0005, p = .022$); together the model explained 55.7% of the cross-state variation. Diagnostic tests indicated no heteroskedasticity or omitted-variable misspecification. Digital literacy emerged, qualitatively, as the mechanism through which internet access translated into independent financial behavior. **Conclusions** Internet access and economic development are meaningful but incomplete structural predictors of women's financial inclusion; digital literacy is the missing link that converts access into agency. The results are for further investment in internet infrastructure along with vernacular-language digital-literacy platforms like DigiSakhi, to usher India's financial inclusion drive from merely having an account to true financial empowerment for women.

Keywords: Female Financial Inclusion; PMJDY; Internet Penetration; Per Capita GSDP; Digital Literacy; Women's Empowerment; India; OLS Regression

Introduction

Background and Context

Financial inclusion is not only about access but also autonomy for women in India. The Pradhan Mantri Jan Dhan Yojana (PMJDY) was introduced as a gamechanger in financial inclusion in August 2014, which aimed to provide every household not covered under the banking network with a RuPay debit card, a zero-balance savings account and with access to credit, insurance and pension facilities¹. An estimated 530 million accounts have been opened in 10 years, with 56 percent of them owned by women and 67 percent in rural or semi-urban areas.

This on the surface is one of the most rapid advances in formal financial access in modern economic history. Even after opening the bank account, one of the significant challenges in financial inclusion in India is its low utilization. MicroSave Consulting research shows that the women are "proxy" users and not financial agents with most of the accounts opened under PMJDY being held by men, mainly husbands of the women. While the gender parity gap has reduced from 43 per cent in 2014 to 78 per cent in 2021, preliminary findings indicated that 43 per cent of all PMJDY accounts were dormant, suggesting a systemic mismatch between access and usage. Such inactivity is not a coincidence but is a result of deep-rooted social norms around women's economic decision-making, movement and access to digital technologies.

Problem Statement and Rationale

Prior Indian studies identify age, income, and education as important correlates of financial inclusion, and note that the pandemic accelerated digital-payment adoption even as female uptake of digital payment services remained significantly lower than male uptake⁴. State-level regression analyses further identify internet density, telecom density, and per capita GSDP, alongside secondary-school enrolment and road infrastructure, as statistically significant structural determinants of financial inclusion across Indian states⁵. Cross-country evidence from the World Bank's Global Findex database similarly shows that the gender gap in account ownership narrows, and usage rates converge, in more economically developed countries⁶. Yet internet access alone does not guarantee financial inclusion for women: connectivity is necessary, but not sufficient, for digital financial participation. This study addresses the resulting gap by asking how far internet penetration and per capita GSDP explain the state-level variation in women's PMJDY adoption, and where digital literacy fits into that structural picture.

Theoretical Framework

The theoretical rationale connecting financial inclusion to women's economic empowerment draws on a substantial development-economics literature. Duflo argues that the relationship between women's empowerment and economic development runs in both directions — empowerment advances development, and development narrows gender inequality — but that neither dynamic is self-sustaining without continued policy commitment to equality as an end in itself⁷. Kabeer's capability framework, a cornerstone of the women's empowerment literature, contends that empowerment must be understood in terms of resources, agency, and achievements: access to a financial resource is not empowerment in itself unless it is accompanied by the agency to use that resource independently⁸. Consistent with this framework, women who received direct wage deposits into their own accounts and training in how to use them experienced significantly greater access to public- and private-sector employment, with training — not account ownership alone — identified as the mechanism of change⁹. Correspondingly, a substantial share of PMJDY accounts held by women remain dormant, and female business correspondents have been identified as a critical lever for converting proxy users into independent account holders¹⁰.

A second strand of literature links internet penetration specifically to female financial inclusion. State-level determinants studies in India identify internet density and telecom density among the most significant physical-infrastructure correlates of financial inclusion⁵, a pattern that is echoed in cross-country evidence linking internet uptake to expanded formal account ownership, albeit with the caveat that internet use is a necessary rather than sufficient condition once digital financial access itself is modeled directly⁶. The digital gender gap compounds this relationship: despite a wide rural gender gap in mobile phone use, women's use of digital payment services in India has remained significantly and persistently lower than men's even as overall digital financial participation grew through the COVID-19 pandemic⁴, a pattern also documented globally in the GSMA Mobile Gender Gap Report¹¹.

A third strand emphasizes per capita income and state-level economic development as a structural determinant of financial inclusion, generally finding a positive cross-country association between GDP per capita and financial participation¹². Within India, however, the picture is more complex: because PMJDY's outreach has been deliberately redistributive, targeting banking correspondents and account-opening drives toward economically weaker states, financial inclusion policy attention itself is negatively correlated with state income, a pattern that gender-inclusive digital-inclusion advocacy has also flagged as a target for policy design¹³.

A fourth strand identifies digital literacy as the “missing link” between internet access and genuine economic empowerment. Evidence synthesizing India-focused studies on digital financial decision-making finds that women face persistent constraints in using digital financial instruments effectively, stemming from gaps in digital financial literacy rather than from a lack of access itself¹⁴. Cross-country panel evidence similarly shows that digital financial inclusion can promote growth, but that in the absence of explicit gender-focused interventions, expanding digital access can deepen rather than narrow gender inequality where financial sectors remain underdeveloped¹⁵. Digitally trained self-help-group members show measurably greater use of formal financial applications relative to untrained members¹⁶, and calls for gender-intelligent financial-service design paired with targeted, vernacular-language literacy efforts — the model that platforms such as DigiSakhi are built around — have grown accordingly¹⁷. Taken together, the literature supports a two-stage model in which internet infrastructure sets the outer limit of potential inclusion, while digital-literacy interventions govern the conversion of that potential into actual financial autonomy.

Significance and Purpose

This study contributes to the literature on gendered digital financial inclusion by empirically separating the structural contribution of internet penetration and economic development from the behavioral and capability-based contribution of digital literacy, using state-level Indian data. If internet penetration is confirmed as a significant structural predictor of female PMJDY adoption, then pairing internet-infrastructure expansion with targeted digital-literacy platforms such as DigiSakhi represents a comparatively cost-effective route to women's financial empowerment. The study joins a growing body of work that moves financial inclusion measurement beyond account access alone, toward the resources-versus-agency distinction at the center of the capability framework.

Objectives

The central research question is: What is the extent of contribution of state-level internet penetration and per capita GSDP towards the differences in the adoption of female PMJDY accounts across states in India and what is the role of digital literacy in this relationship? The effect of internet penetration is hypothesized to be positive and large whereas the effect of per capita GSDP is hypothesized to be negative as it is based on the redistributive targeting logic of PMJDY for economically weaker states. Financial inclusion is measured as number of accounts opened under PMJDY as of December 2022 and internet penetration as the number of wireless Internet subscribers by state as of December 2023.

Methodology Overview

The study is of mixed methods design, consisting of Ordinary Least Squares regression analysis on secondary state-level data and thematic analysis of informal conversations with women that had participated in digital literacy interventions. The regression component takes the dependent variable as state level female PMJDY account holding and the main explanatory variables as the log of wireless internet subscribers, and the per capita GSDP. The Methods section details the full procedure used.

Methods

Research Design

A mixed method research design was adopted in the study, while the secondary data was analysed quantitatively using regression and primary data were collected qualitatively through informal discussions with beneficiaries of the women groups. The quantitative component was implemented in Indian states and union territories, which have a meaningful cross-sectional heterogeneity in economic development, digital infrastructure and banking outreach, appropriate for regression analysis. The qualitative component was conducted with female participants who were previous participants in digital literacy interventions to provide a basis to provide context and validate the quantitative findings.

Sample and Data Scope

States/UTs were chosen for quantitative component with purposive sampling, wherein only those states/UTs were included for which complete data were available for all the study variables for the year 2022-23. Qualitative part was undertaken in a small purposive sample of women with whom the digital literacy platforms have contact. The conversations were not statistically representative but were valuable in terms of an on-the-ground perspective to frame and interpret the regression results.

Data Collection and Data Sources

Primary data were gathered through informal, semi-structured conversations with 15 women beneficiaries about their experiences with digital literacy and the extent to which it helped them manage their bank accounts independently. Secondary data were drawn from three official government sources: per capita GSDP from the Reserve Bank of India Handbook of Statistics on Indian States, 2022–23¹⁸; state-wise wireless internet subscriber data from the Telecom Regulatory Authority of India as of December 2023¹⁹; and state-wise female account data from the Ministry of Finance's PMJDY portal as of December 2022¹. No confidential or proprietary data were used; all sources were publicly available.

Variables and Measurements

The quantitative data consisted of three variables: female PMJDY accounts (in lakh) as the dependent variable, wireless internet subscribers per state and per capita GSDP (in Indian rupees) as independent variables. To normalize the distribution of internet subscribers across states, the value of internet subscribers was

transformed to natural log (lninternet) in Stata before regression. Robustness variables: the percentage of female digital-literacy candidates who have been certified by PMGDISHA and 2023 Human Development Index (HDI) score were also obtained for every state.

Procedure

The regression model estimated was: Female PMJDY Accounts (Lakh) = $\beta_0 + \beta_1(\lninternet) + \beta_2(gsdp) + \varepsilon$. Before regression, descriptive statistics and a Pearson correlation matrix were created. To evaluate multicollinearity, variance inflation factor analysis was performed and to evaluate model specification, two diagnostic tests were conducted: the Breusch-Pagan/Cook-Weisberg test for homoskedasticity and the Ramsey RESET test for omitted-variable bias. A robustness check resulted in the re-estimation of the model using PMGDISHA female-certified candidates instead of the primary predictors and 2023 HDI score. Qualitative responses were analyzed thematically to complement and not generalize from the quantitative findings.

Data Analysis

Quantitative data were analyzed in Stata 17 using Ordinary Least Squares regression as the primary method. Descriptive statistics, a correlation matrix, and the OLS specification described above were estimated sequentially, followed by diagnostic testing and the robustness check. Thematic analysis of the qualitative conversations identified two recurring themes: digital empowerment and financial autonomy.

Ethical Considerations

No individual-level data were collected in the quantitative strand, which relied entirely on publicly available, aggregated, government-published state-level data. In the qualitative strand, voluntariness, confidentiality, and anonymity were strictly respected: participants were informed of the study's aim, their statements were documented without identifying information, and no institutional approval was required given the informal, non-interventional nature of the conversations. The small qualitative sample size ($n = 15$) and the reduced effective quantitative sample ($n = 14$ for models including lninternet, owing to missing internet data in several states) are treated as limitations rather than ethical concerns, and are discussed further below.

Results

Descriptive Statistics

Descriptive statistics for all study variables are shown in Table 1. The sample includes 22 state/union-territory observations for most variables, with internet penetration data available for 14 service areas under TRAI's classification system¹⁹. Female PMJDY accounts varied substantially across states, ranging from 0.05 lakh in Lakshadweep to 461.87 lakh in Uttar Pradesh ($M = 95.72$, $SD = 117.15$). Per capita GSDP ranged from ₹54,111 to ₹5,19,964 ($M = ₹2,03,954$), and female literacy ranged from 57.9% to 93.8% ($M = 73.09\%$), reflecting wide economic and educational heterogeneity across Indian states.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Female PMJDY Accounts (Lakh)	22	95.72	117.15	0.05	461.87
PMGDISHA Female Certified	22	975,874	1,328,569	2,350	6,052,144
HDI Score 2023	22	0.696	0.047	0.614	0.779
Internet Subscribers (Dec 2023)	14	18,700,000	11,500,000	3,565,663	41,200,000
Per Capita GSDP (₹)	22	203,954	116,397	54,111	519,964
Female Literacy Rate (%)	22	73.09	9.02	57.9	93.8

Source: 20,19,21,18,22.

Correlation Analysis

Table 2 displays the Pearson correlation matrix for all the key variables. The most interesting finding is that PMJDY has a statistically significant positive correlation with internet penetration ($r = 0.535$, $p < .05$), meaning that the higher the internet penetration in the state, the higher the number of female PMJDY subscribers. This aligns with the key principle that being connected online helps to foster digital financial literacy that platforms such as DigiSakhi aim to develop. The negative and significant correlation between per capita GSDP and female

PMJDY accounts ($r = -0.472$, $p < .05$) needs to be treated with caution since smaller and wealthier states like Goa, Himachal Pradesh and Sikkim have a smaller absolute number of women who are unbanked while larger and poorer states like Uttar Pradesh, Bihar and Madhya Pradesh have larger absolute numbers of women holding PMJDY accounts emphasising its targeted approach towards economically weaker sections of the population.

Table 2. Correlation Matrix

Variable	PMJDY Accounts	PMGDISHA Certified	HDI 2023	Internet	GSDP	Literacy
Female PMJDY Accounts	1.000					
PMGDISHA Female Certified	0.867*	1.000				
HDI Score 2023	-0.550*	-0.563*	1.000			
Internet Subscribers	0.535*	0.494	-0.432	1.000		
Per Capita GSDP	-0.472*	-0.483*	0.724*	-0.043	1.000	
Female Literacy Rate	-0.397	-0.435*	0.296	-0.446	0.184	1.000

* denotes statistical significance at the 5% level. Source: Author's computation using Stata 14.

Regression Analysis

The results of OLS regression of Female PMJDY Accounts on per capita GSDP and Log internet subscribers are presented in Table 3. The overall model is statistically significant, $F(2, 11) = 6.91$, $p = .0114$, with $R^2 = 0.5569$, which implies that the two predictors account for about 55.7% of the cross state variation in women's PMJDY account holdings. Both predictors have a 5% statistical significance level. The coefficient for log internet subscribers is positive and significant ($\beta = 70.09$, $p = .026$), suggesting that digital connectivity is an important enabler of financial inclusion for women through digital financial education platforms and digital financial literacy. The coefficient on per capita GSDP is negative and significant ($\beta = -0.0005$, $p = .022$), and this is in line with the targeting logic of PMJDY, given that it primarily focuses on opening bank accounts in economically disadvantaged states. The Breusch-Pagan test for heteroskedasticity is not significant, $\chi^2(1) = 1.42$, $p = .234$, which means that the null hypothesis of constant variance is not rejected and the OLS estimates are satisfactory. There is no evidence of omitted-variable bias or model misspecification, based on Ramsey RESET test results ($F(3, 8) = 0.67$, $p = .593$).

Table 3. Main Regression — Female PMJDY Accounts on Per Capita GSDP and Internet Penetration

Variable	Coefficient	Std. Error	t-statistic	p-value	95% CI
Per Capita GSDP (₹)	-0.0005171	0.0001941	-2.66	0.022	[-0.0009442, -0.00009]
Log Internet Subscribers	70.095	27.149	2.58	0.026	[10.341, 129.849]
Constant	-956.791	451.301	-2.12	0.058	[-1950.098, 36.515]

Dependent variable: Female PMJDY Accounts (Lakh). $N = 14$; $F(2, 11) = 6.91$; $Prob > F = 0.0114$; $R^2 = 0.5569$; $Adj. R^2 = 0.4764$. Diagnostics: Breusch-Pagan $\chi^2(1) = 1.42$, $p = 0.234$; Ramsey RESET $F(3, 8) = 0.67$, $p = 0.593$. Source: Author's computation using Stata 14.

Graphical Analysis

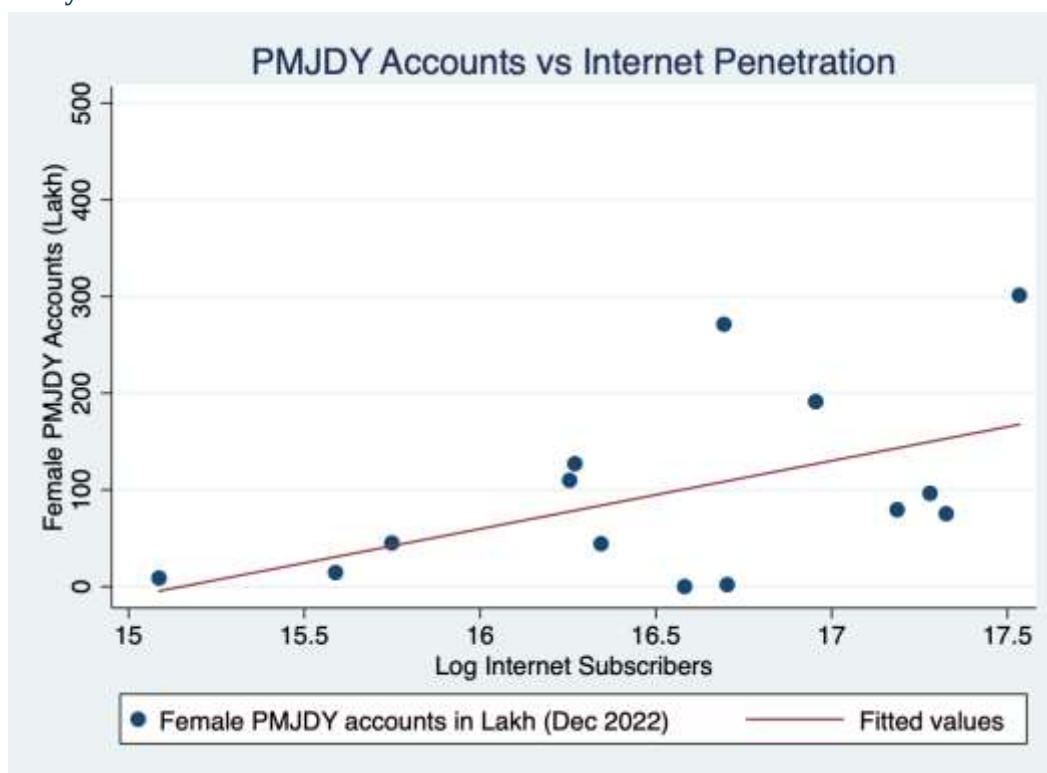


Figure 1. Female PMJDY Accounts vs. Log Internet Subscribers

The positive relationship between the log of internet subscribers per state and female PMJDY accounts in Indian states is shown in the Figure 1 where the linear fit line is in accordance with the coefficient obtained in the regression analysis. States with high internet penetration (like Tamil Nadu, Karnataka and Maharashtra) are grouped towards the right and top of the distribution as they have high connectivity and high female PMJDY account holders.

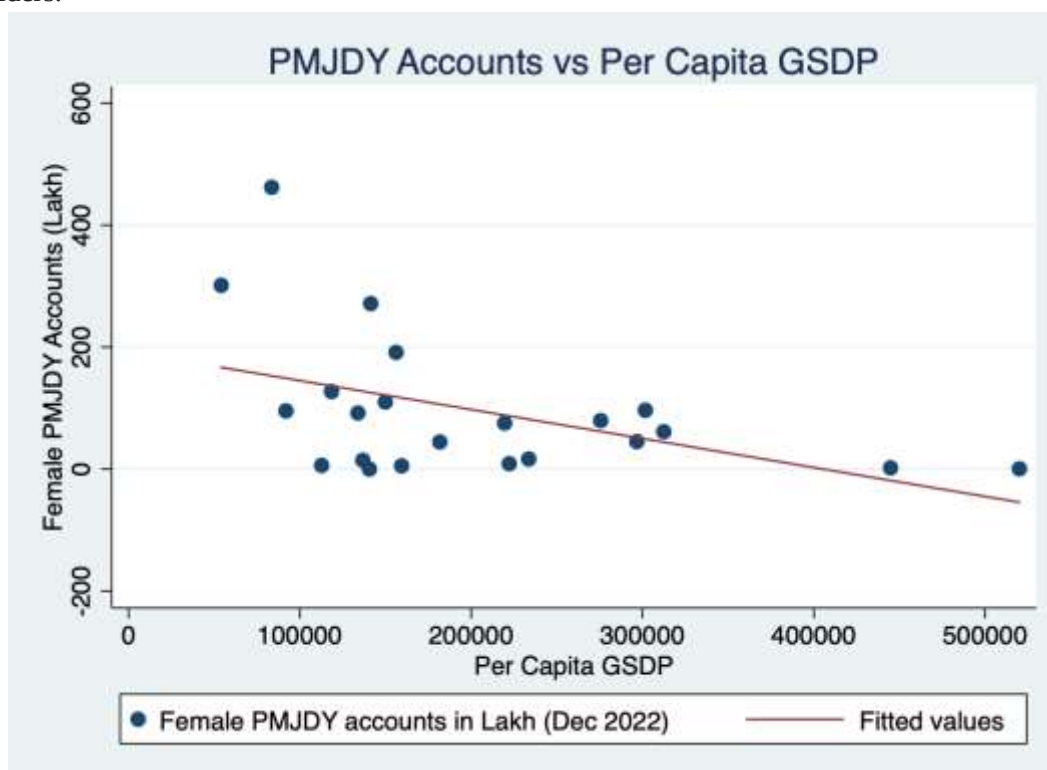


Figure 2. Female PMJDY Accounts vs. Per Capita GSDP

Figure 2 shows a downward-sloping relationship between female PMJDY accounts and per capita GSDP, consistent with the significant negative coefficient found in the regression. States with lower per capita income — Uttar Pradesh, Bihar, Madhya Pradesh, and Rajasthan — have the largest numbers of female PMJDY account holders, reflecting the scheme's intent to serve the unbanked rural population. India's female bank account ownership rose from roughly 35% in 2011 to around 89% in 2024, driven substantially by PMJDY; the negative GSDP coefficient therefore does not imply that financial inclusion undermines economic development, but rather reflects PMJDY's deliberate concentration of account-opening effort in lower-income states with the largest unbanked populations.

Key Findings

Internet penetration is positive and statistically significant in predicting female PMJDY adoption, controlling for per capita GSDP, establishing an empirical link between state-level digital access and women's financial participation that supports the premise that connectivity creates the conditions for digital-literacy interventions to operate¹⁴. Community-based digital literacy platforms such as DigiSakhi are positioned to fill the resulting gap, offering accessible financial education to rural women who have connectivity but lack the knowledge and confidence to use formal financial services independently¹⁷. Second, the negative correlation between per capita GSDP and female PMJDY adoption validates the scheme's progressive targeting of lower-income states, indicating that PMJDY functions as a tool for redistributive, as well as general, financial inclusion. Together, these results suggest that the next phase of India's financial inclusion agenda should shift emphasis from account opening toward account usage, and that internet-delivered digital-literacy programming is among the most scalable ways to accomplish that shift.

Discussion

Restatement of Key Findings

This study examined how far women's adoption of PMJDY accounts across Indian states can be explained by internet penetration and per capita GSDP, situating the analysis within the wider context of women's financial empowerment in a digitally transforming economy. Two themes emerged. First, structural-access proxies — internet access and economic development — are significant but limited predictors of financial inclusion for women. Second, and more fundamentally, infrastructure alone does not connect account holding to ownership of one's financial life; digital literacy is the deliberate, plannable link that must be built between the two.

Implications and Significance

The regression results confirm that internet penetration has a significant positive effect on PMJDY account adoption and that per capita GSDP has a significant negative effect, consistent with PMJDY's redistributive design, which has concentrated banking outreach in states with lower per capita GSDP. These findings indicate that digital infrastructure functions as a social variable: where internet access is greater, formal bank-account access among women is also greater. The robustness check further suggests that digital-skill certification, measured as the share of female candidates certified in digital literacy, is one of the strongest state-level correlates of women's financial inclusion, with direct implications for the design of India's financial inclusion agenda going forward.

These results provide empirical support to Kabeer's capability framework, which distinguishes resources from agency⁸ - internet access is a resource, whereas a person's ability to use the internet to make a bank transfer, make transactions, and independently access government schemes is agency. This theoretical distinction is humanized through the qualitative discussions with women who had interacted with digital literacy platforms. Digital education was reported to have created a new sense of confidence and independence among women who had previously depended on husbands or male relatives to manage money, and who were now able to manage their own finances. These accounts do not merely illustrate the quantitative results — they demonstrate that the pathway from internet use to financial inclusion is not automatic, but is activated by knowledge, confidence, and action.

The practical and policy implications follow directly. Investment in internet infrastructure in currently underserved, gender-inclusive states is likely to benefit women's financial inclusion in India. At the same time, the qualitative evidence indicates that connectivity without literacy produces accounts without autonomy. Digital financial education platforms offering user-friendly, vernacular-language content — such as DigiSakhi — are not an optional supplement to India's financial inclusion program; they are integral to it¹⁷. As internet use continues to grow, the potential audience for such platforms, and the returns on pairing connectivity with structured digital education, should grow correspondingly, both for individual women and in aggregate at the state level.

Connection to Objectives

The study's central objective — determining how far internet penetration and per capita GSDP explain cross-state variation in female PMJDY adoption — was met. Both predictors were statistically significant in the hypothesized directions, and the model explained more than half of cross-state variance. The qualitative strand met its complementary objective of illustrating how digital literacy mediates the conversion of internet access into financial autonomy, though this mediating relationship was explored thematically rather than tested statistically, and should be read as illustrative rather than confirmatory.

Recommendations

Future research should employ longitudinal panel data tracking changes in internet penetration alongside changes in women's account activity, not merely adoption, to better establish the direction of causality between digital access and financial inclusion. Qualitative studies on a larger scale, including income group and state structured focus group discussions, might gainfully investigate the impact of digital learning on women's financial decisions and intra-household bargaining power in more systematic manner. A future state-level model could also incorporate variables like social-norm indices, as well as distance to the nearest bank branch and availability of digital platforms in local languages, when data allow to include them without inducing multicollinearity.

Limitations

The main limitation of the methodology is sample size. The internet penetration being added as an independent variable shrunk the effective quantitative sample to just 14 states and union territories because wireless subscriber data was not available for all of them in the reference period. This reduces the statistical power and some relationships in the data may be subject to the presence or absence of certain states; future work should repeat the analysis as the data coverage of TRAI increases.

Second, a cross-sectional design does not allow for causal conclusions. Internet penetration and the per capita GSDP have a significant association with the adoption of the female PMJDY but the design does not allow for causality to be determined in either direction; for instance, increased financial inclusion could lead to increased investments in digital infrastructure, and thus, cause reverse causality. This would be corrected by a panel design and over a number of years.

Third, the dependent variable — female PMJDY accounts in lakh — is an indicator of the adoption of accounts, and not usage. As per the literature, there is a significant proportion of the accounts opened under the PMJDY that are either unused or left with male household members in the name of women¹⁰. Financial autonomy is a dimension this study is interested in in the end, and would better be represented by account activity or transaction frequency measures, which were not available at the state level in this study.

Fourth, the qualitative component was helpful for providing context to the quantitative findings, but was constrained by a small ($N = 15$), purposeful, and geographically concentrated sample of women. The findings should not be interpreted as a national representative picture of the experience of beneficiaries from digital education; a more systematic qualitative study would lead to a deeper and more representative understanding of the impact of digital education on women's financial behaviour and autonomy.

Fifth, the study is based on secondary data from the Government portals and regulators. They are authoritative, but not infallible sources of data: Reporting delays, different practice for collecting financial data from state to state, and the omission of informal or unreported financial activity are all potential sources of error. Data from the accounts are as of December 2022, while data on Internet penetration is as of December 2023, meaning that there is a one-year lag between the two core variables which can also impact the accuracy of the estimated relationship.

Finally, a few variables could not be included in the regression because they were absent or because they were highly correlated with the other variables. The lack of such variables suggests that they may be part of the estimated coefficients on internet penetration and per capita GSDP and that the true structure of these relationships may be more intricate than this rudimentary model can explain. Nevertheless, the selection of the chosen specification has passed both the Ramsey RESET test for omitted-variable bias and the Breusch-Pagan test for heteroskedasticity, and therefore produced reasonable confidence in the validity of the results contained within its limits and definitions, described above.

Closing Thought

For women, financial inclusion is not just an account opened in their name, it is the knowledge, confidence and autonomy to use that account as they wish. Participants in this research, who were the women, didn't report learning digital literacy as a technical skill, but as a type of freedom. As they read with the regression evidence, their accounts indicate that education that leads them to the internet, but also to the education to learn what to do once there is the most powerful investment that India can make in the financial futures of women.

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References

1. Ministry of Finance, Government of India. Pradhan Mantri Jan Dhan Yojana: Progress report December 2022. 2022, <https://pmjdy.gov.in>.
2. A. Sharma, S. Kukreja, N. Singh. Financial inclusion in India amid COVID-19 pandemic: Recent trends and determinants. *Journal of the Knowledge Economy*. 2024, <https://doi.org/10.1007/s13132-024-01992-z>.
3. S. Mondal. Financial inclusion and its determinants in India. Indian Economic Service Working Paper. 2022, <https://www.ies.gov.in/pdfs/Sudipto-Mondal-Financial-Inclusion-and-its-determinants-in-India.pdf>.
4. A. Demirgüç-Kunt, L. Klapper, D. Singer, S. Ansar. The global index database 2021: Financial inclusion, digital payments, and resilience in the age of COVID-19. World Bank. 2022, <https://doi.org/10.1596/978-1-4648-1897-4>.
5. E. Duflo. Women empowerment and economic development. *Journal of Economic Literature*. Vol. 50, pg. 1051–1079, 2012, <https://doi.org/10.1257/jel.50.4.1051>.
6. N. Kabeer. Resources, agency, achievements: Reflections on the measurement of women's empowerment. *Development and Change*. Vol. 30, pg. 435–464, 1999, <https://doi.org/10.1111/1467-7660.00125>.
7. E. Field, R. Pande, J. Papp, N. Rigol. On her own account: How strengthening women's financial control impacts labor supply and gender norms. *American Economic Review*. Vol. 111, pg. 2342–2375, 2021, <https://doi.org/10.1257/aer.20200705>.
8. M. Duvendack, L. Sonne, S. Garikipati. Gender inclusivity of India's digital financial revolution for attainment of SDGs. *The European Journal of Development Research*. Vol. 35, pg. 1369–1391, 2023, <https://doi.org/10.1057/s41287-023-00585-x>.
9. GSMA. The mobile gender gap report 2023. GSMA Connected Women. 2023, <https://www.gsma.com/r/gender-gap/>.
10. C. Gonzales, S. Jain-Chandra, K. Kochhar, M. Newiak, T. Zeinullayev. Catalyst for change: Empowering women and tackling income inequality. IMF Staff Discussion Note SDN/15/20. International Monetary Fund. 2015, <https://www.imf.org/external/pubs/ft/sdn/2015/sdn1520.pdf>.
11. World Bank. Empowering women through digital financial inclusion. World Bank Blog. 2023, <https://blogs.worldbank.org/en/psd/empowering-women-through-digital-financial-inclusion>.
12. M. Thakur, P. Arora. Digital financial literacy and its impact on financial decision-making of women: Evidence from India. *Journal of Risk and Financial Management*. Vol. 17, pg. 468, 2024, <https://doi.org/10.3390/jrfm17100468>.
13. D. Le Quoc. The relationship between digital financial inclusion, gender inequality, and economic growth. *Journal of Business and Socio-economic Development*. Vol. 4, pg. 370–388, 2024, <https://doi.org/10.1108/JBSED-12-2023-0101>.
14. S. Roy, B. Patro. Effect of women's self-help group participation on their financial inclusion. *Annals of Public and Cooperative Economics*. 2025, <https://doi.org/10.1111/apce.12496>.
15. World Bank. Enabling digital financial inclusion for rural women: Emerging findings from India. World Bank Endpoverty Blog. 2024, <https://blogs.worldbank.org/en/endpovertyinsouthasia/enabling-digital-financial-inclusion-rural-women-emerging-findings-india>.
16. Reserve Bank of India. Handbook of statistics on Indian states 2022–23. RBI. 2023, <https://www.rbi.org.in>.
17. Telecom Regulatory Authority of India. Telecom subscription data report, December 2023. TRAI. 2023, <https://www.trai.gov.in>.
18. Lok Sabha. Unstarred question no. 2777: PMGDISHA female certified digital literacy candidates. Government of India. 2023, <https://sansad.in>.

19. Global Data Lab. Subnational human development index — India. Global Data Lab. 2023, <https://globaldatalab.org>.
20. Rajya Sabha. Unstarred question no. 997: PMJDY account statistics. Government of India. 2024, <https://sansad.in>.

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