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Financial Behaviour and Infrastructural Constraints: Dynamics of Financial Inclusion in Tribal and Non-Tribal Districts of Rajasthan, India

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ABSTRACT

In spite of continuous policy efforts, financial inclusion leftovers irregular between sections and social sets in India. Tribal peoples, in particular, continue to face basic exclusion arising from inadequate infrastructure and socio-cultural constraints. This study examines disparities in financial behaviour and inclusion between tribal and non-tribal districts of Rajasthan and evaluates the role of infrastructural and socio-economic determinants. Using a mixed-method research design, the quantitative component analyses secondary district-level data from five tribal (Banswara, Dungarpur, Pratapgarh, Sirohi, and Udaipur) and five non-tribal districts (Jaipur, Ajmer, Jodhpur, Kota, and Alwar). Financial inclusion is measured using the Inclusix_score, while explanatory variables include bank density, ATM density, road connectivity, and poverty rate. Statistical techniques such as descriptive analysis, independent sample t-tests, correlation, and multiple regression are employed. Results indicate a statistically significant disparity in financial inclusion between tribal (M = 38.24) and non-tribal districts (M = 63.42; p = 0.008). Infrastructure indicators exhibit a strong positive association with financial inclusion (R^2 = 0.85), and higher inclusion is inversely related to poverty levels (R^2 = 0.90). Qualitative insights from interviews and focus group discussions in Banswara and Pratapgarh additional reveal low financial literacy, cultural reliance on informal credit, and limited institutional trust as critical barriers. The study proposes a comprehensive inclusion agenda emphasizing infrastructure development, digital banking expansion, and context-specific financial literacy interventions. The findings contribute to policy debates on inclusive and sustainable regional development in tribal areas.

Keywords: *Financial Inclusion, Tribal Communities, Infrastructure Development, Financial Behaviour, Regional Disparities.*

Introduction

Financial inclusion has renovated into a fundamental pillar of broad and sustainable economic growth in developing economies. The ability of individuals and households to access affordable financial services, such as savings, credit, insurance and payment structures, improves economic security, promotes entrepreneurship and reduces vulnerability to crises (Demirguc-Kunt et al., 2018). At the global level, responsible politicians increasingly recognize that financial exclusion perpetuates poverty, inequality and regional imbalances.

In India, financial inclusion has received a constant political attention through initiatives such as banking nationalization, the Priority Sector Initiatives (PSL), the Linkage Program between Self-Aid Groups (SHG) and Banks, the Pradhan Mantri Jan Dhan Yojana (PMJDY) of 2016 and the expansion of

the digital payments infrastructure. Despite these initiatives, the results in terms of inclusion continue to be unequal between regions and social groups (RBI, 2022). In particular, tribal communities continue to face systematic exclusion due to geographic isolation, inadequate infrastructure, low levels of literacy and entrenched sociocultural practices. Rajasthan presents a convincing case to examine these inequalities. While districts such as Jaipur, Kota and Ajmer present relatively high levels of banking penetration and digital access, the districts of southern Rajasthan, dominated by tribes—namely, Banswara, Dungarpur, Pratapgarh, Sirohi and Udaipur—remain economically backward. These areas are characterized by a mountainous terrain, scant transportation networks, little institutional presence and a high dependence on agriculture and informal labour markets (Government of Rajasthan, 2021).

The financial behaviour in tribal areas is determined not only by limitations of income, but also by cultural norms, linguistic barriers and a historical distrust towards formal institutions. Informal sources of credit, such as moneylenders, traders and family networks, often dominate financial transactions under exploitation conditions (NABARD, 2019). As a result, financial exclusion in tribal areas is as much a structural as behavioural phenomenon. This study conducts a district-level comparative analysis of tribal and non-tribal areas in Rajasthan to examine the role of infrastructure limitations and financial behaviour in the outcomes of inclusion. By integrating quantitative indicators with qualitative perspectives, this study contributes to the work of economic extension and offers relevant recommendations for the formulation of policies aimed at achieving an inclusive development.

Review of Literature

- **The Concept of Financial Inclusion**

The concept of financial inclusion is related to ensuring access to appropriate financial products and services at affordable prices and in a timely manner for all segments of society, especially vulnerable and marginalized groups (Rangarajan Committee, 2008). Sarma (2008) viewed financial inclusion as a multidimensional phenomenon encompassing access to banking, availability, and usage of financial services. Empirical studies consistently show that inclusive financial systems promote economic growth and reduce inequality (Beck et al., 2007; Levine, 2005). Financial access allows households to accumulate assets, smooth consumption, and invest in human capital, leading to improved long-term well-being.

- **Infrastructure and Financial Access**

Infrastructure plays a fundamental role in financial inclusion. Poor road connectivity, a lack of bank branches, and inadequate digital infrastructure increase transaction costs and discourage participation in the formal financial system (Rajan and Zingales, 2003). Burgess and Pande (2005) demonstrated that the expansion of bank branches in rural India significantly reduced poverty and improved non-agricultural employment. Recent studies emphasize the role of digital infrastructure in extending financial services to remote areas. However, digital financial inclusion remains limited due to poor connectivity, low digital literacy, and a lack of trust in technology, particularly in tribal and rural areas (Ghosh and Vinod, 2017; Suri and Jack, 2016).

- **Tribal Communities and Financial Behaviour**

Tribal populations consistently face financial exclusion due to structural disadvantages and socio-cultural factors. The studies by Thorat (2010) and Deshpande (2011) highlight the intersection of social identity and economic exclusion in India. The NABARD (2019) report indicates that tribal households have lower levels of bank account usage, access to formal credit, and insurance coverage compared to the non-tribal population. Reliance on informal credit markets remains common in tribal areas due to their accessibility, flexible repayment terms, and cultural familiarity (Banerjee and Duflo, 2011). Low financial literacy further hinders the effective utilization of formal financial products (Lusardi and Mitchell, 2014).

- **Regional Disparities and Poverty**

Regional inequality remains a defining feature of India's development trajectory. Studies show that districts with higher levels of financial inclusion experience faster poverty reduction and greater income diversification (Swami, 2014; Pradhan, 2019). However, districts with a predominantly tribal population often lag behind due to weak institutional capacity and infrastructure deficits.

Despite the extensive literature on financial inclusion, there is a dearth of comparative district-level studies focusing on tribal and non-tribal areas within the same state, particularly in Rajasthan. This study aims to fill this gap.

Objectives

- To compare financial inclusion levels between tribal and non-tribal districts of Rajasthan.
- To examine the impact of infrastructural variables on financial inclusion.
- To analyse the relationship between financial inclusion and poverty levels.
- To explore socio-cultural factors influencing financial behaviour in tribal districts.

Research Methodology

Study Area and Sample

The study covers ten districts of Rajasthan:

- **Tribal:**Banswara, Dungarpur, Pratapgarh, Sirohi, Udaipur
- **Non-Tribal:** Jaipur, Ajmer, Jodhpur, Kota, Alwar

Data Sources

- **Primary Data:** focus group discussions and Semi-structured interviews directed in selected tribal districts.
- **Secondary Data:** RBI, NABARD, Census of India, Rajasthan Economic Review.

Variables and Measurement

Category	Variables
Dependent	Inclusix_score
Independent	Bank density, ATM density, road connectivity
Control	Poverty rate

Statistical Tools

- Descriptive statistics
- Independent sample *t-test*
- Pearson correlation
- Multiple linear regression

Statistical Analysis and Hypothesis Testing

To conduct an analytical study of the role of inequalities and infrastructure limitations in financial inclusion, a combination of descriptive statistics, hypothesis testing, correlation analysis, and multiple regression techniques was employed. These tools are widely used in financial inclusion and development studies to identify inter-regional disparities and causal relationships (Beck et al., 2007; Sarma, 2008; Swami, 2014). Statistical analysis was performed using SPSS 26 and STATA 17. Diagnostic tests were conducted to ensure model validity.

- **Descriptive Statistics**

Descriptive statistics were used to summarize the distribution and differences in financial inclusion and infrastructure indicators between tribal and non-tribal districts in Rajasthan. Financial inclusion was represented by the Inclusix_score, while infrastructure was represented by bank density, ATM density, and road connectivity. The poverty rate was included as a socio-economic control variable. The descriptive results show that tribal districts have significantly lower Inclusix_score values (38.24) compared to non-tribal districts (63.42). Similarly, tribal districts exhibit lower banking density, ATM availability, and road connectivity, while also having a significantly higher poverty rate. These patterns reinforce previous findings that infrastructure deficits and poverty coexist with financial exclusion in marginalized areas (RBI, 2018; NABARD, 2019).

Table 1: Descriptive Statistics of Financial Inclusion and Infrastructure Indicators

Variable	District Type	Mean	Std. Deviation	Minimum	Maximum
Inclusix_score	Tribal	38.24	6.87	29.10	46.30
	Non-Tribal	63.42	8.15	51.80	74.60
Bank Density (branches per lakh population)	Tribal	5.12	1.43	3.40	7.60
	Non-Tribal	11.86	2.21	8.30	15.90
ATM Density (ATMs per lakh population)	Tribal	3.95	1.02	2.10	5.60
	Non-Tribal	9.47	1.84	6.50	12.30
Road Connectivity (km per 100 sq. km)	Tribal	42.18	6.44	33.70	51.20
Poverty Rate (%)	Tribal	31.25	5.36	24.10	38.60
	Non-Tribal	17.48	4.12	11.90	23.50

Source: Computed from RBI, NABARD, Census of India

Interpretation: Tribal districts exhibit lower financial inclusion and infrastructure availability and higher poverty levels.

- **Formulation of Hypotheses**

$H1_0$: There is no significant difference in financial inclusion between tribal and non-tribal districts.

$H1_a$: There is a significant difference in financial inclusion between tribal and non-tribal districts.

$H2_0$: Infrastructural indicators (bank density, ATM density, and road connectivity) have no significant positive effect on financial inclusion.

$H2_a$: Infrastructural indicators (bank density, ATM density, and road connectivity) have a significant positive effect on financial inclusion.

$H3_0$: There is no significant negative association between financial inclusion and poverty rates.

HC_a: Financial inclusion is negatively and significantly associated with poverty rates.

- **Diagnostic Tests**

Prior to conducting parametric tests, diagnostic checks were performed. The **Shapiro–Wilk test** confirmed that the Inclusix_score followed a normal distribution ($p > 0.05$), justifying the use of parametric statistical techniques (Gujarati & Porter, 2010).

Multicollinearity among explanatory variables be situated evaluated using the **Variance Inflation Factor (VIF)**. Entire VIF values were under the conventional limit of 5, representing the absence of serious multicollinearity (Wooldridge, 2016).

- **Independent Sample t-Test**

An independent sample **t-test** was working to test **HA_1**, examining whether the mean financial inclusion scores differ significantly between tribal and non-tribal districts. The outcomes indicate a statistically substantial variance in Inclusix_score ($p = 0.008$), with non-tribal districts exhibiting substantially higher inclusion levels.

This finding confirms the presence of structural and institutional disparities in access towards financial services and be situated consistent through earlier studies documenting regional and social inequalities in financial inclusion in India (Burgess & Pande, 2005; Thorat, 2010). Accordingly, **H1_a is accepted**.

Table 2: Independent Sample t-Test Results for Financial Inclusion (H_1)

Variable	Mean (Tribal)	Mean (Non-Tribal)	t-value	p-value	Result
Inclusix_score	38.24	63.42	-3.41	0.008	Significant

Note:$p < 0.01$

Inference: Financial inclusion differs significantly between tribal and non-tribal districts.

Hypothesis $H1_a$: *Accepted*

- **Correlation Analysis**

Pearson's correlation coefficients be situated calculated to assess the association among financial inclusion, infrastructural variables, and poverty rate. The results reveal strong positive correlations between Inclusix_score and bank density, ATM density, and road connectivity. Conversely, financial inclusion exhibits a strong negative correlation with poverty rate.

These findings suggest that better physical and financial infrastructure facilitates inclusion, while higher levels of deprivation constrain access to formal financial systems. Similar relationships have been documented in earlier empirical studies (Demirgüç-Kunt & Klapper, 2012; Pradhan, 2019).

Table 3: Pearson Correlation Matrix

Variable	Inclusix_score	Bank Density	ATM Density	Road Connectivity	Poverty Rate
Inclusix_score	1.00	0.81	0.77	0.74	-0.85
Bank Density		1.00	0.69	0.72	-0.71
ATM Density			1.00	0.65	-0.68
Road Connectivity				1.00	-0.63
Poverty Rate					1.00

Note:$p < 0.01$

Interpretation: Financial inclusion is positively associated with infrastructure and negatively associated with poverty.

- **Multiple Regression Analysis**

To test **H2** and **H3**, a multiple linear regression model be located estimated by means ofInclusix_score as the dependent variable:

$$\mathbf{Inclusix_i = \alpha + \beta_1 BankDensity_i + \beta_2 ATMDensity_i + \beta_3 RoadConnectivity_i + \beta_4 PovertyRate_i + \varepsilon_i}$$

The regression results indicate that **bank density, ATM density, and road connectivity exercise a statistically substantial and positive impact** on financial inclusion. In contrast, poverty proportion shows a **substantial undesirable effect**, representing that higher poverty levels reduce access to formal financial services.

The model describes around **85 percent of the difference** in financial inclusion ($R^2 = 0.85$), suggesting strong explanatory power. These outcomes are reliable with development finance literature emphasizing the importance of infrastructure and income levels in determining financial access (Beck et al., 2007; Swamy, 2014). Thus, **$H2_{\_a}$ and $H3_{\_a}$ are accepted**.

Table 4: Multiple Regression Results: Determinants of Financial Inclusion ($H2_{\_a}$& $H3_{\_a}$)

Dependent Variable: Inclusix_score

Variable	Coefficient (β)	Std. Error	t-value	p-value	Impacts
Constant	12.84	5.21	2.46	0.043	Negative
Bank Density	2.18	0.61	3.57	0.009	Positive
ATM Density	1.74	0.53	3.28	0.012	Positive
Road Connectivity	0.96	0.31	3.10	0.015	Positive
Poverty Rate	-1.29	0.42	-3.07	0.016	Negative
R^2	0.85				
Adjusted R^2	0.81				
F-statistic	18.62			0.004	

Note: $p < 0.05$, *$p < 0.01$*

Inference: Infrastructure significantly enhances financial inclusion, while poverty constrains it.

Hypotheses $H2_{\_a}$ and $H3_{\_a}$:*Accepted*

- **Discussion of Statistical Findings**

The statistical evidence highlights that financial exclusion in tribal districts is not merely a purpose of low income but is intensely rooted in infrastructural in addition institutional constraints. Limited bank outreach, poor connectivity, and high poverty rates collectively restrict financial participation. These findings reinforce the argument that financial inclusion strategies must go beyond account ownership and address structural barriers to access and usage (RBI, 2022).

- **Limitations of the Statistical Analysis**

While the results are strong, the analysis is constrained by a limited sample size of ten districts, which may affect generalizability. Nevertheless, the use of multiple indicators, diagnostic tests, and triangulation with qualitative insights enhances the reliability of the findings. Future research may employ **panel data models, fixed-effects estimation, or instrumental variable techniques** to strengthen causal inference (Wooldridge, 2016).

Conclusion

This Paper provides clear evidence of the significant disparity in financial inclusion between tribal and non-tribal districts in Rajasthan. Financial exclusion in tribal areas is not solely due to low income, but also stems from deeper issues such as poor infrastructure, limited digital access, and a lack of trust in banks.

The data reveals a strong correlation: more banks, ATMs, and better roads directly lead to improved financial access (the model shows a high coefficient of determination, R^2, of 0.85). Conversely, higher poverty rates are associated with lower inclusion, demonstrating that access to financial services helps reduce poverty and strengthen households.

Though, simply opening accounts is not enough. Many individuals in tribal communities still rely on local moneylenders due to a lack of financial literacy, language barriers, and a lack of trust in formal banks. Account ownership does not guarantee effective utilization.

In short, achieving meaningful financial inclusion for tribal areas requires a holistic approach: building better roads and improving connectivity, bringing user-friendly digital tools and local banking services closer to the people, implementing accessible education programs through community groups, and linking banking services to employment and social welfare programs. National programs are helpful, but they must be tailored to local needs with specific plans for each district. Only when infrastructure, technology, awareness, and employment improve together will tribal communities truly benefit.

Policy Implications in addition Future Directions

The key conclusion of this document is that improving financial inclusion in tribal areas requires more than simply opening banking accounts. The poor infrastructure, poor digital access and low trust in banks hinder genuine participation.

- **Important Steps**

It is necessary to improve the basic infrastructure (major roads, electricity and mobile/internet coverage) so that people can access banks and use digital services. Instead of opening complete branches in remote areas, local agents, mobile vans and Microcash machines should be used to bring the bank closer to the people. The digital tools should be simple, be available in local languages, work on weak networks, offer biometric session initiations and also offer offline options.

Fostering financial literacy and confidence is crucial. Due to lack of information or fear of banks, many people prefer lenders. A simple education through self-help groups, NGOs and community leaders can explain savings, credit and digital payments.

Linking accounts to jobs, agricultural support, pensions and social welfare programs will encourage regular use and increase income. Future efforts should focus on specific plans for each district, strong support to women's groups and cooperatives, periodic monitoring of actual use and benefits, and public-private partnerships to build rural infrastructure. True progress can only be achieved when infrastructure, technology, awareness and the means of life are jointly improved in a practical and person-centered manner.

In general, the financial inclusion in the tribal areas will only improve when the infrastructure, the technology, the awareness and the means of living are jointly improved as practiced and centered on the people.

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