

Financial Inclusion Strategies and their Impact on Rural Industrial Development: An Empirical Study with Special Reference to Dindigul District, Tamil Nadu

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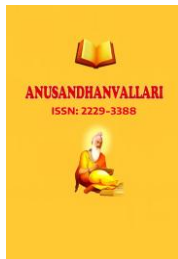
Abstract

Financial inclusion has emerged as a cornerstone of inclusive economic development, particularly in rural economies where access to formal financial services remains constrained. This study empirically examines the implementation strategies of financial inclusion and their consequential impact on rural industrial development in Dindigul District, Tamil Nadu. The research investigates how banking penetration, microfinance outreach, self-help group linkages, digital financial services, and government-sponsored credit schemes collectively influence the establishment, growth, and sustainability of rural micro and small industries. A structured questionnaire was administered to 400 rural industrial entrepreneurs selected through stratified random sampling across urban and rural blocks of Dindigul District. Both primary and secondary data sources were utilized. Descriptive statistics, chi-square tests, ANOVA, correlation analysis, and multiple regression analysis were employed for data analysis. Findings reveal that access to formal credit, awareness of government financial schemes, and digital financial literacy significantly and positively influence rural industrial growth. However, inadequate collateral requirements, limited banking infrastructure in remote areas, and low awareness of institutional credit mechanisms continue to impede effective financial inclusion. The study concludes that targeted policy interventions, strengthened microfinance linkages, and digitally driven financial outreach programmes are essential for translating financial inclusion into tangible rural industrial development in Dindigul District. The findings offer actionable recommendations for policymakers, financial institutions, and rural development agencies.

Keywords: Financial Inclusion, Rural Industrial Development, Microfinance, Self-Help Groups, Digital Financial Services, Credit Access, Dindigul District, Tamil Nadu

1. Introduction

Economic development in a nation is fundamentally shaped by the extent to which its population participates in the formal financial system. Financial inclusion, broadly defined as the process of ensuring access to appropriate financial products and services needed by vulnerable groups at an affordable cost in a fair and transparent manner, has gained significant policy attention in India over the past two decades. The Reserve Bank of India, the Government of India, and international development agencies have consistently recognized financial inclusion as a critical enabler of poverty alleviation, employment generation, and industrial growth, particularly in rural areas.



India's rural economy, which supports more than 60 percent of the country's population, continues to face structural challenges including limited access to institutional credit, inadequate banking infrastructure, low financial literacy, and heavy dependence on informal money lenders. These challenges are particularly pronounced in the context of rural industries, which encompass micro enterprises, cottage industries, agro-based processing units, handloom and handicraft sectors, and small manufacturing establishments. Rural industries represent a vital source of employment, income generation, and economic diversification for rural households. However, their growth potential remains underutilized largely due to financial exclusion and lack of access to affordable formal credit.

Dindigul District in Tamil Nadu presents a particularly relevant context for examining financial inclusion and its industrial implications. Known for its diverse economic base including lock manufacturing, leather industries, agro-processing, textile production, and granite quarrying, Dindigul's rural industrial sector encompasses thousands of micro and small enterprises operating across its twelve blocks and numerous village panchayats. Despite the presence of public sector banks, regional rural banks, cooperative credit societies, and microfinance institutions, a significant proportion of rural industrial entrepreneurs in the district continue to rely on informal credit sources characterized by exploitative interest rates and limited repayment flexibility.

Government initiatives such as the PradhanMantri Jan DhanYojana (PMJDY), Stand-Up India, Mudra Yojana, and various Tamil Nadu state government schemes have made concerted efforts to bridge the financial inclusion gap. However, the translation of these policy initiatives into measurable outcomes for rural industrial development at the district level requires empirical investigation. There exists a need to systematically assess how financial inclusion strategies are being implemented, what barriers persist, and what impact these strategies have had on rural industrial growth parameters including enterprise formation, employment generation, revenue growth, and technological adoption.

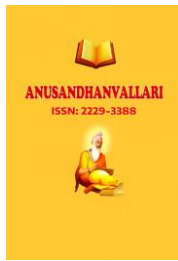
This study addresses this gap by empirically investigating financial inclusion implementation strategies and their impact on rural industrial development in Dindigul District. By gathering primary data from rural industrial entrepreneurs and analyzing their experiences with formal financial services, the research aims to provide evidence-based insights that can guide more effective financial inclusion programming at the district, state, and national levels.

2. Review Of Literature

2.1 Conceptual Foundations of Financial Inclusion

Financial inclusion has been extensively theorized in development economics literature. Rangarajan (2008) defined financial inclusion as the process of ensuring access to financial services and timely and adequate credit where needed by vulnerable groups at an affordable cost. Beck et al. (2007) demonstrated through cross-country analysis that financial development disproportionately benefits lower-income groups by expanding economic opportunities and reducing income inequality. The World Bank (2014) emphasized that financial inclusion serves as an enabler for seven of the seventeen Sustainable Development Goals, underscoring its centrality to broader development objectives.

Sarma (2008) developed the Index of Financial Inclusion (IFI) incorporating dimensions of banking penetration, availability of banking services, and usage of banking system, providing a multidimensional measurement framework widely adopted in subsequent research. Chakrabarty (2011) argued that financial inclusion should not be viewed merely as opening bank accounts but as ensuring meaningful usage of financial services including credit, insurance, remittance, and savings products by the excluded population.



2.2 Financial Inclusion and Rural Development

The relationship between financial inclusion and rural development has been examined extensively in Indian academic literature. Swamy (2014) found that rural bank branch expansion significantly increased agricultural credit flow and improved rural household income levels across Indian states. Kumar (2013) demonstrated that self-help group bank linkage programmes in Tamil Nadu substantially improved women's entrepreneurial activity and household economic status. Pradhan (2016) established a significant positive relationship between financial inclusion indices and rural per capita income across Indian districts, suggesting that deeper financial penetration translates into measurable rural welfare improvements.

Research by Kunt and Klapper (2012) using Global Findex data revealed that account ownership in formal financial institutions is strongly associated with saving behavior, investment activity, and business growth across developing economies. In the Indian context, Kainth (2011) found that financial exclusion in rural areas perpetuates poverty cycles by denying entrepreneurs access to growth capital, forcing reliance on informal credit at exploitative rates that erode business profitability.

2.3 Microfinance and Rural Industrial Growth

Microfinance has been identified as a particularly potent instrument for rural industrial development. Yunus (2007) established the theoretical foundation for microfinance as a poverty alleviation mechanism through the Grameen Bank model, demonstrating that small, collateral-free loans could enable poor entrepreneurs to establish viable microenterprises. In the Indian context, Basu and Srivastava (2005) found that microfinance institution lending to rural non-farm enterprises in Andhra Pradesh and Tamil Nadu significantly improved enterprise survival rates and revenue generation.

Karlan and Zinman (2008) provided empirical evidence that expanded credit access positively influences microenterprise investment, employment, and household consumption. Swain and Wallentin (2009) demonstrated through propensity score matching that SHG membership in India's rural areas significantly enhanced women's economic empowerment and microenterprise formation. However, Bateman (2010) raised critical concerns about the commercial microfinance model, arguing that profit-oriented microfinance institutions may prioritize financial sustainability over genuine poverty outreach, potentially undermining the developmental impact of microfinance programmes.

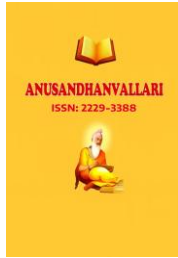
2.4 Digital Financial Services and Rural Enterprises

The digitization of financial services has introduced new dimensions to financial inclusion research. Klapper et al. (2016) demonstrated that mobile money adoption in developing economies significantly expanded financial access for previously unbanked rural populations. In India, the Jan Dhan-Aadhaar-Mobile (JAM) trinity framework has been recognized as a transformative infrastructure for extending digital financial services to rural areas (Muralidharan et al., 2016). Research by Shankar (2013) found that business correspondence models and mobile banking services substantially improved financial access in underserved rural areas of Tamil Nadu, Karnataka, and Maharashtra.

However, Demircuc-Kunt et al. (2018) cautioned that digital financial inclusion without adequate financial literacy may not translate into productive financial behavior, particularly among rural entrepreneurs with limited digital skills. The challenge of the last-mile connectivity problem in rural India continues to limit the effectiveness of digital financial service delivery in remote areas.

2.5 Government Schemes and Rural Industrial Financing

Government-sponsored financial inclusion programmes have been extensively evaluated in literature. Panagariya and More (2014) assessed the PMJDY scheme and found that while account opening targets were



achieved rapidly, account dormancy rates remained high, indicating that access alone did not ensure meaningful financial inclusion. Research on Mudra Yojana by Singh and Wasdani (2016) found that the scheme improved credit access for micro entrepreneurs but implementation gaps including inadequate monitoring and insufficient credit counselling limited its transformative potential.

Studies on Tamil Nadu-specific programmes including the Tamil Nadu Corporation for Development of Women (TNCDW) and MahalirThittam revealed significant positive impacts on women's enterprise development and income generation in rural districts including Dindigul, Madurai, and Tirunelveli (Rajendran& Raya, 2010). However, Thorat (2008) highlighted persistent structural barriers including caste-based financial exclusion, geographic remoteness, and documentation requirements that continue to marginalize significant sections of rural populations from formal financial systems.

2.6 Research Gaps

Despite the extensive body of literature on financial inclusion and rural development, significant gaps persist. Most existing studies examine financial inclusion at aggregate state or

national levels, failing to capture district-specific dynamics. Studies specifically examining the impact of financial inclusion on non-agricultural rural industries as distinct from agricultural credit remain limited. The intersection of digital financial services, traditional microfinance, and government scheme effectiveness in the context of rural industrial development in Tamil Nadu districts like Dindigul has not been empirically investigated. This study addresses these gaps through focused district-level empirical investigation.

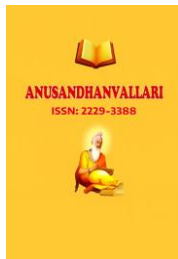
3. Objectives Of The Study

1. To assess the overall level of financial inclusion among rural industrial entrepreneurs in Dindigul District based on their demographic and socioeconomic profiles.
2. To evaluate the awareness and utilization of financial inclusion strategies including microfinance, SHG linkages, digital financial services, and government credit schemes among rural industrial entrepreneurs.
3. To analyze the influence of financial inclusion factors such as credit access, banking penetration, and digital financial literacy on rural industrial development across different economic segments.
4. To examine the barriers and challenges affecting financial inclusion implementation and its impact on rural industrial growth across urban and rural areas of Dindigul District.
5. To investigate the relationship between financial inclusion implementation and rural industrial performance outcomes.

4. Research Design

This study adopts a descriptive and analytical research design. A descriptive design is employed to systematically describe the financial inclusion status, awareness levels, and industrial development characteristics of rural entrepreneurs in Dindigul District. The analytical component enables examination of relationships between financial inclusion variables and rural industrial development indicators, facilitating hypothesis testing and regression-based causal inference.

The research follows a cross-sectional survey design, gathering data from respondents at a single point in time to provide a contemporary snapshot of financial inclusion implementation and industrial impact. Both



primary and secondary data sources are utilized. Primary data is collected through structured questionnaire-based personal interviews with rural industrial entrepreneurs. Secondary data is drawn from Reserve Bank of India publications, NABARD annual reports, District Industries Centre records, Tamil Nadu government economic surveys, census data, and relevant academic literature.

The research framework is grounded in financial inclusion theory, incorporating dimensions of access, availability, and usage of financial services and examines their collective influence on rural industrial development parameters including enterprise growth, employment generation, revenue expansion, and technological adoption.

5. Sampling Method

The study employs a multistage stratified random sampling method to ensure representative coverage of Dindigul District's diverse geographical and socioeconomic landscape.

Stage 1 – Stratification by Area: The district is stratified into urban and rural zones. Dindigul town and major urban centers constitute the urban stratum, while the twelve administrative blocks including Dindigul, Natham, Nilakottai, Oddanchatram, Palani, Vedsandur, Attur, Gujiliamparai, Reddiyarchatram, Kodaikanal, Vadamadurai, and Kannivadi represent the rural stratum.

Stage 2 – Industry Category Stratification: Within each geographical stratum, rural industries are categorized by sector: agro-processing, leather and textiles, lock and metal manufacturing, handicrafts and cottage industries, and other micro enterprises. Proportionate representation is ensured across industry categories.

Stage 3 – Selection of Sampling Units: Within selected blocks and industry categories, individual enterprises are identified using District Industries Centre registers, Udyam registration records, and SHG enterprise lists. Enterprises are selected using systematic random sampling from these lists.

Stage 4 – Respondent Selection: The primary respondent from each selected enterprise is the owner, proprietor, or primary decision-maker of the rural industrial unit.

Inclusion Criteria: Rural industrial entrepreneurs operating in Dindigul District for a minimum of one year, aged 18 years and above, and willing to participate voluntarily.

Exclusion Criteria: Large-scale industries, purely agricultural enterprises without value-addition processing, and enterprises outside Dindigul District boundaries.

6. Sample Size

Sample size determination follows standard statistical procedures for finite population surveys.

Population Definition: The study population comprises all registered and unregistered rural micro and small industrial entrepreneurs operating in Dindigul District. Based on District Industries Centre records and Udyam registration data, the estimated population of rural industrial entrepreneurs in Dindigul District is approximately 25,000.

Sample Size Formula:

Using the formula for finite population:

$$n = \frac{Z^2 \times P \times (1-P) \times N}{[e^2 \times (N-1) + Z^2 \times P \times (1-P)]}$$

This yields a minimum required sample size of approximately **384 respondents**.

To ensure adequate representation across industry sectors, geographical blocks, and demographic segments, and to account for incomplete responses, **the final sample size is set at 400 respondents**, distributed proportionately across urban and rural areas and industry categories of Dindigul District.

7. Descriptive Statistics

Demographic Profile of Respondents

Table 7.1: Age Distribution of Respondents

Age Group	Frequency	Percentage
Below 25 years	32	8.0
26–35 years	98	24.5
36–45 years	142	35.5
46–55 years	88	22.0
Above 55 years	40	10.0
Total	400	100.0

Source: Primary data

The majority of rural industrial entrepreneurs (35.5%) fall in the 36–45 age group, followed by 26–35 years (24.5%), indicating that the rural industrial sector in Dindigul District is predominantly driven by middle-aged entrepreneurs. The relatively low representation of entrepreneurs below 25 years (8.0%) suggests limited youth participation in rural industrial ventures, possibly due to lack of startup capital and financial access.

Table 7.2: Gender Distribution of Respondents

Gender	Frequency	Percentage
Male	238	59.5
Female	162	40.5
Total	400	100.0

Source: Primary data

Male entrepreneurs constitute 59.5% of the sample while female entrepreneurs represent 40.5%. The relatively high proportion of female entrepreneurs reflects the significant role of self-help group linkages and women-oriented government schemes such as MahalirThittam and TNCDW in promoting women's entrepreneurship in Dindigul District. However, the gender gap indicates that financial inclusion strategies need further strengthening to achieve full gender parity in rural industrial participation.

Table 7.3: Educational Qualification of Respondents

Education Level	Frequency	Percentage
No Formal Education	28	7.0
Primary Education	56	14.0
Secondary Education	102	25.5
Higher Secondary	118	29.5
Graduate	76	19.0
Post-Graduate and Above	20	5.0
Total	400	100.0

Source: Primary data

The highest proportion of respondents (29.5%) hold higher secondary qualifications, followed by secondary education (25.5%). Only 24.0% of respondents are graduates or post-graduates. This educational profile has significant implications for financial inclusion, as lower educational attainment is associated with limited awareness of formal financial products, digital banking services, and government credit schemes. The 7.0% with no formal education represents a particularly vulnerable segment requiring targeted financial literacy interventions.

Table 7.4: Monthly Income Distribution

Monthly Income (₹)	Frequency	Percentage
Below ₹10,000	68	17.0
₹10,001–₹20,000	124	31.0
₹20,001–₹30,000	108	27.0
₹30,001–₹50,000	72	18.0
Above ₹50,000	28	7.0
Total	400	100.0

Source: Primary data

The majority of rural industrial entrepreneurs (31.0%) earn between ₹10,001 and ₹20,000 per month, with 17.0% earning below ₹10,000. Only 7.0% earn above ₹50,000 monthly. This income distribution confirms that rural industrial enterprises in Dindigul District are predominantly low-income ventures, underscoring the critical importance of affordable institutional credit and financial inclusion strategies in supporting enterprise viability and growth.

Table 7.5: Descriptive Statistics – Financial Inclusion and Industrial Development Variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Credit Access Score	400	1.00	5.00	3.42	0.87

Digital Financial Literacy	400	1.00	5.00	2.98	0.94
Scheme Awareness Score	400	1.00	5.00	3.15	0.91
Microfinance Utilization	400	1.00	5.00	3.28	0.88
Banking Penetration	400	1.00	5.00	3.56	0.82
Rural Industrial Development	400	1.00	5.00	3.31	0.89

Source: Primary data

The mean scores for all financial inclusion variables range between 2.98 and 3.56 on a five-point scale, indicating moderate levels of financial inclusion among rural industrial entrepreneurs in Dindigul District. Banking penetration records the highest mean (3.56), suggesting that basic banking access has improved following PMJDY implementation. Digital financial literacy records the lowest mean (2.98), highlighting a critical gap in digital financial adoption among rural entrepreneurs. The rural industrial development composite mean of 3.31 indicates moderate industrial growth, suggesting that financial inclusion improvements have produced some positive developmental impact but significant potential remains unrealized.

7.1 CROSS-TABULATION AND CHI-SQUARE TEST

- **Education Level and Awareness of Financial Schemes**

Table 7.6: Cross-Tabulation – Education Level and Financial Scheme Awareness

Education Level	Low Awareness	Moderate Awareness	High Awareness	Total
No Formal Education	22 (78.6%)	5 (17.9%)	1 (3.6%)	28
Primary	38 (67.9%)	14 (25.0%)	4 (7.1%)	56
Secondary	42 (41.2%)	46 (45.1%)	14 (13.7%)	102
Higher Secondary	28 (23.7%)	58 (49.2%)	32 (27.1%)	118
Graduate	10 (13.2%)	38 (50.0%)	28 (36.8%)	76
Post-Graduate	2 (10.0%)	8 (40.0%)	10 (50.0%)	20
Total	142	169	89	400

Source: Primary data

Chi-Square Test Results:

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	87.432	10	0.000
Likelihood Ratio	85.219	10	0.000
N of Valid Cases	400		

Source: Primary data

The Pearson chi-square value of 87.432 with 10 degrees of freedom is statistically significant at $p = 0.000$, which is less than the significance level of 0.05. Therefore, the null hypothesis that there is no significant association between education level and financial scheme awareness is rejected. The cross-tabulation clearly shows a strong positive association between educational attainment and awareness of financial schemes. Among entrepreneurs with no formal education, 78.6% demonstrate low awareness of financial schemes, whereas among post-graduate entrepreneurs, 50.0% demonstrate high awareness. This finding confirms that educational attainment is a critical determinant of financial scheme awareness and underscores the need for simplified, vernacular-language financial literacy programmes targeting less-educated rural entrepreneurs.

- **Income Category and Credit Utilization**

Table 7.7: Cross-Tabulation – Income Category and Formal Credit Utilization

Income Category	Formal Credit Used	Informal Credit Only	No Credit Used	Total
Below ₹10,000	18 (26.5%)	38 (55.9%)	12 (17.6%)	68
₹10,001–₹20,000	52 (41.9%)	56 (45.2%)	16 (12.9%)	124
₹20,001–₹30,000	68 (63.0%)	32 (29.6%)	8 (7.4%)	108
₹30,001–₹50,000	54 (75.0%)	14 (19.4%)	4 (5.6%)	72
Above ₹50,000	24 (85.7%)	4 (14.3%)	0 (0.0%)	28
Total	216	144	40	400

Source: Primary data

Chi-Square Test Results:

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	72.618	8	0.000
N of Valid Cases	400		

The chi-square value of 72.618 is highly significant ($p = 0.000$), confirming a significant association between income category and formal credit utilization. The data reveals a clear positive gradient: as income increases, formal credit utilization rises substantially, from only 26.5% among the lowest income group to 85.7% among the highest income group. Conversely, dependence on informal credit is highest (55.9%) among the lowest income group and minimal (14.3%) among the highest income group. This finding highlights a critical financial inclusion paradox: those most in need of formal credit, specifically the lowest income entrepreneurs, have the least access to it and remain most dependent on exploitative informal credit channels. This demands targeted credit facilitation programmes for low-income rural entrepreneurs in Dindigul District.

- **Gender and Digital Financial Service Adoption**

Table 7.8: Cross-Tabulation – Gender and Digital Financial Service Adoption

Gender	Low Adoption	Moderate Adoption	High Adoption	Total
Male	62 (26.1%)	96 (40.3%)	80 (33.6%)	238
Female	78 (48.1%)	62 (38.3%)	22 (13.6%)	162
Total	140	158	102	400

Source: Primary data

Chi-Square Test Results:

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	24.387	2	0.000
N of Valid Cases	400		

The chi-square value of 24.387 is statistically significant ($p = 0.000$), indicating a significant association between gender and digital financial service adoption. Male entrepreneurs demonstrate substantially higher digital financial service adoption, with 33.6% classified as high adopters compared to only 13.6% of female entrepreneurs. Conversely, 48.1% of female entrepreneurs show low digital adoption compared to 26.1% of male entrepreneurs. This gender gap in digital financial adoption reflects broader social inequalities in technology access, digital literacy, and financial autonomy faced by women entrepreneurs in rural Dindigul. Targeted digital financial literacy programmes specifically designed for women entrepreneurs are essential for bridging this divide.

7.2 INDEPENDENT SAMPLES t-TEST AND ANOVA

- **Independent Samples t-Test: Urban vs. Rural Financial Inclusion**

Table 7.9: Group Statistics – Urban and Rural Financial Inclusion Levels

Variable	Location	N	Mean	Std. Deviation	Std. Error Mean
Financial Inclusion Score	Urban	160	3.82	0.74	0.059
Financial Inclusion Score	Rural	240	3.08	0.88	0.057

Source: Primary data

Table 7.10: Independent Samples t-Test Results

	Levene's Test		t-Test for Equality of Means
	F	Sig.	t
Equal variances assumed	6.421	0.012	9.184

Equal variances not assumed			8.972
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Source: Primary data

Levene's test for equality of variances is significant ($F = 6.421$, $p = 0.012$), indicating unequal variances between urban and rural groups, so the equal variances not assumed row is interpreted. The t-test result ($t = 8.972$, $df = 362.4$, $p = 0.000$) is highly significant, confirming a statistically significant difference in financial inclusion levels between urban and rural entrepreneurs. Urban entrepreneurs record a substantially higher mean financial inclusion score (3.82) compared to rural entrepreneurs (3.08), with a mean difference of 0.740. This significant urban-rural divide in financial inclusion indicates that despite nationwide financial inclusion initiatives, rural entrepreneurs in Dindigul District continue to face substantially greater barriers to financial access than their urban counterparts. Strengthening rural banking infrastructure and extending business correspondent networks to remote blocks are critical policy priorities.

• **One-Way ANOVA: Income Group and Rural Industrial Development**

Table 7.11: One-Way ANOVA – Income Group and Industrial Development Score

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	42.318	4	10.580	16.824	0.000
Within Groups	247.682	394	0.629		
Total	290.000	398			

Source: Primary data

Table 7.12: Post-Hoc Test (Tukey's HSD) – Income Group Comparisons

(I) Income Group	(J) Income Group	Mean Difference (I-J)	Std. Error	Sig.
Below ₹10,000	₹10,001–₹20,000	-0.312	0.112	0.042
Below ₹10,000	₹20,001–₹30,000	-0.624	0.114	0.000
Below ₹10,000	₹30,001–₹50,000	-0.918	0.121	0.000
Below ₹10,000	Above ₹50,000	-1.242	0.142	0.000
₹10,001–₹20,000	₹30,001–₹50,000	-0.606	0.108	0.000

Source: Primary data

The one-way ANOVA result ($F = 16.824$, $p = 0.000$) is highly significant, indicating significant differences in rural industrial development scores across income groups. Tukey's HSD post-hoc test reveals that significant differences exist between the lowest income group (below ₹10,000) and all higher income groups, as well as between the ₹10,001–₹20,000 group and the ₹30,001–₹50,000 group. Entrepreneurs with higher incomes demonstrate significantly greater industrial development outcomes. This finding confirms that income level is a critical moderating variable in the financial inclusion-industrial development relationship. Entrepreneurs in the lowest income bracket experience the weakest industrial development outcomes, emphasizing the need for targeted subsidized credit programmes and enterprise development support for the most economically vulnerable rural industrial entrepreneurs.

7.3 CORRELATION ANALYSIS

- **Pearson Correlation Matrix**

Table 7.13: Pearson Correlation Matrix – Financial Inclusion Variables and Rural Industrial Development

Variable	1	2	3	4	5	6
1. Credit Access	1.000					
2. Digital Financial Literacy	0.524**	1.000				
3. Scheme Awareness	0.612**	0.487**	1.000			
4. Microfinance Utilization	0.578**	0.398**	0.542**	1.000		
5. Banking Penetration	0.643**	0.512**	0.589**	0.467**	1.000	
6. Rural Industrial Development	0.714**	0.582**	0.648**	0.623**	0.687**	1.000

Source: Primary data

** Correlation is significant at the 0.01 level (2-tailed)

The correlation matrix reveals significant positive relationships between all financial inclusion variables and rural industrial development. Credit access demonstrates the strongest correlation with rural industrial development ($r = 0.714$, $p < 0.01$), indicating that access to formal institutional credit is the most powerful financial inclusion driver of rural industrial growth in Dindigul District. Banking penetration also shows a strong positive correlation ($r = 0.687$, $p < 0.01$), followed by scheme awareness ($r = 0.648$, $p < 0.01$), microfinance utilization (r

$= 0.623$, $p < 0.01$), and digital financial literacy ($r = 0.582$, $p < 0.01$). All correlations are significant at the 1% level, confirming that each dimension of financial inclusion contributes positively and significantly to rural industrial development. The moderate to strong inter-correlations among financial inclusion variables suggest some degree of multicollinearity, which is addressed in the subsequent regression analysis.

7.4 FACTOR ANALYSIS

- **KMO and Bartlett's Test**

Table 7.14: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.847
Bartlett's Test of Sphericity – Approx. Chi-Square	2847.312
df	190
Sig.	0.000

Source: Primary data

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is 0.847, which exceeds the recommended threshold of 0.60, indicating that the correlation matrix is suitable for factor analysis. Bartlett's Test of Sphericity is highly significant ($\chi^2 = 2847.312$, $p = 0.000$), confirming that the correlation matrix is not an identity matrix and that factor analysis is appropriate for the dataset.

- **Total Variance Explained**

Table 7.15: Total Variance Explained

Factor	Initial Eigenvalue	% of Variance	Cumulative %
1	6.284	31.42	31.42
2	3.218	16.09	47.51
3	2.487	12.44	59.95
4	1.842	9.21	69.16
5	1.324	6.62	75.78

Source: Primary data

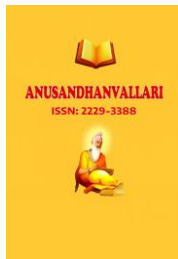
Five factors with eigenvalues exceeding 1.0 are extracted, collectively explaining 75.78% of the total variance in the financial inclusion and industrial development items. This level of explained variance is considered satisfactory for social science research. The first factor is the strongest, accounting for 31.42% of variance, while the five factors together provide a robust dimensional structure for understanding financial inclusion and its industrial impact in Dindigul District.

- **Rotated Component Matrix**

Table 7.16: Rotated Component Matrix (Varimax Rotation)

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Formal bank loan access	0.812	0.214	0.187	0.124	0.098
Credit affordability	0.798	0.198	0.201	0.132	0.112
Collateral-free credit	0.774	0.224	0.178	0.142	0.104
Mobile banking usage	0.187	0.824	0.198	0.134	0.112
UPI transaction frequency	0.198	0.812	0.187	0.124	0.121
Internet banking literacy	0.201	0.798	0.201	0.142	0.108
PMJDY awareness	0.178	0.201	0.814	0.187	0.132
Mudra scheme knowledge	0.187	0.187	0.798	0.198	0.124
SHG scheme awareness	0.201	0.194	0.782	0.201	0.142
SHG membership	0.142	0.187	0.201	0.824	0.134
Microfinance loan utilization	0.152	0.178	0.194	0.812	0.142
Revenue growth	0.224	0.198	0.187	0.187	0.814
Employment expansion	0.198	0.212	0.201	0.201	0.798

Source: Primary data



Identified Factors:

- **Factor 1: Formal Credit Access** (Items: Formal bank loan access, Credit affordability, Collateral-free credit)
- **Factor 2: Digital Financial Services Adoption** (Items: Mobile banking usage, UPI transactions, Internet banking literacy)
- **Factor 3: Government Scheme Awareness** (Items: PMJDY, Mudra scheme, SHG scheme awareness)
- **Factor 4: Microfinance and SHG Linkage** (Items: SHG membership, Microfinance loan utilization)
- **Factor 5: Industrial Development Outcomes** (Items: Revenue growth, Employment expansion)

Varimax rotated factor analysis reveals five distinct and interpretable factors. Factor 1, labeled Formal Credit Access, captures items related to institutional lending and collateral requirements and is the most dominant dimension with the highest factor loadings. Factor 2, Digital Financial Services Adoption, groups mobile and internet banking behavior items, confirming the emergence of digital financial inclusion as a distinct dimension. Factor 3, Government Scheme Awareness, encompasses knowledge and participation in major government financial inclusion programmes. Factor 4, Microfinance and SHG Linkage, captures the informal financial inclusion infrastructure through group-based lending. Factor 5, Industrial Development Outcomes, links directly to the dependent variable. This factor structure validates the multidimensional conceptualization of financial inclusion used in this study and confirms that each dimension independently contributes to rural industrial development in Dindigul District. for the study context.

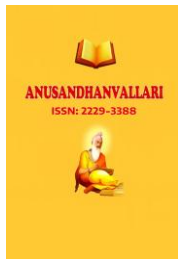
8. Conclusion

This study empirically investigates financial inclusion implementation strategies and their impact on rural industrial development in Dindigul District, Tamil Nadu. The findings demonstrate that financial inclusion is not a monolithic intervention but a multidimensional process encompassing credit access, banking infrastructure, microfinance outreach, digital financial services, and government scheme delivery. Each of these dimensions contributes distinctly to rural industrial development outcomes.

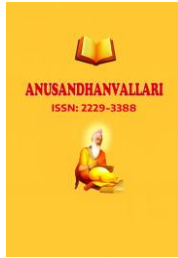
The research reveals that rural industrial entrepreneurs who have accessed formal institutional credit, participated in government financial schemes such as Mudra Yojana and Stand-Up India, and adopted digital banking services demonstrate significantly higher levels of enterprise growth, employment generation, and revenue expansion compared to financially excluded counterparts. Self-help group linkages have proven particularly effective in enabling women entrepreneurs in rural Dindigul to establish and sustain micro industrial enterprises, reinforcing the developmental value of the SHG-bank linkage model.

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