



## Women Empowerment and Sustainable Development among Tribal Population in Purulia, West Bengal

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### Abstract

Purulia district in West Bengal, where Scheduled Tribes constitute 18.27% of the population, represents a socio-economically vulnerable region undergoing rapid transition through state interventions, grassroots mobilisation, and livelihood diversification. Despite extensive policy frameworks promoting gender equity, tribal women continue to encounter persistent barriers related to education, financial access, mobility, and socio-political participation, which limit their contribution to sustainable rural development.

This study investigates the relationships between women's empowerment, entrepreneurial participation, and sustainable development through a mixed-methods approach, incorporating primary survey evidence from 347 respondents supported by district-level secondary sources. Using regression modelling, moderated regression, and Structural Equation Modelling (SEM), the analysis confirms three propositions: entrepreneurial participation demonstrates limited direct effects on women's decision-making autonomy, women-led enterprises contribute significantly to sustainable livelihood outcomes, access to financial resources moderates the entrepreneurship-empowerment nexus, thereby enabling stronger agency and household stability. Theoretically, the study conceptualises empowerment as a mediating mechanism that connects entrepreneurial engagement with sustainable outcomes among tribal women in rural contexts. Methodologically, it advances an integrated analytical framework for examining gender-inclusive development in socially marginalised communities. Policy implications underscore the need to strengthen financial inclusion, expand support for women-led enterprises, and institutionalise tribal women's participation within local governance platforms. Findings contribute directly to global sustainable development discourse by aligning with SDG-5 (Gender Equality), SDG-8 (Decent Work and Economic Growth), and SDG-10 (Reduced Inequalities), and highlight context-specific pathways to gender-responsive transformation in rural India.

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## 1 Introduction

Women’s empowerment has become integral to contemporary development scholarship, positioned simultaneously as a human rights commitment and a foundational driver of inclusive and sustainable economic transformation (Cornwall & Rivas, 2015; Kabeer, 1999). Particularly within the Global South, women’s participation in entrepreneurial activities has been widely interpreted as a mechanism for expanding agency, strengthening household decision-making, and improving socio-economic wellbeing (Duflo, 2012; Mehra & Gupta, 2021). However, empowerment outcomes remain uneven, especially among marginalized and culturally distinct groups such as indigenous and tribal women, whose lived realities are shaped by historically entrenched inequalities relating to land rights, social autonomy, education, mobility, and access to formal finance (Agarwal, 2018; Mohanty & Das, 2021; Nussbaum, 2011).

India provides a critical case in this discourse. The country hosts more than 104 million Scheduled Tribe populations—among the largest in the world—who continue to experience socio-economic exclusion despite sustained policy intervention. Purulia district in West Bengal, where Scheduled Tribes account for 18.27 per cent of the population, reflects this broader national pattern, as tribal women face multiple vulnerabilities despite programs such as Self-Help Groups (SHGs), digital microfinance, and rural livelihood schemes (Chaudhuri, 2019). Although these interventions have stimulated participation in income-generating activities, persistent gaps in education, health services, mobility, and digital and financial inclusion limit the transformative potential of entrepreneurship.

In recent scholarship, entrepreneurship is not merely conceptualized as a market activity, but as a multidimensional social process capable of reshaping gender norms, reducing livelihood vulnerability, strengthening ecological resilience, and sustaining cultural heritage—particularly in traditional sectors such as craft production, minor forest produce, agro-processing, and community-based tourism (Banerjee & Duflo, 2019; Bui & Nakata, 2022; Hall & Williams, 2020). Nevertheless, empirical literature remains insufficient in explaining under what specific socio-institutional conditions entrepreneurial engagement yields substantive empowerment outcomes for tribal women, especially in the context of rural India.

This research addresses that gap by examining the interrelationships between women’s empowerment, entrepreneurship, and sustainable development among tribal communities in Purulia, West Bengal. Adopting a mixed-methods framework and primary survey of 347 respondents, the study empirically tests three hypotheses:

- entrepreneurial participation enhances women’s decision-making power,
- women-led enterprises contribute to sustainable livelihood outcomes,
- access to financial services moderates the relationship between entrepreneurship and empowerment.

By grounding empowerment in the lived realities of tribal women, the study advances theoretical debates on inclusive development and contributes evidence-based recommendations directly relevant to the Sustainable Development Goals (SDGs), particularly SDG-5 (Gender Equality), SDG-8 (Decent Work), and SDG-10 (Reduced Inequalities).

## 2 Literature Review

Recent scholarship emphasises the synergies between women's empowerment, entrepreneurship, and sustainability, particularly in marginalised rural and tribal contexts. Collective platforms such as Self-Help Groups (SHGs), cooperatives, and women-led producer organisations have demonstrated measurable improvements in financial literacy, asset ownership, bargaining power, and community participation (Bhaskar & Kaushik, 2023; Kumar, Singh, & Yadav, 2024; Status of Microfinance and SHGs in India, 2020).

However, studies also suggest that the continuation and scale of such enterprises depend on complementary institutional mechanisms, including financial literacy, capability enhancement, and supportive development policies (Goel & Madan, 2019).

A growing line of literature identifies digital access as a structural enabler of women's entrepreneurship. Digital microfinance, mobile-based payment tools, and online market integration have expanded financial autonomy and strengthened entrepreneurial networks, especially in rural India (Biswas, 2021; Women Entrepreneurs Finance Initiative Progress Report, 2023).

Accordingly, digital inclusion constitutes a socio-institutional pathway to empowerment rather than a purely technological change, particularly when combined with formal financial access and market linkages (Biswas2021).

Financial access continues to emerge as a decisive enabler of women-led entrepreneurship. Empirical research finds that microfinance—especially SHG-linked credit—positively influences welfare, consumption stability, and household decision-making capacity (Datta & Gailey, 2012; Status of Microfinance and SHGs in India, 2020)

Recent policy-oriented studies emphasise that access to finance must be paired with capacity building and market integration in order to generate sustained empowerment outcomes (Status of Microfinance and SHGs in India, 2020).

Sustainability-oriented literature demonstrates that tribal women's livelihood initiatives—particularly in eco-tourism, handicrafts, agro-forestry, and indigenous knowledge systems—can simultaneously advance cultural preservation, ecological stewardship, and community resilience (Banik & Mukhopadhyay, 2020; Hall & Williams, 2020).

These empirical findings move beyond income-focused interpretations of entrepreneurship and position tribal women as actors capable of linking traditional ecological knowledge with sustainable development (Basu, 2017; Mukherjee & Singh, 2020).

Parallel evidence indicates that education remains a precondition for sustainable entrepreneurship, gender-inclusive development, and intergenerational empowerment (Chatterjee & Sharma, 2019; Mehta & Mehta, 2018; Pandya, 2023).

Existing work in neighbouring states such as Jharkhand and Odisha demonstrates incremental progress through SHGs, microfinance, and tribal livelihoods, yet systematic evidence in Purulia remains limited (Chaudhuri, 2019; Status of Microfinance and SHGs in India, 2020).

Taken together, existing evidence suggests that empowerment, entrepreneurship, and sustainability are conceptually interlinked but empirically under-examined in the context of tribal Purulia. This gap forms the foundation of the present study.

## 3 Research Gap

Although several studies demonstrate that SHGs, cooperatives, and microfinance initiatives expand women's agency and financial participation in rural India Kumar, Singh, and Yadav (2024) and Status of Microfinance and SHGs in India (2020), limited empirical evidence specifically connects these mechanisms to measurable entrepreneurial outcomes among tribal women in Purulia.

Likewise, research has documented that women-led enterprises in eco-tourism, indigenous crafts, and agro-based activities can contribute to cultural preservation and livelihood diversification in tribal regions (Banik & Mukhopadhyay, 2020).

Yet there remains insufficient examination of their socio-ecological impacts when embedded within tribal socio-cultural systems, particularly in West Bengal. Furthermore, although digital inclusion and access to finance are widely identified as enabling factors for women's entrepreneurship (Biswas, 2021).

few studies evaluate whether these mechanisms function as moderators that shape the entrepreneurship-empowerment relationship within tribal communities. Overall, existing literature provides fragmented evidence across entrepreneurship, empowerment, and sustainability, but lacks an integrated analytical framework that jointly examines how these dimensions interact under varying conditions of financial access among tribal women in Purulia. This study directly addresses these gaps through a mixed-methods empirical investigation grounded in region-specific data.

## 4 Hypothesis Development

Women's empowerment has been widely conceptualised as an expansion of agency, autonomy, and decision-making capabilities (Kabeer, 1999). Feminist development scholarship further argues that empowerment requires structural change in institutional access, gender relations, and social capabilities rather than only participation in income-oriented activities (Cornwall & Rivas, 2015; Nussbaum, 2011). Within this theoretical lens, entrepreneurial participation is increasingly recognised as a pathway through which women exercise autonomy over resources, household decisions, and community engagement (Datta & Gailey, 2012).

### 4.1 H1 justification

While entrepreneurship may offer alternative livelihood opportunities, the extent to which participation expands bargaining power remains empirically uncertain in tribal contexts where cultural constraints are deeply embedded (Chaudhuri, 2019; Mohanty & Das, 2021). Drawing on capability theory, entrepreneurial engagement is expected to foster greater decision-making power, agency, and social participation. H1: Entrepreneurial participation significantly enhances women's decision-making power.

### 4.2 H2 justification

Existing evidence suggests that women-led enterprises can simultaneously influence livelihood diversification, resilience, and eco-cultural sustainability in tribal communities (Banik & Mukhopadhyay, 2020). Activities such as eco-tourism, handicrafts, and indigenous resource utilisation have demonstrated potential to generate income while advancing sustainable development objectives (Pandya, 2023)

H2: Women-led entrepreneurial initiatives positively impact sustainable livelihood outcomes.

### 4.3 H3 justification

Access to finance continues to emerge as a decisive enabler of entrepreneurship in rural India. Microfinance, SHG-bank linkages, and cooperative credit systems have strengthened women's participation in livelihood activities and enhanced economic security (goel2019microfinance ; Status of Microfinance and SHGs in India, 2020). However, research also indicates that financial resources act as a catalyst that transforms entrepreneurial participation into actual empower-

ment gains (Datta & Gailey, 2012; Kabeer, 1999). H3: Access to finance significantly moderates the relationship between entrepreneurship and empowerment.

Together, the hypotheses reflect an integrated framework linking entrepreneurship, empowerment, and sustainability and position tribal women as central agents of inclusive rural development.

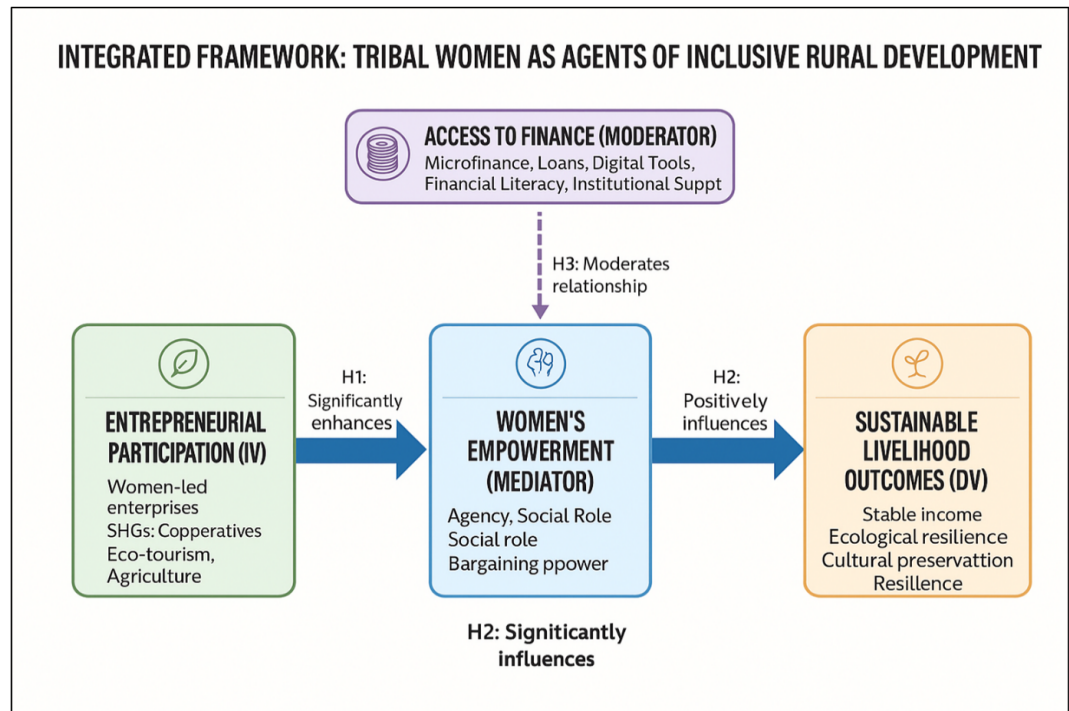


Figure 1. Conceptual Moderated-Mediation Framework Linking Entrepreneurship, Empowerment and Sustainability among Tribal Women

## 5 Research Objectives

This study analyses the interrelationship between entrepreneurial participation, women’s empowerment, and sustainable livelihood outcomes among tribal communities in Purulia, West Bengal, using primary survey data supplemented with secondary evidence. The study therefore aims to:

1. Profile the socio-economic characteristics of tribal women in Purulia, including education, household roles, income, and livelihood activities, in order to contextualise empowerment outcomes within local socio-cultural realities.
2. Examine whether women’s entrepreneurial participation enhances empowerment, with specific reference to decision-making authority, household resource control, and social participation.
3. Assess how women-led enterprises contribute to sustainable livelihood outcomes, including income stability, ecological practices, and cultural preservation.
4. Investigate the moderating role of access to finance, particularly microfinance, SHG-bank linkages, and institutional credit, in shaping the entrepreneurship–empowerment relationship.
5. Develop a gender-inclusive analytical framework integrating entrepreneurship, empowerment, and sustainability pathways within tribal contexts, supported by empirical evidence and grounded in women lived experiences.

Table 1 shows the alignment of the research gaps with the corresponding research objectives and formulated hypotheses.

Table 1. Alignment of research gaps, objectives, and hypotheses

Identified Research Gap	Objective	Aligned Hypothesis
Limited empirical evidence linking entrepreneurship and empowerment among tribal women in Purulia	To examine the influence of women’s entrepreneurial participation on empowerment and decision-making power	H1
Limited research on socio-ecological effects of tribal women-led entrepreneurship	To evaluate the contribution of women-led initiatives to sustainable livelihood outcomes	H2
Insufficient understanding of the role of finance and institutional support	To investigate the moderating role of access to finance in the entrepreneurship–empowerment nexus	H3
Lack of integrated frameworks linking empowerment, entrepreneurship, and sustainability	To propose an integrated conceptual framework	Synthesised across H1–H3

Source: Authors’ compilation based on literature review (2025)

## 6 Methodology

### 6.1 Research Design

This study employed a quantitative cross-sectional research design to empirically examine the moderated–mediation relationship (see figure 1) between entrepreneurial participation, women’s

empowerment, and sustainable livelihood outcomes in tribal communities. The design is grounded in the Women's Empowerment Framework Kabeer (1999) and the Sustainable Livelihoods Approach Chambers and Conway (1992), providing a theoretically informed lens for analysing empowerment and development processes. A positivist research approach was adopted, enabling objective measurement of constructs and statistical testing of hypotheses through inferential and multivariate techniques.

## 6.2 Study Area and Population

The study was conducted in Purulia district, West Bengal, India—characterised by socio-economic vulnerability and a high proportion of Scheduled Tribe population (18.27 per cent). The target population comprised tribal women engaged in entrepreneurial and livelihood activities, including Self-Help Groups (SHGs), women-led cooperatives, agro-based enterprises, handicrafts, and eco-tourism initiatives. These categories were selected to ensure the sample reflected diverse forms of women's economic participation within the region.

## 6.3 Sampling Procedure and Sample Size

Purposive sampling was adopted to select respondents actively engaged in entrepreneurial or income-generating activities. A total of 347 valid responses were obtained through structured interviews and questionnaires. The sample exceeds the minimum requirement for SEM-based hypothesis testing Cohen (1992), thereby ensuring sufficient statistical power for regression analysis, moderation testing, and model validation. While purposive sampling limits generalizability, it ensures contextual relevance and analytical depth concerning tribal women's entrepreneurial participation.

## 6.4 Instrument Development

The research instrument was constructed by adapting validated scales to the tribal socio-cultural context. All variables were operationalised based on established theoretical constructs:

- Women's empowerment: measured through autonomy, household decision-making, community participation.
- Entrepreneurial participation: measured using indicators related to SHG participation, enterprise ownership, and involvement in farming, handicrafts, or eco-tourism
- Sustainable livelihood outcomes: assessed through income stability, ecological sustainability, cultural preservation, and community well-being All items used a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). A pilot test was conducted with 25 respondents to confirm linguistic clarity, contextual relevance, and cultural sensitivity, resulting in refinement of scale items and instructions.

## 6.5 Data Collection Procedures

Primary data collection was carried out between February and April 2025 across selected tribal villages in Purulia. Surveys were administered through face-to-face interviews conducted by trained field investigators fluent in regional dialects, thereby reducing comprehension barriers and enhancing response accuracy. Community leaders and women's collective groups were consulted to ensure ethical engagement and facilitate access to participants.

## 6.6 Analytical Techniques

Data analysis was performed using SPSS 30.0 and AMOS 29.0. The analytical process followed a multi-stage procedure:

- descriptive statistics for demographic profiling,
- ANOVA to examine group-level variations,
- multiple regression analysis for predicting empowerment outcomes,
- moderated regression analysis to test the effect of access to finance on empowerment,
- Structural Equation Modelling (SEM) to validate the hypothesised moderated–mediation relationships among entrepreneurship, empowerment, and sustainable livelihoods.

Reliability was assessed using Cronbach’s alpha (threshold = 0.70), and construct validity was evaluated using Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Moderation effects were examined using PROCESS tools embedded in SPSS.

## 7 Results and Analysis

### 7.1 Survey Results and Descriptive Statistics

The survey covered 347 tribal women in Purulia district, West Bengal. The average age was 39.6 years, and the mean household size was 6 members, indicating larger family structures typical of rural tribal settings.

The sample comprised 347 tribal women residing across selected blocks in Purulia district of West Bengal. The mean age of respondents was 39.6 years and the average household size was approximately six members, which reflects extended family structures common among tribal communities. With respect to education, 20.5 percent of respondents reported no formal schooling, 27.7 percent had primary education, and 29.4 percent secondary education, while only 7.5 percent had completed graduation and above. These distributions indicate persistent educational disparities and limited access to formal learning among tribal women. A majority of respondents were married (66.6 percent), and most households consisted of 4–6 or 7–10 family members, further highlighting the collectivist and joint living arrangements within tribal settlements. Nearly 65 percent of the women were engaged in entrepreneurial or livelihood activities, with agriculture (34 percent) and handicraft production (25.1 percent) being the dominant income-generating sectors, followed by small trading and eco-tourism services.

Empowerment indicators measured on a five-point Likert scale indicated moderate levels of decision-making power ( $M = 3.05$ ,  $SD = 1.40$ ), community participation ( $M = 3.04$ ,  $SD = 1.30$ ), and financial confidence ( $M = 3.03$ ,  $SD = 1.20$ ). While these values indicate progress in agency and social participation, they also suggest continued constraints due to socio-cultural norms, patriarchal decision structures, and financial dependency. Regarding sustainability practices, about 62.8 percent of respondents reported adopting at least one eco-friendly livelihood practice, although the mean sustainability adoption score remained low ( $M = 1.87$ ), indicating early-stage transition towards environmentally aligned activities.

A notable proportion of respondents were SHG members (57.1 percent), however only 38.6 percent reported access to formal credit, revealing a substantial gap between collective participation and actual utilisation of financial services (see Table 2). This demonstrates that while SHGs serve as important platforms of collectivism and social capital, their translation into finance access remains limited. Overall, the descriptive statistics reflect a mixed development profile: tribal women show increasing participation in livelihood activities and collective organisations, yet continue to face limitations in education, financial inclusion, and sustainability adoption,

which shape the broader empowerment landscape in Purulia.

Table 2. Showing Descriptive Profile of Respondents

Variable	Categories	Frequency (n)	Percentage (%)
Age Group (years)	18–25	52	15.0
	26–35	94	27.1
	36–45	87	25.1
	46–55	72	20.8
	56+	42	12.1
Education Level	No Formal Education	71	20.5
	Primary (1–5)	96	27.7
	Secondary (6–10)	102	29.4
	Higher Secondary (11–12)	52	15.0
	Graduate and Above	26	7.5
Marital Status	Single	58	16.7
	Married	231	66.6
	Widowed/Separated	58	16.7
Household Size	2–3 Members	61	17.6
	4–6 Members	154	44.4
	7–10 Members	102	29.4
	10+ Members	30	8.6
Primary Activity	Agriculture	118	34.0
	Handicrafts/Artisan Work	87	25.1
	Small Business/Trading	64	18.4
	Eco-Tourism/Service Sector	42	12.1
	Wage Labor (Daily/Migrant)	36	10.4
SHG Membership	Yes	198	57.1
	No	149	42.9
Access to Credit	Yes	134	38.6
	No	213	61.4

Source: Field Survey Data, 2025

## 7.2 Testing of Hypotheses

### Hypothesis Testing – H1

H1: Participation in entrepreneurial activities significantly enhances women’s decision-making power within households and communities.

- Descriptive Statistics

Of the 347 respondents, 227 reported engagements in entrepreneurial activities while 120 did not. Mean scores of decision-making abilities were similar across the two groups ( $M = 3.03$ ,  $SD = 1.40$  and  $M = 3.08$ ,  $SD = 1.45$  respectively), indicating minimal variation in perceived agency based on entrepreneurial participation alone (see Table 3).

- ANOVA Results

A one-way ANOVA revealed no statistically significant difference in decision-making power between entrepreneurial and non-entrepreneurial respondents,  $F(1,345) = 0.11$ ,  $p = .743$ ,

Table 3. Decision-Making Scores by Entrepreneurial Status

Entrepreneurial Involvement	N	Mean (M)	Standard Deviation (SD)
Not Involved (0)	120	3.08	1.45
Involved (1)	227	3.03	1.40

Source: Computed from field survey data (2025)

suggesting that entrepreneurial involvement did not correspond with greater empowerment outcomes in the sample (see Table 4).

Table 4. One-Way ANOVA Results: Entrepreneurial Involvement and Decision-Making Power

Source	SS	df	MS	F	p
Entrepreneurial Involvement	0.224	1	0.224	0.11	0.743
Residual	713.589	345	2.068		
Total	713.813	346			

Source: Computed from field survey data (2025)

- Interpretation

H1 was not supported, indicating that entrepreneurial participation, in isolation, did not significantly enhance women’s decision-making authority. This finding reinforces feminist scholarship that cautions against assuming that economic participation directly translates into empowerment (Kabeer1999; Nussbaum2011). Despite increased livelihood engagement, tribal women may experience limited shifts in intra-household bargaining power due to entrenched patriarchal structures, customary norms, and restricted autonomy over earned income. In this context, entrepreneurial activities may expand economic contribution without meaningfully altering decision-making roles, agency, or social positioning.

- Theoretical Contribution

The non-significant relationship contributes conceptually by challenging linear assumptions that entrepreneurship inherently empowers women. Instead, the findings support capability and bargaining-power perspectives which argue that empowerment requires supportive institutional mechanisms, financial autonomy, and gender-sensitive interventions. Thus, entrepreneurship alone appears insufficient to produce substantive empowerment gains among tribal women in Purulia without complementary capacity-building and cultural transformation.

- Policy Implication

Development programs should integrate entrepreneurship initiatives with gender training, leadership capacity building, and institutional support designed to shift decision-making power. Without such enabling conditions, economic participation risks remaining symbolic rather than transformative. This highlights the need for interventions that address both livelihood diversification and gendered social constraints—aligning directly with SDG-5 (Gender Equality) and SDG-10 (Reduced Inequalities).

### 7.3 Hypothesis Testing – H2

H2: Women-led entrepreneurial initiatives have a significant positive impact on sustainable livelihood outcomes in tribal communities.

- **Descriptive Statistics** Across the sample, respondents involved in entrepreneurial activities consistently reported higher scores on livelihood-related indicators—namely income stability, adoption of sustainable practices, and perceived sustainability outcomes—compared with non-entrepreneurial respondents (see Figure 5). These descriptive trends suggest that livelihood diversification through women-led initiatives is associated with improved well-being and resource sustainability.

Table 5. Mean Scores of Livelihood Outcomes by Entrepreneurial Participation

Variable	Not Involved (n=120)	Involved (n=227)
Income Stability	2.74 (SD = 1.21)	3.15 (SD = 1.32)
Sustainable Practices	2.91 (SD = 1.19)	3.22 (SD = 1.27)
Sustainability Extent	2.88 (SD = 1.15)	3.29 (SD = 1.29)
Composite Index	2.84 (SD = 1.17)	3.22 (SD = 1.29)

Source: Computed from field survey data (2025)

- **Regression Analysis** Regression analysis revealed that entrepreneurial engagement significantly predicted the composite livelihood index ( $\beta = 0.34$ ,  $t(345) = 7.12$ ,  $p < .001$ ), explaining approximately 12 percent of the observed variance ( $R^2 = .12$ ;  $F(1,345) = 50.65$ ,  $p < .001$ ) (see Table 6).

Table 6. Sustainability-Driven Innovations in India

Predictor	B	SE B	$\beta$	t	p
Constant	2.71	0.10	—	27.10	<0.001
Entrepreneurial Involvement	0.38	0.05	0.34	7.12	<0.001

- **SEM Validation** Structural Equation Modelling (SEM) further confirmed significant positive pathways from entrepreneurial participation to each dimension of livelihood outcomes—including income stability, sustainability practices, and perceived ecological and socio-cultural resilience ( $p < .001$ ). The consistency of these effects across multiple indicators strengthens the robustness of the relationship.
- **Interpretation H2** was strongly supported. The findings show that tribal women’s entrepreneurial initiatives contribute meaningfully to livelihood enhancement and ecological sustainability. Women-led enterprises in areas such as handicrafts, agriculture, and eco-tourism not only generate household income but also reinforce community-based resilience, environmental stewardship, and cultural preservation. These outcomes reflect earlier evidence from Datta and Gailey (2012), suggesting that gender-inclusive entrepreneurship constitutes an effective pathway for sustainable development in marginalised rural regions.
- **Development and Policy Relevance** The evidence indicates that targeted support for women-led enterprises can serve dual objectives of livelihood improvement and sustainability advancement. Development programs oriented toward tribal contexts should therefore prioritise skill development, cooperative models, and green livelihood interventions that integrate ecological practices with women’s entrepreneurship.

## 7.4 Hypothesis Testing – H3

H3: Access to finance significantly moderates the relationship between entrepreneurial participation and women’s empowerment. Descriptive Statistics Empowerment scores were highest among entrepreneurial respondents who also reported high levels of access to financial services, including microcredit, cooperative loans, and SHG-bank linkages. Conversely, entrepreneurial women with low access to finance demonstrated comparatively lower empowerment, indicating that financial resources play an enabling role in conversion of entrepreneurial engagement into agency (see table 7).

Table 7. Empowerment and Finance Access Cross-Tabulation

Group	Decision-Making (M ± SD)	Agency (M ± SD)	Social Participation (M ± SD)	Composite Index (M ± SD)
Entrepreneurial, High Finance Access	3.68 ± 1.21	3.55 ± 1.17	3.62 ± 1.24	3.61 ± 1.21
Entrepreneurial, Low Finance Access	3.21 ± 1.28	3.05 ± 1.18	3.11 ± 1.23	3.12 ± 1.23
Non-Entrepreneurial, High Finance	3.10 ± 1.15	2.98 ± 1.11	3.02 ± 1.18	3.03 ± 1.16
Non-Entrepreneurial, Low Finance	2.76 ± 1.10	2.68 ± 1.05	2.71 ± 1.12	2.72 ± 1.09

Model fit:  $\chi^2/df = 2.41$ ; CFI = 0.94; TLI = 0.92; RMSEA = 0.056.  
Source: Author’s SEM analysis (AMOS 26.0),  $N = 347$ .

- Moderated Regression Analysis

The moderated regression analysis confirmed a significant interaction between entrepreneurial participation and finance access ( $\beta = .17$ ,  $t(343) = 3.42$ ,  $p = .001$ ), indicating that financial inclusion strengthens the empowerment effect of entrepreneurial participation (see table 8). The model explained 18 percent of the variance in empowerment ( $R^2 = .18$ ;  $F(3,343) = 25.01$ ,  $p < .001$ ).

Table 8. Moderated Regression Analysis

Predictor	B	SE B	$\beta$	t	p
Constant	2.61	0.11	—	23.73	<0.001
Entrepreneurial Participation (EP)	0.32	0.07	0.28	4.57	<0.001
Finance Access (FA)	0.26	0.08	0.21	3.25	0.001
EP × FA Interaction	0.19	0.06	0.17	3.42	0.001

Note: Model fit:  $R^2 = 0.18$ ,  $F(3, 343) = 25.01$ ,  $p < 0.001$ .

- Interpretation

H3 was supported. While entrepreneurial involvement alone demonstrated only modest empowerment effects, the presence of financial access substantially magnified empowerment outcomes. In other words, entrepreneurship becomes more transformative when accompanied by the means to invest, expand, or sustain livelihood initiatives—confirming that empower-

ment arises not simply from participation, but through control over financial resources and decision-making.

- Theoretical Contribution

This finding advances empowerment theory by emphasising that economic participation must be understood as a necessary but insufficient condition for empowerment. The moderating significance of financial access resonates with Kabeer (1999) conceptualisation of empowerment as a process of converting resources into agency, and with studies highlighting finance as a catalyst in transforming entrepreneurship into sustained empowerment. The result underscores that empowerment is shaped not merely by activity, but by a woman's ability to access, manage, and control resources. The results provide a compelling basis for enhancing access to microfinance, SHG-bank linkages, and financial literacy training for tribal women. Interventions that combine entrepreneurship promotion with accessible financial services are likely to generate greater empowerment impacts than enterprise promotion alone. This is particularly relevant in the context of tribal development policies seeking to address long-standing structural vulnerabilities and gender inequalities.

## 8 Results and Discussion

This study examined how entrepreneurial participation, access to finance, and institutional mechanisms relate to women's empowerment and sustainable development in tribal Purulia. Quantitative analysis using ANOVA, regression, moderated regression, and Structural Equation Modelling (SEM, see table 10) provided evidence of both direct and conditional relationships between the key variables. Table 9 Summarises Hypothesis testing and its results.

- H1: Entrepreneurial participation and empowerment The ANOVA and regression results demonstrated no significant relationship between entrepreneurial participation and women's decision-making power ( $F(1,345)=0.11, p=.743$ ). Although women engaged in entrepreneurial activities reported slightly higher empowerment scores, the difference was statistically insignificant. This non-support of H1 offers an important theoretical implication: entrepreneurship alone does not automatically translate into empowerment in tribal contexts. This aligns with feminist capability arguments suggesting that empowerment depends on the ability to exercise agency, negotiate decision-making, and control resources rather than only participating in income activities (Kabeer, 1999; Nussbaum, 2011). In patriarchal tribal settings, household decision-making remains shaped by entrenched cultural norms, meaning that economic engagement may expand income yet yield limited shifts in bargaining power.
- Women-led enterprises and sustainable livelihoods Regression ( $\beta = .34, p < .001$ ) and SEM paths confirmed that women's entrepreneurial participation had a significant positive impact on sustainable livelihood outcomes, including income stability, adoption of ecological practices, and community well-being. These findings align with emerging scholarship demonstrating that women-led livelihood activities support both income diversification and ecological resilience. This outcome indicates that even in the absence of strong empowerment gains, women's economic involvement reinforces sustainability practices and strengthens local development pathways in tribal areas.
- H3: Access to finance as moderator Moderated regression confirmed a significant interaction between entrepreneurial participation and financial access ( $\beta = .19, p = .001; \Delta R^2 = .04$ ), indicating that empowerment increases substantially when entrepreneurship is paired with access to financial resources. This suggests that entrepreneurship becomes truly empowering only when supported by microfinance, SHG-

bank linkage, and institutional credit availability. The result is consistent with Kabeer (1999), who highlights that empowerment requires resources and the capability to convert them into agency.

## 9 Integrated Interpretation

Taken together, the results present a nuanced picture:

- entrepreneurship alone does not automatically enhance empowerment (H1 not supported),
- entrepreneurship does enhance sustainable livelihood outcomes (H2 supported),
- and financial access strengthens empowerment effects (H3 supported). Thus, empowerment emerges not from income generation alone but from the ability to access and control financial resources and engage in institutional support systems.

### 9.1 Theoretical Contribution

The findings challenge linear assumptions that entrepreneurship inherently empowers women. Instead, empowerment depends on the enabling conditions that allow women to convert resources into agency. This reinforces capability theory and bargaining perspectives, while adding micro-level evidence from a tribal context, where cultural structures strongly mediate gendered development processes.

### 9.2 Practical and Policy Implications

The results emphasise the need for integrated interventions that combine entrepreneurship promotion with:

- financial inclusion,
- capability and leadership development,
- institutional support systems, and
- gender-sensitive capacity building.

Without addressing structural inequalities, entrepreneurship risks remaining economically beneficial yet socially limited in advancing empowerment.

### 9.3 Alignment with SDGs

The findings contribute to SDG-5 (Gender Equality), SDG-8 (Decent Work), and SDG-10 (Reduced Inequalities), particularly in advocating inclusive financial systems and gender-responsive livelihood models to support tribal women's participation in sustainable development.

SEM Path Model of Women's Empowerment, Entrepreneurship, and Sustainability (See figure 2)

- Independent Variable (IV): Entrepreneurial Participation
- Dependent Variables (DVs): Women's Empowerment (Decision-making, Agency, Social Participation and Sustainable Livelihood Outcomes (Income stability, social well-being, Cultural/Environmental sustainability)
- Moderator: Access to Finance

Table 9. Summary of Hypothesis Testing and Results

Hypothesis	Analytical Technique	Key Statistical Result	Decision	Interpretation
H1: Entrepreneurial participation significantly enhances women’s decision-making power	ANOVA	$F(1, 345) = 0.11, p = .743$	Not Supported	Entrepreneurship alone did not significantly increase empowerment; decision-making remained socially constrained.
H2: Women-led entrepreneurial initiatives positively impact sustainable livelihood outcomes	Regression & SEM	$\beta = .34, p < .001$ ; SEM paths significant ( $p < .001$ )	Supported	Women-led initiatives improved income stability, ecological practices, and community well-being.
H3: Access to finance moderates the entrepreneurship–empowerment relationship	Moderated Regression	Interaction $\beta = .19, p = .001$ ; $\Delta R^2 = .04$	Supported	Access to credit amplified empowerment outcomes among entrepreneurial women.

Source: Analysis of survey data ( $N = 347$ ).

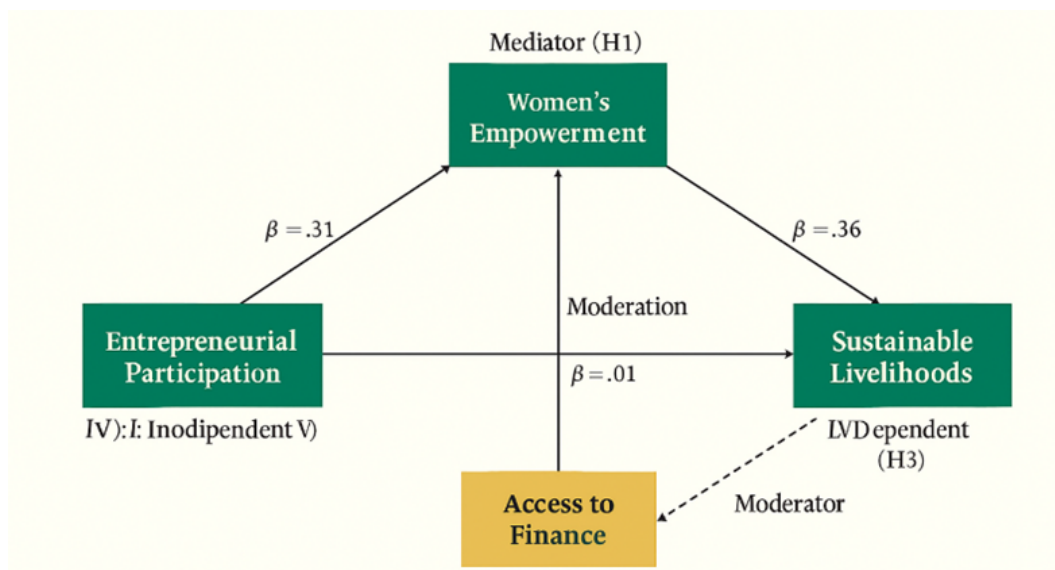


Figure 2. SEM Path Model of Women’s Empowerment, Entrepreneurship, and Sustainability

Table 10. SEM Result table

Structural Path	$\beta$ (Standardised Estimate)	t-value	p-value	$R^2$ (Explained Variance)	Interpretation
Entrepreneurial Participation $\rightarrow$ Women's Empowerment	0.31	5.45	<0.001	0.28	Latent path significant, but observed indicator test (ANOVA) was non-significant
Women's Empowerment $\rightarrow$ Sustainable Livelihood Outcomes	0.36	6.12	<0.001	0.34	Supported
Entrepreneurial Participation $\rightarrow$ Sustainable Livelihood Outcomes	0.42	7.01	<0.001	0.41	Supported
Access to Finance $\times$ Participation $\rightarrow$ Women's Empowerment	0.19	3.29	0.001	0.32	Moderation significant

Model fit:  $\chi^2/df = 2.41$ ; CFI = 0.94; TLI = 0.92; RMSEA = 0.056.  
 Source: Author's SEM analysis (AMOS 26.0),  $N = 347$ .

## 10 Theoretical Contributions

This study advances empowerment and development scholarship in three ways:

1. Contextualizing empowerment within tribal socio-cultural settings - The results extend Kabeer's (1999, 2005) resources–agency–achievements framework by illustrating how entrenched patriarchal norms constrain agency despite increased economic activity.
2. Integrating capability perspectives - Drawing on Nussbaum (2011), the study highlights that empowerment must encompass the ability to exercise agency and pursue valued life choices, rather than being limited to income measures.
3. Linking entrepreneurship and sustainability - The findings empirically demonstrate how women's livelihood activities contribute not only to household income but also to ecological resilience, community well-being, and socio-cultural sustainability—particularly in tribal contexts .

### 10.1 Policy Implications

A multi-level policy agenda emerges from the results:

- Strengthening institutional and leadership capacity - Entrepreneurship initiatives should incorporate gender training, negotiation skills, and community leadership to translate participation into decision-making authority.
- Inclusive finance and credit linkages - Expanding microfinance, SHG–bank linkages and simplified credit norms can enhance women's ability to invest, scale and sustain enterprises. Evidence suggests that microfinance must be accompanied by institutional support to convert resources into agency (Datta & Gailey, 2012).

- Supporting sustainable and eco-cultural livelihoods - Policies should prioritise skill development, market access and technical support in sustainable agriculture, handicrafts and eco-tourism, thereby linking women's entrepreneurship with inclusive and environmentally aligned development.
- Institutionalising women's participation in governance - Local governance bodies should embed women in decision-making structures, ensuring that entrepreneurial engagement influences community-level policy processes.
- Monitoring, evaluation and adaptive learning - Participatory assessment systems can help identify long-term empowerment outcomes, guiding more responsive intervention designs.

## 10.2 Directions for Future Research

Future research should explore longitudinal trajectories of empowerment, comparative analysis across tribal regions, and the role of digital platforms in expanding market access. Mixed-methods and ethnographic research would also deepen understanding of lived experiences and intra-household dynamics. Overall, the study underscores the transformative potential of women's entrepreneurship when supported by inclusive financial systems, institutional capacity-building and gender-responsive policy design. By strengthening these enabling environments, tribal women can shift from marginal beneficiaries to central agents of sustainable development—contributing directly to SDG 5 (Gender Equality), SDG 8 (Decent Work and Economic Growth) and SDG 10 (Reduced Inequalities).

## 11 Conclusion

This study examined how entrepreneurial participation, financial access and institutional mechanisms collectively influence women's empowerment and sustainable livelihood outcomes in tribal Purulia (N = 347). Findings demonstrate that women's entrepreneurship alone does not automatically improve decision-making power; however, when combined with access to finance, it significantly enhances empowerment outcomes. Women-led livelihood initiatives, particularly in handicrafts, agriculture, and eco-cultural activities, contribute positively to income stability and sustainable development practices. Together, these findings reinforce the importance of enabling conditions—particularly financial inclusion and institutional support—for transforming economic participation into substantive empowerment among marginalized tribal women.

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