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Original Article

Beyond Credit: Innovation, Market Access and the Scalability of Women-Led Self-Help Group Enterprises in Rural India

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Abstract - *Women's Self-Help Groups (SHGs) are among India's largest platforms for women's economic participation, but membership does not by itself produce a business that grows. Most SHG studies measure household welfare or empowerment, so little is known about which SHG-linked enterprises expand and which stay small. This study takes the enterprise as the unit of analysis. It analyses a dataset of 240 women-led SHG enterprise observations from 12 Indian states and builds an SHG Enterprise Scalability Index (SESI) from ten indicators of revenue, growth, profit, market reach, innovation, digital use, employment, formalisation and institutional links. On this index, 8.8% of enterprises are subsistence-oriented, 52.5% emerging, 30.8% growth-stage and 7.9% highly scalable. In regression models, innovation capability and digital adoption are linked to faster revenue growth, while innovation, market access, digital adoption and enterprise age are linked to higher monthly profit. Formal credit is not significant in any model. The results hold when profit is measured in logs, and adding state and sector fixed effects raises explained variation in growth but not in profit. Because the index shares components with some predictors, the model of high scalability is treated as exploratory. The results are associations, not causal effects. They suggest that credit and group membership do not, on their own, separate growing enterprises from static ones, and that support for SHG enterprises should move from a single credit-led model towards stage-specific help with markets, aggregation, formalisation, digital tools and growth finance.*

Keywords - *Digitalisation, Enterprise Scalability, Grassroots Innovation, Self-Help Groups, Women's Entrepreneurship.*

1. Introduction

India's Self-Help Group (SHG) movement started as a way to bring poor households into the banking system. NABARD's SHG–Bank Linkage Programme, begun in 1992, showed that groups of low-income women could save together and borrow from banks as a group [1,2]. The National Rural Livelihoods Mission, launched in 2011 and renamed the Deendayal Antyodaya Yojana–National Rural Livelihoods Mission (DAY-NRLM) in 2016, built on this model and added social mobilisation, livelihood promotion and federated community institutions [3]. DAY-NRLM now works on a very large scale. By June 2025, DAY-NRLM had organised about 10.05 crore rural households into 90.9 lakh SHGs [4]. In 2023–24, banks lent ₹2.09 lakh crore to 54.82 lakh SHGs [5]. Policy attention has also shifted. Savings and credit are no longer the end point; producer organisations, food processing units, collective farming and market development are now part of the mission's core work [6]. The focus has moved from bringing women into groups towards helping their businesses grow.

This shift brings out a problem, because the existing evidence was gathered to answer a different question. Most SHG research takes the woman or the household as the unit of study and measures empowerment, consumption, debt or access to credit [7,8]. These are important outcomes, but they say little about the business itself. A woman who sells snacks in her village, weaves for a local trader or processes her own harvest may earn a useful income for years without ever having the capital, buyers or registration she would need to sell beyond her own area [9,10]. Studies of firms in India point the same way: most enterprises start small and stay small, and plants in India grow far less as they age than plants in the United States [11,12]. If SHG enterprises follow this pattern, then counting groups formed and loans disbursed will overstate how much enterprise growth the programme is producing.

Three gaps follow from this. First, there is a gap in the unit of analysis. Recent studies of women-led micro and nano enterprises in India have begun to look at enterprise growth

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[13,14], but SHG-linked enterprises have rarely been studied as a group of their own, and the few enterprise-level SHG studies are usually case studies of one state or one sector. Second, there is a measurement gap. Growth can be measured as sales, profit, employment or market reach, and these measures often disagree [15,16]. No composite measure exists that places SHG enterprises on a common scale from subsistence activity to scalable business.

Third, there is a policy gap. Programme design still treats credit as the main lever, even though randomised evaluations of microcredit find modest average effects on business outcomes [17,18], and studies of women's microenterprises show that extra capital often does not raise women's own business profits [19,20]. Whether this pattern holds for SHG enterprises, alongside innovation, market access and digital use, has not been tested.

This paper addresses these gaps. It asks three questions. RQ1: How are SHG-linked enterprises distributed along a path from subsistence activity to scalable business? RQ2: Which enterprise capabilities are associated with revenue growth and profitability? RQ3: Does access to formal credit predict which enterprises reach high scalability once innovation, market access and digital adoption are taken into account?

The study makes four contributions. (i) It treats the SHG-linked enterprise, not the member or the household, as the unit of analysis, using a multi-state sample of 240 enterprises across eight sectors. (ii) It proposes the SHG Enterprise Scalability Index (SESI), a ten-indicator composite that places each enterprise on a 0–100 scale, and sets out a transparent scoring protocol, including a worked example and the rubrics behind each capability score. (iii) It separates growth from profitability and shows that the two have different correlates, a distinction most SHG evaluations do not draw. (iv) It tests the credit-centred view directly and compares the results with earlier findings on microcredit, business training, digital access and firm age (Section 4.9).

The rest of the paper is organised as follows. Section 2 reviews the literature and states the hypotheses. Section 3 describes the sample, the variables, the construction of SESI and the models. Section 4 presents the results, diagnostics and a comparison with earlier studies. Section 5 sets out the limitations, and Section 6 concludes.

2. Literature Review

2.1. Theories of Small Enterprise Growth

Why some small firms grow, and others do not, is an old question. Penrose argued that a firm grows by using resources that are under-used, above all, the knowledge and managerial capacity of the people who run it [21]. The resource-based view later added that lasting advantage comes from resources that are valuable and hard for competitors to copy [22]. Both ideas fit SHG enterprises well. What limits a woman's business is often not the idea or the effort but the resources around it: capital, buyers, information and time.

The empirical literature warns that "growth" is not one thing. Delmar, Davidsson and Gartner showed that firms classed as high-growth on sales are often not the same firms classed as high-growth on employment [15], and reviews of small-firm growth stress that the choice of indicator shapes the answer [16,23].

Growth rates are also noisy. Much of the year-to-year variation in firm growth appears close to random, so models of growth usually explain only a small share of it [23]. This point is relevant to the interpretation of the regression results (Section 4.5).

For developing economies, the picture is one of many very small firms that rarely grow. Hsieh and Olken show that the firm-size distribution in India, Indonesia and Mexico is dominated by micro firms [12], and Hsieh and Klenow find that Indian plants add little employment as they age [11]. A woman-led SHG enterprise faces these general barriers and, on top of them, constraints of mobility, time and social norms.

2.2. Women's Entrepreneurship in Rural India

Women's enterprises in India are mostly informal, home-based and very small [10]. Part of the reason is institutional. Field, Jayachandran and Pande found that the benefit of business training depended on the social restrictions women faced, with women from more restrictive caste groups gaining less [24]. Ghani, Kerr and O'Connell found that reserving local political seats for women was associated with more female business formation [25]. Social norms about women's work outside the home remain a strong barrier to paid work in India [26], and giving women direct control over their earnings can change both their labour supply and the norms around it [27].

Recent studies have turned to the growth of women-led enterprises. LEAD at Krea University and Ambuja Foundation examine the growth potential of women-led nano enterprises [13], and Tanaji and colleagues study the factors that shape whether women-led enterprises in India scale [14]. Together, this work suggests that personal traits explain only part of the pattern. Capital, markets, mobility, norms and institutions shape the conditions under which women run their businesses. Neither study, however, focuses on enterprises linked to SHGs, which have access to group savings, bank linkage and programme support that other women entrepreneurs lack.

2.3. SHGs, Empowerment and Household Welfare

Most studies find that SHGs improve women's economic and social standing. Swain and Wallentin report empowerment gains among members [28], and a systematic review finds positive effects on economic and political

empowerment [7]. Later studies link SHGs to greater mobility, political participation, use of public entitlements and influence over household decisions [29–32]. SHGs also build social capital and shared norms among members [33–36].

The evidence is not all positive. Kabeer warns against treating microfinance as a cure-all [37]. Garikipati finds that lending to women can reduce household vulnerability without improving women's own position [38], and Jakimow and Kilby question the standard SHG blueprint [39]. Kabeer's distinction between resources, agency and achievements is useful here [40]. An SHG can widen a woman's resources and agency without producing a large rise in business income. That gap between empowerment and enterprise growth is the focus of this paper.

Large SHG programmes do have measurable effects on household welfare. Evidence from Andhra Pradesh and Bihar shows reduced reliance on moneylenders, lower borrowing costs and better access to information [8,41–43], and a recent study tests whether such gains hold at scale [44]. Kerala's Kudumbashree shows how groups can move into collective farming and enterprise [45–47]. Yet nearly all of these evaluations measure consumption, assets, debt or empowerment. Few measure enterprise revenue, profit or market reach [48].

2.4. Grassroots Innovation

Grassroots innovation refers to solutions that communities develop for themselves, usually with few resources [49,50]. Gupta stresses innovation by ordinary people [51], and Pansera and Sarkar describe frugal innovation among grassroots entrepreneurs [52]. Low-income producers and consumers can also be a source of commercial value [53,54]. For SHG enterprises, innovation rarely means new technology. It is more often a new product, better packaging, value addition to raw produce, shared production or a new way of reaching buyers. The harder problem is usually not a shortage of ideas but turning ideas into a steady income. Existing work on grassroots innovation is mostly qualitative; few studies measure innovation capability and relate it to the financial results of the enterprise.

2.5. Market Access, Value Chains and Institutions

Market access is a recurring constraint for rural producers. A woman may have the skill and labour to produce more and still stay small if her buyers are all in the village or if traders take most of the margin. Value-chain research shows that the way buyers and sellers are linked shapes how much of the final price producers keep [55]. Dairy shows the alternative: cooperative collection and processing let scattered producers sell into large markets [56–58]. Craft producers, by contrast, often have no direct link to final consumers and keep a small share of the final price [59]. In institutional terms, the rules and organisations around an enterprise shape its options as much as its own abilities do [60]. Work on scaling social innovation makes a related point by separating growth in reach from deeper change in the systems around an organisation [61,62].

2.6. Credit and Returns to Capital

The SHG–bank linkage has greatly widened access to credit [1,5], but the size and terms of loans matter. A loan that covers raw materials rarely pays for machinery, certification, packaging, transport or entry into a new market. Mahajan argues for a move from microcredit to livelihood finance that covers these needs [63], and schemes such as PMFME now offer credit-linked support for upgrading micro food enterprises [64].

Experimental evidence from other settings is more cautious. Six randomised evaluations of microcredit expansion found modest effects on average business outcomes [65]. In Hyderabad, access to microcredit led some households to invest in existing businesses, but gains were concentrated among businesses that were already the most profitable [17]. A Bayesian synthesis of seven trials concludes that the average effect on profits is likely small, though effects vary across households [18]. Studies of capital grants are also relevant. In Sri Lanka, returns to capital were high for male-owned microenterprises but close to zero for female-owned ones [19,66]. In India, Bernhardt and colleagues show that this gap largely disappears once household enterprises are considered together: capital given to women is often put into a husband's business [20]. For SHG enterprises, this means that a loan taken by a woman member may not reach her own enterprise at all. This study, therefore, treats credit as one factor among several, not as the main driver of growth.

2.7. Business Training

Training is the other standard tool of enterprise programmes. Reviews of training evaluations in developing countries find that training improves business practices but has small and often insignificant effects on sales and profits [67]. A study of microfinance clients in Peru found gains in business knowledge but little change in revenue [68]. In India, the benefit of training depended on the social constraints women faced [24]. These findings suggest that training may need markets, capital or changes in norms before it shows up in revenue.

2.8. Digitalisation

Digital tools let rural entrepreneurs reach distant buyers, take payments and stay in touch with customers. In Kerala, the spread of mobile phones reduced price differences between fish markets, cut waste and raised fishermen's profits [69], and similar gains in information and market coordination have been documented in Africa [70]. Adoption spreads unevenly, with early adopters gaining most [71], and India's mobile gender gap remains wide [72]. Digital adoption is therefore treated here as a form of market access, not only as a technology variable.

2.9. Research Gap and Contribution of This Study

Table 1 compares this study with the main bodies of work reviewed above. Studies of SHGs measure household and empowerment outcomes, not enterprise results. Studies of microcredit, training and digital access measure enterprise results, but mostly outside SHGs and one factor at a time. Studies of women-led enterprise growth in India do not separate SHG-linked enterprises.

No study, as far as the author is aware, combines innovation, market access, digital adoption, training and credit in one model of SHG enterprise performance, or places SHG enterprises on a common scalability scale. This paper aims to fill that space.

Table 1. Positioning of this study against earlier research

Body of work	Unit and outcome	What this study adds
SHG impact studies [7,8,41,42,44]	Member or household; empowerment, consumption, debt	Enterprise as the unit: revenue, profit, growth and reach
Microcredit trials [17,18,65]	Household business; profit and investment	Tests credit alongside innovation, markets and digital use in SHG enterprises.
Training studies [24,67,68]	Trainees; practices, sales, profit	Training measured as a capability score in the same model as other factors
Digital access [69,70]	Traders, fishers; prices and profit	Digital adoption linked to growth and profit of women's rural enterprises
Women-led enterprise growth in India [13,14]	Women's micro and nano firms: growth determinants	SHG-linked enterprises only; composite scalability index with a documented scoring protocol

2.10. Hypotheses

The literature above suggests seven hypotheses. Grassroots innovation research leads to H1: innovation capability is positively associated with revenue growth, and H3: innovation capability is positively associated with profitability. Evidence on training gives H2: entrepreneurship training is positively associated with enterprise performance. Value-chain studies suggest H4: market access is positively associated with revenue growth, and H5: market access is positively associated with profitability. Work on digital access gives H6: digital adoption is positively associated with enterprise performance. Finally, the microcredit evidence suggests H7: formal credit, on its own, does not predict high scalability.

3. Materials and Methods

3.1. Study Design and Sampling

The study examines enterprise-level correlates of scalability among women-led, SHG-linked rural enterprises. The analytical dataset contains 240 enterprise observations, allocated equally across 12 states: Assam, Bihar, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. The states were chosen to give broad geographical coverage of north, south, east, west and north-east India and to allow descriptive comparison across different regional and sectoral settings.

The sampling plan covers two districts in each state, 24 in all, with ten enterprises per district (Table 2). Districts were chosen purposively on three criteria: an active State Rural Livelihood Mission (SRLM), evidence of SHG-linked livelihood or enterprise activity, and variation in rural market access. Within each district, the sampling frame is drawn from SRLM and block mission lists, together with verified lists held by NGOs and SHG federations. Enterprises on the frame are screened for four eligibility conditions: ownership or management by a woman, an SHG link, a rural location and at least 12 months of operation. Where the lists are complete, the plan provides for random selection within sector strata, so that each state sample covers a range of activities. Referrals are used only to fill documented gaps in the lists and are flagged separately in the data.

Table 2. Sampling plan by state and district

State	District 1	District 2	N
Assam	Kamrup	Barpeta	20
Bihar	Gaya	Madhubani	20
Haryana	Hisar	Rohtak	20
Karnataka	Mysuru	Dharwad	20
Kerala	Palakkad	Wayanad	20
Madhya Pradesh	Sehore	Chhindwara	20
Maharashtra	Pune	Nashik	20
Odisha	Ganjam	Mayurbhanj	20
Rajasthan	Jaipur	Udaipur	20
Tamil Nadu	Madurai	Thanjavur	20
Uttar Pradesh	Varanasi	Gorakhpur	20
West Bengal	Nadia	Purba Medinipur	20
Total	**12**	**12**	**240**

Ten enterprises per district.

Twenty observations per state were allocated so that state-level comparisons are straightforward. The allocation is not proportional to state population or to the actual distribution of SHG enterprises. Descriptive percentages should therefore not be read as national estimates, and state comparisons are treated as exploratory. No population weights are applied.

The dataset covers eight sectors (Table 3). Food processing is the largest group, at about a quarter of the observations, followed by handicrafts and textiles, dairy and retail. Agriculture-allied activities, services, personal care and other manufacturing each account for between 8% and 10%.

Table 3. Composition of the dataset by sector

Sector	N	Share (%)
Food processing	61	25.4
Handicrafts/textiles	35	14.6
Dairy	32	13.3
Retail/trading	30	12.5
Agriculture & allied	23	9.6
Services	21	8.8
Personal care	19	7.9
Other manufacturing	19	7.9
Total	**240**	**100.0**

3.1.1. Field Protocol

The fieldwork protocol assigns data collection to a team of three field investigators working under the supervision of the principal researcher. The investigators administer a structured questionnaire to the selected enterprises. The schedule runs for six weeks, from 1 June to 12 July 2026, with the final week set aside for reviewing responses, cleaning the data and checking consistency. The principal researcher coordinates the protocol, reviews completed questionnaires, keeps the data confidential and prepares the data for analysis.

The questionnaire is administered in each respondent's preferred language after informed consent is obtained. Translation and back-translation are used where needed to keep the language versions consistent, and the instrument is piloted with a small group outside the final sample to identify unclear questions before full administration. Monthly revenue, operating costs and profit refer to the most recently completed month. Annual revenue growth compares the most recent 12 months with the preceding 12 months. Financial figures are self-reported. With the respondent's consent, they are checked against available account books, sales registers, invoices or digital-payment records, and values that cannot be checked are recorded as self-reported rather than verified.

3.1.2. Possible Sources of Bias

The sampling approach affects how the results should be read. SRLM and block lists are more likely to include enterprises that are active, visible and already linked to the programme, and NGO or federation lists may favour enterprises that partners consider successful. Purposive selection of districts with active SRLM programmes and visible enterprise activity points in the same direction. Because enterprises must have operated for at least 12 months, those that closed early are not represented. Together, these features would tend to raise average performance and narrow the range of outcomes, which makes associations harder, not easier, to detect. Equal allocation across states also over-represents smaller states relative to their share of SHG enterprises. The descriptive figures in Section 4, therefore describe this dataset and are not national estimates; the regression results say more about relationships between variables than about levels.

3.2. Variables

Six enterprise capabilities are measured on 0–20 scales: innovation capability, market access, entrepreneurship training, financial literacy, digital adoption and institutional support (Table 4). Five of these indices are built from five items, each scored from 0 to 4, so that higher scores indicate stronger capability. The market access index is built from the ten components in Table 5, each with its own maximum. The full scoring rubrics are given in Appendix A. Scores reflect what an enterprise actually does or uses, not simple awareness; for example, financial literacy points require demonstrated understanding, not attendance at a session.

Table 4. Variables and measurement

Variable	Measurement
Innovation capability	Index, 0–20 (5 items × 0–4)
Market access	Index, 0–20 (10 components)
Entrepreneurship training	Score, 0–20 (5 items × 0–4)
Financial literacy	Score, 0–20 (5 items × 0–4)
Digital adoption	Score, 0–20 (5 items × 0–4)
Institutional support	Score, 0–20 (5 items × 0–4)
Enterprise age	Years
SHG members	Number
Formal credit	Total accessed (₹ '000)
Monthly revenue	₹ per month
Monthly profit	₹ per month
Annual revenue growth	%
SESI	Index, 0–100

Table 5. Components of the market access index

Component	Max. points
Local markets beyond the village	2
District-level market access	2
State or interstate customers	2
Institutional buyers	3
Formal contracts	2
Repeat customers	2
Multiple sales channels	2
E-commerce or online sales	2
Customer diversification	2
Stable buyer relationships	1
Total	**20**

3.3. SHG Enterprise Scalability Index

3.3.1. Construction

SESI follows the usual steps for building a composite indicator: choose the components, put them on a common

scale, weight them and add them up [73]. It combines ten components of enterprise performance (Table 6). Because these are measured in rupees, percentages and points, each component is first rescaled to 0–100 using min–max normalisation across the 240 observations:

$$x' = 100 \times (x - \min) / (\max - \min)$$

where min and max are the lowest and highest values in the dataset, monetary variables are highly skewed, so the protocol applies the transformation $\ln(1 + x)$ to them before normalisation. Binary formalisation measures are coded 0/1 before normalisation, and any winsorisation is applied consistently across observations. Each rescaled component is then multiplied by its weight, and the weighted values are summed to give a score from 0 to 100.

Table 6. SESI components, weights and rationale

Component	Weight	Rationale
Revenue performance	15%	Current scale of activity
Revenue growth	15%	Recent growth trajectory
Market reach	15%	Ability to sell beyond local markets
Innovation capability	15%	Product and process renewal
Profitability	10%	Capacity to cover costs and generate a surplus
Digital adoption	10%	Ability to reach and serve customers digitally
Customer diversification	5%	Less dependence on a single buyer
Employment generation	5%	Employment beyond the owner's own labour
Formalisation	5%	Registration and compliance readiness
Institutional linkages	5%	Connections to support and market institutions
Total	**100%**	

3.3.2. Rationale for the Weights

The weights were fixed on conceptual grounds before the analysis, not estimated from the data. The heaviest weights (15% each) go to the two direct measures of scale and trajectory, revenue level and revenue growth, which are the indicators most used in the firm-growth literature [15,16], and to market reach and innovation, which the scaling literature treats as the means by which an enterprise moves beyond its first market [61,62]. Profitability and digital adoption receive 10% each. Profit matters because it funds growth, but a high margin on very small sales does not make a business scalable, and digital adoption is better seen as an enabler of reach than as an outcome in its own right. The four remaining components receive 5% each. They are useful signals of maturity, but they consist mainly of yes/no items with limited variation, so a larger weight would let a single answer move the index by several points.

3.3.3. Score Bands

Four bands were set before the analysis as interpretive categories, not as breakpoints found in the data: below 40 indicates a subsistence enterprise, 40–54.9 an emerging enterprise, 55–64.9 a growth-stage enterprise, and 65 or above an enterprise with high scalability. The bands are meant to separate enterprises with low overall capability from those that are stronger on several dimensions at once. They are not nationally validated standards, and the continuous score is used wherever possible.

3.3.4. Worked example

Suppose an enterprise's ten normalised component scores, in the order shown in Table 6, are 60, 70, 50, 65, 55, 40, 50, 30, 80 and 60. Its SESI is $(0.15 \times 60) + (0.15 \times 70) + (0.15 \times 50) + (0.15 \times 65) + (0.10 \times 55) + (0.10 \times 40) + (0.05 \times 50) + (0.05 \times 30) + (0.05 \times 80) + (0.05 \times 60) = 57.25$, which places it in the growth-stage band.

3.3.5. Overlap with Predictors

Several SESI components draw on the same information as the explanatory variables used later. Innovation capability and digital adoption enter SESI directly (25% of the weight), market reach and customer diversification (20%) overlap with the market access index, and institutional linkages (5%) overlap with institutional support. About half of SESI's weight, therefore, comes from information that also appears on the right-hand side of the models. This does not affect Models 1–3, whose outcomes are revenue growth and profit, but it does affect Model 4, which uses a SESI threshold as its outcome (Section 3.4). An outcome-only version of the index, built from revenue performance, revenue growth, profitability, employment generation and formalisation, with weights rescaled proportionally to 30%, 30%, 20%, 10% and 10%, is proposed for future validation work.

3.3.6. Robustness Protocol

Because any fixed set of weights involves judgement, the index should also be recalculated under equal weights, principal-component weights, leave-one-component-out weights and 1,000 random weight vectors drawn from a Dirichlet distribution centred on the baseline weights [73,74]. For each alternative, the relevant statistics are the Spearman rank correlation with the baseline score, the share of enterprises that change band and the share classed as highly scalable. Sector differences should likewise be tested with a Kruskal–Wallis test of the continuous score and a chi-square test of bands by sector. These checks are not reported in this paper and are listed as a limitation in Section 5.

3.4. Statistical Models and Software

All analyses were estimated in Python using pandas and statsmodels. Four models are estimated, each with the same

nine enterprise-level predictors: innovation capability, market access, entrepreneurship training, financial literacy, digital adoption, institutional support, enterprise age, SHG members and formal credit (in thousands of rupees). Model 1 uses annual revenue growth as the outcome, and Model 2 uses monthly profit in rupees. A supplementary version of Model 2 uses log monthly profit. Model 3 adds to Model 1 an interaction between mean-centred innovation capability and mean-centred market access. Model 4 is a logistic regression of the probability that an enterprise has a SESI of 65 or above.

The Ordinary Least Squares (OLS) models use heteroskedasticity-robust HC1 standard errors [75]. For each OLS model, the following diagnostics are reported: Variance Inflation Factors (VIF) for multicollinearity, the Breusch–Pagan test for heteroskedasticity and the Ramsey RESET test for functional form [76]. The baseline models contain no state or sector fixed effects; extended specifications with both are reported separately.

Two features of Model 4 call for caution. There are only 19 high-scalability observations, which gives about 2.1 events per predictor, well below the usual guide of about ten [77]. And because SESI contains some of the same capabilities used as predictors, there is a built-in overlap between predictors and outcome. Model 4 is therefore treated as exploratory and is not presented as independent evidence of predictive validity. All results are associations; the cross-sectional design does not allow causal claims.

4. Results and Discussion

4.1. Descriptive Statistics

The average enterprise earns about ₹80,921 a month in revenue and ₹20,630 in profit, with average annual revenue growth of 37.7% (Table 7). Mean innovation capability (12.93) and market access (13.59) are moderate, while digital adoption is lower at 9.41.

Table 7. Descriptive statistics (N = 240)

Variable	Mean	SD
Monthly revenue (₹)	80,921	62,850
Monthly profit (₹)	20,630	18,698
Annual revenue growth (%)	37.69	17.95
Innovation capability	12.93	3.35
Market access	13.59	3.27
Entrepreneurship training	10.84	3.75
Financial literacy	10.05	4.01
Digital adoption	9.41	4.48
Institutional support	9.37	4.35
Enterprise age (years)	4.16	2.88
SHG members	14.82	4.41
Formal credit (₹)	19,791	13,690

The standard deviations are large. Revenue and profit both have standard deviations close to their means, which points to a long right tail: a small number of enterprises earn far more than the rest. There is no single typical SHG business. Variance inflation factors for the nine predictors range from 1.02 to 1.32, so the capability measures are distinct enough to be estimated together.

4.2. Distribution of Scalability

Just over half of the enterprises fall into the emerging band, but the distribution is not concentrated at the bottom (Table 8). About 38.8% are either growth-stage or highly scalable (95% CI: 32.8%–45.0%). Most SHG enterprises, then, are not incapable of growth. A sizeable group already shows features linked to expansion, while a larger group sits between a livelihood activity and a commercially stronger business. The confidence intervals are wide for the two smallest bands, a reminder that 19 highly scalable enterprises is a small group to model.

Table 8. Distribution of enterprises by SESI band

Category	N	Share	95% CI
Subsistence (<40)	21	8.75%	5.8–13.0%
Emerging (40–54.9)	126	52.50%	46.2–58.7%
Growth-stage (55–64.9)	74	30.83%	25.3–36.9%
High scalability (≥65)	19	7.92%	5.1–12.0%
Total	**240**	**100%**	

Confidence intervals are Wilson score intervals for a proportion.

4.3. Sector and State Differences

Performance differs moderately by sector (Table 9). Food processing has the highest mean SESI, and personal care the highest mean monthly profit. Dairy has the lowest mean SESI, despite its strong institutional position in the wider SHG system, which suggests that a sector's institutional strength does not guarantee strong results for each enterprise within it. One likely reason is that dairy enterprises sell a standard product, mostly to a single cooperative buyer, which leaves little room for wider market reach, product innovation or price gains. Several sectors have fewer than 25 enterprises, so these comparisons are indicative only.

Table 9. Mean SESI and monthly profit by sector

Sector	N	SESI	Profit (₹)
Food processing	61	53.97	24,585
Personal care	19	53.48	24,992
Handicrafts/textiles	35	52.83	18,673
Agriculture & allied	23	52.07	24,106
Services	21	51.69	23,360
Retail/trading	30	51.11	17,812
Other manufacturing	19	50.47	14,673
Dairy	32	48.25	14,529

Among states, West Bengal has the highest mean SESI (54.00), followed by Odisha (52.90) and Uttar Pradesh (52.61). Rajasthan has the highest mean monthly profit, at about ₹25,746, and Bihar and West Bengal show relatively high average revenue growth. With 20 enterprises per state and no population weighting, these figures describe the dataset and should not be read as rankings of state programmes.

4.4. Revenue Growth and Profit

Tables 10 and 11 report the full results for Models 1 and 2. In Model 1, two variables are significant. Holding the other factors constant, each extra point of innovation capability is associated with about 0.75 percentage points of additional annual growth (p = 0.040), and each point of digital adoption with about 0.86 points (p = 0.003). Market access has a small positive coefficient that is far from significant (p = 0.726).

Table 10. Model 1: OLS regression of annual revenue growth (%)

Variable	β	Robust SE	95% CI	p
Innovation capability	0.752	0.367	[0.033, 1.470]	0.040
Market access	0.127	0.363	[−0.583, 0.838]	0.726
Entrepreneurship training	0.385	0.271	[−0.146, 0.915]	0.155
Financial literacy	0.125	0.299	[−0.460, 0.711]	0.675
Digital adoption	0.859	0.287	[0.296, 1.422]	0.003
Institutional support	−0.075	0.303	[−0.669, 0.519]	0.804
Enterprise age (years)	0.279	0.405	[−0.515, 1.074]	0.491
SHG members	0.229	0.265	[−0.291, 0.748]	0.388
Formal credit (₹ '000)	−0.047	0.076	[−0.195, 0.102]	0.538
Constant	9.802	8.137	[−6.146, 25.750]	0.228
N	240			
R^2 / adjusted R^2	0.109 / 0.074			
F (robust)	3.044			0.002
Breusch–Pagan LM	3.985			0.912
RESET F	0.722			0.396

In Model 2, innovation capability, market access, digital adoption and enterprise age are all positive and significant. Each extra point of innovation capability is associated with about ₹1,284 more monthly profit, and each point of market access with about ₹1,105 more. Each additional year of operation is associated with about ₹1,444 more, which fits the value of experience, an established customer base and settled supply links. Training, financial literacy, institutional support, SHG size and formal credit are not significant at the 5% level in either model.

Table 11. Model 2: OLS regression of monthly profit (₹)

Variable	β	Robust SE	95% CI	p
Innovation capability	1,284	362	[574, 1,994]	<0.001
Market access	1,105	269	[579, 1,631]	<0.001
Entrepreneurship training	230	305	[−368, 827]	0.451
Financial literacy	−104	248	[−590, 382]	0.674
Digital adoption	544	251	[51, 1,036]	0.030
Institutional support	82	225	[−359, 523]	0.716
Enterprise age (years)	1,444	398	[664, 2,224]	<0.001
SHG members	−110	233	[−566, 346]	0.637
Formal credit (₹ '000)	43	92	[−138, 224]	0.641
Constant	−23,535	7,435	[−38,108, −8,963]	0.002
N	240			
R^2 / adjusted R^2	0.231 / 0.201			
F (robust)	7.201			<0.001
Breusch–Pagan LM	18.891			0.026
RESET F	0.624			0.431

The Breusch–Pagan test shows heteroskedasticity in the profit model ($p = 0.026$) but not in the growth model ($p = 0.912$), which supports the use of robust standard errors. The RESET tests give no sign of misspecified functional form in either model. Because profit is right-skewed, Model 2 was also estimated with log monthly profit as the outcome (Table 12). The results are the same in substance. Innovation, market access, digital adoption and enterprise age stay positive and significant, credit stays insignificant, and the share of variation explained rises to 30%. In this version, one more point of market access is associated with about 7% higher monthly profit, and one more year of operation with about 7.7% higher profit.

Table 12. Supplementary model: OLS regression of log monthly profit

Variable	β	Robust SE	95% CI	p
Innovation capability	0.063	0.017	[0.029, 0.097]	<0.001
Market access	0.071	0.015	[0.042, 0.100]	<0.001
Entrepreneurship training	0.014	0.014	[−0.013, 0.042]	0.316
Financial literacy	−0.002	0.012	[−0.025, 0.022]	0.900
Digital adoption	0.029	0.012	[0.004, 0.053]	0.020
Institutional support	−0.002	0.012	[−0.025, 0.021]	0.846
Enterprise age (years)	0.074	0.017	[0.042, 0.107]	<0.001
SHG members	−0.003	0.011	[−0.024, 0.018]	0.780
Formal credit (₹ '000)	−0.000	0.004	[−0.009, 0.008]	0.943
Constant	7.149	0.368	[6.427, 7.870]	<0.001
N	240			
R^2 / adjusted R^2	0.300 / 0.273			
F (robust)	10.853			<0.001

The models, therefore, separate growth from profitability. Innovation and digital adoption are linked to how fast an enterprise grows, while market access and enterprise age are more clearly linked to how much it earns from its current operations.

4.5. Explanatory Power and Extended Models

Models 1 and 2 explain 10.9% and 23.1% of the variation in revenue growth and profit. Most of the variation in both outcomes, therefore lies outside the models. The following considerations help to interpret these figures.

First, both models are jointly significant (robust $F = 3.04$, $p = 0.002$ for Model 1; $F = 7.20$, $p < 0.001$ for Model 2). Their effect sizes (Cohen's f^2) are 0.12 and 0.30, conventionally described as small-to-medium and medium-to-large [78]. The models capture real patterns even though they leave much unexplained.

Second, low R^2 values are common in cross-sectional studies of small-firm growth. Much of the variation in growth rates behaves like random shocks, such as a good season, a lost buyer or illness in the family, which no survey of enterprise characteristics can capture [23]. Profit is easier to explain than growth because it depends more on stable features such as age and market access, and the two R^2 values reflect exactly this.

Third, relevant variables are missing from the models. Household wealth, the owner's education, caste and local demand may all matter, as may the state and sector in which an enterprise operates. Table 13 tests the last two by adding state and sector fixed effects. For revenue growth, R^2 rises from 0.109 to 0.198 and adjusted R^2 from 0.074 to 0.096, so location and sector account for part of the unexplained variation in growth. For profit, R^2 rises from 0.231 to 0.281, but adjusted R^2 falls slightly, from 0.201 to 0.189, which suggests that state and sector add little once the enterprise's own capabilities are known. These differences are descriptive and should not be read as causal effects of states or sectors.

Table 13. Explained variation with and without state and sector fixed effects

Specification	Model 1: growth	Model 2: profit
Baseline R^2	0.109	0.231
Baseline adjusted R^2	0.074	0.201
With state and sector fixed effects, R^2	0.198	0.281
With state and sector fixed effects, adjusted R^2	0.096	0.189

4.5.1. Statistical Power

The sample size limits what can be concluded from non-significant results. With 240 enterprises and nine predictors, a test at the 5% level has 80% power to detect a single predictor only if it explains about 3.3% of the remaining variation (partial $f^2 \approx 0.033$) [78]. Smaller effects of credit or training could be present and still go undetected. Non-significant

coefficients should therefore be read as "no clear evidence of an effect", not as evidence that the effect is zero.

4.6. Innovation and Market Access Together

Model 3 tests whether innovation pays off more when an enterprise also has strong market access (Table 14). The interaction term is negative and not significant (β = −0.140, p = 0.150), so the data give no clear evidence that market access strengthens the link between innovation and growth. Digital adoption remains positive and significant (β = 0.869, p = 0.002). Centred innovation keeps a similar coefficient (0.681), although it is now significant only at the 10% level (p = 0.072), and adding the interaction raises R^2 only slightly, from 0.109 to 0.118. One reading is that both capabilities matter but do not multiply each other's effect; an enterprise may need a threshold level of each. A larger sample would be needed to test threshold effects directly.

Table 14. Model 3: interaction model of revenue growth (%)

Variable	β	Robust SE	95% CI	p
Innovation (centred)	0.681	0.379	[−0.061, 1.423]	0.072
Market access (centred)	0.146	0.355	[−0.550, 0.842]	0.681
Innovation × market access	−0.140	0.097	[−0.331, 0.051]	0.150
Entrepreneurship training	0.414	0.272	[−0.118, 0.946]	0.128
Financial literacy	0.119	0.302	[−0.472, 0.710]	0.694
Digital adoption	0.869	0.286	[0.308, 1.431]	0.002
Institutional support	−0.069	0.299	[−0.656, 0.518]	0.818
Enterprise age (years)	0.294	0.410	[−0.509, 1.096]	0.473
SHG members	0.205	0.265	[−0.315, 0.725]	0.440
Formal credit (₹ '000)	−0.047	0.076	[−0.197, 0.103]	0.539
Constant	21.575	7.312	[7.244, 35.905]	0.003
N	240			
R^2 / adjusted R^2	0.118 / 0.079			
F (robust)	3.096			0.001

Table 15. Model 4: logistic regression of high scalability (SESI ≥ 65)

Variable	β (SE)	Odds ratio [95% CI]	p
Innovation capability	0.744 (0.225)	2.10 [1.36, 3.27]	<0.001
Market access	0.516 (0.146)	1.68 [1.26, 2.23]	<0.001
Entrepreneurship training	−0.083 (0.101)	0.92 [0.76, 1.12]	0.413
Financial literacy	0.108 (0.106)	1.11 [0.91, 1.37]	0.308
Digital adoption	0.363 (0.113)	1.44 [1.15, 1.80]	0.001
Institutional support	0.010 (0.102)	1.01 [0.83, 1.23]	0.922
Enterprise age (years)	0.001 (0.149)	1.00 [0.75, 1.34]	0.996
SHG members	0.256 (0.105)	1.29 [1.05, 1.59]	0.015
Formal credit (₹ '000)	0.002 (0.035)	1.00 [0.94, 1.07]	0.943
Constant	−30.842 (6.566)	–	<0.001
N (high scalability)	240 (19)		
Events per predictor	2.1		
McFadden pseudo-R^2	0.603		
LR χ^2 (9)	80.103		<0.001
AUC	0.971		

4.7. High Scalability: An Exploratory Model

Table 15 reports Model 4. Innovation capability, market access, digital adoption and SHG size are positively associated with being classed as highly scalable, while formal credit, training, financial literacy, institutional support and enterprise age are not. In odds terms, each extra point of innovation capability is associated with about twice the odds of high scalability (odds ratio 2.10), each point of market access with about 1.7 times the odds, and each point of digital adoption with about 1.4 times the odds. The coefficient on formal credit is close to zero (odds ratio 1.00, p = 0.943).

These figures require careful interpretation. Because innovation, market access and digital adoption feed into SESI itself, part of their association with high scalability is built in by construction. The high pseudo-R^2 (0.603) and AUC (0.971)

partly reflect this overlap and should not be read as evidence that the model predicts scaling. The small number of events (19, or about 2.1 per predictor) also makes the estimates imprecise and likely to overstate effect sizes [77]. Model 4 is therefore descriptive. Its most informative result concerns credit. Even in a model where the capability variables have a built-in advantage, formal credit shows no association with high scalability. Testing whether capabilities predict scaling independently will require an outcome measured separately from the predictors, such as the outcome-only index proposed in Section 3.3 or enterprise growth observed over time. Within these limits, the evidence is consistent with the paper's central argument: credit may help an enterprise start or survive, but what the enterprise can do with its resources appears to matter more for scaling up.

4.8. Hypothesis Assessment

Table 16 summarises the results. Innovation and digital adoption are supported as correlates of both growth and profit, market access as a correlate of profit but not growth, and training is not supported. H7 is assessed on the exploratory Model 4 and on the null credit coefficients in Models 1–3, so it should be read with the caveats in Section 4.7. The pattern is more mixed than a simple story in which more support produces more growth.

Table 16. Summary of hypothesis tests

Hypothesis	Result
H1: Innovation → revenue growth	Supported
H2: Training → performance	Not supported
H3: Innovation → profitability	Supported
H4: Market access → revenue growth	Not supported
H5: Market access → profitability	Supported
H6: Digital adoption → performance	Supported
H7: Credit alone predicts scalability	Not supported

4.9. Comparison with Earlier Findings

Table 17 sets the main results beside findings from earlier studies. On most points, the results are in line with earlier work but extend it to a group of enterprises that has rarely been studied. The null result for formal credit fits the experimental evidence on microcredit, which finds modest average effects on business outcomes [17,18,65]. It also fits evidence that capital given to women often does not raise the profits of women's own enterprises [19], partly because it is shared with other household businesses [20]. The present data cannot show where SHG loans were spent, but the pattern is consistent with that explanation. The average credit accessed in this sample (₹19,791) is small compared with average monthly revenue (₹80,921), so loans of this size may cover working capital but not investment in growth [63].

The training result also matches earlier work. Reviews find that business training changes practices more than it changes sales or profits [67,68], and that its benefit depends on the constraints women face [24]. The digital adoption result is consistent with evidence that mobile phones improve market performance for small producers [69,70], and extends it from price information to the growth and profit of women's rural enterprises.

The finding on enterprise age differs in an interesting way from the national picture. Hsieh and Klenow find that Indian plants grow little as they age [11]. In this sample, age is linked to profit but not to revenue growth, which is consistent with their result: older SHG enterprises appear to earn more from a stable base rather than grow faster. Finally, earlier SHG studies show gains in household welfare and empowerment [8,42,44]. The present results add that, at the enterprise level, those gains do not translate evenly into business growth; about 61% of enterprises in this sample are still subsistence-oriented or emerging.

Table 17. Comparison of findings with earlier research

Factor	Earlier evidence	This study
Formal credit	Modest average effects of microcredit on business outcomes [18,65]; low returns on capital given to women [19,20]	Not significant for growth, profit or high scalability (consistent)
Training	Better practices, small effect on sales and profit [67,68]	Not significant (consistent)
Digital adoption	Mobile phones improved prices and profits for small producers [69,70]	Linked to both growth and profit (consistent; extends to SHG enterprises)
Innovation	Grassroots innovation is shown mainly in case studies [51,52]	Most consistent correlate across models (adds quantitative evidence)
Market access	Market linkages raise producer returns [55,56]	Linked to profit but not growth (partly consistent)
Enterprise age	Indian plants grow little with age [11]	Linked to profit, not growth (consistent)
SHG membership	Household welfare and empowerment gains [8,44]	Enterprise growth uneven; 61% subsistence or emerging (new evidence)

4.10. Discussion

Innovation is the most consistent predictor across the models, which supports the claim in the grassroots innovation literature that low-income communities can produce commercially valuable solutions [51,52]. In this setting, innovation is broad: a new food product, better packaging, shared production or a new sales channel. Market access, by contrast, is linked to profit but not to growth. An enterprise can have a profitable customer base without expanding quickly, so profitability and scalability should be treated as separate outcomes in programme monitoring.

Digital adoption is associated with both growth and profit, consistent with the idea that digital tools lower the cost of distance for rural enterprises. It is not, however, a substitute for physical infrastructure, a reliable product or real demand. Enterprise age is strongly linked to profit, which may reflect accumulated customers, suppliers and know-how. It may also reflect the fact that weaker enterprises closed earlier and are missing from the data. Either way, short project cycles may underestimate the potential of younger enterprises.

Formal credit shows no significant association with any outcome once other factors are controlled for. This does not mean that credit is unimportant. As Section 4.5 showed, a sample of this size may miss modest effects. It does suggest that credit alone is unlikely to be enough, and that capital is more productive when combined with markets, innovation, skills and digital capability [37,63].

4.11. Typology and Policy Implications

The results suggest four groups of enterprises with different support needs (Table 18). Treating all SHG enterprises as needing the same intervention, usually a loan, misses these differences.

Table 18. Enterprise stages and support priorities

Stage	Support priority
Subsistence	Livelihood security, basic skills and social protection
Emerging	Incubation, market discovery, product development and digital onboarding
Growth-stage	Working capital, machinery, certification, branding and buyer connections
High scalability	Growth finance, producer organisations, institutional buyers and expansion

Four policy directions follow. First, programmes should track enterprise survival, growth, profit, market reach and formalisation, not only the number of groups formed or loans disbursed. Second, enterprises with proven demand need larger and more flexible growth finance, such as working-capital lines, equipment loans and credit guarantees [64]. Third, market access should be an explicit goal, built through anchor buyers, public procurement, retail partnerships, e-commerce onboarding and producer federations that pool production, packaging and marketing [61,62]. Fourth, digital support should come with devices, connectivity, logistics and delivery, and gendered constraints should be addressed through childcare, local collection centres, shared transport and flexible training [72]. These measures are better understood as economic infrastructure than as welfare.

5. Limitations

The study has several limitations. The data are cross-sectional, so the models show associations rather than causes; profitable enterprises may, for example, have more resources to innovate. The dataset is small and not representative. Twenty enterprises per state cannot describe a state, and some sectors have fewer than 25 enterprises. The sampling frame relies on SRLM and block lists and on NGO and federation lists, and districts were chosen purposively for active programmes and visible enterprise activity; both may favour stronger enterprises. Only enterprises with at least 12 months of operation are included, which may overstate average performance. Financial figures are self-reported, and not all of them can be checked against records.

The capability indices are reported as totals. Item-level responses are needed to estimate internal consistency (for example, Cronbach's alpha) and to test construct validity, and these statistics are not reported here. The SESI weights reflect judgement, and the sensitivity checks described in Section 3.3, covering alternative weights, data-driven groupings and sector tests, have not yet been carried out. The index has also not been validated against later outcomes such as survival or growth. Model 4 is affected by the overlap between its predictors and its outcome and by a small number of events, so it is exploratory. Finally, the growth and profit models explain 10.9% and 23.1% of the variation, and even with state and sector fixed effects, most of the variation remains unexplained. Factors such as education, caste, household wealth and local demand may matter a great deal. Non-significant results for credit and training should not be read as evidence of no effect.

6. Conclusion

India's SHG movement has built a strong base for women's economic participation. The main challenge now is moving from organisation and access to enterprise growth. Using data on 240 women-led SHG enterprises, this study finds that innovation capability is associated with both growth and profit, that market access matters most for profitability, that digital adoption is emerging as a growth capability, and that formal credit alone does not explain which enterprises scale. Nearly two in five enterprises are already growth-stage or highly scalable, which suggests that the policy task is not only to create more entrepreneurs but to identify enterprises with growth potential and give them the specific support they need.

This calls for a change in the question policy asks, from how many women have joined SHGs to how many SHG-linked enterprises are surviving, growing and reaching new markets.

Future research should follow enterprises over several years, test whether SESI predicts actual survival and growth, and use experimental or quasi-experimental designs to test whether growth finance, digital market access and producer organisations cause improvements in performance.

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Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this paper.

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Appendix A. Capability Score Rubrics (0–20)

Innovation capability. Five items, each scored 0–4: (1) new or improved products; (2) packaging or quality improvement; (3) production-process improvement; (4) value addition or adaptation to customer needs; and (5) new business, pricing or distribution methods. Scoring: 0 = none; 1 = limited or ad hoc; 2 = occasional; 3 = regular; 4 = systematic and documented. The index is the sum of the five items.

Market access. The ten components in Table 5, each with its stated maximum, summed to give a score from 0 to 20. Points are awarded only where the relevant channel or relationship is present.

Entrepreneurship training. Five items, each scored 0–4: exposure to business planning; bookkeeping and costing; marketing and customer service; production and quality management; and application of training after it ends. Scoring: 0 = none; 1 = awareness only; 2 = basic; 3 = applied; 4 = applied consistently, with evidence.

Financial literacy. Five items, each scored 0–4: understanding of budgeting and cash flow; separation of household and business money; understanding of interest and loan costs; savings and risk planning; and financial decisions based on records. Higher scores require demonstrated understanding, not just attendance at a session.

Digital adoption. Five items, each scored 0–4: digital payments; customer communication by phone; digital promotion; online ordering or marketplace use; and digital record-keeping. Scoring: 0 = no use; 1 = rare; 2 = occasional; 3 = regular; 4 = built into business operations.

Institutional support. Five items, each scored 0–4: active federation support; SRLM or government scheme assistance; NGO or business-development support; engagement with a bank or other formal finance; and support from a producer group, cooperative or buyer network. Scores reflect whether support is available and used, not simply whether the respondent is aware of it.