Assessing Financial Sustainability of SHGs in Rajasthan: Reports of the Model Development and Its Instrument Testing

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Abstract

Financial sustainability is a critical determinant of the long-term viability and effectiveness of Self-Help Groups (SHGs), particularly in developing economies such as India where SHGs play a central role in financial inclusion and women's empowerment. Despite extensive research on SHG performance, limited attention has been paid to the systematic development of financial sustainability models and the rigorous validation of measurement instruments. Addressing this gap, the present study aims to develop a comprehensive financial sustainability model for SHGs and to examine the reliability and validity of the instrument derived from the proposed model. The study adopts a structured model development approach grounded in an extensive review of theoretical and empirical literature. Key determinants of financial sustainability were identified and grouped into six latent constructs: external credit linkages, financial governance and transparency, savings and internal lending efficiency, loan portfolio quality and repayment capacity, strategic planning, and financial sustainability. A pilot study was conducted using data collected from 80 women-dominated SHGs operating in selected clusters of Ajmer district, Rajasthan. Partial Least Squares Structural Equation Modeling (PLS-SEM) was utilized to evaluate the measurement characteristics of the instrument. The outcomes of instrument testing demonstrate acceptable levels of indicator reliability, internal consistency reliability, convergent validity, and discriminant validity after the removal of four indicators with low outer loadings. The validated instrument demonstrates strong psychometric properties and provides empirical support for the proposed financial sustainability model. The study contributes methodologically by offering a transparent and replicable framework for model and instrument development in SHG research. The findings offer significant insights for institutions supporting SHGs, policymakers, and financial agencies aiming to enhance the financial sustainability of SHGs.

Keywords: Self-Help Groups (SHGs); Financial Sustainability; Model Development; Instrument Validation; PLS-SEM

Introduction

The concept of financial sustainability for Self-Help Groups has gained considerable importance in recent years. In developing nations like India, the heightened significance of these groups underscores the necessity of financial sustainability as a key criterion for the efficacy of Self-Help Groups (SHGs). As an affiliated entity of microfinance, or a modest, unsecured loan allocated at the grassroots level, SHG denotes a distinct category of organisation, predominantly including women from impoverished communities (Aland et al., 2011; Sraboni et al., 2014).

Self-Help Groups (SHGs) are obligated to gather funds from their members, which are then distributed to those in need as loans, while also generating a profit for their members through interest, so enhancing access to financial services for marginalised population (Avantika et al., 2024; S. K. Das & Bhowal, 2013). Self-Help Groups (SHGs) have evolved into a formidable instrument for social and economic development by enabling access to credit, strengthening community participation, and promoting sustainable livelihood opportunities. The effectiveness of SHGs' medium- and long-term implementation largely hinges on their financial viability. Financial sustainability refers to the capacity of Self-Help Groups (SHGs) to conduct their financial activities and independently obtain and disburse cash without external assistance, a condition that is primarily influenced by the dynamics of size and development, particularly regarding the existence of SHGs(Shetty, 2009b). The financial outlook of Self-Help Groups (SHGs) is influenced by several parameters, including the quantity of outstanding loans, the quality of the loan portfolio, the influx of savings to SHGs, and the income generated from SHG operations, all of which are directly linked to issues impacting their financial viability (Desai & Joshi, 2014; Kumar et al., 2019).

Research that simultaneously integrates theoretical perspectives on financial sustainability with empirical model and instrument development in the context of Self-Help Groups (SHGs) remains limited. Although numerous empirical studies on SHGs examine the factors influencing sustainability and present hypothesis testing, scant research specifically clarifies the conceptual framework underpinning model development, the systematic breakdown of constructs into quantifiable indicators, and the methodological procedures for assessing the reliability and validity of the research instrument. Consequently, there exists a methodological gap in the literature concerning transparent and replicable model construction for assessing the financial sustainability of SHGs.

The current study was to close this gap by creating a holistic financial sustainability model for SHGs and assessing the reliability and validity of the model-based measurement instrument. The study is guided by the following research questions:

RQ1: How can a financial sustainability model for Self-Help Groups be systematically developed based on existing theoretical and empirical literature?
RQ2: Is the research instrument derived from the proposed financial sustainability model reliable and valid?

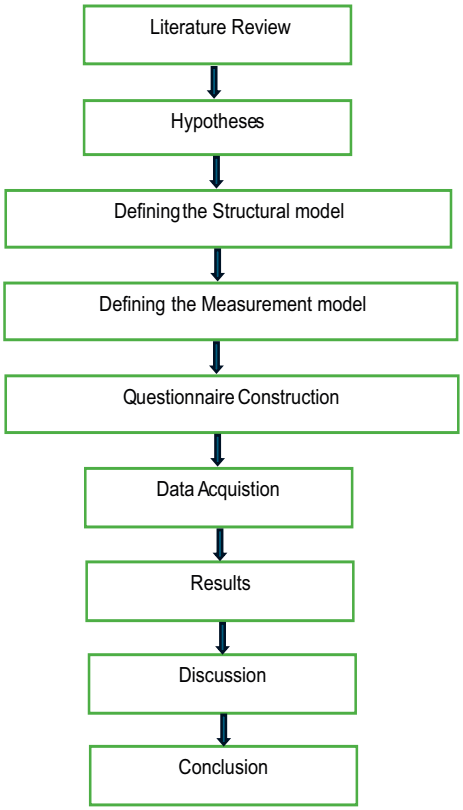
The paper outlines the phases of model development and instrument development in four systematically organised sections. Following the introductory section, the second section outlines the methodological framework and implementation procedures adopted in the study. The following sections detail the instrument validation procedure and empirical findings, and the concluding section highlighting major findings, methodological advancements, and research significance for SHG sustainability.

Material and Methods

A search for articles that discussed the elements of SHGs' financial sustainability was done as part of the literature review. They were categorized into constructs based on the substance of their definitions. As a result, every potential connection between two constructions was hypothesized, leading to the creation of a structural model(Pereira et al., 2024).

The measurement model formulation, questionnaire development, data collection, assessment of suitability for factor analysis and sampling, results production, discussion, and conclusions are various steps in the methodology. Figure 1 illustrate the process in a flowchart.

Figure 1. The methodology step



PLS-SEM vs CB-SEM approaches for structural modeling

Partial least squares structural equation modeling(PLS-SEM) serves as a dependable method for analyzing proposed relationships among factors, particularly in intricate research models. PLS-SEM can be applied even when the sample size is limited ($n < 100$) and the data violate the assumption of normality (Hair et al., 2018).

In addition, it strengthens construct validity and reliability, rendering it appropriate for modeling composite variables (i.e., constructs) in exploratory research contexts (Pereira et al., 2024). Consequently, PLS-SEM was adopted over CB-SEM (Covariance Based Structural Equation Modeling), as latter necessitates large samples ($n > 100$), adherence to normality assumptions, and confirmatory research approach.

Defining the Structural Model

Five hypotheses were formulated from the existing literature to model SHG financial sustainability(in Table 1):

Table-1 Hypotheses based on the literature.

Hypotheses	Basis
H1: "External credit linkages of the SHG significantly influencing their financial sustainability"	(Bhanot & Bapat, 2019; T. Das, 2019; Isern et al., 2007; Malhotra & Baag, 2021; Paradia & Sinha, 2010; Sa-Dhan, 2005)
H2: "Financial governance & transparency in the SHG significantly influencing their financial sustainability"	(Hartarska, 2005; Kyereboah -Coleman & Osei, 2008; Mersland & Øystein Strøm, 2009; Thapa, 2002)
H3: "Savings and internal lending efficiency of the SHG significantly influencing their financial sustainability"	(Bhanot & Bapat, 2019; T. Das, 2019; Isern et al., 2007; Narkhede & Dhake, 2019; Paradia & Sinha, 2010; Shetty, 2009a; Singh et al., 2018; Suntha, 2015; Tankha, 2002)
H4: "Loan portfolio quality & repayment capacity of the SHG significantly enhances their financial sustainability"	(Balraj & Rao, 2016; T. Das, 2019; Jeklin, 2016; Sa-Dhan, 2005; Shetty, 2009a; Tankha, 2002)
H5: "Strategic planning in the SHG significantly enhances their financial sustainability"	(Badatya & Puhazhendi, 2002; Misra & Tankha, 2021; Nair, 2005; Srinivasan, 2008; Tankha, 2002)

The financial sustainability is measured by examining its associations with the remaining factors.

Defining the Measurement Model

PLS_SEM comprises two types of measurement models, namley reflective and formative models (Hair et al., 2017). In the reflective model, where constructs directly influence their indicators, the objective is to assess whether the model accurately captures the underlying phenomenon. The measurements obtained through observation can be used to evaluate the model's correctness (Hair et al., 2017).

The formative scheme minimizes or maximizes a target construct through the relation ships between factors present in the model, with the real measurements (indicators) being used as a driver (Hair et al., 2017).

Table 2 shows thirty-eight indicators divided into six constructs in order to build the structural model.

Table-2 Constructs, their position and its items.

Construct	Position in the table	Items
External credit linkages	Exogenous	ECL1-Multiple bank loans history
		ECL2-Substantial external credit received
		ECL3-Full bank account & its services
		ECL4-Efficient external fund utilization
		ECL5-Independent without subsidies/grants
		ECL6-Proper guidance and support from bank staff.
Financial governance and Transparency	Exogenous	FGT1-Good governance practices
		FGT2-Active member participation
		FGT3-Fast & Transparent conflict resolution
		FGT4-Complete, accurate and updated financial records
		FGT5-Regular auditing
		FGT6-Effective leaders in managing group finance
		FGT7-Maintain social capital
Saving and Internal lending efficiency	Exogenous	SILE1-Consistently increasing savings per member
		SILE2-Regular & timely member savings
		SILE3-Significant savings used for intra-group lending
		SILE4-Savings rotated frequently for lending
		SILE5-Majority availed internal loans
		SILE6-Preference for SHG credit over others
Loan portfolio quality and Repayment	Exogenous	LPQR1-High internal repayment rate
		LPQR2-Timely repayment of external loans
		LPQR3-Proper loan recovery mechanism
		LPQR4-Loans for productive purposes
		LPQR5-Sustainable profit from loans
		LPQR6-Diversified loan portfolio
Strategic planning	Exogenous	SP1-Clear vision and growth goals
		SP2-Contingency measures with reserve funds
		SP3-Capacity to secure external credit
		SP4-Operate independently without support
		SP5-Strategic plans for scale-up
		SP6-Reviews performance and improvements in monthly meetings.
Financial Sustainability of SHGs	Endogenous	SUS1-The income of SHG members has increased
		SUS2-Good creditworthiness
		SUS3-Consistent growth in the net worth of SHG members
		SUS4-Membership dropouts is very less or negligible
		SUS5-Ability to withstand external shocks and emergencies
		SUS6-Financially self-sufficient
		SUS7-Operationally self-sufficient

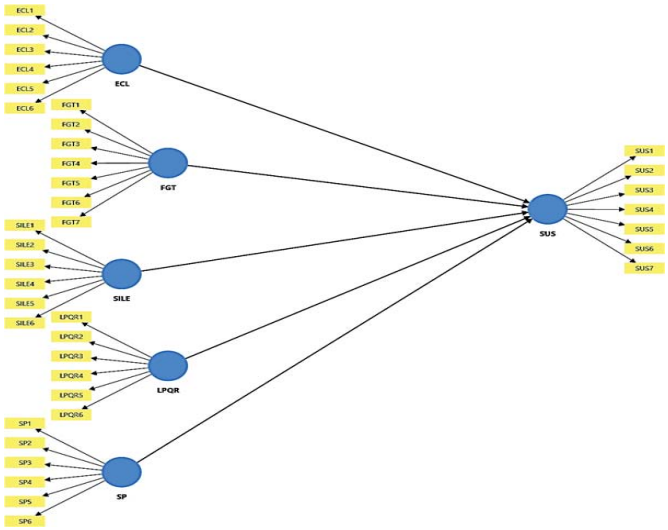
Rationale for adopting the Reflective Measurement Model

Under reflective model, the direction of causality is conceptualised as running from the con-struct to the observed indicators. In a reflective model, indicators are considered a representa-tive elements of the construct's conceptual universe (Hair et al., 2017).

Indicators associated with a certain reflective construct should have a strong correlation and be interchangeable. Provided that adequate reliability is ensured, removing one indicator does not compromise the construct's conceptual definition.

Figure 2 depicts the suggested reflective structure, with the indicators in rectangles and the constructs in circles.

Figure 2. SMARTPLS 4 illustrates the reflective structure consisting constructs, indicators, and hypothesized relationships.



Data Acquisition

Table 3 elucidates the profile of 80 SHGs in the testing phase. All the SHGs were wowen dominant. The study was carried out in Kishangarh block of Ajmer district of rajasthan. From the four clusters in Kishangarh, Harmada and Silora were selected, with equal numbers of respondents chosen from both clusters. Total number of members per group were approximately 10-11. Also, SHGs were 6 to 7 years old.

Table-3 List of respondent profiles

Profile	Classification	Frequency	Percentage
Gender	Female	80	100%
	Male	0	0%
Cluster	Harmada	40	50%
	Silora	40	50%
No. of Members	10-11	54	67%
	12-13	20	25%
	14-15	6	8%
Age of SHGs	6	40	50%
	7	40	50%

Results and Discussion (The Instrument Testing)

Figure 3 shows the results of the preliminary PLS-SEM algorithm run, including outer loadings and path coefficients. Yellow denotes indicators while blue denotes constructs.

Figure 3. The results of the preliminary PLS-SEM algorithm run, including outer loadings and path coefficients.

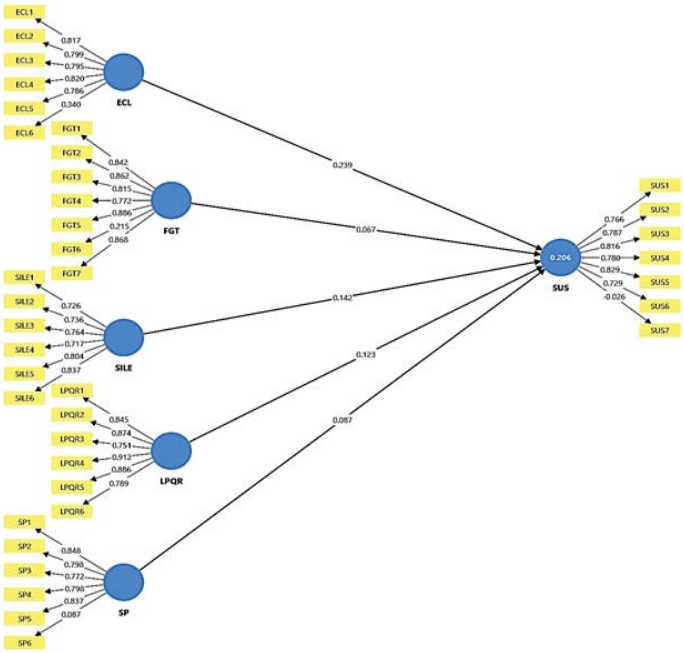
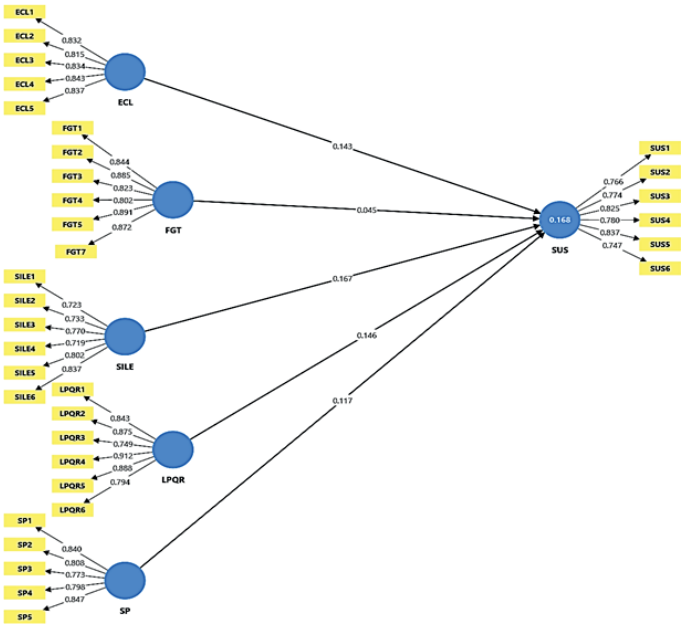


Figure 4. The results of the second PLS-SEM algorithm run, including outer loadings and path coefficients.



Outer loading values should ideally be at least 0.708 but below 0.95, since values above this range reflect redundancy and weaken construct validity(Hair et al., 2018).

After discarding four indicators with outer loadings below the threshold value, the algorithm was executed again. They were ECL-6 (0.340), FGT-6 (0.215), SP-6 (0.087), and SUS-7(-0.026). The remaining 34 outer indicators were preserved due to their higher contribution to the model, as their outer loadings were above 0.708. Figure 4 shows the updated results of the second PLS-SEM algorithm run, including outer loadings and path coefficients.

The reliability and validity analysis results, shown in Table 4 and 5, reflect the removal of 4 indicators (i.e., ECL-6, FGT-6, SP-6, and SUS-7) and the acceptance of 34 indicators. The assessments of measurement quality involved examining indicator reliability with cross loading (CL) $\geqslant 0.7$, the internal consistency reliability (Composite reliability (CR) $\geqslant 0.7$), and convergent validity (Average variance extracted (AVE) $\geqslant 0.5$. Discriminant validity was verified using Fornell-Larcker criteria, requiring the square root of each construct's AVE to be greater than its highest inter-construct correlation (Hair et al., 2018).

Table-4 List of CLs, CRs and AVEs

Factors	Items	CLs	CRs	AVEs
External credit linkages (ECL)	ECL1	0.832	0.919	0.693
	ECL2	0.815		
	ECL3	0.834		
	ECL4	0.843		
	ECL5	0.837		

Factors	Items	CLs	CRs	AVEs
Financial governance and Transparency (FGT)	FGT1	0.844	0.941	0.729
	FGT2	0.885		
	FGT3	0.823		
	FGT4	0.802		
	FGT5	0.891		
	FGT7	0.872		
Loan portfolio quality and Repayment(LPQR)	LPQR1	0.843	0.937	0.715
	LPQR2	0.875		
	LPQR3	0.749		
	LPQR4	0.912		
	LPQR5	0.888		
	LPQR6	0.794		
Saving and Internal lending efficiency (SILE)	SILE1	0.723	0.894	0.586
	SILE2	0.733		
	SILE3	0.77		
	SILE4	0.719		
	SILE5	0.802		
	SILE6	0.837		
Strategic planning (SP)	SP1	0.84	0.907	0.662
	SP2	0.808		
	SP3	0.773		
	SP4	0.798		
	SP5	0.847		
Financial Sustainability of SHGs (SUS)	SUS1	0.766	0.908	0.622
	SUS2	0.774		
	SUS3	0.825		
	SUS4	0.78		
	SUS5	0.837		
	SUS6	0.747		

Table-5 The square root of AVEs

	ECL	FGT	LPQR	SILE	SP	SUS
ECL	0.832					
FGT	0.370	0.854				
LPQR	0.031	0.278	0.845			
SILE	0.474	0.511	0.380	0.765		
SP	0.316	0.268	-0.045	0.313	0.814	
SUS	0.281	0.255	0.221	0.350	0.220	0.789

In summary, although four indicators were excluded during the instrument testing process, the statistical results confirmed that the remaining indicators exhibited satisfactory psychometric properties. In addition to interpretative evaluation, statistical testing serves as an important basis for revising and refining the questionnaire. The literature underscores this integrated validation strategy, merging statistical analysis with interpretative assessment (Carlsson et al., 2021; Liu et al., 2018).

Conclusion

Addressing the research questions, the study emphasizes the development of financial sustainability of SHGs model and the validation of its measurement instruments.

Firstly, this study systematically reviewed the existing literature to identify key factors influencing the financial sustainability of Self-Help Groups (SHGs). These factors were conceptually grouped into relevant constructs based on their definitional similarities. The formulation of an integrated structural model for evaluating SHG financial sustainability was guided by hypothesized relationships among these constructs, informed by prior theoretical insights. From a methodological perspective, this study contributes by employing PLS-SEM to examine the relationships among key determinants of financial sustainability in SHGs, offering a robust analytical approach for exploratory research with complex constructs. The use of PLS-SEM may be particularly valuable for researchers seeking alternative methods to validate newly developed models and scales in the context of community-based financial institutions.

Secondly, despite the rejection of four proposed indicators, the statistical evaluation verifies the reliability and validity of the remaining indicators. The empirical findings highlight the primary factors of SHG financial sustainability and contribute to constructing a conceptual model that captures their interconnections.

In practical terms, the findings pro vide useful insights for SHG members, promoting institutions, financial institutions, policymakers, government and its implementing agencies by identifying critical factors influencing financial sustainability. The study highlights how internal governance, credit linkages, financial practices, internal and external lendings and strategic planning interact to shape the long-term viability of SHGs.

Considering the limitations of the present study, further studies may incorporate additional constructs, indicators, and hypotheses related to managerial capacity, operational efficiency, market linkages, and policy support. Although the proposed model was developed within the specific socio-economic and institutional context of SHGs operating in selected blocks of Rajasthan, the framework can serve as a foundational model for analyzing SHG sustainability in other regions with comparable characteristics, subject to appropriate contextual adaptations.

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