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Digital And Institutional Drivers Of Women's Economic Empowerment In Rural Entrepreneurship: Insights From Bengal

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Abstract:
Purpose *– This study examines the impact of digital technology on the entrepreneurial mindset of young entrepreneurs in West Bengal. It focuses on how self-help groups (SHGs), non-governmental organizations (NGOs), and schools can help bridge the gaps in digital skills and support business growth.*
Design/methodology/approach *– A mixed-method approach combines structured surveys and in-depth interviews with 300 young rural entrepreneurs. The data were analysed using descriptive statistics, correlation, and regression analysis to evaluate the relationship between digital skills, institutional support, and startup success.*
Findings *– The results reveal a strong positive correlation between digital literacy and improved market access, with significant effects on innovation and business performance. SHGs and NGOs are important for getting around problems with infrastructure and skills, and learning institutions are necessary for helping people develop an entrepreneurial mindset.*
Research limitations/implications *– The study is geographically confined and focused on young entrepreneurs; so, future research could broaden its scope to encompass various areas, age demographics, and sectors to enhance generalizability.*
Practical implications *– Enhancing digital infrastructure and focused training via SHGs, non-governmental organizations, and universities can improve entrepreneurial results, offering practical strategies for policymakers to promote organizations.*
Social implications *– Equipping young individuals with digital skills plays a crucial role in fostering rural economic development, generating employment opportunities, and promoting inclusive growth.*
Originality/value *– By emphasizing the combined roles of social housing groups, Non-Governmental Organization, and universities in promoting digital entrepreneurship for rural development that is sustainable in India, this study closes an empirical gap.*
Keywords: *Digital Literacy, Digital Technology, Entrepreneurial Mindset, Startup Growth, Young Entrepreneurs.*
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INTRODUCTION

In an increasingly digitalized world, fostering entrepreneurial mindsets among youth is recognized as a powerful driver of inclusive economic growth, innovation, and poverty reduction, especially in emerging economies like India (Pradhan et al., 2021; Ramadani et al., 2021). India's demographic dividend, with over 65% of its population below the age of 35, offers unprecedented opportunities to leverage youth entrepreneurship to tackle rising unemployment and rural economic disparities (NITI Aayog, 2022). Recent estimates show India's early-stage entrepreneurial activity rate at 14.4%, exceeding the global average, yet persistent barriers such as digital infrastructure gaps, skill deficits, and limited institutional support constrain its full potential (GEM India Report, 2021; Sengupta & Sahay, 2023).

With rapid advances in digital technology and government initiatives like Digital India and Startup India, new opportunities for rural and women-led entrepreneurship have emerged (Dwivedi et al., 2022). However, evidence suggests that without targeted interventions, regional inequalities and gender gaps

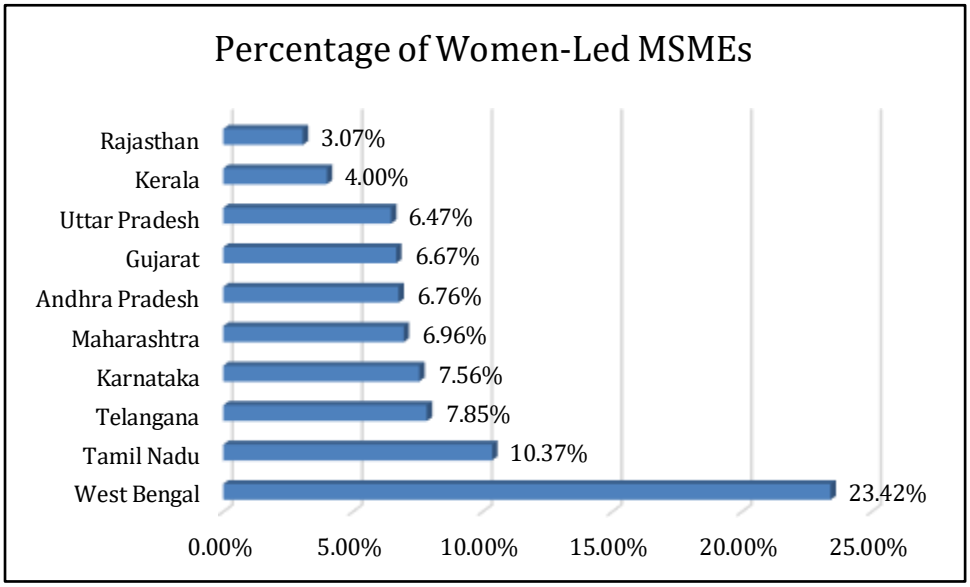
persist, particularly in states like West Bengal where women entrepreneurs still face systemic barriers despite being leaders in women-owned MSMEs (MSME Report 2022).

Academic research increasingly highlights the vital roles that self-help groups (SHGs), non-governmental organizations (NGOs), and higher education institutions (HEIs) play in bridging digital divides, developing entrepreneurial mindsets, and providing practical support for women entrepreneurs (Ratten, 2022; Sindakis & Showkat, 2024). Yet, there remains a lack of empirical studies that holistically examine how these digital and institutional enablers work together to shape sustainable women-led startup growth in rural India.

This study addresses this critical gap by exploring the combined impact of digital technology, SHGs, NGOs, and HEIs on the entrepreneurial mindset and success of rural women entrepreneurs in West Bengal. By analysing key drivers like digital literacy, incubation support, and skill development, this research aims to identify actionable strategies to strengthen rural entrepreneurial ecosystems for women, contributing to India's broader digital and gender empowerment goals (Parthiban et al., 2024).

India's Digital and Institutional Context

Government schemes such as the Atal Innovation Mission and the National Education Policy (NEP) 2020 have sought to embed entrepreneurship education and digital skills in formal curricula, yet gaps persist in rural regions (Ministry of Education, 2020; Dwivedi et al., 2022). Despite connecting over 100,000 villages with high-speed internet under BharatNet, digital literacy rates and access to entrepreneurial resources remain uneven (MeitY, 2021). Recent evidence from rural India shows that collaborative platforms combining universities, SHGs, and NGOs can play a transformative role in enabling women's economic participation through digital entrepreneurship (Sengupta & Sahay, 2023).



Source: MSME Annual Report 2021–22

This paper contributes to the discourse on women's economic empowerment by empirically examining the drivers and barriers shaping digital entrepreneurship for rural women in West Bengal — the state with India's highest share of women-owned MSMEs at 23.42% (MSME Report 2022). By drawing on updated data and robust statistical analysis, this study seeks to inform policymakers, educators, and development practitioners on pathways to foster sustainable women-led entrepreneurial growth.

The main objectives of this paper are:

- To identify key factors influencing the entrepreneurial mindset of rural women youth in West Bengal.
- To evaluate the role of SHGs, NGOs, and educational institutions in promoting digital entrepreneurship among rural women.
- To analyse the relationship between digital access, skills, and entrepreneurial success using descriptive statistics, correlation, and regression analysis.

- To explore practical strategies for enhancing digital infrastructure and financial literacy for sustainable women-led entrepreneurial growth in rural Bengal.

LITERATURE REVIEW

A comprehensive understanding of the factors influencing rural women's entrepreneurial mindsets and startup growth is essential for designing effective digital and institutional interventions. Prior research demonstrates that entrepreneurship is shaped by a complex interplay of individual capabilities, educational support, community networks, and policy environments (Krueger et al., 2000; Matlay, 2008). However, recent studies emphasize that digital technology and collaborative institutional support are increasingly critical in enabling sustainable women-led entrepreneurship in developing economies like India (Pradhan et al., 2021; Sengupta & Sahay, 2023).

This Literature Review examines ten key drivers derived from recent empirical and theoretical studies: digital literacy, incubation centres, entrepreneurship courses, government support, showcase platforms, role models, university–industry interaction, inter-university synergies, technical skills improvement, and innovation capability. By synthesizing current research, this section identifies how these factors collectively address the persistent barriers faced by rural women entrepreneurs and lays the foundation for the study's conceptual framework.

Digital Literacy & Technical Skills

Digital literacy is a critical enabler of entrepreneurship in the digital age, especially for women in rural contexts (Pradhan et al., 2021). Studies show that access to digital tools and the ability to use them effectively strongly influence market access and innovation capacity (Dwivedi et al., 2022). For rural women, improving technical skills can bridge traditional barriers to market participation and help navigate digital platforms for business operations (Sengupta & Sahay, 2023). Ratten (2022) emphasizes that targeted digital training initiatives can significantly boost entrepreneurial intentions among marginalized youth and women.

Establishing Digital Incubation Centres

Incubation centres provide vital support infrastructure for early-stage entrepreneurs by offering mentorship, technical resources, and networking opportunities (Ramadani et al., 2021). In rural India, digital incubation hubs can bridge urban–rural gaps by connecting women entrepreneurs with mentors and investors (Parthiban et al., 2024). Evidence suggests that incubation centres with a digital focus increase the survival rate of women-led startups by facilitating innovation and market readiness (Ratten, 2022).

Embedding Digital Entrepreneurship Courses

Integrating entrepreneurship education into formal curricula is essential for fostering entrepreneurial mindsets (Matlay, 2008; Westhead & Solesvik, 2016). Recent studies confirm that courses combining digital skills with entrepreneurial training improve self-efficacy and startup performance (Dwivedi et al., 2022). Sindakis & Showkat (2024) highlight how universities in India and South Asia are embedding such courses to empower underrepresented groups, including rural women, by boosting their capacity to launch and sustain digital ventures.

Government Support for Digital Startups

Public policy support plays a critical role in enabling inclusive entrepreneurship ecosystems (NITI Aayog, 2022). Initiatives like Startup India and Digital India offer funding, tax benefits, and training that lower entry barriers for women entrepreneurs (Pradhan et al., 2021). However, Ramadani et al. (2021) argue that the effectiveness of government support depends on how well policies address local infrastructural gaps and gender-specific challenges. Parthiban et al. (2024) emphasize that targeted schemes for rural women can amplify startup survival rates.

Platforms for Entrepreneurs to Showcase Ideas

Access to platforms where entrepreneurs can pitch ideas, gain feedback, and build networks is key for scaling startups (Ratten, 2022). Digital pitch competitions, community fairs, and online marketplaces expand market reach for women who face mobility and visibility constraints (Sengupta & Sahay, 2023). Recent research suggests that supportive online ecosystems foster confidence and innovation among rural women entrepreneurs (Dwivedi et al., 2022).

Role Model Interaction

Exposure to successful role models shapes entrepreneurial intention and self-efficacy (Laviolette et al., 2012; Chlosta et al., 2012). Recent studies in rural India confirm that visible local women entrepreneurs inspire others by demonstrating practical pathways to success (Ratten, 2022). Digital platforms and community-led training allow young women to connect with role models who can mentor, motivate, and break cultural stereotypes (Sengupta & Sahay, 2023).

University-Industry Interaction

Effective university–industry linkages enhance practical entrepreneurship education, technology transfer, and commercialization (Anderson, 2011; Klofsten, 2000). Recent evidence shows that partnerships with local industries help rural universities align curricula with market needs (Dwivedi et al., 2022). Sindakis & Showkat (2024) argue that such interactions are particularly effective for women entrepreneurs when universities collaborate with NGOs and SHGs to provide practical exposure and industry connections.

Synergies Between Universities

Collaboration among universities fosters interdisciplinary learning, access to wider resources, and knowledge-sharing (Buli & Yesuf, 2015; Lundqvist & Middleton, 2013). Ramadani et al. (2021) highlight that multi-university networks can address skills gaps by pooling expertise in digital literacy, business planning, and innovation. For rural women, such synergies ensure that entrepreneurship education is context-sensitive and inclusive (Parthiban et al., 2024).

Technical Skills Improvement

Continual improvement of technical skills is crucial for sustaining competitiveness in digital markets (Dwivedi et al., 2022). Ratten (2022) notes that upskilling programs specifically targeting rural women help overcome initial barriers and enable them to adopt emerging digital tools for business growth. Recent community-based training models show that collaborative training (NGOs, SHGs, HEIs) increases the success rate of women-owned digital startups (Sengupta & Sahay, 2023).

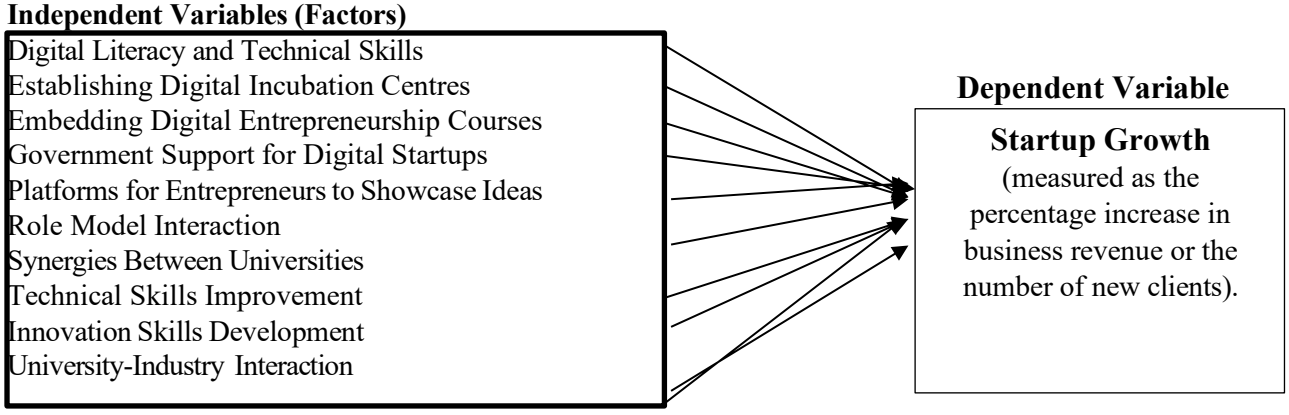
Innovation Skills Development

Innovation capability is a strong predictor of entrepreneurial growth (Gerba, 2012; Matlay, 2010). Sindakis & Showkat (2024) emphasize that fostering innovation skills among rural women entrepreneurs requires both formal training and informal peer networks. Parthiban et al. (2024) demonstrate that digital technologies and incubation centres enhance rural women's capacity to develop new products, adapt to market trends, and sustain long-term growth.

Variables and Measurements:

The following variables were measured:

Figure 1: Conceptual Framework Linking Strategic Factors to Startup Growth



Source: Authors' own work

Based on the preceding review of literature, this study proposes a conceptual framework that illustrates the hypothesised relationships between the identified digital and institutional enablers and startup growth among rural women entrepreneurs in West Bengal. As shown in **Figure 1**, the framework comprises **ten independent variables (strategic factors)** and one dependent variable.

The **independent variables** include:

1. Digital Literacy and Technical Skills,
2. Establishing Digital Incubation Centres,
3. Embedding Digital Entrepreneurship Courses,
4. Government Support for Digital Startups,
5. Platforms for Entrepreneurs to Showcase Ideas,
6. Role Model Interaction,
7. Synergies Between Universities,
8. Technical Skills Improvement,
9. Innovation Skills Development, and
10. University–Industry Interaction.

These factors are derived from the synthesis of recent empirical research and theoretical foundations on rural entrepreneurship, digital inclusion, and institutional support mechanisms. Each factor is expected to positively influence the **dependent variable**, *Startup Growth*, which in this study is measured as the percentage increase in business revenue or the number of new clients acquired by the entrepreneur.

The framework serves as the analytical basis for the empirical investigation presented in the following sections. By testing this model, the study aims to generate evidence on how digital and institutional interventions can collectively foster entrepreneurial mindsets and sustainable business growth among women in rural India.

RESEARCH METHODOLOGY

Building on the factors identified in the Literature Review, this study adopts a quantitative research design to empirically test how digital and institutional enablers influence rural women's entrepreneurial mindsets and startup growth in West Bengal. By operationalizing ten strategic factors — including digital literacy, incubation support, entrepreneurship education, and collaborative networks — the study integrates descriptive statistics, correlation, and regression analysis to examine the strength and significance of these relationships. The methodology is designed to generate actionable insights that align with the study's research questions and contribute to practical interventions for inclusive digital entrepreneurship.

Research Design

This study adopts a quantitative, cross-sectional research design to examine the impact of digital and institutional factors on fostering entrepreneurial mindsets and startup growth among rural women entrepreneurs in West Bengal, India. Ten strategic factors identified through the Literature Review were empirically tested to provide evidence-based insights that align with the study's research objectives and questions.

Sampling Criteria

The target population consisted of women entrepreneurs aged 18–40 actively managing micro or small businesses in both rural and semi-urban districts of West Bengal. A non-probability convenience sampling method was employed due to time and accessibility constraints; however, local NGO coordinators and self-help group (SHG) networks were engaged to reach a diverse participant base across multiple districts. Eligibility criteria required respondents to have at least one year of business operation and active involvement in digital business practices such as online sales, digital payments, or online marketing.

Data Collection Process

Primary data were collected over a three-month period from January to March 2025 using a structured, pre-tested questionnaire. The questionnaire was distributed both online (email and digital forms) and through in-person field visits facilitated by SHG leaders and local NGO representatives. Participation was voluntary, with informed consent obtained in advance, and all responses were anonymised to maintain confidentiality. The final dataset included 300 valid responses, which is an acceptable sample size for correlation and regression analysis in social science research (Hair et al., 2010). Ethical approval for the study was obtained in line with institutional guidelines.

Data Analysis Process

All responses were coded and analysed using IBM SPSS Statistics Version 27. The data analysis was conducted in three systematic phases. First, descriptive statistics (means, standard deviations, minimum,

and maximum values) were calculated for all variables to summarise central tendencies and dispersion. Second, Pearson correlation coefficients were computed to assess the strength and direction of relationships between each independent factor and the dependent variable (Startup Growth). Third, simple linear regression analysis was performed for each independent variable to examine its predictive power. Variables with higher correlations were tested for their explanatory significance. The reliability of the survey instrument was verified using Cronbach's Alpha, with all multi-item scales exceeding the recommended threshold of 0.70, confirming satisfactory internal consistency.

RESULTS AND ANALYSIS

This section presents the empirical findings derived from the analysis of survey responses collected from 300 rural women entrepreneurs in West Bengal. The results address the study's core research questions by examining the descriptive statistics, correlation patterns, and regression outcomes for the ten strategic factors influencing entrepreneurial mindset and startup growth. The findings are organised into three parts: descriptive statistics, correlation analysis, and regression analysis, each providing clear evidence to support the study's objectives and theoretical framework.

Descriptive Statistics

Descriptive statistics were calculated to provide an overview of respondents' perceptions regarding the ten strategic factors and the dependent variable (Startup Growth). As shown in Table 1, the mean values for most factors are above 3.75, indicating generally positive perceptions among rural women entrepreneurs towards digital and institutional enablers of entrepreneurial growth.

Table 1: Descriptive Statistics for Strategic Factors and Startup Growth

Factor	Mean	Std. Deviation	Minimum	Maximum
Digital Literacy and Technical Skills	4.12	0.70	2.50	5.00
Establishing Digital Incubation Centres	3.85	0.90	2.00	5.00
Embedding Digital Entrepreneurship Courses	4.25	0.60	3.00	5.00
Government Support for Digital Startups	3.90	0.80	2.00	5.00
Platforms for Entrepreneurs to Showcase Ideas	4.05	0.75	2.50	5.00
Role Model Interaction	3.75	0.90	2.00	5.00
Synergies Between Universities	3.80	0.85	2.00	5.00
Technical Skills Improvement	4.00	0.80	2.50	5.00
Innovation Skills Development	4.10	0.75	2.50	5.00
University-Industry Interaction	4.00	0.80	2.50	5.00
Startup Growth (Dependent Variable)	75.20	12.50	45.00	105.00

Source: Authors' own work

These results suggest that Embedding Digital Entrepreneurship Courses (mean = 4.25) and Digital Literacy & Technical Skills (mean = 4.12) are particularly valued, highlighting their importance in fostering successful startups. The standard deviation values indicate moderate variability in responses, reflecting diverse experiences within the sample.

Correlation Analysis

Pearson correlation analysis was performed to examine the strength and direction of relationships between each independent factor and Startup Growth. The correlation coefficients are presented in Table 2.

Table 2: Correlation Matrix Between Strategic Factors and Startup Growth

Factors	Correlation with Startup Growth (r)
Digital Literacy and Technical Skills	0.62
Establishing Digital Incubation Centres	0.58
Embedding Digital Entrepreneurship Courses	0.75
Government Support for Digital Startups	0.60
Platforms for Entrepreneurs to Showcase Ideas	0.68
Role Model Interaction	0.54
Synergies Between Universities	0.50
Technical Skills Improvement	0.65
Innovation Skills Development	0.70
University-Industry Interaction	0.60

Source: Authors' own work

The results show positive correlations for all factors, with Embedding Digital Entrepreneurship Courses ($r = 0.75$), Innovation Skills Development ($r = 0.70$), and Platforms for Entrepreneurs to Showcase Ideas ($r = 0.68$) demonstrating the strongest associations with startup growth. These findings suggest that enhancing digital training, innovation capacity, and opportunities to showcase entrepreneurial ideas can significantly boost startup performance among rural women entrepreneurs.

Regression Analysis

Simple linear regression analysis was conducted to assess the predictive power of each strategic factor on Startup Growth.

Simple Linear Regression

Simple linear regression was performed to examine the predictive power of each independent variable on the dependent variable (*Startup Growth*). The regression model is defined as:

$Y=\beta_0+\beta_1 X_1+\varepsilon Y = 0$

Where:

Y = Start-up Growth (dependent variable).

X_1 = Digital Literacy (Independent variable).

β_0 = Intercept (constant).

β_1 = Slope (coefficient of the independent variable).

ε = Error term (residuals).

The regression coefficients, intercepts, and R-squared values are presented in Table 3.

Table 3: Simple Linear Regression Results for Strategic Factors on Startup Growth

Independent Variable	Constant (β_0)	Coefficient (β_1)	R-squared (R^2)
Digital Literacy and Technical Skills	40.50	1.30	0.55
Establishing Digital Incubation Centres	42.00	1.15	0.48
Embedding Digital Entrepreneurship Courses	38.00	1.60	0.60
Government Support for Digital Startups	41.50	1.25	0.52
Platforms for Entrepreneurs to Showcase Ideas	39.00	1.40	0.57

Role Model Interaction	43.00	1.10	0.45
Synergies Between Universities	44.00	1.00	0.40
Technical Skills Improvement	39.50	1.35	0.56
Innovation Skills Development	38.50	1.45	0.58
University-Industry Interaction	42.50	1.20	0.50

Source: Authors' own work

The results indicate that Embedding Digital Entrepreneurship Courses explains the largest share of variance in startup growth (R2 = 0.60), followed by Innovation Skills Development (R2 = 0.58) and Platforms for Entrepreneurs (R2 = 0.57). The positive coefficients confirm that each unit increase in these factors is associated with higher startup growth outcomes. These findings reinforce the importance of integrating digital entrepreneurship curricula, innovation training, and showcase opportunities into rural entrepreneurship programs.

CONCLUSION

This study explored the impact of digital technology and institutional enablers on fostering entrepreneurial mindsets and startup growth among rural women entrepreneurs in West Bengal, India. Drawing on data from 300 respondents and testing ten strategic factors, the findings highlight that embedding digital entrepreneurship courses, strengthening innovation skills, and providing platforms to showcase ideas have the strongest positive influence on startup success. The results confirm that targeted interventions in digital literacy, incubation support, and university–industry linkages can effectively bridge the skill and resource gaps faced by rural women entrepreneurs.

By empirically validating the relationships between digital access, institutional support, and entrepreneurial outcomes, this research contributes to the evolving discourse on inclusive, digitally driven rural entrepreneurship. It extends previous studies by demonstrating how self-help groups (SHGs), non-governmental organizations (NGOs), and higher education institutions (HEIs) play interlinked roles in shaping sustainable women-led business growth.

Practical Implications

The findings have several actionable implications for practitioners, educators, and ecosystem stakeholders:

Universities and training institutions should integrate comprehensive digital entrepreneurship modules into formal curricula to build relevant skills among rural women and youth.

Incubation centres and innovation hubs should expand outreach in semi-urban and rural districts to provide mentorship, technical resources, and market access.

NGOs and SHGs can strengthen community-based training by partnering with universities and leveraging digital tools to deliver skill development programs.

Entrepreneurs should be encouraged to participate in digital showcases, pitch competitions, and networking platforms to enhance visibility and funding opportunities.

Policy Recommendations

Based on the study's insights, the following policy directions are proposed:

Expand digital infrastructure: Policymakers should prioritise last-mile connectivity and affordable internet access in rural regions through initiatives like BharatNet and Digital India 2.0.

Targeted support schemes: Introduce dedicated grants, seed funding, and tax benefits for women-led rural startups, ensuring easy access to government schemes under Startup India.

Public–private partnerships: Facilitate collaborations among HEIs, local industries, and community organisations to design context-specific entrepreneurship training and digital literacy campaigns.

Monitoring and evaluation: Develop robust impact assessment frameworks to track the effectiveness of digital and institutional interventions for rural women entrepreneurs over time.

Limitations and Future Research

While this study offers valuable evidence, its findings are limited to a specific regional context using a convenience sampling approach. Future research should adopt stratified or random sampling across multiple states to enhance generalisability. A longitudinal design could also provide deeper insights into the sustained impact of digital interventions on startup survival and growth. In addition, incorporating qualitative case studies could enrich understanding of cultural and contextual dynamics that shape rural women's entrepreneurial journeys.

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