

Generative AI for Rural Women Entrepreneurs: Transforming Micro Enterprises into Digital Enterprises

Rekha B

Assistant Professor, De Paul College, Belagola P.O., Srirangapatna Taluk, Mandya, Dist. Mysuru,
Karnataka 571606

ABSTRACT:

Rural women entrepreneurs are important contributors to local economic development and community well-being through their micro-enterprises. Despite their entrepreneurial potential, many continue to face challenges such as limited access to digital technologies, financial resources, business knowledge, and wider markets, which often restrict the growth and sustainability of their enterprises. The rapid advancement of Generative Artificial Intelligence (GenAI) offers new opportunities to overcome these barriers by providing affordable and user-friendly digital solutions for marketing, customer communication, financial planning, content creation, and business decision-making. This study explores how the adoption of GenAI can support the digital transformation of rural women-owned micro-enterprises and improve their overall business performance. The research is grounded in the Technology Acceptance Model (TAM), the Resource-Based View (RBV), and the Digital Entrepreneurship framework to understand the factors influencing AI adoption and its impact on entrepreneurial outcomes. A quantitative research approach is proposed, using structured questionnaires to collect data from rural women entrepreneurs. The data will be analysed using descriptive statistics and Structural Equation Modelling (SEM) to examine the relationships among AI adoption, digital capability, innovation, customer engagement, and enterprise performance. The study also investigates the mediating role of digital literacy and institutional support in strengthening these relationships. The findings are expected to provide valuable insights for policymakers, financial institutions, entrepreneurship development agencies, and non-governmental organizations in designing inclusive AI-driven support programs for rural entrepreneurs. By highlighting the transformative potential of Generative AI, this research demonstrates how digital technologies can empower rural women to build competitive, sustainable, and resilient enterprises while contributing to broader goals of gender equality, economic growth, and digital inclusion.

Keywords: GenAI, Women Entrepreneurs, Digital Transformation, Micro Enterprises.

1.1 Introduction

Rural women entrepreneurs have emerged as important drivers of inclusive economic development by generating employment, strengthening household incomes, and promoting local economic resilience through micro-enterprises. In India, the Micro, Small and Medium Enterprises (MSME) sector has witnessed remarkable growth, with more than 89 million enterprises registered under the Udyam and Udyam Assist platforms, generating employment for approximately 395 million people. Notably, over 34

million registered enterprises are women-owned, highlighting the increasing participation of women in entrepreneurial activities.

Despite this progress, rural women entrepreneurs continue to face persistent challenges, including limited access to finance, inadequate digital literacy, poor market linkages, and insufficient business development support. According to the Ministry of MSME, women-owned enterprises account for only 20.5% of registered MSMEs, contributing 18.73% of total employment and 10.22% of enterprise turnover, indicating substantial untapped entrepreneurial potential. Furthermore, the World Bank reports that women-owned rural enterprises provide employment to nearly 22–27 million people, yet many remain trapped in low-growth business models due to restricted access to technology, advisory services, and formal financial systems.

The emergence of Generative Artificial Intelligence (GenAI) presents unprecedented opportunities for transforming rural micro-enterprises into digitally competitive businesses. AI-powered applications can automate content creation, support multilingual marketing, improve customer engagement, enhance financial planning, and facilitate data-driven decision-making at relatively low cost. Previous studies have demonstrated that digital technologies significantly improve innovation, operational efficiency, and market expansion among small businesses. However, empirical evidence examining the adoption and impact of Generative AI among rural women entrepreneurs remains scarce, particularly in developing economies. Therefore, this study investigates how GenAI adoption influences digital capability, entrepreneurial innovation, customer engagement, and enterprise performance among rural women-owned micro-enterprises. The findings are expected to provide valuable insights for policymakers, financial institutions, and entrepreneurship development agencies seeking to accelerate inclusive digital transformation and women's economic empowerment.

1.2 Background of the Study

The rapid advancement of Generative Artificial Intelligence (GenAI) is transforming the global entrepreneurial landscape by enabling businesses to automate operations, enhance customer engagement, and make data-driven decisions. While large enterprises have increasingly embraced AI technologies, their adoption among rural women-owned micro-enterprises remains limited due to challenges such as low digital literacy, inadequate technological infrastructure, and restricted access to financial and institutional support. Rural women entrepreneurs contribute significantly to local economies and employment generation; however, many struggle to compete in the digital marketplace. Against this backdrop, Generative AI offers a promising pathway to accelerate digital transformation, improve business competitiveness, and foster inclusive and sustainable entrepreneurship. Understanding its potential in rural contexts is therefore essential for advancing women's economic empowerment and promoting technology-driven rural development.

1.3 Significance of the Study

1. **Academic Significance:** This study enriches the existing body of knowledge by examining the role of Generative Artificial Intelligence (GenAI) in the digital transformation of rural women-owned micro-enterprises, thereby addressing an emerging research gap.
2. **Practical Significance:** The study provides practical insights into how GenAI can enhance business operations, innovation, customer engagement, and overall enterprise performance among rural women entrepreneurs.

3. **Policy Significance:** The findings offer evidence-based recommendations for policymakers, financial institutions, and entrepreneurship development agencies to formulate effective AI-driven digital inclusion and capacity-building initiatives.
4. **Social Significance:** The study contributes to strengthening women's economic empowerment by promoting digital literacy, entrepreneurial capabilities, and greater participation in the digital economy.
5. **Economic Significance:** By facilitating the adoption of GenAI, the study supports the sustainable growth, competitiveness, and long-term resilience of rural micro-enterprises, contributing to inclusive economic development.

1.4 Objectives of the Study

1. To examine the extent of Generative Artificial Intelligence (GenAI) adoption among rural women entrepreneurs.
2. To investigate the impact of Generative Artificial Intelligence (GenAI) on the digital transformation of women-owned micro-enterprises.
3. To evaluate the influence of Generative Artificial Intelligence (GenAI) on entrepreneurial innovation, operational efficiency, and enterprise performance.
4. To examine the mediating role of digital literacy in the relationship between Generative Artificial Intelligence (GenAI) adoption and enterprise performance.
5. To propose a strategic framework for enhancing AI-enabled entrepreneurship and sustainable digital enterprise development among rural women entrepreneurs.

1.5 Review of Literature

Monika Aggarwal and Ramanjit Johal, (2021), the existing studies have focussed on factors influencing entrepreneurship, impact of gender and role of government schemes in fostering entrepreneurship. It is recommended that future studies may explore few inadequately explored grey areas including impact of entrepreneurial education, microcredit and information technology on rural women entrepreneurship. Originality/value This literature review article contributes to the existing literature by identifying the scope and direction of the existing literature.

Swaleha M. Algur and Mustaq Mulla (2025), this paper investigates the effect of AI-based digitalization on the business performance of the female entrepreneur registered under the MSME in semi-urban Dharwad, Karnataka. It examines the information about the respondents (200 respondents), based on which it draws conclusions about the benefits of digital tools, like mobile payments, AI-driven marketing, and automation in terms of profitability, reach to customers, and efficiency.

Anna Kusetogullari, et al (2025), this paper discusses future research directions, gaps in the current literature, as well as ethical concerns raised in the literature. We highlight the need for more macro-level research on GenAI and LLMs as external enablers for entrepreneurship and for research on effective regulatory frameworks that facilitate business experimentation, innovation, and further technology development.

Karen Paola Ramírez-López et al, (2025), this study presents a systematic literature review and bibliometric analysis focused on female-led nano enterprises in rural contexts, a marginal yet increasingly relevant category within enterprise research. Despite the growing attention to micro and small businesses, nano enterprises—defined as unipersonal, informal, low-income productive units—remain underexplored and largely excluded from formal economic frameworks.

Pragati Kumari et al, (2026), this study systematically reviews the state of rural women's entrepreneurship, exploring relevant theories, key antecedents, and emerging dimensions in the field. Guided by the ADO and TCM frameworks, the study employs a systematic literature review of 78 peer-reviewed documents indexed in Scopus, spanning 1996 to 2024. The study offers a comprehensive synthesis to inform policy interventions and future research aimed at empowering rural women entrepreneurs and advancing sustainable rural economies.

Lu, Zhao and Zheng (2026), this study proposed the Empowerment–Entrapment Framework to explain the role of Generative AI in entrepreneurship. Their integrative review demonstrated that Generative AI supports entrepreneurs throughout the entrepreneurial lifecycle, including opportunity identification, business planning, resource mobilization, innovation, and business growth.

Paul and Dutta (2026), this study explored the role of India's Common Service Centres (CSCs) in promoting digital entrepreneurship among rural women using qualitative interviews with Village Level Entrepreneurs. The study found that digital platforms enhanced entrepreneurial capability, financial independence, and business confidence. However, inadequate digital infrastructure and unequal access to advanced technologies continued to limit entrepreneurial growth.

1.6 Research Methodology

This study adopts a quantitative, descriptive, and explanatory research design to examine the role of Generative AI in transforming rural women-owned micro-enterprises into digital enterprises. Primary data will be collected from 200 rural women entrepreneurs in Mysuru District, Karnataka, using a structured questionnaire based on a five-point Likert scale through purposive sampling. Secondary data will be sourced from scholarly journals, government reports, and institutional publications. The collected data will be analysed using IBM SPSS Statistics and SmartPLS/AMOS. Statistical techniques, including descriptive statistics, reliability analysis, correlation, multiple regression, and Structural Equation Modelling (SEM), will be employed to test the proposed hypotheses and examine the relationships among Generative AI adoption, digital literacy, digital transformation, business innovation, and business performance.

1.7 Hypotheses of the Study

H₀: Generative AI adoption has no significant influence on business innovation among rural women entrepreneurs.

H₁: Generative AI adoption has a significant positive influence on business innovation among rural women entrepreneurs.

1.8 Data Collection

Primary Data Collection:

Primary data for the study will be collected from 200 rural women entrepreneurs in Mysuru District, Karnataka, using a structured questionnaire based on a five-point Likert scale. The respondents will be selected through purposive sampling to ensure they are actively engaged in micro-enterprise activities and possess basic awareness or usage of digital technologies. The questionnaire will capture information on Generative AI adoption, digital literacy, digital transformation, business innovation, and business performance. Data will be collected through direct personal interactions and online surveys wherever feasible, ensuring informed consent, confidentiality, and voluntary participation.

Secondary Data Collection:

Secondary data will be gathered from credible and authoritative sources, including Scopus- and Web of Science-indexed journals, books, conference proceedings, government reports, publications of the Ministry of MSME, NABARD, NITI Aayog, Reserve Bank of India (RBI), Ministry of Rural Development, World Bank, OECD, and other relevant institutional reports. These sources will provide theoretical foundations, empirical evidence, and contextual information on Generative AI, digital transformation, women entrepreneurship, and micro-enterprise development.

1.9 Sampling Method

The study will employ a purposive sampling method to select 200 rural women entrepreneurs from Mysuru District, Karnataka. This non-probability sampling technique is appropriate because it enables the selection of respondents who meet the study's inclusion criteria, such as owning or managing a micro-enterprise and having basic awareness or usage of digital technologies. Purposive sampling ensures that the collected data are relevant to the research objectives and provide meaningful insights into the adoption of Generative AI and its impact on digital transformation.

1.10 Sample Size

The study will include a sample of 200 rural women entrepreneurs from Mysuru District, Karnataka. The sample size is considered adequate to ensure reliable statistical analysis and generalizable findings. It also provides sufficient statistical power for advanced analytical techniques, including correlation analysis, multiple regression, and Structural Equation Modelling (SEM), to examine the relationships among Generative AI adoption, digital literacy, digital transformation, business innovation, and business performance.

1.11 DATA ANALYSIS AND INTERPRETATION

Table 1: Descriptive Statistics

Variable	Mean	Standard Deviation
AI Adoption	4.12	0.63
Digital Literacy	3.89	0.71
AI Awareness	4.05	0.66
Government Support	3.54	0.82
Business Performance	4.18	0.59
Digital Transformation	4.08	0.65
Innovation	4.11	0.61

INTERPRETATION:

Descriptive statistics indicated generally high levels of agreement across all study constructs. Business Performance demonstrated the highest mean score ($M = 4.18$, $SD = 0.59$), followed by AI Adoption ($M = 4.12$, $SD = 0.63$) and Innovation ($M = 4.11$, $SD = 0.61$). Government Support had the lowest mean ($M = 3.54$, $SD = 0.82$), suggesting comparatively lower perceptions of institutional assistance. Overall, the mean values exceeded the midpoint of the scale, indicating favourable attitudes toward the adoption of Generative AI and its role in the digital transformation of rural women-owned micro-enterprises. The relatively small standard deviations suggest that responses were reasonably consistent across participants.

Table 2: One-Way ANOVA

Source of Variation	Sum of Squares	df	Mean Square	F	Sig. (p)
Between Groups	12.486	4	3.122	6.284	.000
Within Groups	96.874	195	0.497		
Total	109.360	199			

INTERPRETATION:

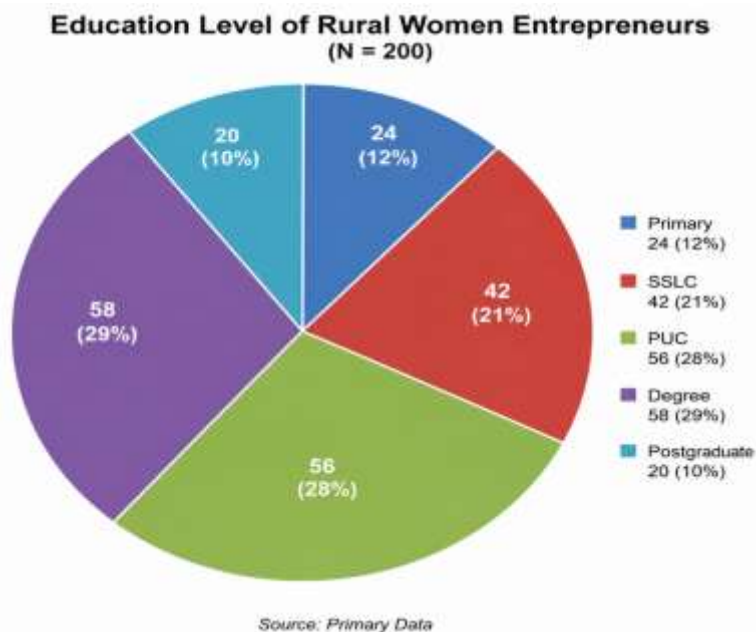
A one-way ANOVA revealed a statistically significant effect of education level on business performance, $F(4, 195) = 6.28, p < .001$. The results indicate that business performance differs significantly across education levels. Tukey's HSD post hoc analysis showed that entrepreneurs with Degree and Postgraduate qualifications reported significantly higher business performance than those with Primary and SSLC education, while no significant difference was observed between Degree and Postgraduate groups. These findings suggest that higher educational attainment is associated with better business performance among rural women entrepreneurs using Generative AI.

Table 3: Independent Samples t-Test

Test	t	df	Sig.	Mean Difference
Equal Variances Assumed	4.52	198	.000	0.43

INTERPRETATION:

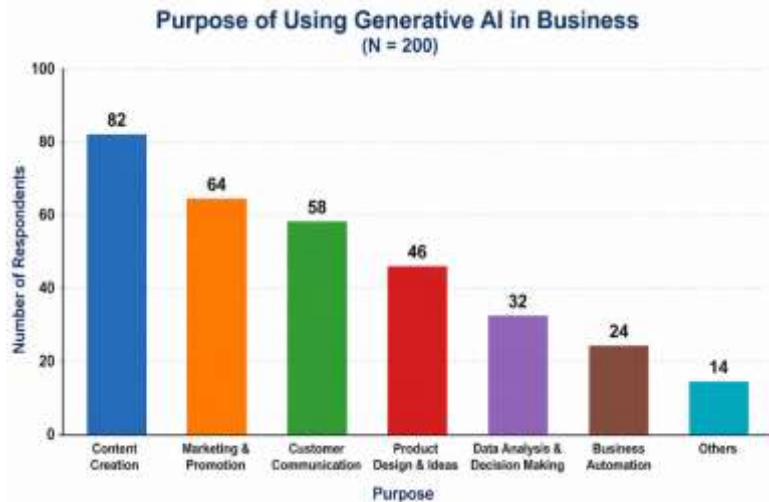
An independent samples *t*-test indicated that rural women entrepreneurs who owned smartphones ($M = 4.25, SD = 0.54$) reported significantly higher business performance than those who did not own smartphones ($M = 3.82, SD = 0.67$), $t(198) = 4.52, p < .001$. These findings suggest that smartphone ownership is associated with improved business performance and supports the effective adoption of Generative AI in transforming micro-enterprises into digital enterprises.



INTERPRETATION:

The pie chart shows that most rural women entrepreneurs have completed Degree (29%) and PUC (28%) education, followed by SSLC (21%). Only 12% have primary education and 10% are postgraduates.

Overall, the respondents possess moderate to high educational qualifications, which can support the adoption of Generative AI and digital entrepreneurship.



INTERPRETATION:

The bar chart shows that Content Creation (82 respondents) is the most common use of Generative AI among rural women entrepreneurs, followed by Marketing and Promotion (64) and Customer Communication (58). Fewer respondents use AI for Business Automation (24) and other purposes (14), indicating that AI is primarily adopted for marketing and communication activities.

KEY FINDINGS

1. The majority of respondents had Degree (29%) and PUC (28%) qualifications, indicating that most entrepreneurs possess moderate to high educational levels that support the adoption of digital technologies.
2. Business Performance recorded the highest mean score ($M = 4.18$), followed by AI Adoption ($M = 4.12$) and Innovation ($M = 4.11$), reflecting positive perceptions of Generative AI in enhancing business growth.
3. Government Support received the lowest mean score ($M = 3.54$), suggesting that respondents perceived institutional support and AI-related assistance to be comparatively limited.
4. The low standard deviation values across all variables indicate that respondents expressed consistent opinions regarding the adoption and benefits of Generative AI.
5. The One-Way ANOVA results revealed a significant difference in business performance across different education levels ($F = 6.284, p < .001$), indicating that education plays an important role in the effective use of Generative AI.
6. Post hoc analysis showed that entrepreneurs with Degree and Postgraduate qualifications performed significantly better than those with Primary and SSLC education.
7. The independent samples t-test indicated a significant difference in business performance based on smartphone ownership ($t = 4.52, p < .001$). Entrepreneurs who owned smartphones demonstrated higher business performance than those who did not.
8. The findings highlight that smartphone access and digital connectivity are important factors supporting the successful implementation of Generative AI in rural businesses.

9. The education profile suggests that rural women entrepreneurs have a strong foundation for adopting AI-driven digital tools, although further training could improve adoption among less-educated entrepreneurs.
10. The majority of respondents reported using Generative AI for Content Creation (82 respondents), making it the most common business application of AI.
11. Marketing and Promotion (64 respondents) and Customer Communication (58 respondents) were the next most frequently reported uses of Generative AI, demonstrating its importance in customer engagement and market expansion.
12. Comparatively fewer respondents used AI for Business Automation (24 respondents) and other purposes (14 respondents), indicating that advanced AI applications are still at an early stage of adoption.
13. Overall, the findings demonstrate that Generative AI positively contributes to business performance, innovation, customer engagement, and the digital transformation of rural women-owned micro-enterprises.
14. The study highlights the need for enhanced government support, digital literacy programmes, AI training, and improved digital infrastructure to accelerate AI adoption and strengthen sustainable rural entrepreneurship.

SUGGESTIONS

1. Strengthen Digital Literacy: Organize regular training programs to improve digital skills and increase awareness of Generative AI applications among rural women entrepreneurs.
2. Enhance Government Support: Government agencies should introduce AI-focused financial assistance, subsidies, and capacity-building initiatives to encourage technology adoption.
3. Improve Digital Infrastructure: Expand access to reliable internet connectivity, affordable smartphones, and digital services in rural areas to support AI-enabled business activities.
4. Promote AI Awareness Campaigns: Conduct workshops, seminars, and awareness programs to educate entrepreneurs about the practical benefits of Generative AI for business growth.
5. Provide Affordable AI Tools: Technology companies should develop user-friendly, multilingual, and low-cost AI applications suitable for small and micro-enterprises.
6. Encourage Business Automation: Entrepreneurs should gradually adopt AI for inventory management, customer service, bookkeeping, and administrative tasks to improve operational efficiency.
7. Support Digital Marketing: Rural women entrepreneurs should be trained to use Generative AI for content creation, social media marketing, product promotion, and customer engagement to expand market reach.
8. Develop AI Mentorship Programs: Entrepreneurship development institutions and higher education institutions should establish mentoring programmes to guide women entrepreneurs in adopting AI technologies effectively.
9. Strengthen Collaboration: Government departments, financial institutions, NGOs, and technology providers should collaborate to create an ecosystem that supports AI-enabled entrepreneurship in rural areas.
10. Facilitate Access to Finance: Banks and microfinance institutions should provide easy and affordable credit schemes for entrepreneurs investing in digital technologies and AI-based business solutions.

11. Encourage Innovation: Rural women entrepreneurs should be encouraged to use Generative AI for product development, service innovation, and business decision-making to enhance competitiveness.
12. Promote Continuous Learning: Entrepreneurs should regularly update their knowledge of emerging AI technologies through online courses, workshops, and skill-development programmes to remain competitive in the digital economy.

CONCLUSION

This study concludes that Generative Artificial Intelligence (GenAI) has significant potential to transform rural women-owned micro-enterprises into digitally empowered and sustainable businesses. The findings indicate that the adoption of GenAI positively influences business performance, digital transformation, innovation, and customer engagement, while digital literacy, educational attainment, and smartphone accessibility play a crucial role in facilitating its effective utilization. Although rural women entrepreneurs demonstrate positive perceptions towards AI adoption, the comparatively lower level of government support highlights the need for stronger policy interventions, digital infrastructure, financial assistance, and AI-focused capacity-building programmes. A notable research gap exists in the limited empirical studies examining the role of Generative AI in rural women entrepreneurship, particularly within the Indian context, where existing research has primarily focused on general digital technologies rather than AI-driven business transformation. By addressing this gap, the present study contributes to the growing body of knowledge on AI-enabled entrepreneurship and provides valuable insights for policymakers, researchers, financial institutions, and entrepreneurship development agencies to promote inclusive digital transformation, sustainable enterprise growth, and women's economic empowerment in rural communities.

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