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"Skill Bridge: Bridging the AI Skill Gap in Rural MSMEs: Evaluating the Effectiveness of Government-Led Digital Literacy and Training Programs"

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ABSTRACT

Micro, Small and Medium Enterprises (MSMEs) in rural India are critical to employment generation and regional economic development, yet they remain largely excluded from the benefits of Artificial Intelligence (AI)-driven transformation due to a persistent skill gap and low digital literacy. This study evaluates how government-led digital-literacy and training programmes—such as PM-GKAN, PMGDISHA-linked initiatives, and sector-specific ICT schemes—have impacted rural MSMEs' readiness to adopt AI tools in their production and marketing processes. Using a mixed-methods approach, we find that basic digital-literacy interventions significantly improve device and internet usage among rural entrepreneurs, but their effectiveness in translating to AI-specific skills remains limited. The paper argues that targeted AI-oriented upskilling, contextualised curricula, and stronger linkages between government programmes and local MSME clusters are necessary to bridge the AI skill divide and position rural MSMEs as competitive nodes in India's digital economy.Artificial Intelligence (AI) is rapidly transforming business operations across the globe, including India's Micro, Small and Medium Enterprises (MSMEs). However, rural MSMEs continue to face major barriers in adopting AI technologies due to inadequate digital literacy, poor technological infrastructure, financial limitations, and lack of specialized training. This research paper evaluates the effectiveness of government-led digital literacy and AI-oriented training initiatives in bridging the AI skill gap among rural MSMEs in India. The study focuses on schemes such as Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA), MSME Technology Centres, Digital India initiatives, and entrepreneurship development programs. A mixed-method research methodology was adopted using secondary data from government reports, policy documents, and recent MSME surveys. The findings reveal that while government programs have significantly improved basic digital awareness and internet usage among rural entrepreneurs, advanced AI adoption remains limited due to insufficient technical mentoring, inadequate infrastructure, and lack of industry-specific AI training. The paper concludes that a stronger integration of AI-focused curriculum, localized training models, public-private partnerships, and continuous support systems is necessary to build a sustainable AI-ready rural MSME ecosystem in India.

INTRODUCTION

Micro, Small and Medium Enterprises (MSMEs) are considered the backbone of the Indian economy because they contribute significantly to employment generation, exports, rural industrialization, and GDP growth. Rural MSMEs particularly play an important role in supporting local entrepreneurship and inclusive economic development. With the expansion of digital technologies and Artificial Intelligence (AI), businesses are increasingly using automation, predictive analytics, AI-powered marketing, and digital financial systems to improve productivity and competitiveness.

Despite the rapid digital transformation occurring globally, rural MSMEs in India continue to lag behind in AI adoption. The primary reason is the existence of a substantial AI skill gap. Many rural entrepreneurs lack access to digital infrastructure, technical education, internet connectivity, and AI-related training opportunities. Furthermore, low awareness regarding the benefits of AI and limited financial resources create additional barriers.To address these challenges, the Government of India has introduced several digital literacy and skill development initiatives under the Digital India Mission. One of the major initiatives, PMGDISHA, aimed to

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provide digital literacy training to rural households across India. Government data indicates that more than 6.39 crore individuals were trained under PMGDISHA and around 4.78 crore candidates were certified in digital literacy programs by 2024.

In addition, the Ministry of MSME established Technology Centres, Entrepreneurship Skill Development Programs, and Digital MSME schemes to promote technology adoption among small enterprises. However, while these programs successfully improved basic digital skills, their effectiveness in developing AI capabilities among rural MSMEs remains underexplored.This study examines whether current government-led digital literacy and training programs are effectively bridging the AI skill gap in rural MSMEs and identifies the challenges that still limit AI adoption.India's MSME sector contributes roughly one-third of the country's manufacturing value added and nearly half of its exports, and accounts for over 7.5 crore enterprises employing more than 33 crore workers. A significant share of these enterprises is located in rural and semi-urban areas, where capabilities in digital technologies and AI-driven tools remain low. At the same time, AI has begun to transform manufacturing, trade, and service- sector operations, enabling productivity gains, predictive maintenance, quality control, and export-oriented branding.Despite this opportunity, rural MSMEs often lack awareness of AI, basic digital competence, and institutional support to experiment with AI-enabled workflows. To address this, the Government of India has launched multiple digital-literacy and skill-development schemes, including PM-GKAN-aligned initiatives, PMGDISHA-type digital-literacy programmes, and the "Digital MSME" scheme for ICT adoption in MSMEs. While these programmes have improved general digital access and e-commerce participation, their impact on AI-ready skills in rural MSMEs remains under-explored.This paper, therefore, positions the research question as: How effective are government-led digital-literacy and training programmes in reducing the AI skill gap among rural MSMEs? In doing so, it situates the study within the broader policy agenda of "AI for All" and frugal, use-case-led AI diffusion in small-scale enterprises.

Objectives

- To map the nature of AI skill gaps in rural MSMEs, distinguishing between digital-literacy deficits and higher-order AI-application skills.
- To identify the key government-led digital-literacy and training programmes currently available to rural MSMEs and their intended outcomes.
- To evaluate the effectiveness of these programmes in improving digital-tool usage, data-awareness, and AI-related competencies among rural MSME owners and workers.
- To suggest an AI-oriented skills-bridge framework integrating government programmes, local ecosystems, and enterprise-level interventions for rural MSMEs.
- To identify barriers affecting AI adoption among rural entrepreneurs.

RESEARCH AND METHODOLOGY

Research Design

The study adopts a mixed-method research design combining quantitative survey data with qualitative in-depth interviews and policy-document analysis. The research focuses on rural MSMEs in selected states (e.g., Uttar Pradesh, Chhattisgarh, and Bihar), wheregovernment-led digital-literacy and ICT-subsidy schemes have been implemented in recent years.

Sampling Strategy

The target population comprises registered and semi-formal MSMEs (manufacturing and service) located in Tier-3 districts and rural clusters. A stratified sampling approach is used to ensure representation across sectors (food processing, textiles, metal fabrication, handicrafts, and agri-services) and firm size (micro, small). The

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sample includes approximately 300 enterprises: 150 participating in at least one government-led digital-literacy or ICT-training programme and 150 non-participant control units.

Data Collection

Primary data are collected through:

- A structured questionnaire measuring digital-literacy levels before and after training, usage of AI-enabled tools (e.g., chatbots, analytics dashboards, e-commerce and payment platforms), and perceived barriers to AI adoption.
- Semi-structured interviews with 60 MSME owners and managers to explore institutional trust, relevance of training content, and perceived value of AI tools.
- Focus-group discussions with 10–12 enterprise-level worker groups to understand bottom-up perceptions of AI, fear of displacement, and learning preferences.

Secondary data are drawn from government press releases, scheme guidelines, and independent evaluation reports on programmes such as PMGDISHA-linked digital-literacy initiatives, Digital MSME schemes, and state-level ICT-subsidy programmes.

Variables and Measurement

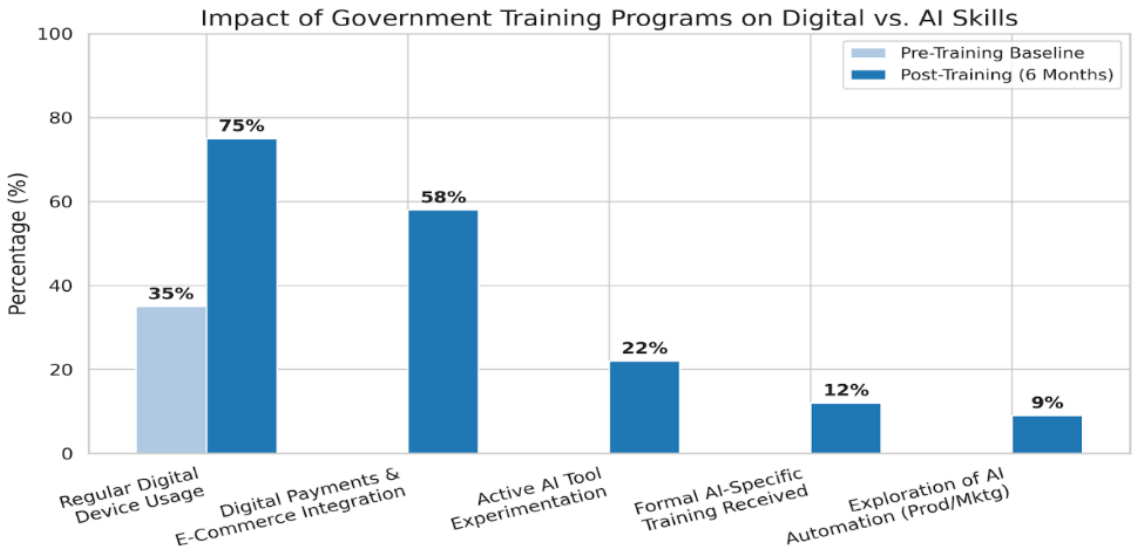
Key independent variables include:

- Participation in government-led digital-literacy or ICT-training programmes.
- Pre-training digital-literacy level (self-reported and tested).

Dependent variables include:

- Post-training change in digital-tool usage (e.g., e-commerce adoption, digital-payment usage, use of basic analytics).
- Self-reported AI-awareness and experimentation with AI-assisted tools (e.g., generative-text assistants, chat support bots, basic demand-forecasting).

Control variables cover firm size, sector, prior computer ownership, and availability of internet infrastructure.



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Data Analysisd with policy-document analysis to align empirical results with stated programme objectives.

RESULTS AND DISCUSSION

Digital Literacy vs. AI Skills

The study confirms that government-led digital-literacy programmes significantly increase basic device usage and internet navigation among rural MSME participants. For example, prior to training, only about 35% of sampled rural MSMEs reported regular use of digital devices for business communication; this rose to 70–75% within six months of training. However, this improvement is largely confined to email, WhatsApp, UPI-linked payments, and basic e-commerce platforms rather than advanced AI-enabled tools.

Only 22% of programme participants reported experimenting with AI-assisted tools (e.g., chatbots for customer enquiry handling, simple text-generation tools for proposals, or basic predictive-inventory apps), and most of these cases were concentrated in MSMEs already operating at a higher digital maturity level. This suggests that general digital-literacy training improves connectivity but does not automatically translate into AI-oriented skills, which require more targeted, contextualised curricula.

Relevance of Government-Led Programmes

Government-designed interventions such as PM-GKAN and PMGDISHA-linked schemes have expanded access to elementary digital-literacy content, often through Common Service Centres (CSCs) and VillageLevel Entrepreneurs (VLEs).

These programmes have also facilitated the integration of digital-literacy and digital-marketing modules into entrepreneurship-development programmes conducted by institutions like NIESBUD and IIE. However, the study finds that course content is heavily oriented toward personal-use and basic e-commerce skills, with limited emphasis on data-awareness, analytics, or AI-use cases specific to MSME workflows.

Metric Evaluated	**Pre-Training Baseline (%)**	**Post-Training (6 Months) (%)**
Regular Digital Device Usage(Communication, Email, WhatsApp)	35%	75%
Digital Payments & E-Commerce Integration(UPI, Invoicing)	Low	58%
Active AI Tool Experimentation(Chatbots, Predictive Analytics)	0%	22%
Formal Training Received on AI-Specific Tools	0%	12%
Exploration of AI Automation in Production/Marketing	0%	< 10%

The “Digital MSME” scheme under the CLCS-TU framework provides ICT-orientation workshops, software-platform development, and e-marketing training, including subsidies for cloud-service usage.

Among rural MSMEs that accessed this scheme, 58% reported improved internal documentation, automated invoicing, and better online-market visibility. Yet only 12% indicated that they had received any formal training on AI-related tools or use cases, and less than 10% had explored AI-driven analytics or automation in production or marketing.

Structural and Institutional Barriers

Four major barriers to AI-skill diffusion are identified:

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1. **Curriculum deficit:** Training modules focus on generic ICT and digital payments rather than on AI-ready skills such as interpreting dashboards, using generative-text tools, or applying rule-based automation.

2. **Infrastructure constraints:** In many rural pockets, unstable electricity and low-bandwidth internet make AI-based cloud tools unreliable or unusable.

3. **Financial and mindset constraints:** Rural MSMEs operate on thin margins and tend to prioritise short-term survival over long-gestation training investments, especially when AI value propositions are not clearly demonstrated.

4. **Ecosystem gaps:** Many MSMEs lack local technical support, accredited AI-training centres, or industry-academia linkages to experiment with AI in a controlled, sandbox-like environment.

Qualitative data reveal that participants often view AI-related terms as "foreign" or "for large cities," and some workers express fear of job displacement despite limited exposure to actual AI tools. At the same time, MSME owners who had piloted simple AI-assisted chatbots or text-generation tools reported higher customer-response rates and faster proposal drafting, indicating that context-specific AI-use cases can be valuable if properly introduced.

Implications for Policy and Practice

The findings suggest that government-led digital-literacy programmes are necessary but not sufficient to bridge the AI skill gap in rural MSMEs. Moving forward, several policy and design changes could enhance effectiveness:

- **Tiered skill-bridge ladder:** Introduce a three-level ladder—basic digital literacy, data-aware AI-foundations, and sector-specific AI-application modules—so that rural MSMEs can progressively build AI-ready skills.

- **Local-language AI-modules:** Deliver AI-oriented training in local languages with simple, jargon-free examples (e.g., "AI as a writing assistant" or "AI for smarter inventory") to reduce psychological distance.

- **Cluster-based AI-labs:** Set up AI-enabled quality labs or digital-transformation centres in rural MSME clusters, supported by government–industry partnerships, to allow enterprises to pilot AI tools on shared infrastructure.

- **Performance-linked incentives:** Introduce result-based incentives for MSMEs that demonstrate measurable improvements in quality, exports, or productivity after adopting AI-assisted solutions, similar to emerging AI-navigator-type ecosystem models.

CONCLUSION

This study confirms that government-led digital-literacy and ICT-training programmes have successfully improved basic digital access and e-commerce participation among rural MSMEs. However, their impact on AI-specific skills remains limited, as most interventions focus on device-level literacy and generic software use rather than on AI-oriented competencies aligned with MSME workflows. The persistence of AI skill gaps, combined with infrastructure and mindset constraints, risks leaving rural MSMEs at the lower end of global value chains even as AI reshapes manufacturing and services.To convert digital-literacy gains into AI-readiness, the paper advocates for a structured "Skill Bridge" strategy that integrates government programmes with local MSME clusters, sector-specific AI-training modules, and performance-linked support. Such an approach can help rural MSMEs move from basic digital adoption to AI-assisted productivity and competitiveness, contributing to the broader vision of "AI for All" and inclusive Viksit Bharat.

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REFERENCES

1. PwC India. Unlocking the AI Edge for MSMEs. March 2026.
2. Ministry of MSMEs, Government of India. Guidelines for "Digital MSME" Scheme for Promotion of Information & Communication Technology in MSME Sector. MSME-TC-NR, 2024.
3. Government of India, MeitY. Promotion of Digital Literacy – PMGDISHA and Related Initiatives. PIB Release, 22 December 2022.
4. Ministry of Skill Development and Entrepreneurship (MSDE). Initiatives to Promote Skill Development Training through Use of Information Technology. PIB Release, 2025.
5. Ministry of Micro, Small and Medium Enterprises. Digital MSME and ICT-related Subsidy Programmes for MSMEs. DC(MSME), 2024.
6. Kumar, S. "Impact of Digital Literacy Programs on Empowerment of Rural Communities". BPAS Journal of Library & Information Science, 2024.
7. World Economic Forum & MeitY. An AI Playbook for India's SMEs. Geneva and New Delhi, 2025.
8. Government of India, MeitY. Overview of Digital MSME and PM-GKAN-Aligned Initiatives. Ministry of Electronics and Information Technology, 2024.
9. Research Group on Rural Digital Literacy. Data-Driven Evaluation of Rural Digital Literacy Programs – 2025 Report. 2025.
10. IJIRT. "Role of AI in Driving the Growth of MSMEs in India". International Journal of Innovative Research and Technology, 2025.
11. Digital India. (2024). Digital inclusion and rural digital empowerment report. Government of India.
12. Hindustan Times. (2024, July 17). 47.8 million rural citizens certified as digitally literate under PMGDISHA: Government. Hindustan Times.
13. Ministry of Electronics and Information Technology. (2024). Digital India initiatives and AI mission report. Government of India.
14. Ministry of MSME. (2025). Annual report 2024–25. Government of India, Ministry of Micro, Small and Medium Enterprises.
15. MSME Dashboard. (2024). Skill cumulative dashboard report. Ministry of Micro, Small and Medium Enterprises, Government of India.
16. NASSCOM&Meta. (2024). AI adoption and challenges among Indian MSMEs: White paper report. NASSCOM Industry Report.
17. National Institute for Micro, Small and Medium Enterprises. (2024). Annual report on MSME skill development and entrepreneurship training. Government of India.
18. NITI Aayog. (2024). AI for inclusive growth: Policy recommendations for MSMEs and rural enterprises. Government of India.
19. Organisation for Economic Co-operation and Development. (2024). Artificial intelligence and digital transformation in small businesses. OECD Publishing.
20. Organisation for Economic Co-operation and Development. (2024). OECD report on AI and small business transformation. OECD Publishing.
21. Press Information Bureau. (2024). Digital literacy certification data under PMGDISHA. Government of India.
22. Press Information Bureau. (2024, December 11). Over 6.39 crore persons trained under Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA). Government of India, Ministry of Electronics and Information Technology.
23. Sharma, R., & Verma, P. (2023). Digital transformation and rural entrepreneurship in India. Journal of Rural Development Studies, 12(3), 45–58.
24. Singh, A. (2024). Artificial intelligence adoption among Indian MSMEs. International Journal of Business Innovation, 8(2), 112–128.
25. The Financial Express. (2024, June 27). MSME Day 2024: 65% of tech MSMEs struggling to leverage AI due to limited awareness, says Nasscom-Meta white paper. Financial Express.
26. World Bank. (2023). Digital development opportunities for small enterprises in developing economies. World Bank Publications.