Bodhi International Journal of
Research in Humanities, Arts and Science

Vol. 10 Special Issue 2 December 2025
E-ISSN: 2456-5571

A Study on the Role of Bridging the Gender Gap in E-Business: AI Tools for Women's Economic Empowerment

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Open Access

Manuscript ID:
BIJ-SPL2-Dec25-ECO-047

Subject: Economics

Received : 21.08.2025
Accepted : 25.08.2025
Published : 31.12.2025

DOI: 10.64938/bijsi.v10si2.25.Dec047

Abstract

This study examines how artificial intelligence (AI) tools can be leveraged to bridge the gender gap in E-Bussiness and advance women's economic empowerment, with a specific focus on Tamil Nadu and India. . The digital economy has become a key driver of growth in India, with E-Bussiness platforms reshaping trade, services, and entrepreneurship. Despite these opportunities, women entrepreneurs face structural and cultural obstacles that hinder their full participation. Limited access to capital, unequal digital literacy, and social expectations often prevent women from harnessing the power of online markets. Artificial Intelligence (AI) technologies — such as predictive analytics, chatbots, automated marketing platforms, and recommendation engines — are emerging as transformative tools that can level the playing field. Relying solely on secondary data from government reports, scholarly publications, and industry statistics, this research synthesizes existing evidence to identify patterns, policy gaps, and emerging opportunities. Key findings suggest that AI tools significantly improve market reach, reduce operational costs, and open access to global supply chains for women-led businesses. However, awareness, training, and infrastructure support remain critical barriers. The study also evaluates current government initiatives and private-sector programs in Tamil Nadu aimed at digital skill-building and financial inclusion. Using descriptive tables to illustrate participation trends, this paper underscores the importance of gender-sensitive digital policies and investments in AI literacy. The analysis concludes that bridging the gender gap in E-Bussiness is not merely a question of equality but an economic imperative for sustainable growth. Policy recommendations include integrating AI into skill development schemes, enhancing access to affordable digital infrastructure, and promoting mentorship networks powered by AI-driven platforms. The findings have implications for policymakers, educators, financial institutions, and technology providers seeking to empower women in the era of Industry .The paper highlights the challenges faced by women entrepreneurs, including limited access to technology, funding barriers, and socio-cultural constraints, while exploring how AI-driven solutions—such as digital marketing automation, intelligent analytics, and virtual mentorship—can enable women to participate effectively in the digital economics.

Keywords: underrepresented, posterior, amplification, persistent, synthesize, exacerbating, amalgamation, confederation, manifestation, amplify

Introduction

The digital economy has become a key driver of growth in India, with E-Bussiness platforms reshaping trade, services, and entrepreneurship. Despite these opportunities, women entrepreneurs face structural and cultural obstacles that hinder their full participation. Limited access to capital, unequal digital literacy, and social expectations often prevent women from harnessing the power of online markets. Artificial Intelligence (AI) technologies — such as predictive analytics, chatbots, automated marketing platforms, and recommendation engines are emerging as transformative tools that can level the playing field.

However, this transformation has not been uniformly inclusive. Women entrepreneurs, despite their proven potential to contribute significantly to economic growth, remain underrepresented in the digital business ecosystem. Structural inequalities such as restricted access to finance, limited digital literacy, and deep-rooted socio-cultural expectations continue to hinder their participation.

In recent years, Artificial Intelligence (AI) has become a key driver of business efficiency and market expansion. AI technologies ranging from predictive analytics to automated digital marketing, virtual assistants, and inventory optimization allow businesses to reduce costs, improve decision-making, and scale rapidly. For women-led enterprises, these tools can be transformative: they minimize dependence on large workforces, provide real-time market insights, and open global supply chain opportunities. Yet, awareness and adoption of such tools remain limited, particularly among micro- and small-scale women entrepreneurs.

Tamil Nadu serves as an important case study due to its robust MSME sector, relatively better digital infrastructure, and proactive government initiatives for entrepreneurship development. The state has consistently performed above the national average in terms of women's participation in business, but the integration of AI tools among women-led enterprises still lags behind potential.

Need for the Study

The persistent gender gap in India's digital entrepreneurship is not only a question of social justice but also an economic concern. According to NITI Aayog (2021), narrowing the gender gap in business participation could add billions of dollars to India's GDP. Tamil Nadu, known for its vibrant micro, small-, and medium-scale enterprise (MSME) sector, has shown progress in women's economic participation. However, the adoption of AI tools among women-led enterprises remains limited.

Literature Review

A literature review is a critical summary of existing research and publications related to a specific topic. It identifies key theories, findings, and gaps in knowledge. Its purpose is to show what is already known, how studies relate to each other, and where further research is needed. It forms the foundation for new research by providing context and justification.

FICCI (2022) highlighted that AI-driven platforms enable women to reduce operational costs by 30% and enhance customer reach by 40%, but lack of awareness limits impact.

Kabeer (2019) emphasized that economic empowerment requires access to both resources and decision-making power.

Lakshmi and Ramya (2021), studying Tamil Nadu's rural digital literacy programs, found that targeted training improved women's willingness to adopt e-commerce tools.

Ministry of Skill Development and Entrepreneurship (2022) – Found that women constitute less than 25% of digital entrepreneurs in India, with digital literacy as a major barrier.

NITI Aayog (2021) – Reported limited access to financing and digital tools for women-led enterprises, calling for targeted government support.

Objectives

a. To analyse the role of AI tools in enhancing women's participation in E-Bussiness.
b. To identify key barriers hindering women entrepreneurs from adopting AI technologies.

c. To evaluate policy measures and initiatives that promote gender-inclusive digital entrepreneurship.
d. To recommend strategies for integrating AI tools into women-led enterprises to achieve sustainable economic empowerment.

Methodology

This research uses only secondary data collected from official government sources, academic journals, industry reports, and databases such as the Census of India, National Sample Survey Office (NSSO), and reports by the Ministry of Electronics and Information Technology. Data regarding female participation in E-Bussiness, adoption of AI tools, and entrepreneurship performance indicators were extracted from: Ministry of Skill Development and Entrepreneurship (MSDE) reports, National Sample Survey Office (NSSO) statistics, Tamil Nadu e-Governance Agency (TNeGA) publications, NITI Aayog and FICCI reports, and Peer-reviewed journal articles.

Data Findings and Sources

Table 1 Women's Participation in E-Business in Tamil Nadu vs. India (2018–2024)

Year	Tamil Nadu (%)	India Overall (%)
2018	12	10
2020	16	12
2022	20	15
2024	24	18

Source: Annual Reports (2018–2024)

Explanation

The above table represent Women's participation E- business in Tamil Nadu vs. India (2018-2024). Data compiled and estimated by the author using trend information from multiple secondary sources, including Ministry of Skill Development and Entrepreneurship (MSDE) Annual Reports (2018–2024), and Startup India data dashboards.

Table 2 AI Tool Adoption by Women Entrepreneurs in MSMEs (2024)

Tool type	Adopting Rate (%)
Digital Marketing AI	35
Predictive Analytics	28
Chatbots/Assistant	22
Inventory Automation	18

Source: The Economic Times, 2024.

Explanation

The above table represent adoption rates of AI tools among women-led MSMEs presented in Table 2 are based on a synthesis of multiple secondary data source. Meta–NASSCOM report and the Economic Times 2024.

Challenges

- **Digital Literacy Gap** – Rural and semi-urban women lack access to structured training in AI-driven tools.
- **High Cost of AI Solutions** – Many platforms remain unaffordable for small women-led businesses.
- **Limited Access to Finance** – Banks and investors still perceive women entrepreneurs as high-risk clients.
- **Socio-cultural Barriers –** Family and societal expectations can restrict women's entrepreneurial choices.
- **Infrastructure Deficit** – Poor internet connectivity and electricity issues affect rural areas in Tamil Nadu and other states.
- **Algorithmic Bias –** AI systems trained on biased data can inadvertently reinforce existing inequalities.
- **Infrastructure Limitations** – Inadequate internet access and poor digital infrastructure in rural or underserved regions restrict participation.
- **Policy Gaps** – Lack of comprehensive policies supporting women's inclusion in the digital economy limits systemic change.

Discussion

Findings show that women's participation in E-Bussiness is rising steadily, with Tamil Nadu performing better than many Indian states. However, AI adoption remains low due to limited awareness and affordability. Evidence suggests that AI improves productivity and global market reach for women-led businesses. Therefore, tailored interventions — including AI literacy programs, subsidized digital tools, and mentorship networks — are vital. Collaboration between state government agencies, financial institutions, and private technology providers is needed to bridge the gap and accelerate inclusive growth.

The data reveal that while Tamil Nadu performs better than the national average, significant gaps persist. AI tools—like automated inventory systems, digital marketing assistants, and voice-based analytics—could bridge these gaps by reducing technical complexity. However, adoption is slower among rural women due to poor infrastructure and limited AI awareness.

Policies must shift from general "digital inclusion" to AI-specific enablement, focusing on affordable tools, local-language training, and gender-sensitive entrepreneurship support.

However, despite these gains, women still represent less than one-fourth of digital entrepreneurs in Tamil Nadu and even fewer nationally, indicating that structural barriers continue to outweigh incremental progress.

Policy Recommendations

- **Integrate AI into skill development schemes** – Introduce AI-based entrepreneurship modules in programs like Digital India and Skill India to enhance awareness and capacity among women entrepreneurs.
- **Ensure affordable access to technology** – Provide subsidies, tax incentives, or shared cloud-based AI platforms for small women-led enterprises to reduce cost barriers.
- **Expand mentorship networks** – Build AI-powered platforms to connect women entrepreneurs with experts, investors, and global markets for real-time guidance.
- **Enhance financial inclusion** – Encourage banks and NBFCs to provide special credit facilities with reduced collateral requirements for women-led MSMEs.
- **Improve digital infrastructure** – Invest in high-speed internet access and rural technology hubs to reduce regional disparities and ensure that women in remote areas benefit equally.

Implementing these recommendations would accelerate AI adoption, improve business competitiveness, and enable women entrepreneurs to participate more fully in India's digital economy.

Conclusion

The study concludes that AI technologies have the power to transform women's entrepreneurship in India by overcoming systemic barriers in E-Bussiness. Tamil Nadu's relatively higher participation rates demonstrate the positive impact of targeted digital skill programs and infrastructure investments. However, women remain underrepresented in the digital economy, and AI adoption levels are still low, especially among micro and small-scale enterprises. Addressing these gaps is critical for inclusive growth. Bridging the gender divide in E-Bussiness is not just about achieving equality but also about unlocking substantial economic potential for the nation in the era of Industry. This study demonstrates that bridging the gender gap in E-Bussiness through Artificial Intelligence (AI) is both an equity goal and an economic imperative for India. Evidence from Tamil Nadu shows encouraging progress in women's participation in digital entrepreneurship, rising from 12% in 2018 to 24% in 2024, yet women remain significantly under represented. AI tools such as digital marketing platforms, predictive analytics, and chatbots have proven effective in enhancing productivity, expanding market reach, and reducing operational barriers for women-led enterprises. However, adoption remains selective and constrained by limited digital literacy, high costs, inadequate access to finance, and socio-cultural obstacles. These

findings affirm that technology alone cannot close the gender divide — it must be supported by targeted interventions including AI skill development, affordable digital infrastructure, inclusive financial policies, and mentorship networks. Empowering women to fully participate in the digital economy is not just a matter of social justice but a strategic pathway to drive innovation, create jobs, and ensure sustainable economic growth.

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