

ROLE OF HIGHER EDUCATION IN BUILDING SUSTAINABLE WOMEN TECHNOPRENEURS IN TIER-II CITIES: A ROADMAP FOR INCLUSIVE INNOVATION

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Abstract

Higher education institutions play a significant role in fostering innovation-driven and socially responsible women technopreneurs in India's Tier-II cities. Despite the growth of national initiatives such as Startup India, Stand-Up India, and Digital India, women's participation in technology-based entrepreneurship remains relatively low in smaller urban regions. Limited access to finance, mentorship gaps, digital skill constraints, and socio-cultural barriers continue to restrict women from entering the entrepreneurial ecosystem. This study examines the role of higher education institutions in empowering women students with entrepreneurial competencies, digital skills, and innovation exposure required to launch technology-based ventures. The study explores how entrepreneurship education, incubation support, industry interaction, and policy Awareness can improve women's readiness for sustainable technopreneurship. Using a descriptive research approach based on secondary data, policy reports, and case insights, the study highlights the importance of a structured curriculum design, digital capability building, and mentorship networks. The paper proposes a roadmap for developing sustainable women-led technopreneurship ecosystems in Tier-II cities by integrating entrepreneurship education, financial inclusion, digital innovation, and institutional support systems. The findings emphasize that higher education institutions can act as catalysts for inclusive innovation by bridging skill gaps, creating incubation awareness, and promoting collaborative networks between academia, industry, and government schemes.

Keywords: *Higher Education, Women Technopreneurs, Tier-II Cities, Sustainable Technopreneurship, Entrepreneurial Education, Digital Skills, Financial Inclusion, Mentorship, Inclusive Innovation.*

Introduction

Entrepreneurship has become an important driver of economic growth, innovation, and employment generation across the world. In developing countries like India, entrepreneurship contributes not only to economic development but also to social transformation and inclusive growth. To promote entrepreneurial activities, the Government of India has introduced several initiatives, such as Startup India, Digital India, and Stand-Up India, which aim to create a supportive ecosystem for innovation and startup development.

Despite these initiatives, women's participation in entrepreneurship, particularly technology-based entrepreneurship, remains comparatively low. Women entrepreneurs often face challenges such as limited access to finance, lack of mentorship, inadequate digital skills, and socio-cultural barriers. These challenges are even more significant in Tier-II cities where entrepreneurial infrastructure,

startup support systems, and innovation networks are still developing.

Higher education institutions play a vital role in developing entrepreneurial mindsets among students. Universities and colleges act as knowledge centers where students gain exposure to innovation, digital technologies, and business opportunities. Through entrepreneurship education, incubation centres, startup labs, and industry collaboration, higher education institutions can equip students with the skills required to launch technology-based ventures.

Maharashtra, one of India's most industrially developed states, has several emerging entrepreneurial hubs beyond metropolitan cities like Mumbai and Pune. Tier-II cities such as Nashik, Nagpur, Aurangabad, Kolhapur, Solapur, Amravati, Nanded, Jalgaon, Sangli, and Akola are witnessing growing startup activity due to improving digital infrastructure, skilled graduates

from educational institutions, and supportive government initiatives.

Technopreneurship, which combines technology and entrepreneurship, is gaining importance in the digital economy. Areas such as e-commerce, fintech, digital marketing, and artificial intelligence offer new opportunities for aspiring entrepreneurs. Women students equipped with digital skills and entrepreneurial knowledge can leverage these opportunities to create innovative and sustainable business ventures.

Therefore, this study examines the role of higher education institutions in promoting sustainable women technopreneurship in Tier-II cities. It identifies the major challenges faced by women entrepreneurs and proposes a roadmap that integrates entrepreneurship education, digital capability development, mentorship networks, and financial inclusion to support women-led technology ventures.

Literature Review

Entrepreneurship plays a crucial role in economic growth by encouraging innovation, opportunity recognition, and new business creation in modern economies (Shane & Venkataraman, 2000).

Women entrepreneurship contributes significantly to economic and social development, although women often face barriers such as limited financial access and weak professional networks (Brush, de Bruin & Welter, 2009).

Gender stereotypes and societal perceptions influence women's entrepreneurial intentions and participation in business activities (Gupta, Turban & Bhawe, 2008).

Entrepreneurship education in higher education institutions helps students develop entrepreneurial skills, creativity, and risk-taking abilities necessary for starting new ventures (Kuratko, 2016).

Digital technologies are transforming entrepreneurship by enabling innovative business models and expanding market opportunities for startups (Nambisan, 2017).

Sustainable entrepreneurship promotes economic development while addressing environmental and social challenges in modern business ecosystems (Neumeyer & Santos, 2018).

Small and medium enterprises and startup ecosystems contribute significantly to employment generation, economic innovation, and regional development (OECD, 2017).

Inclusive economic participation and gender equality are important factors for sustainable development and innovation-driven economies (United Nations, 2015).

Women entrepreneurship can enhance economic development in developing countries where

women's workforce participation remains comparatively low (Minniti & Naudé, 2010).

Women entrepreneurs in India often encounter challenges such as financial constraints, limited mentorship opportunities, and socio-cultural barriers (Baporikar, 2017).

Higher education institutions act as important catalysts in building entrepreneurial ecosystems by providing innovation exposure, incubation support, and skill development opportunities (Etzkowitz, 2008).

Technology-based entrepreneurship is becoming increasingly important in the digital economy, enabling startups to create scalable and innovative solutions (Audretsch, 2012).

Research Gap

Existing literature highlights the importance of entrepreneurship, women entrepreneurship, and the role of higher education in promoting innovation and startup development. However, limited studies focus specifically on women-led technopreneurship in Tier-II cities, particularly in the context of Maharashtra. There is also a lack of research explaining how higher education institutions can systematically support women students through entrepreneurship education, digital skill development, mentorship, and financial awareness. Therefore, this study attempts to address this gap by examining the role of higher education in promoting sustainable women technopreneurship in Tier-II cities of Maharashtra.

Objectives

To examine the role of higher education institutions in promoting women technopreneurship in Tier-II cities of Maharashtra.

To identify the major challenges faced by women technopreneurs in Tier-II cities, such as financial constraints, mentorship gaps, digital skill limitations, and socio-cultural barriers.

To analyze the impact of entrepreneurship education and digital skill development on women students' intention to start technology-based ventures.

To evaluate the contribution of incubation centres, industry collaboration, and institutional support in encouraging women-led startups.

To propose a roadmap for strengthening sustainable and inclusive women technopreneurship in Tier-II cities through higher education initiatives.

Methodology

The study adopts a descriptive research design using a mixed-method approach that combines both qualitative and quantitative analysis based on

secondary data sources. The qualitative aspect involves reviewing academic literature, policy documents, and reports related to entrepreneurship education, digital skill development, incubation support, and women empowerment to understand the current landscape of women technopreneurship. The quantitative aspect includes analyzing available statistical data on startup growth, women entrepreneurship, and entrepreneurial ecosystems in Tier-II cities. Secondary data were collected from sources such as research journals, government reports, Startup India, NITI Aayog, MSME reports, Government of Maharashtra publications, OECD reports, and United Nations development reports. The collected data were analyzed using descriptive and thematic analysis to identify key factors influencing women technopreneurship and to develop a conceptual roadmap for promoting sustainable women-led technopreneurship in Tier-II cities of Maharashtra.

Data Analysis

The collected data were analyzed using descriptive and thematic analysis in relation to the objectives of the study.

1. Role of Higher Education Institutions in Promoting Women Technopreneurship

Higher education institutions contribute to entrepreneurship development through entrepreneurship courses, incubation centres, innovation labs, and startup competitions. According to Startup India (2023), more than 50% of recognized startups in India originate from Tier-II and Tier-III cities, indicating increasing entrepreneurial activity beyond metro cities. Universities and engineering colleges in cities such as Nashik, Nagpur, and Aurangabad are promoting innovation through incubation centres, startup awareness programs, and entrepreneurship development initiatives.

2. Women Entrepreneurship Participation in India

According to the MSME Annual Report(2022):

| Category | Percentage |
|---------------------------------|------------|
| Women-owned MSMEs in India | ~20% |
| Women participation in startups | ~18% |
| Women in technology startups | ~10-12% |

Table No. 1 - Women Entrepreneurship Participation in India

This indicates that although women entrepreneurship is growing, women

technopreneurs remain underrepresented in technology-driven sectors.

3. Startup Growth in Tier-II Cities:

| Year | % Startups from Tier-II Cities |
|------|--------------------------------|
| 2018 | 32% |
| 2020 | 40% |
| 2023 | 50% |

Table No. 2 - Startup Growth in Tier-II Cities

Source: Startup India Ecosystem Report (2023)

This trend shows that Tier-II cities are becoming important innovation hubs due to lower business costs, improved digital infrastructure, and growing educational institutions.

4. Major Challenges Faced by Women Technopreneurs:

Based on literature and policy reports, the major challenges include;

| Challenge | Approximate Impact |
|-------------------------|--------------------|
| Lack of funding access | 35% |
| Limited mentorship | 25% |
| Digital skill gap | 20% |
| Socio-cultural barriers | 20% |

Table No. 3 - Major Challenges Faced by Women Technopreneurs

Source: NITI Aayog Women Entrepreneurship Platform Reports.

These challenges highlight the need for strong institutional support from higher education institutions.

Roadmap for Building Sustainable Women-Led Technopreneurship in Tier-II Cities

The analysis highlights that entrepreneurial education significantly influences women students' interest in technology-based ventures. Exposure to innovation ecosystems such as incubation centres, Startup labs, and hackathons enhances confidence and practical understanding of entrepreneurship. Digital skill development programs help women acquire competencies required for modern technology ventures such as e-commerce platforms, fintech applications, and digital marketing solutions.

Mentorship from industry experts and startup founders plays a crucial role in guiding aspiring women technopreneurs. Financial inclusion initiatives and awareness of government schemes also help overcome major funding barriers.

The presence of supportive networks, peer communities, and institutional encouragement further strengthens women's participation in the entrepreneurial ecosystem.

Framework for Women-Led Technopreneurship

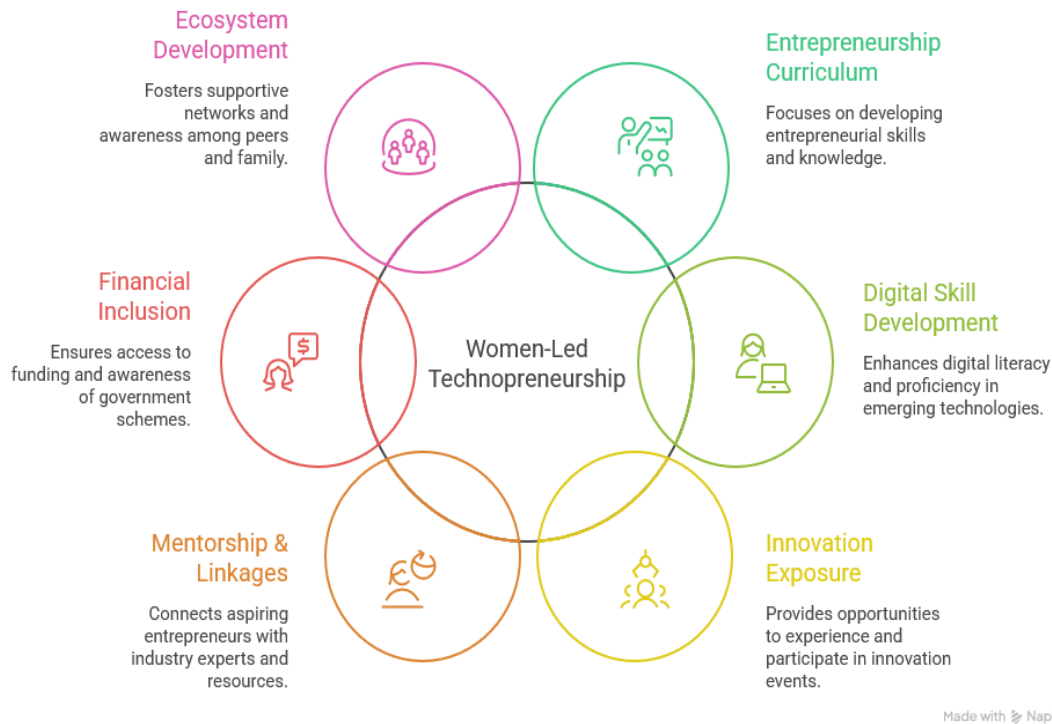


Fig. No. 3 - Framework for Women-LED Technopreneurship

Limitations

The study focuses only on Tier-II cities of Maharashtra, so the findings may not be applicable to other states or metropolitan regions.

The research is based mainly on secondary data sources, which may limit the depth of real-time insights.

The study does not include primary data from women entrepreneurs or students, which could provide more detailed perspectives.

Limited availability of city-specific statistical data related to women technopreneurs in Tier-II cities may affect the comprehensiveness of analysis.

Recommendations

Higher education institutions should strengthen entrepreneurship education and startup-oriented curriculum to encourage students to explore entrepreneurial careers.

Universities should establish and expand incubation centres, startup labs, and innovation hubs to support student-led startups.

Special training programs should be organized to improve digital skills such as AI, digital marketing, fintech, and e-commerce among women students.

Institutions should create mentorship networks involving successful entrepreneurs, industry experts, and startup incubators.

Greater awareness should be created regarding government funding schemes and startup support programs available for women entrepreneurs.

Collaboration between universities, government agencies, and industry partners should be strengthened to build a supportive entrepreneurial ecosystem in Tier-II cities.

Conclusion

Entrepreneurship has become an important driver of economic growth, innovation, and employment generation in the modern economy. Women entrepreneurship, particularly technology-driven entrepreneurship, has the potential to contribute significantly to inclusive and sustainable development. However, women entrepreneurs often face challenges such as limited financial access, mentorship gaps, digital skill limitations, and socio-cultural barriers.

The study highlights the important role of higher education institutions in nurturing women technopreneurs, especially in Tier-II cities of Maharashtra where startup ecosystems are gradually developing. Entrepreneurship education, digital skill development, incubation support, and industry collaboration can significantly influence women students' entrepreneurial intentions and capabilities.

By strengthening these institutional support systems and promoting awareness of government initiatives, higher education institutions can help build a supportive ecosystem for sustainable women-led technopreneurship. Encouraging women students to participate in technology-based entrepreneurship can contribute to innovation, regional development, and inclusive economic growth in Tier-II cities.

References

1. Audretsch, D. B. (2012). Entrepreneurship research. *Management Decision*, 50(5), 755–764.
2. Baporikar, N. (2017). Entrepreneurship development and women entrepreneurship in India. *International Journal of Entrepreneurship and Small Business*, 30(3), 423–439.
3. Brush, C. G., de Bruin, A., & Welter, F. (2009). A gender-aware framework for women's entrepreneurship. *International Journal of Gender and Entrepreneurship*, 1(1), 8–24.
4. Etzkowitz, H. (2008). *The triple helix: University–industry–government innovation in action*. Routledge.
5. Gupta, V. K., Turban, D. B., & Bhawe, N. M. (2008). The effect of gender stereotype activation on entrepreneurial intentions. *Journal of Applied Psychology*, 93(5), 1053–1061.
6. Kuratko, D. F. (2016). *Entrepreneurship: Theory, process, and practice* (10th ed.). Cengage Learning.
7. Minniti, M., & Naudé, W. (2010). What do we know about the patterns and determinants of female entrepreneurship across countries? *European Journal of Development Research*, 22(3), 277–293.
8. Nambisan, S. (2017). Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrepreneurship Theory and Practice*, 41(6), 1029–1055.
9. Neumeyer, X., & Santos, S. C. (2018). Sustainable business models and entrepreneurship policy. *Journal of Cleaner Production*, 198, 1343–1351.
10. OECD. (2017). *Enhancing the contributions of SMEs in a global and digitalised economy*. OECD Publishing.
11. Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review*, 25(1), 217–226.
12. United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. United Nations.