Bridging the Digital Gender Gap in India: Inclusive Leadership, Legal Rights, and the Rise of Women in Technology Entrepreneurship

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Abstract-- **This research paper will examine the relationship between access to digital education and the involvement of women in technology entrepreneurship in India. While there is a significant legal framework attempting to safeguard equality and numerous government-sponsored programs-such as the SHE Cohort and Future Tycoons initiatives-solopreneur women still encounter harsh social challenges like systemic discrimination and gendered biases, insufficient financing possibilities, and traditional societal expectations. Although some legal provisions like equal pay and occupational safety are available, gaps around policy awareness and implementation are fundamental-especially towards intellectual rights, regulation, and access to subsidized government programs. The scope of the study captures women entrepreneurship with its focus on STEM participation, highlighting women-led startups and active STEM initiatives set by educational institutions, but stresses that policy and legal reforms must be accompanied by personalized guidance through digital skills, community initiatives, and active involvement in making the entrepreneurial framework less obstinately exclusionary. Construction of gender-neutral frameworks alongside the improvement of existing social barriers is critical to harnessing the latent potential of women tech entrepreneurs in India.**

Keywords-- **STEM, SDG Goals, Entrepreneurial Ecosystem, PMDISHA**

I. INTRODUCTION

The intersection of digital education access, women's participation in tech entrepreneurship, and the influence of legal and social frameworks in semi-urban or tier-2 Indian cities remains an underexplored area in academic literature. While national-level data on digital literacy and women's economic participation exist, localized, gender-specific, and sector-focused studies are sparse (**Verma et al. 2024, Sujarwo et al. (2022, Debbarma and Chinnadurai 2023 etc**). This gap is particularly evident when examining how legal rights and social norms affect women's entry into technology-based entrepreneurial ventures, especially in smaller urban centers where cultural constraints are more deeply rooted.

Firstly, most existing research on digital education and women's entrepreneurship tends to focus on metropolitan areas such as Delhi, Mumbai, or Bangalore, where access to resources, policy implementation, and social awareness are comparatively advanced (**Hamid et al. 2020, Salamzadeh, 2024**). These studies often overlook the nuanced challenges faced by women in tier-2 cities, where infrastructure, societal attitudes, and institutional support mechanisms may not mirror those in larger cities. Thus, there is a critical need for place-based research that examines how regional contexts mediate access to digital education and shape women's entrepreneurial aspirations.

Secondly, while some research addresses gender disparities in technology education or entrepreneurship separately **(Goel and Ahuja, 2018),** there is a lack of integrated studies that connect digital education access to entrepreneurial outcomes among women. Most investigations treat these topics in isolation, failing to explore how digital upskilling (or the lack thereof) directly influences women's ability to innovate, launch, or sustain tech-based ventures. This separation also overlooks the pipeline from education to entrepreneurship—particularly important in assessing how women transition from digital learners to business leaders **(Chandwani and Verma, 2020).**

Thirdly, literature addressing the legal dimensions of women's entrepreneurship in India often focuses on macro-level policy frameworks such as the Maternity Benefit Act, MSME support schemes, or the Digital India initiative. However, there is minimal empirical investigation into how these legal instruments are perceived, accessed, or utilized by women in specific communities. For instance, how aware are aspiring women entrepreneurs in Amritsar of their legal rights to own property, secure loans, or benefit from government schemes targeting women in tech? Are these rights effectively enabling them to overcome traditional barriers, or are they limited by bureaucratic, social, or cultural constraints? These are critical questions that remain insufficiently addressed.

Furthermore, cultural and social barriers including gender norms, familial expectations, mobility restrictions, and digital patriarchy continue to hinder women's participation in digital spaces and entrepreneurial endeavours. Yet these social determinants are often generalized in literature without attending to regional or community-specific dynamics. India with its unique blend of religious conservatism and urban expansion, presents a compelling case for investigating how entrenched patriarchal norms and evolving economic opportunities coexist and influence women's choices.

This paper seeks to bridge these gaps by providing an empirical, region-specific examination of how access to digital education impacts women's participation in tech entrepreneurship in India. It will integrate legal analysis with socio-cultural evaluation, offering a comprehensive understanding of both structural enablers and inhibitors. By foregrounding the voices of women through primary research and engaging with local stakeholders, this paper will contribute original insights into the mechanisms that either facilitate or obstruct women's tech entrepreneurship in smaller Indian cities. In doing so, it not only addresses the geographical and thematic gaps in current literature but also offers policy-relevant findings to inform more inclusive and localized strategies for digital and entrepreneurial inclusion.

II. SDG GOALS AND INCLUSIVE LEADERSHIP AND DIGITAL EMPOWERMENT OF WOMEN

The leadership and digital empowerment of women fit well within the United Nations' Sustainable Development Goals (SDGs), most importantly in enhancing inclusive, equitable, and sustainable social development through education, gender equality, economic empowerment, and innovation. By studying the convergence points of digital education, women's legal rights, and tech entrepreneurship in India, it directly addresses various SDGs in the regional and national landscape.

SDG 4: Quality Education

The research responds to the root potential of digital learning as a factor in empowerment and social mobility. The research takes center stage addressing accessibility, openness, and proficiency of digital educational platforms for women within a semi-urban community. Through establishing hindrances—a gamut involving access to technological hardware to resistance from socio-culture—the study affirms focused, equitable expansion of digital illiteracy efforts. This contributes to lifelong capacity-building for the normally under engaged women's sector in the digital environment.

SDG 5: Gender Equality

Fundamentally, the project revolves around learning and breaking down gendered obstacles to education and entrepreneurship. It examines how legal rights (or their absence) and deeply rooted social norms restrict women's engagement in the digital economy. Through the production of policy suggestions and instruments for legal empowerment, the research seeks to empower women to enter and succeed in the tech entrepreneurship sector. This directly contributes to SDG 5.5 (ensuring full participation of women in leadership and decision-making) and 5.b (strengthening the use of enabling technology to enhance women's empowerment).

SDG 8: Decent Work and Economic Growth

Women's access to tech entrepreneurship is not just a matter of gender but also a route to economic progress. It emphasizes the ways in which better access to digital capabilities and legal rights can create more jobs and promote inclusive growth. Through the emphasis on women-owned micro-enterprises and startups, especially in non-metropolitan regions such as Amritsar, the research encourages innovation and self-employment—essential principles of inclusive and sustainable economic growth.

SDG 9: Industry, Innovation and Infrastructure

This identifies digital infrastructure not only as a technical field but also as a socio-political arena governed by access, literacy, and fairness. By evaluating how women use digital tools for commerce and learning, and to what extent legal and entrepreneurial systems are (or are not) supportive, the research makes recommendations for making tech ecosystems more equitable. It also offers information for policymakers and industry players to invest in gender-sensitive infrastructure and online platforms.

SDG 10: Reduced Inequalities

By focusing on a marginalized group—women in a conservative and semi-urban area of India—the research confronts system-wide inequalities and geographic disparities in opportunity access. It engages with legal, educational, and cultural frameworks that limit digital and entrepreneurial access, thereby helping the wider objective of decreasing gender and geographic inequality

III. RESEARCH STUDIES BASED ON INCLUSIVE LEADERSHIP AND DIGITAL EMPOWERMENT

Pavaimala and Renuka (2025) researched on the effects of digital education on women's empowerment. The study emphasizes how digital literacy is linked to greater social engagement, financial freedom, and self-reliance.

It also looks at issues like cost, accessibility, and cultural limitations. The study highlights how digital education can promote gender equality and societal advancement by examining case studies and statistical data.

Sudha and Muthukumaravel (2024) studied on Digital Literacy and Education Empowering Women Entrepreneurs. They found that Digital literacy serves as a catalyst for women entrepreneurs, empowering them to overcome barriers, seize opportunities, and thrive in the dynamic landscape of entrepreneurship.

A significant part of success in the tech-industry is shaped by fast growth and internationalisation and adequate public policies **(Dana et al., 2004).** Regardless, little is known about the effect of gender issues in the high technology sector and how women who start-up firms are affected or are facing these challenges **(Cohoon and Aspray, 2007).**

Wynarczyk and Renner (2006) stated that the effect of gender on entrepreneurial venturing and technological innovation is a 'largely neglected area of research and policy'.

A study on funding Swedish (traditional) start-ups confirms that women tend to rely on informal capital (Abbasian and Yazdanfar, 2015). But is this assumption also applicable to tech-ventures.

Despite significant strides toward gender equality, women continue to face unique challenges in the tech industry, particularly in terms of under-representation and systemic biases. Women are twice as likely as men to experience discrimination based on their gender (United Nation Report 2023).

Gender constitutes an essential dynamic in entrepreneurial learning since gender functions as a structure that emerges in the construction of different knowledge systems, organisational policies, and interactions (Rodriguez & Guenther, 2022).

It is for this reason that it is usually oriented in a way that women encounter different problems or limitations that men do not experience. The entrepreneurial learning task is part of the knowledge areas; the entrepreneurial preparedness aspect discusses gender at a personal level, while the learning history dimension identifies how gender affects the entrepreneurial process (Stead, 2017).

Hamid et al. (2020), makes an attempt to report the findings on women entrepreneurship and digital literacy skills. It focuses on digital knowledge and its usage. The findings showed that most of the respondents have knowledge of the Internet, are moderate in digital literacy skills, and have been using the Internet via smart phones and tablets to browse Face book and WhatsApp.

Debbarma and Chinnadurai (2023), explores the transformative impact of digital literacy and Information and Communication Technology (ICT) on women's empowerment. Emphasizing digital literacy as more than mere technical competence, the discussion navigates through the multifaceted skills required for meaningful engagement in a digitally connected world.

Sujarwo et al. (2022) attempted to investigate whether digital literacy- based information technology can be used as an empowerment model for women in tourist villages. The study showed that technology may be used by women in tourist villages to expose their culinary products.

According to **United Nations (2023)** the increased participation of women and girls in digital technology and innovation, and their engagement as students and professionals in science, technology, engineering and mathematics, is crucial to economies around the world, as well as the global transition to sustainability.

Verma et al. (2024) studied on role of digital entrepreneurship in social empowerment of women entrepreneurs in India: An empirical Study. A sample of 203 women entrepreneurs from different entrepreneurial sectors were surveyed know the factors that determines different Role of digital entrepreneurship in social empowerment of women entrepreneurs and found that breaking barriers, skill development, financial independence and community building are the factors that shows different role of digital entrepreneurship in social empowerment of women entrepreneurs. It equips women with digital skills, fosters an inclusive and bias-free digital environment, and helps to implement supportive policies.

These policies should focus on "providing financial aid, technical resources, and market access to empower female entrepreneurs" **(Sun et al., 2024).**

According to study conducted by **Ashcraft and Blithe (2010),** women in information technology hold 9% of management positions in the industry and account to 14% of senior management positions at Silicon Valley start-ups. From the venture capital dimension, less than 10% venture-backed companies in the United State West coast have a woman as founder that have raised a round of VC funding since 2005 **(PitchBook, 2015).**

There is a crucial role of social media platforms for women entrepreneurs that help to establish connections and overcome "societal pressures, family responsibilities, and traditional gender roles" **(Miniesy et al., 2022; Beninger et al., 2016).**

A creative entrepreneurial ecosystem stimulates innovation and competition by social media platforms like Facebook **(Beliaeva, 2020).**

Salamzadeh (2024) found that the customer reach and professional networks of women-owned businesses is significantly enhanced by accessing online markets and digital networking. It is proved that there are number of benefits of digital skill development platforms as they help to overcome traditional barriers, support the need for improved digital literacy among women entrepreneurs.

Apeh (2023) examined the impact of digital entrepreneurship on empowerment and revealed that introduction of innovative ways for entrepreneurs to digitize their businesses significantly contributes to youth empowerment and national development through job creation.

Goel and Ahuja (2018) explores the developing role of women in entrepreneurship in terms of digitalization and its impact on empowerment in India. In the digital world, women are improving themselves by lifting their interpersonal skills like "empathy and team building," which cannot be replaced by technology.

Karnavat et al. (2024) examined "Entrepreneurship Development Programs (EDPs)"and analyzed the connection between their demographic characteristics and perceptions of these programs in women's perspectives. It is revealed that since women recognised the efficiency in communicating essential entrepreneurial knowledge and skills, addressing the unique challenges faced by women entrepreneurs, and boosting confidence and self-efficacy, had positive views towards "Entrepreneurship Development Programs."

Chandwani and Verma (2020) highlights the establishment of digital presence that enables women to overcome many of the obvious limitations forced on them. The digital presence helps women to ease out and lessen the restrictions related to time and space, address the challenge.

In the context of women entrepreneurs, digital technologies have been identified as tools for overcoming traditional barriers such as access to finance, networking opportunities, and information **(Nambisan, 2021).**

IV. Focused Area Of Inclusive Leadership And Digital Empowerment Of Women In Punjab

Impact of Digital Education on Women's Entry and Growth in Tech Entrepreneurship

- Look into how access to digital literacy programs (like **Punjab's SHE Cohort** and **PMGDISHA**) empowers women with the technical know-how (think **AI/ML and e-commerce)** to kickstart and grow their tech businesses.
- Explore how online platforms (such as **Daraz** and **SHEROES**) help break down market access barriers and broaden business networks.

- Compare the differences in digital infrastructure between urban and semi-urban areas and how these disparities influence entrepreneurial success.

V. Role Of Legal Rights Awareness In Formalizing Women-Led Tech Ventures

- Gauge how aware women are of their legal rights under **Punjab's Industrial Policy 2022**, which includes things like intellectual property rights, business registration, and compliance with initiatives like Stand-Up India.
- Investigate how a lack of legal knowledge (for instance, around property ownership and funding access) can hold women back from formalizing and expanding their startups.
- Pinpoint the institutional hurdles that prevent gender-sensitive policies from being effectively implemented at the grassroots level.

VI. Identify Socio-Cultural Barriers Limiting Women's Participation In Tech Sectors

- Delve into the patriarchal norms (like family resistance and limited mobility) that disproportionately impact women in rural and semi-urban communities.
- Assess the intersectional challenges related to caste, class, and the rural-urban divide, especially for marginalized groups.
- Examine how effective mentorship programs (like **GirlsxTech**) can help counteract gender biases in male-dominated fields such as fintech.

Assessing the Effectiveness of Policies and Institutional Support Systems

- Take a closer look at how well Punjab's entrepreneurship initiatives (like the **Startup Punjab Fund** and **SHE Cohort 3.0**) are doing in creating tech ecosystems led by women.
- Explore how educational institutions (such as Guru Nanak Dev University) are helping to close the STEM skill gaps through partnerships with industry.
- Suggest improvements to boost digital infrastructure, access to funding, and legal aid services specifically designed for women entrepreneurs.

Alignment with Existing Research

- *Digital Literacy:* Builds on research that connects digital skills to market access (**IJFM, 2024)** and Punjab's commitment to tech-skilling women (Invest Punjab, 2024).

- *Legal Frameworks:* Addresses the gaps in legal awareness pointed out by the **Mediation Act, 2023,** and reports on Punjab's startup ecosystem.
- *Social Barriers:* Expands on findings from **JIER (2024)** regarding socio-cultural limitations and the necessity for mentorship to empower women entrepreneurs.

VII. CONCLUSION

This paper underscores that digital empowerment alone is insufficient to ensure women's meaningful participation in India's technology-driven entrepreneurial ecosystem. While national initiatives have strengthened digital infrastructure and formal startup frameworks, persistent social norms, limited legal awareness, unequal access to finance, and gaps in digital competencies continue to restrict women's full engagement in tech entrepreneurship.

These barriers are particularly pronounced for women from marginalized and special needs backgrounds, who face compounded structural disadvantages.

The findings reaffirm that inclusive leadership within educational institutions, community networks, and policy ecosystems plays a transformative role in bridging these gaps. Leadership models grounded in equity, mentorship, legal literacy, and gender-responsive digital training create enabling environments where women can transition from digital access to digital agency. By fostering safe, adaptive, and innovation-oriented learning spaces, inclusive leaders not only enhance entrepreneurial readiness but also promote confidence, resilience, and sustainable enterprise development.