

# Women in Science: Leading Innovation in Science and Technology- The challenges, achievements and Future prospects

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## Abstract

The growing participation of women in science and technology is essential for fostering innovation, sustainability, and global development. This study explores the achievements, challenges, and future prospects of women in STEM (Science, Technology, Engineering, and Mathematics). Despite increased access to education and a rising number of qualified women, their representation in leadership positions, research output, and decision-making roles remains limited. Structural barriers such as gender bias, unequal access to funding, and lack of recognition continue to hinder their career progression. Historically, women have made significant contributions to scientific advancement. Pioneers such as Ada Lovelace, Marie Curie, Rosalind Franklin, and Katherine Johnson exemplify resilience and innovation, paving the way for future generations. However, persistent inequalities, including the “Matthew Matilda effect,” highlight the continued under-recognition of women’s contributions in scientific fields. The study also emphasizes the role of women as key drivers of innovation. Gender diversity enhances creativity, interdisciplinary research, and problem solving, leading to more effective and sustainable scientific outcomes. Women led initiatives have contributed significantly to fields such as biotechnology, artificial intelligence, and environmental science. In recent years, policy interventions and global initiatives such as mentorship programs, scholarships, and international collaborations have improved women’s participation and leadership in science. Looking ahead, achieving gender parity requires sustained efforts from governments, institutions, and society. An inclusive STEM ecosystem, characterized by equal opportunities and supportive policies is crucial for addressing global challenges and promoting economic growth. Gender inclusivity is not only a matter of equity but also a strategic necessity for advancing science and technology.

**Keywords:** Women in STEM; Gender equality; Scientific innovation; Leadership in science; Inclusive development; Research productivity.

## Introduction

In the modern era, science and technology are the driving forces behind global development, shaping economies, healthcare systems, and environmental sustainability. Increasingly, women are

emerging as powerful contributors and leaders in these domains. Their involvement is not only a matter of gender equality but also a crucial factor in enhancing innovation, creativity, and problem solving. Studies suggest that inclusive participation in science leads to more effective and sustainable outcomes, making women's leadership essential in the innovation ecosystem (Pankratova, 2024). In common perception, women and science are often not seen as closely connected. Apart from Marie Curie, very few people can readily name women scientists. Even in the early twenty-first century, many journal and newspaper articles highlight both the loss faced by individuals and society when women choose not to pursue or continue in scientific fields, as well as the challenges even highly accomplished female scientists face in receiving recognition within their own communities. The role of women in science and technology has gained significant attention in recent years, particularly in the context of innovation and sustainable development. Studies indicate that women contribute uniquely to innovation processes by bringing diverse perspectives, interdisciplinary approaches, and inclusive solutions. A systematic review by Martínez et al. (2020) highlights that women's participation in innovation, especially in climate change solutions, enhances the effectiveness and sustainability of outcomes. The 2018 Gender Inequality Task Force Report by the National Institutes of Health highlights troubling patterns viz. women hold only 39% of tenure-track faculty positions and an even lower 23% of tenured roles, while their representation in leadership positions is more limited still. However, absence of delineation of women cannot be attributed to a scarcity of qualified candidates, as women have reported for more than half of Ph.D. graduates in the biological sciences for over a decade (Council of Graduate School; UNESCO, 2021).

Women who continue in scientific careers encounter numerous significant challenges. Strong evidence indicates the presence of gender bias in key areas of academic life, including hiring practices, pay structures, access to research funding, mobility opportunities, research directions, and recognition through prestigious awards (Racusin et al., 2012; Witteman et al., 2019; Liu, 2023). Moreover, women are clearly underrepresented in overall scientific output, especially in highly valued first-author positions. The peer-review process is also not free from bias, as women often experience unequal treatment within it. This concept, described as the "Matthew Matilda effect" by Margaret Rossiter (1993), explains how prominent male researchers, who largely dominate academic publishing, tend to receive a disproportionate number of citations, recognition, and authority within their disciplines. These imbalances highlight a persistent culture that is often unsupportive of women, reinforced by structural barriers that hinder their professional advancement (Yang, 2024).

This study adopts a qualitative and descriptive research design, aimed at analysing the role of women in science and technology. It focuses on understanding their contributions, challenges faced, and future opportunities through an integrative approach. The study was based on the secondary data collection, primarily on secondary sources which includes peer-reviewed journal, research articles, government and international reports, online databases and reports on gender equality in STEM fields. Thematic analysis is used to identify recurring patterns and themes such as gender bias and discrimination, access to education and opportunities, leadership and innovation contributions and policy support and institutional frameworks. Comparative analysis is conducted between past and present scenarios to understand progress and trends. This study covers the global as well as regional perspectives, focuses on various fields of STEM and includes both the historical contributions and current developments.

### **Gender in the history of science:**

Now a days, the continued under representation of women in leadership roles within science has been widely discussed and critically examined in academic circles. Since 1901, just 26 out of the 646 Nobel Prizes awarded in Physics, Chemistry, and Medicine have gone to women. From the early 1980s onward, there has been a significant expansion in studies focusing on gender and science. Spearheaded largely by American scholars, this body of work includes contributions from historians, as well as philosophers, sociologists, and scientists, all of whom have investigated the marginalized role of women in science and the associated notion of the “masculinization” of the field. Although a few detailed studies on women in science and medicine appeared in the early twentieth century, the topic was later largely overlooked in the history of science. However, from the 1960s onward, the field like other areas of historical study was influenced by emerging philosophical and intellectual movements that encouraged critical examination of dominant narratives and traditional ideas of progress. Feminist historians reshaped this perspective. As early as 1982, Margaret Rossiter, in her extensively researched first volume on women scientists in America, surprised readers by presenting a detailed account of the “double bind” faced by women scientists from the late nineteenth to the early twentieth century. Positioned between two nearly conflicting stereotypes, they were seen as “atypical” both as women and as scientists. Consequently, even as access to higher education expanded, women found it relatively easier to study science than to secure successful careers in it, a challenge that persisted over time (Watts, 2013).

Historically, women have made remarkable contributions to science despite facing systemic barriers. From early pioneers to modern innovators, women have gradually carved a space in scientific

research and technological advancement. Although their participation was limited in the past, recent decades have seen a significant rise in women entering Science, Technology, Engineering and Mathematics (STEM) fields and contributing to groundbreaking discoveries (Hamdi, 2022).

Throughout history, women have made significant contributions to STEM, often overcoming societal barriers to achieve groundbreaking innovations. Their work has advanced scientific knowledge and inspired future generations. Ada Lovelace, pioneered the concept of algorithms through her work on the Analytical Engine, laying the foundation of modern computing. Marie Curie revolutionized the study of radioactivity and contributed to cancer treatment through her discoveries. Rosalind Franklin provided crucial evidence for the DNA double-helix structure, while Katherine Johnson played a key role in space missions through her precise calculations. These women exemplify resilience and innovation, and their achievements continue to promote inclusivity and recognition of women in STEM (Nweje, 2025).

Despite these contributions, a persistent gender gap exists in STEM fields. According to Hill, Corbett, and St. Rose (2010), women remain underrepresented in science and technology careers, which limits the overall innovation potential of societies. This gap is further reinforced by structural barriers such as gender bias, unequal access to resources, and limited leadership opportunities.

A notable rise can be seen in the proportion of female scientists appearing as first authors in research publications, increasing from 15.6% in 1990 to 21.6% in 2016. A comparable pattern is evident for last authorship, which grew from 10.1% to 21.2% over the same period. In addition, the presence of women across research teams and institutions shows considerable variation. Interestingly, the growth in female representation in leading author positions is more pronounced within larger research groups and prestigious institutions (Samson, 2006; Yang, 2014; Nweje, 2025).

## **Women as drivers of innovation**

Recent research emphasizes the importance of women in leadership roles for driving innovation. A 2024 study published in *Humanities and Social Sciences Communications* demonstrates that organizations with women leaders tend to exhibit higher levels of creativity, collaboration, and innovation performance. This suggests that gender diversity is not only a matter of equality but also a driver of economic and technological progress. Women are increasingly leading innovation across diverse fields such as biotechnology, artificial intelligence, healthcare, and environmental science. Many reports show that women lean to adopt and promote technologies that are efficient and socially beneficial. Their

participation in innovation processes contributes to greater productivity, diffusion of ideas, and sustainable technological development (Lemaire, 2021).

Moreover, women led research teams often generate more novel and disruptive ideas, challenging traditional scientific paradigms and expanding the boundaries of knowledge. Innovation fuels scientific progress by expanding knowledge and pushing boundaries. It can be understood in two forms: novelty (new or recombined ideas) and disruption (paradigm-shifting impact). Novelty arises from existing knowledge and drives societal and technological advancement, while diversity and inclusivity further enhance it. Disruption, based on paradigm shifts, reflects how new ideas transform or replace existing frameworks. It is often measured through citation networks, with tools like the CD index used to assess the disruptive impact of scientific work (Yang, 2024).

### **Role of women in leading scientific research:**

Women in leadership roles significantly influence innovation outcomes. Organizations with women leaders demonstrate higher levels of creativity, collaboration, and inclusive decision-making. A large-scale study across developing nations highlights that women's leadership positively impacts corporate innovation and organizational performance (Kong, 2024).

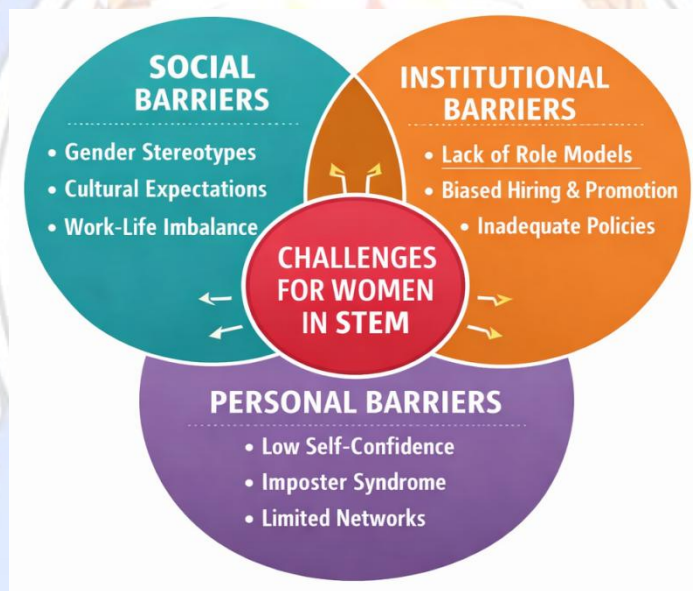
According to the Department of Science and Technology, the participation of women as leaders in scientific research is gradually increasing. The recent report shows that the proportion of women Principal Investigators (PIs) rose from 24% in 2016–17 to 28% in 2018–19 in projects supported through Extramural Research (EMR) funding. During 2018–19, total EMR funding by the central government increased to ₹2091.04 crore from ₹2036.32 crore in the previous year. Alongside this, both the number of research projects and PIs grew, with 3839 PIs leading 4616 projects compared to 3491 PIs and 4137 projects in 2017–18.

A major share of funding (71%) was concentrated in eight states in India, including Tamil Nadu, Delhi, Karnataka, and Maharashtra. Among institutions, the IITs received the highest number of projects and funding, followed by NITs. Engineering and Technology secured the highest funding, while Biological Sciences accounted for the largest number of projects. The Department of Science and Technology (DST) contributed the majority of EMR funding (67%), followed by the Department of Biotechnology (DBT) at 16%, together accounting for 83% of total funding (<https://dst.gov.in/role-women-leading-scientific-research-increasing>).

Scientific and technological activities play a crucial role in national development, requiring significant investment and efficient use of resources. In this context, EMR projects awarded through a competitive, peer-reviewed process which help to promote research and innovation while encouraging scientists to pursue research careers. The CHORD division of DST is responsible for collecting and analysing data on such projects, which supports policy planning and evaluation. The annual directory of extramural R&D projects, published by DST since 1990–91, provides comprehensive data on funded research. The 2018–19 edition includes details of 4616 projects supported by 16 government agencies (<https://dst.gov.in/role-women-leading-scientific-research-increasing>).

### Barriers to the Participation of Women in Science:

A clear understanding of the challenges limiting women's careers in science has frequently been obstructed by enduring myths and stereotypes. Here, **Table 1** outlines some of these widely held assumptions and compares them with available evidence.



**Figure1:** Barrier faced by women in STEM (Source: Nweje, 2025).

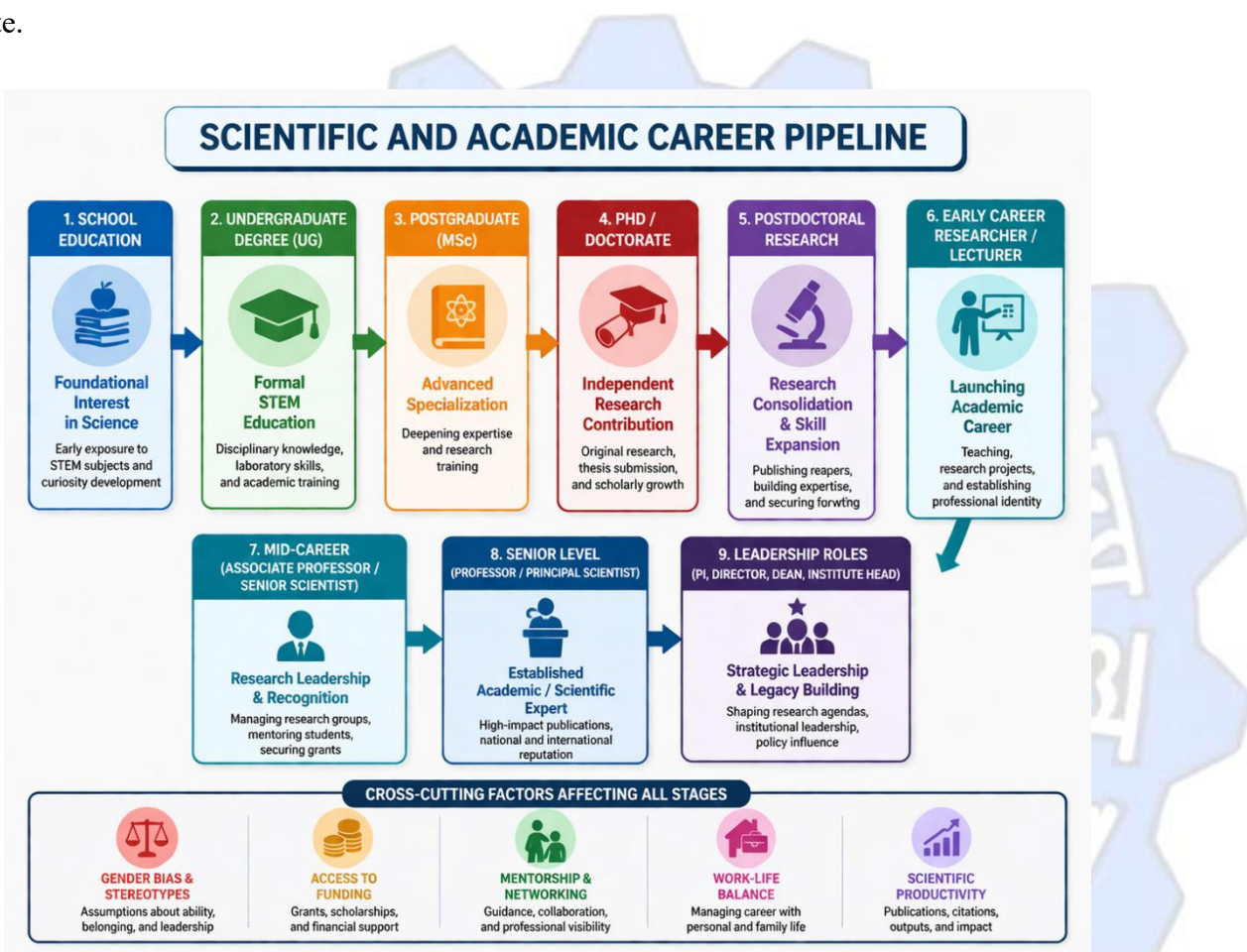
**Table1:** Myths Surrounding Women in STEM: An Evidence-Based Reassessment (Source: Extracted and adapted from NAS, 2007)

Myth	Evidence
<p>Women don't have ability and drive to succeed in STEM.</p>	<ul style="list-style-type: none"> <li>✓ Studies of brain structure and function, hormonal modulation, human cognitive development, and human evolution have not found any significant biological difference in men's and women's ability to perform in science and mathematics (Ceci and Williams, 2007).</li> <li>✓ In the United States, female performance in high school mathematics matches that of males (NAS, 2007).</li> <li>✓ Among adolescents in the top 1 percent of mathematics ability, boys are almost twice more likely than girls to obtain degrees in physical sciences and engineering (Weinberger, 2005). Lack of innate mathematics ability could not explain this difference.</li> </ul>
<p>The underrepresentation problem in science faculties will be naturally solved with the passing of time.</p>	<ul style="list-style-type: none"> <li>✓ In the United States, women under representation along the academic career is present also in fields that have had a large proportion of female Ph.Ds. for 30 years (NAS, 2007).</li> </ul>
<p>Academia is a meritocracy.</p>	<ul style="list-style-type: none"> <li>✓ Scientists like to accept that they "choose the best" based on objective criteria, decisions are influenced by factors—including biasness about geographic location of a university, and age, race, sex etc.— that have nothing to do with the quality of the person or work being evaluated.</li> <li>✓ An article receives less favorable reviews when it is identified as written by a female author (Paludi and Bauer, 1983).</li> </ul>
<p>Changing the rules of selection and promotion to foster gender equality means that the standards of excellence and advancement will be adversely affected.</p>	<ul style="list-style-type: none"> <li>✓ Throughout a scientific career, advancement depends upon judgments about one's performance by more senior scientists and engineers. This process does not optimally select and advance the best scientists and engineers, because of implicit bias and disproportionate weighting</li> </ul>

	<p>of qualities that are stereotypically male. Reducing these sources of bias will foster excellence in science and engineering fields.</p> <ul style="list-style-type: none"> <li>✓ Wenneras and Wold (1997) stated that “a woman has to be more than twice as productive as a man to be judged equally competent.”</li> </ul>
<p>Female faculty members are less productive than their male counterparts.</p>	<ul style="list-style-type: none"> <li>✓ Over the last 30 years, women faculty in science and engineering have demonstrated a substantial increase in publication productivity, reaching levels comparable to their male counterparts. Access to institutional resources remains the most significant determinant of research output, while factors such as marriage, childcare, and eldercare responsibilities exert only limited influence.</li> <li>✓ According to Sedeño (ed.) (2001), “women are members of low power committees, have fewer financial resources, less support from staff, or are located in offices which are further away, lack access to “beginners’ networks” in order to obtain information, and do not have models or mentors to ask for advice or support.”</li> <li>✓ Symonds (2007) finds that funding still depends on the number of papers published, which keeps men at the top.</li> </ul>
<p>Women are often perceived as less competitive than men and less inclined to pursue careers in academia.</p>	<ul style="list-style-type: none"> <li>✓ Equal proportions of men and women science and engineering doctoral students plan to enter postdoctoral study or academic employment.</li> </ul>
<p>Women are often seen as prioritizing family over careers.</p>	<ul style="list-style-type: none"> <li>✓ Despite balancing parenting and professional roles, women in STEM remain in academia, though their dedication is often undervalued.</li> </ul>
<p>Women take more time off due to childrearing, so they are a bad investment.</p>	<ul style="list-style-type: none"> <li>✓ Study in an average, early in their careers, women often take more time off for caregiving; however, by middle age, men tend to take more sick leave.</li> </ul>

The system as it currently exists has worked well in producing great science; why change it?	✓ Career barriers rooted in bias prevent the nation from benefiting from capable and accomplished researchers.
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The factors identified in economic literature across different stages of the career pipeline are outlined in **Figure 2**. These include higher education, career development stages, and scientific productivity. While some factors are specific to certain stages, many persist throughout the entire career route.



**Figure2:** Scientific and Academic Career pipeline (Source: Castillo, 2014).

**Strategies for Advancing Women's Role and Participation: Current efforts and initiatives:**

Across the globe, governments, universities, and international organizations have introduced and implemented various policies to address the barriers outlined earlier and to enhance women's participation in science and technology. While some of these measures target specific stages of the career pipeline, many have broader impacts across multiple stages (Castano, 2010).

In Europe, most countries have taken significant steps to promote gender equality in STEM. Many European Union member states have adopted policies focused on women in science, including commitments to gender mainstreaming, the establishment of national committees on women and science, the collection of sex-disaggregated data, and the promotion of gender-focused research and studies (Caprile, 2010).

#### **a) Government and Institutional support:**

A key set of initiatives focuses on boosting women's participation in higher science education. These include mentoring programs that connect PhD students, postdoctoral researchers, and senior academics (as seen in countries like Norway and Germany), as well as motivational sessions for female school graduates. Other policies aim to make scientific fields more attractive to women by addressing gender biases in education and improving the perception of STEM careers. The programs are like Women Give New Impetus to Technology (Germany), The Great sEXPERIMENT (Belgium), Athena Project (UK), The ETHNIC Project (EU), SciTech (Sweden), Increasing the Participation and Advancement of Women in Academic Science and Careers Advance Program (USA) (OECD, 2008). These types of programs generally motivate women to pursue their career goals. They help build self-confidence, facilitate networking with peers in similar situations, and provide a better understanding of academic and research institutions and their structures (Castillo, 2014). Assessing the effectiveness of these policies in promoting gender equality is essential. Accordingly, several initiatives such as the ADVANCE Fellows Program, the Aspatia Program of the Netherlands, and the G&D Rockefeller and Borlaug Fellowship Programs have been evaluated to examine their impact on women's careers. Overall, these programs have been found to be successful, although certain challenges were noted in their design and implementation (Chu, 2006).

#### **b) Public Foundations and International Non-Governmental Organizations:**

Public foundations are non-profit organizations that receive support from the public, with funding coming from a combination of individual donors, government bodies, private foundations, and other sources. In recent years, many of these organizations have adopted a rights-based approach, while others are still in the process of integrating such perspectives. Overall, they have expanded their engagement with governments and multilateral institutions, strengthened their policy and advocacy efforts, and increasingly utilized human rights frameworks to support and legitimize their initiatives.

For this study, organizations such as ActionAid International, Hivos, and NOVIB (both based in the Netherlands) were analysed. ActionAid International, Hivos, and NOVIB were examined in this study. While all focus on gender equality and women's rights, their engagement with science, technology, and innovation (STI) is limited and uneven. Most related programs concentrate on education, ICTs, and health, especially HIV/AIDS. NOVIB has recently begun integrating gender issues into agriculture and sustainable development, though its impact is still uncertain (Samson, 2006)

**Table2:** Major Worldwide Initiatives Promoting Women in science (STEM) and their Outcomes (Source: Nweje, 2025)

Initiatives	Region	Focus	Outcomes
L'Oréal-UNESCO For Women in Science	Global	Scholarships and research funding	Supported over 3,600 women scientists globally
Girls Who Code	USA, Global	Coding education for girls	Over 500,000 participants, many joining tech companies
Vigyan Jyoti	India	Encouraging STEM education for girls	Increased female enrolment in STEM courses by 15% in target areas
African Girls Can Code Initiative	Africa	Digital and coding skills for young women	Trained thousands of young women in digital technologies
Horizon Europe	Europe	Funding for women researchers	Increased female participation in EU-funded research projects
UN Women's STEM Campaigns	Global	Advocacy, policy reforms, and partnerships	Raised global awareness and initiated regional STEM programs

## **Envisioning an Inclusive and Equitable Future:**

Achieving gender equality in STEM is an ambitious yet achievable goal that requires joint efforts from governments, institutions, and individuals. The future of STEM should be inclusive and equitable, reflecting different perspectives essential for solving global challenges.

In this perception, women have similar access to education through mentorship, scholarships, and digital platforms. Emerging fields such as quantum computing, AI and green technologies benefit from balanced gender representation, supported by inclusive policies and leadership opportunities. An inclusive future also imagines young girls aspiring to become scientists and innovators, inspired by successful women role models. Diverse teams enhance collaboration and innovation, leading to solutions that serve all sections of society. By addressing structural impediments and promoting inclusivity, STEM can evolve into a field where success is determined by ability rather than gender, ensuring that women's contributions are recognized and continue to drive global progress (Kopinathan, 2020).

### **Conclusion:**

Gender inclusivity in science is not only a matter of fairness but also a key driver of innovation and economic development. When women are equally represented, a wider range of ideas and perspectives emerges, enhancing creativity and enabling more effective solutions to complex challenges. Women's contributions from major discoveries to advanced innovations, are vital to scientific and technological progress. Inclusivity also carries significant economic benefits. Reducing the gender gap allows countries to better utilize their full talent pool, boosting productivity and growth. In a world where technological advancement shapes global competitiveness, participation of women in STEM is important for addressing major issues such as digital transformation, healthcare, and climate change.

Beyond economic and scientific gains, gender inclusivity promotes broader social progress. It empowers communities, inspires future generations, and provides role models who break stereotypes. The growing success of women in STEM is gradually reshaping societal perceptions and encouraging young girls to pursue careers in traditionally male-dominated fields.

### **References:**

1. Bansal, S., et al. (2017). Gender and its rising role in modern Indian innovation and entrepreneurship. *IIMB Management Review*, 29(4), 234–245.

2. Caprile, M., and N. Vallès. 2010. "Meta-Analysis of Gender and Science Research Topic Report: Science as a Labour Activity." Luxembourg: Publications Office of the European Union.
3. Castano, C., Müller, J., González, A. and R. Palmén. 2010. "Policy Towards Gender Equity in Science and Research", Meta-Analysis of Gender and Science Research, mimeo
4. Ceci, S. J., and W. M. Williams. 2007. "Why Aren't More Women in Science? Top Researchers
5. Chu Clewell, C., Cosentino de Cohen, C., Tsui, L., and Deterding, N. 2006. "Revitalizing the Nation's Talent Pool in STEM", Washington, DC: The Urban Institute.
6. Debate the Evidence." Washington, DC: American Psychological Association.
7. Ding, W. W., et al. (2022). Female inventors and innovation performance: Evidence from patent data. *Journal of Innovation & Knowledge*, 7(2), 100–115.
8. Hamdi, Y., Mulder, N., & Abdelhak, S. (2022). Women in Systems Science and Gender Parity: Why and How to Democratize the "Technology, Innovation, and Society Nexus". *OMICS: A Journal of Integrative Biology*, 26(6), 329-338.
9. Hill, C., Corbett, C., & St Rose, A. (2010). Why so few? Women in science, technology, engineering, and mathematics. American Association of University Women. 1111 Sixteenth Street NW, Washington, DC 20036.
10. <https://dst.gov.in/role-women-leading-scientific-research-increasing>.
11. Kong, L., Usman, M., Yue, W., Yasmin, F., & Sokolova, M. (2024). Leadher: role of women leadership in shaping corporate innovation. *Humanities and Social Sciences Communications*, 11(1), 1-10.
12. Kopinathan A, Weaver L, Locock K. Be a catalyst for change: breaking down barriers to maximise Australian female talent in chemistry. *Australian Journal of Chemistry*. 2020 Jun 5;73(10):853-60.
13. Le Loarne-Lemaire, S., Bertrand, G., Razgallah, M., Maalaoui, A., & Kallmuenzer, A. (2021). Women in innovation processes as a solution to climate change: A systematic literature review and an agenda for future research. *Technological Forecasting and Social Change*, 164, 120440.
14. LeadHer: Role of Women Leadership in Shaping Corporate Innovation. (2024). *Humanities and Social Sciences Communications*.
15. Liu, M., Yang, S., Bu, Y., & Zhang, N. (2023). Female early-career scientists have conducted less interdisciplinary research in the past six decades: Evidence from doctoral theses. *Humanities and Social Sciences Communications*, 10, 918.
16. Martínez, J. L., et al. (2020). Women in innovation processes as a solution to climate change: A systematic review. *Technological Forecasting and Social Change*, 160, 120–130.

17. Moss-Racusin, C. A., Dovidio, J. F., Brescoll, V. L., Graham, M. J., & Handelsman, J. (2012). Science faculty's subtle gender biases favor male students. *Proceedings of the National Academy of Sciences*, 109(41), 16474–16479.
18. Nweje, U., Amaka, N. S., & Makai, C. C. (2025). Women in STEM: Breaking barriers and building the future. *International Journal of Science and Research Archive*, 14(1), 202-217.
19. OECD. 2008. "Women in Scientific Careers: Unleashing the Potential." Paris: Organisation for Economic Co-operation and Development.
20. Paludi M. A., and W. D. Bauer. 1983. "Goldberg Revisited: What's in an Author's Name?" *Sex Roles*, 9: 387–390.
21. Pankratova, E., Ajwad, M. I., Alrayess, D. J., Loots, S., Duell, N., & de Moraes, G. (2024). *Unlocking Opportunities*.
22. Rossiter, M. W. (1993). The Matthew Matilda effect in science. *Social Studies of Science*, 23(2), 325–341.
23. Samson, A. E. S. (2006). Gender and science, technology, and innovation. *UNCTAD Current Studies on Science, Technology and Innovation*, (5).
24. Sedeño, E. 2001. "A modo de introducción: las mujeres en el sistema de ciencia y tecnología."
25. Symonds, M. 2007. "Perspectives: Quantity, Quality and Equality." *New Scientist*, 195: 2611.
26. Tacsir, E., Grazi, M., & Castillo, R. (2014). *Women in science and technology: What does the literature say?*
27. *The Innovation Recognition Paradox*. (2026). *Journal of Innovation Studies*.
28. UNESCO. (2021). *Gender equality in science, technology and innovation*. Paris: UNESCO Publishing.
29. Watts, R. (2013). *Women in science: a social and cultural history*. Routledge.
30. Weinberger, C. J. 2005. "Is the Science and Engineering Workforce Drawn from the Far Upper Tail of the Math Ability Distribution?" Working Paper. Institute for Social, Behavioral and Economic Research and Department of Economics. Santa Barbara: University of California at Santa Barbara.
31. Wennerås, C. and A. Wold. 1997. "Nepotism and Sexism in Peer Review." *Nature*, 387: 341–43.
32. Witteman, H. O., Hendricks, M., Straus, S., & Tannenbaum, C. (2019). Are gender gaps due to evaluations of the applicant or the science? A natural experiment at a national funding agency. *Lancet*, 393(10171), 531–540.
33. *Women in STEM Education*. (2023). *Frontiers in Education*, 8, 1319874.