

THE conversation on women in science, technology, engineering and mathematics (STEM) has, for too long, been framed around inclusion. It is time to reframe it around power, leadership and agency. The real question is not whether women should participate in science and technology, but whether they will shape its future.

Across the world, women are stepping forward not just as scientists and innovators, but as institution builders, capital allocators and ecosystem shapers. Their influence is redefining how we think about empowerment—not as access alone, but as the ability to create, lead and transform systems.

India begins from a position of latent strength. Women account for a significant 43 percent of its STEM graduates, placing the country among the strongest globally in terms of participation. The imperative now is to convert this participation into authority and leadership.

Though women enter STEM education in significant numbers, their drop-offs at senior levels—in research leadership, deep-tech entrepreneurship and policy influence—remain stark. This is not a pipeline problem alone. It is a power asymmetry. Empowerment in STEM must, therefore, move beyond with elevation to leadership, ownership and participation in decision-making.

Encouragingly, India's wider policy experience shows what is possible when structural barriers are removed. Over the past decade, women's access to assets, credit, health and basic infrastructure has expanded at unprecedented scale. More than 72 percent of homes under PM Awas Yojana (Gramin) are owned by women, while women account for nearly 69 percent of loans sanctioned under the Mudra Yojana and 84 percent of beneficiaries under the Stand-Up India scheme. These outcomes demonstrate that when women are given agency and control over resources, participation can translate into leadership.

When women lead in science, they expand the frontier of what science chooses to solve. They bring not just representation, but reorientation. From healthcare to climate science, women leaders often prioritise preventive and community health models, focus on access, affordability and equity, and drive collaborative, interdisciplinary innovation. This is not anecdotal; it is structural. Diverse leadership produces more relevant, scalable and humane solutions.

A defining shift of our time is that

Women form a significant share of India's STEM graduates. It's time to elevate them to positions where they can also shape the budgets and policies that govern science

WOMEN AS LEADERS IN SCIENCE AND TECH, NOT JUST PARTICIPANTS

Indianexpress ,dt:17.4.26,pgno.10

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women are not waiting to be included; they are deploying capital and influence to build new pathways. American philanthropist MacKenzie Scott has redefined large-scale trust-based philanthropy, directing billions towards education, equity and institutional capacity. Closer home, Rohini Nilekani has consistently emphasised building public goods and ecosystems—recognising that access to knowledge, digital infrastructure and education are foundational to participation in the future economy.

In India, this shift is also being reinforced by public policy that expands women's economic agency by bringing them into the mainstream. Over the past decade, the country has invested in enabling conditions that free up women's time, energy and ambition. Clean cooking access through more than 10

crore Ujjwala LPG connections has reduced health burdens. Tap water to over 14 crore rural households under the Jal Jeevan Mission has lifted one of the most invisible forms of unpaid labour. Improved dignity and safety through Swachh Bharat—where over 90 percent of women report freedom from the dangers of open defecation—has transformed everyday lives.

Yet, we risk under-leveraging this advantage if women continue to be underrepresented in advanced research, innovation ecosystems and leadership roles. Empowerment must therefore be engineered deliberately. Women trained in science and technology bring evidence-based thinking, data literacy and systems reasoning into governance—strengthening policymaking across public health, cli-

mate and digital infrastructure.

In the age of artificial intelligence, this becomes even more critical. AI systems are not neutral; they reflect the data, assumptions and values embedded within them. Women leaders with STEM grounding are uniquely positioned to shape AI regulation and deployment so that innovation remains inclusive, ethical and socially responsive.

If we are serious about women's empowerment in STEM, we must focus on four structural levers. **Early confidence, not just early exposure:** ensuring girls see themselves as future scientists, engineers and innovators. **Networks that matter:** providing mentorship, sponsorship and peer networks that are critical to progression. **Flexible career pathways:** not allowing career breaks to become career dead-ends. **Access to capital and platforms:** supporting women as founders and builders in deep-tech and life sciences.

These levers are most effective when backed by systems that reduce time poverty and health burdens—areas where India's development experience offers valuable lessons. Women's empowerment in STEM is not about incremental progress. It is about systemic redesign. It requires institutions that promote women into leadership, capital that backs women-led innovation, policies that enable continuity and scale, and narratives that celebrate women as creators of science—not just contributors.

The future of STEM will be defined not just by technological breakthroughs, but by who leads them. Empowerment is not the end goal; it is the starting point. The real objective is power. And it is time women claim it—fully, visibly and decisively.

Moving from aspiration to action requires not only cultural and institutional change, but legislative intent. A significant step in that direction has been taken with the passage of the Nari Shakti Vandan Adhiniyam, 2023—the Constitution (One Hundred and Twenty-Eighth Amendment) Act, which reserves one-third of all seats for women in the Lok Sabha and state Assemblies, including for seats reserved for the Scheduled Castes and Scheduled Tribes.

Notably, this was the first Bill to be taken up in the new Parliament building, signalling its place at the heart of India's soaring ambitions. The new Bill creates the structural imperative to ensure that scientific talent also shapes the laws, budgets and policies that govern science itself.

(Views are personal)