

Bringing Back the Missing Millions and Disappearing Female Toppers in Education and Workforce – The Unfinished Agenda

Dr Jagannath Patil¹, Prof Vani Laturkar², Mrs Rohini Salunkhe³, DJ Savitha⁴

¹Chairperson Asia Pacific Quality Register, Adviser, National Assessment and Accreditation Council

²Senior Professor, School of Commerce and Management Sciences, Swami Ramanand Teerth Marathwada University

³Research Fellow, Shahid Virpatni Lakshmi Mahavidyalaya

⁴Former Research Fellow, National Assessment and Accreditation Council

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ABSTRACT

This paper examines the paradox of women's educational achievement and their declining representation in the workforce, leadership, and STEM profession. The same is conceptualized here as the phenomenon of the "Missing Millions." Drawing upon recent data from UNESCO GEM Report 2025, ASER 2023, AISHE 2021–22, the Economic Survey 2025–26, IMF estimates, and various national and international studies, the paper analyses how female students consistently outperform male students in school education and board examinations. However they remain underrepresented in competitive examinations, research professions, corporate leadership, and decision-making positions. The study argues that this "leaky pipeline" is not due to lack of talent, but emerges from a combination of structural inequalities in society. This includes patriarchal social norms, biased educational investments, workplace rigidities, unpaid care burdens, and institutional discrimination. The paper further highlights how skewed sex ratios, son preference, gender-biased stream selection, and early withdrawal from employment cause the erosion of women's long-term socio-economic participation. By comparing global examples and policy interventions from India, the paper demonstrates that bridging the education-employment gap is not just a social justice matter. It is also a major economic necessity capable of increasing GDP, institutional integrity, and national productivity. In conclusion the paper proposes some radical structural reforms such as leadership reservation, women friendly workplace systems and rules, investment in care infrastructure, and long-term policy studies on impact of interventions—to reclaim the "missing millions".

Keywords: Missing Millions; Leaky Pipeline; Women in STEM; Female Labour Force Participation; Girls' Education in India; Educational inequalities; Women Leadership; Care Economy; Gender Gap in Employment; Institutional hurdles; Viksit Bharat.

INTRODUCTION

An important task of providing scope to the inherent virtues of women is being done through education. Sustainable Development Goal 4 commits all signatory countries to ensure that, by 2030, "all girls and boys complete free, equitable and quality primary and secondary education." Most countries in the world have achieved universal primary education. Girls and boys have gained access to primary school at in a big way , with each age cohort surpassing the enrolment rates of the previous one.

Over the past fifty years there has been some progress towards gender parity in school enrolment, both at the primary and secondary level. The gender gap in children out of school is least in primary school and widest in upper secondary schooling. Gender disparities in STEM tertiary education remain high, as per reports.

The average female literacy rate throughout the world is 79.9%, while for men it is 89.2%. India stays behind at 62.3% for women as compared to 80% for men. India falls behind its neighbouring countries, such as China, where the female literacy rate is high 94.4%. Enrolment rates also indicate educational disparities in India. Major reforms in recent years have allowed for an improvement in enrolment rates for girls. The Right to Education Act (RTE) was implemented in India since 2009, which made education compulsory for children between the ages of 6 and 14. In 2000, enrolment rates were just above 73% for girls in India; as a result of the RTE, enrolment rates are now recorded at 93% for girls. This is good jump. Although enrolment rates have increased in primary school, dropout rates going into secondary education are still considerably high for girls. As of 2013, enrolment rates for girls were around 93% in primary school but only just over 64% in secondary schools. Comparatively, enrolment rates for boys were 91% in primary schools and 68% in secondary schools. This situation is even more severe in rural areas, where only less than half of girls finish the tenth grade. Gender gaps seem to get wide with each progressive stage of schooling as it becomes more difficult for girls to stay in school for various socioeconomic reasons.

In the landscape of Indian education, a recurring headline dominates every summer: **"Girls Outshine Boys in Board Exams."** Whether it is the Secondary School Certificate (SSC) or the Higher Secondary Certificate (HSC), female students consistently secure higher pass percentages and claim the majority of top ranks. However, as the academic journey enters into the arena of high-stakes, high investment competitive entrance exams (JEE, NEET) and subsequently into the upper echelons of corporate leadership, these bright girl stars seem to just "disappear."

This phenomenon, known as the **"Leaky Pipeline,"** is not a result of a sudden decline in cognitive ability of these brilliant girls. Instead, it is a systemic erasure—a creation of **"Missing Millions"**—apparently fuelled by structural economic choices, deep-seated patriarchal norms, and institutional hurdles.

Looking back at the past and turning the golden pages of history, one remembers capable women like Ahilyabai Holkar, Savitribai Phule, Indira Gandhi, etc., who created history. Observing the present times, names of few duty-bound women like Kalpana Chawla, P.T. Usha, Lata Mangeshkar.....Kiran Bedi, Sadhanatai Amte, and Medha Patkar come to the lips

But if we think about the future, it has to be stated with regret that we are neglecting the future generation of women by putting them engaged only as a homemakers...a wife or a mother, even as they are capable of fulfilling multiple roles simultaneously. Suppressing such capable and duty-bound women before they even emerge! The current picture of a woman educational progression is distressing. There are great educational disparities among girls in India. Key reasons include:

1. Many of these girls from poor families are raised without the expectation that they will complete their education. When they become the mothers of the next generation, educational disparities become a cyclical, intergenerational issue.
2. Other factors such as cultural values, child marriage, a scarcity of feminine hygiene products, and child labor also contribute to disparities.
3. The lack or shortage of formal education among young girls leads to poverty, decreased child well-being, health issues, and possibility of domestic violence. Several organizations work to advocate for equal education for girls, distribute reusable feminine hygiene products, and prevent child marriage in order to close the gender gap in Indian education.

The Global "Missing Millions" In Stem and Leadership

The disappearance of female talent is not unique to India; it is a global crisis of wasted human capital. Recent studies, including the **UNESCO 2025 Global Education Monitoring (GEM) Report**, highlight that while women now make up the majority of university students in many high-income countries, they remain "missing" from the labs and boardrooms to a great extent.

The Research Profession: Globally, women represent only **31.1%** of researchers. In the Global South, this figure is often lower, with women making up just **30% of STEM practitioners**. The most female-dominated

degrees include Veterinary Sciences (83.4% women), Psychology (81.5%), Subjects Allied to Medicine (79.5%), Education and Teaching (77.7%), and Languages (72.4%).

The Leadership Gap: Even in academia, the "pipeline" leaks at the top. Data shows women occupy 45% of academic staff roles but only 30% of higher education leadership positions globally. This "missing millions" effect in science and technology is estimated by the IMF to cause a loss of up to 35% of GDP in countries with the largest gender gaps.

In India, data from the National Science Foundation (NSF) shows that though 52 per cent of women enrolled for the STEM courses for their graduation, only 29 per cent of them had actually joined the STEM workforce. As per the All-India Survey on Higher Education (AISHE) 2021–22, women constitute 43% of the total enrolment in Science, Technology, Engineering and Mathematics (STEM) disciplines at the higher education level in the country.

Also, in a report from Geena DaDavis Institute, it was found that men are seven times more likely to be featured in an on-screen role in an identifiable STEM career. Even at the C-suite level, the disparity peaks, with data showing that just 3 per cent of the women hold the post of CEOs in the STEM industry.

The Institutional Gap: Private "Son Preference"

The divergence begins long before the first job interview. Data from the Annual Status of Education Report (ASER) 2023: 'Beyond Basics' reveals a startling trend in how Indian families invest in education based on gender.

1. The Medium of Instruction: There is a documented "son preference" in private schooling. Research indicates that boys are disproportionately enrolled in private, English-medium schools, while girls are often enrolled in local-language government schools. This is more prominent in rural areas of north India.
2. The "Stream" Divide: ASER 2023 reports that 36.3% of males are enrolled in STEM compared to only 28.1% of females. Even high-performing girls are often steered toward Arts or Commerce under the assumption that these careers are "more compatible" with domestic life.
3. In low-income contexts where poverty and gender inequalities intersect, structural differences in the life paths of boys and girls mean that they have different experiences of transitioning through education systems and into work.
4. Girls and young women in particular encounter multiple gendered barriers that take a heavy toll on their transition into work.

Skewed Sex Ratios and the "Bachelor States"

The systemic neglect of the girl child has led to a grim demographic crisis: a skewed sex ratio that has created so called "bachelor states" in northern India.

1. The Marriage Squeeze: In states like Haryana, Punjab, and Rajasthan, the child sex ratio (0-6 years) has historically dipped below 850 girls per 1000 boys. This has resulted in a problem where millions of men are unable to find brides, adverse impact of own making.
2. Social Instability: Studies link this imbalance to an increase in crimes against women, bride trafficking, and a rise in frustrated, unmarried young men. This demographic distortion is the indication of ultimate "leaky pipeline," where the girl child is "missing" from a classroom.
3. The large-scale employment surveys in lower- and middle-income countries indicate that young people who develop a range of core competencies, mainly foundational, transferable, digital, technical, and vocational skills, etc, are better equipped to secure, retain, and thrive in work. However, girls and young women face a number of gender-related hurdles to education, along with disparities in labour force participation. This prevents them from developing such core competencies. Girls and young women have lower rates of access

to and participation in school, fewer qualifications, a higher drop-out risk, and fewer opportunities to participate in technical and vocational training.

Government Interventions: Bridging the Academic Gap

To counter these trends, several flagship schemes have been instituted in India:

1. IIT Supernumerary Scheme: This raised female enrolment in IITs from 8% to over 20%.
2. Maharashtra's Free Education (2024): The scheme gives 100% tuition and exam fee waivers for girls from families earning up to ₹8 lacs / year for professional courses like Engineering and Medicine.
3. PhD Scholarships: Schemes like WISE-PhD and the Indira Gandhi Scholarship for Single Girl Child provide monthly stipends (up to ₹37,000) to ensure women don't drop out of research.
4. Cash Incentives: Recent policies in some states offer cash incentives (over ₹1 lakh) to parents of one or two girl children to flip the perception of girls from a "liability" into a "financial asset."

International scenario

Some noteworthy interventions that can support disadvantaged girls at each stage of their transitions through school and onwards into higher education or work have been noticed in various countries. A Few examples are given below:

1. Programs in Bangladesh, Guatemala, Liberia, and Tanzania encouraged delayed marriage, reduced teenage childbearing, and kept girls in school for longer. This had a strong positive impact on their educational achievements and economic outcomes. Notably the Fireflight Foundation program in Rwanda successfully built up the financial, physical, personal, and social assets of out-of-school girls. That support gave them the opportunity to re-enrol, complete their education, and enter into the workplace.
2. Steps such as providing vocational skills training or tutoring in English and mathematics have enabled disadvantaged girls to develop some of the foundational skills required for transitioning to higher education or work. Training for different skills simultaneously – such as combining academic tutoring with life skills training, or technical training with financial literacy – have been shown to be more effective than vocational training schemes alone. Thus an integrated approach to supporting girls to develop their competencies can increase their ability to earn an income. According to a study in Kenya, young women who completed the Kenya Youth Empowerment Project, which combined skills development with work placements, increased their likelihood of being employed afterwards by 8.7%.
3. It is seen that while most jobs in low-income contexts have a digital component, girls lag behind boys in terms of technological know-how. Hence measures that integrate ICT training with other skills and work experience can enable girls to build capacity in an increasingly digital world. Providing girls with access to youth-friendly micro-financing opportunities can empower them to start and grow their own businesses, as noted in some studies.
4. Combining workforce readiness and entrepreneurship training into the school curriculum has also been shown to improve a girl's chances of finding a job, or starting her own business.

Education Not Automatically Lead to Jobs

The latest Economic Survey of 2025-2026 in India indicated, among other things, that educational progress has not translated proportionately into workforce participation. Despite more women completing school and higher education, female labour force participation remains considerably lower than male participation.

The Survey shows that while female labour force participation has improved in recent years, the increase is uneven and concentrated in certain sectors and forms of work.

Theories of human capital would suggest that with more education, women acquire greater skills and their earnings increase, resulting in higher labour force participation. However, it has been long known that in India, women's education has a U-shaped relationship with labour force participation. Part of the decline at moderate levels of education may be due to an income effect whereby women with more education marry into richer families that enable them to withdraw from the labour force.

The Big Drop-off: From Education to Employment

The transition from education to work emerges as a critical drop-off point for women. The Economic Survey highlights that many women who complete education either: Do not enter the workforce immediately; or Exit the workforce early due to social, household or care-related responsibilities in family. This pattern is especially visible during early adulthood.

The Survey mentions it as the result of structural constraints that interrupt continuity.

Childbearing years remain a major exit point: Another clear trend in the Survey's data is the decline in female workforce participation during childbearing and care giving years.

The Survey points towards major care responsibilities and limited access to flexible or secure employment and uneven availability of support systems at workplaces.

What Keeps Women Out from Workplaces

Many structural and social hurdles play role in pushing women out of the workforce:

1. Women shoulder a disproportionately higher share of household and Care giving duties for kids and elders.
2. Long, inflexible hours and physical attendance rigidity make balancing work and family difficult in rigid workplaces we have mostly.
3. Safety and mobility issues: Concerns about harassment, long or unsafe travel deter many from pursuing or continuing work.
4. Stigma around career breaks: Time away from paid work due to child care, pregnancy, etc is often seen as a professional liability, particularly in unorganised private sector.

Closing The Gap

Thus India's gender story in education and employment is one of progress, but also of pause. The Economic Survey 2025–26 shows that more women are entering schools, colleges and parts of the workforce than ever before.

India Today 4th February 2026 the Economic Survey 2025–26 shows rising participation of women in education and work, but flags sharp drop-offs from work during key life transitions that limit long-term employment continuity.

Addressing the education–employment gap requires action from both the state and employers:

1. Rethink workplace design: There is need to completely rethink how workplaces are designed. Flexible hours, hybrid roles, and outcome-based evaluations need to be made integral.

2. Invest in the care economy: Investments in public childcare centres, employer-subsidized daycare, and eldercare support can save women's time.
3. Monitor and measure: We need to put in place gender audits, transparent reporting, and linking incentives to diversity outcomes to make organizations accountable.
4. Challenge mindsets: Societal attitudes that see women's careers as optional need to change through media, education, and public campaigns.

The "Ethics Dividend": Women and Corruption

A strikingly different but compelling argument for female leadership comes from the **"Ethics Dividend."**

Seminal studies have found that women in public administration are less likely to engage in bribery. With respect to Institutional Integrity Cross-country research found a negative correlation between the share of women in the labour force and the perception of corruption. Increasing women's participation in key roles isn't just a matter of equity; it's a proven method to improve governance and reduce leakages in public funds. This is clearly Ethics Dividend.

Sociological Roots: "Well-Married" Vs. "Well-Educated"

In traditional patriarchal systems, a girl's education is frequently viewed through the lens of marriage ability.

1. Education as a "Dowry Substitute": A degree is often used to secure a higher-status groom. Once married, the "double burden" of domestic labour and the "caregiving penalty" force even toppers to exit the workforce.
2. Regional Success: The NITI Aayog SDG India Index shows Southern states lead because they have higher "institutional density," making education safer and more accessible for girls.

Global Best Practices and Prosperity

Global research confirms that closing the gender gap is an economic imperative as well.

1. The GDP Multiplier: Study indicates that raising female labour force participation in India to match men could boost the country's GDP by 27% [about 770 Billion \$].
2. Nordic countries like Norway and Iceland use "paternity quotas" to ensure childcare is shared. This allows female toppers to remain in the "top jobs" pipeline.
3. Happier, more equitable, and economically resilient societies is obvious result on increased women participation in places like Nordic countries

To sum up it is not enough to get girls into school; we must ensure they stay in the workforce. And hence we need to work with the vision of reclaiming the "Missing Millions" to fuel a \$5 Trillion economy and dream of truly Viksit Bharat.

Future Roadmap: Proposed Structural Reforms

To bring back the missing millions, radical structural shifts are suggested as below:

1. 33% Horizontal Promotion Quota: Mirroring the Nari Shakti Vandan Adhiniyam, a 33% horizontal reservation should be applied to promotions to fix the "Broken Rung" at mid-management.
2. Raising Marriage Age to 21: Providing a critical three-year window for women to complete undergraduate degrees and establish career foundations before marital pressure begins.

3. Women friendly labour laws: Extending leaves and other service benefits available to government female staff should be extended to private and unorganised sectors as well by reforms in labour laws and also by using government funded social security networks
4. Long-term Impact Studies: Mounting 15-year longitudinal studies to track the impact of schemes like the Bihar Bicycle Scheme on lifetime earnings and GDP so this can be implemented in other places.
5. Rotational Reservation in Leadership: Introducing rotational reservation for roles like Vice-Chancellor, Director, and Head of Department in universities and government bodies can be a game changer.

CONCLUSION

Across India and globe, millions of girls are proving their academic capabilities, yet societies do not get full benefit of this ocean of talent. During the transition from education to employment and leadership these talented women disappear. The “Missing Millions” phenomenon is a challenge and unfinished development agenda of current times. It is not merely a gender justice issue but a question of economic growth, demographic stability, institutional ethics, innovation potential, and national development. Nations which are not able to retain educated women in productive and leadership roles adversely impact their own growth potential. Whereas societies that create enabling ecosystems through flexible workplaces, shared caregiving, equal opportunities, safety through institutional reforms are likely to prosper more. They rise to become inclusive, and resilient economies. India today stands at a critical juncture: it has the demographic dividend, educational expansion and huge talent pool of women as seen through the results of many examinations. However, these educational scores need to translate into sustainable workforce participation including leadership opportunities. Otherwise the promise and full potential of our female talent will remain latent. Hence reclaiming these disappearing female toppers and bringing back the “missing millions” is a moral responsibility. It is also an essential pre-condition for building a truly equitable, inclusive “Viksit Bharat” in coming decades.

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