

## **INDIAN WOMEN IN ENGINEERING PROFESSION: ACHIEVEMENTS AND CONCERN**

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*Abstract: Indian women have made a long and momentous journey to achieve a significant position in all the spheres of life. The most peculiar phenomenon of the Indian Industry and business is entry and survival of women on big scale. The transformation of social fabric of the Indian society, in terms of increased educational status of women and varied aspirations for better living, necessitated a change in the life style of Indian women. The current paper presents an overview of huge initiation and achievement of Indian women in engineering field. It throws light on how booming economy of India at an amazing speed has opened up wide career opportunities to Indian women in engineering profession. It attempts to focus on some issues which invite immediate concern like leaving ratio, balance in personal and professional life, gender discrimination and safety and security issues at workplace. It recommends that some policy and mindset changes are required to boost career advancement and overall wellbeing of Indian women engineers.*

**Keywords:** Career break, Gender Equity, Gender Inclusivity, Glass Ceiling, Indian Woman Professional (IWP), Information and Technology (IT)

### **I. INTRODUCTION**

The entry and growth of Indian women in engineering education and industry have got encouragement, strength and momentum because of the conditions imposed by the World Bank and the International Monetary Fund last year that 50 percentage of the workforce should be women for the companies to be eligible for IMF funding. The Union Public Service Commission too has stated that women would be given preference in selection for the new Indian Engineering Service. Due to tremendous growth in technical education with private participation in higher education in India, enrolment of women as student and faculty has seen the highest increase in engineering field in the last decade. 'Gender Inclusivity' which involves giving women employees equal opportunities and suitable work environment to help them meet the demands of work and home has become a new buzzword in human capital management and especially in industry. There has been overpowering evidence for the world that 'Gender Inclusivity' is not just a fundamental right of women but a key factor for economic and social development of any nation.

This paper attempts to understand where we are on our journey to gender equity and it calls for action from all the key stakeholders- individuals, organizations, social

systems and the Government arguing appropriate representation of women in engineering field will be immensely fruitful for social and economic development of our country.

## II. GIRLS' STUDENTS AT ENTRY LEVEL IN ENGINEERING COLLEGES OF INDIA

Engineering has become an extremely popular undergraduate degree in India. The women in India see engineering profession as a pursuing a career path of socioeconomic success. Recent momentous changes in higher education scenario have furnished a very conducive environment for women in higher education and especially for science and technical courses. The recent UGC data suggest that women have more than doubled their number across the country's engineering colleges over the past as the admissions in engineering and technology courses increased by 122% (124,606 in 2001 turned into 276,806 in 2011).

## III. WOMEN ENGINEERS EMPLOYED BY THE INDUSTRY

The emergence of a new confident Indian woman in milieu of engineering education and industry is strongly visible. It is very hopeful to find this new change. One more motivating factor is the 'difference in perception of engineering in India' versus the West as a career option paying rich dividends. Number of women in professional courses and career in India is amongst the highest in the world. It is quite common to find representation of women in some typical IT companies to be almost 50%.

## IV. THE TIME IS RIGHT

The current global economic scenario is one of its own kinds. 'Global ageing of the workforce' is the major challenge ahead of most of developed countries in the world. It will affect the economic, technological, educational and social factors and will rapidly transform the employment trends of developed and developing countries (World population ageing, 2009)" (Chitra.2010).

While India has been facing unemployment crunch, most of the developed countries anticipate workforce shortages in very near future. The reasons may be lower birth rates and an increase in the proportion of the elderly in their population, fewer entries to the workforce due to strict demands of technically skilled labor and preferences towards early retirement. India is in very advantageous position to accept these opportunities because our country is having large pool of qualified young manpower. India is standing at second position for producing English learning scientific professionals. The acceleration of economic growth and the employment of skilled youth in the next two decades are key concerns for India. The challenge of ageing workforce faced by some countries presents a great opportunity for some developing countries like India. India can target this shortage by providing remote services to these countries and also by importing customers and servicing their needs in India. For this, our country needs to train more and more young people as skilled labor.

The current global economic scenario presents challenges as well as opportunities for Indian women engineers. Through gender inclusivity, India has an opportunity to fill the gap between labor supply and demand, by adding skilled women labor which is largely

underutilized till date. It is proved by researches that creativity and diversity are linked. By employing the potential of women to contribute to the science and technology enterprise, gender-diverse technical workforce can be created. Science, technology, and engineering – all the fields need the talent of women’s minds.

#### **v. WHY WOMEN CAN BE SUCCESSFUL IN ENGINEERING REASONS**

Global researches support the fact that including more women in design, product, project management, community, and leadership positions in general creates a more balanced workplace. A diverse workplace is proven to get better results, more accurately reflects customer/client base, and ensures a wider range of experience. Engineering is a field for divergent types of people because it embraces wide variety of jobs and roles. Research shows that scientists and engineers with diverse backgrounds, interests, and cultures can produce better scientific and technological results, as well as ensure the best uses of those results. Industry simply needs people with the best minds and skills and many of those people are women. Our country’s growth and development in coming time will rest on on how we handle this knowledge and technology, and how qualitatively we can develop scientific and technical talent in our youth. All citizens of India should have the opportunity to explore career options in science and engineering which are greatly rewarding. Homogeneity in the workforce is also a barrier to growth and development. Industries need diverse backgrounds and perspectives to keep their lead in this age of innovation. To get gender diversity in the engineering workforce, it is absolutely obligatory to encourage more women to enter the field. But only those who have passion drive and inclination for the engineering field should take up the challenge.

There is a developing consent amongst the industry, academia and governing bodies in India that women make up half of the human resource pool available and the development of the country is destined to suffer if this talent is unused. Technical education, especially in this age of information technology and advancement, plays a significant role in strengthening the human resource capital and thereby contributing positively to the national economy. The Mercer NASSCOM “Gender Inclusivity: Building Empowered Organizations” study in 2008 shows how inclusivity efforts on the part of some organizations in India have helped them in enhancing creativity, productivity and ability to manage change. Their attempts to reduce woman attrition and increased women employment helped them to improve their diversity ratio and build up stronger work cultures.

#### **VI. ISSUES AND CONCERNS**

Indian Industry and business has seen an unprecedented increase in the female workforce in the two decades shows assurance towards gender inclusivity and diversity. Government and companies across the industrialized world have strengthened and sponsored efforts to increase representations of women in technical areas. There are still many issues. Although many women engineers persevere through difficulties to achieve success, there are others who are less able to endure or fight for themselves. The low presence of women in the engineering sphere is indeed a matter of concern. If progress is to be made, it is imperative that the understated gender preference awarded to men in education and industry be understood, acted upon, and changed. The issues for women engineers are found at many levels:

- Raising number is an issue, but retention is a major issue. The gender gap begins at the primary level of education itself where the number of girls enrolling at the primary level is comparatively lower adding the number of girl dropouts in rural areas. At the university-level, gender disparity and traditional mindset prevent women from opting for courses like science and engineering, which are believed to be male-dominant subjects. In addition to this, lesser job opportunities, discrimination in jobs, lesser professional recognition, lack of awareness and societal pressures further warrant that those women engineers who complete their degrees end up receiving negligible opportunities for longer and rewarding careers..
- Getting admission in engineering courses is highly influenced by family decisions. The classroom climate for girls in degree level institutions for women students and faculty in technical university departments has been classically described as ‘marginal’ to some extent. Many women undergraduates enter their engineering courses highly competent, experience a drop in confidence in the first year of their science and engineering studies. Even the most prestigious institutions such as the Indian Institute of Technology, women are underrepresented at all levels. May it be a college or company, it is still predominantly male culture at majority places, where women acting like women are out of place and women acting like men are just bizarre.
- Most of the studies examining the gender difference in the employment opportunities of engineering graduates in India find that the share of women engineering graduates are less than that of men to get a job offer due to factors like the lack of adequate and suitable employment opportunities for women, deliberate discrimination in the job market against women which may be based on the false notion of women productivity or simply the prejudice against women. (Suriya, 2015)
- It is also observed that that women in engineering profession ‘leak out’ of the career pipeline at various stages. The percentage of women students in engineering is not matched by the percentage of women engineering professors and senior researchers or of women professional engineers in industry. In fact, getting the first job after graduation has continued to be the major obstacle in the career track of women engineers. Management and administrative discrimination in hiring and advancement of women is a major cause for slower advancement of women in engineering. The available data not only confirms a slow pace of career growth of women engineers, but also asserts the presence of a glass ceiling. Very few women engineers can reach to the upper management levels, most getting stuck in the middle levels. Many work environment studies highlight the degree to which women in engineering have to prove themselves in a largely male environment. Indian women hardly experience any kind of linearity in their work lives. The engineering field work environment is quite demanding with tight deadline, work pressure and tough competition and career progression is ensured through sustained performance. Indian women at one of many peculiar phases of personal life cannot sustain these demands. Sometimes, the typical Indian social fabric forces them to leave their career before actually leaving. Domestic responsibilities of childcare and care for elders have been the primary reason for the breaks in career. Women often leave the workforce due to the inability to achieve a strong work-life balance. Women who choose to take a break at this stage miss the crucial stage that takes them to the next level of management. When the return to their

careers, they find that they have lost leadership roles to their peers who remained in the workforce. It proves to be a brutal circle. The management and administrative discrimination cuts the women participation in engineering and the less participation further reduce their scope to work.

A scarcity of role models is another contributing factor to the underrepresentation of women in engineering. Women students look to faculty as role models for balancing career and family. Although with changing times women are beginning to attain positions of leadership in engineering schools. Women are beginning to attain positions of leadership in engineering schools and business organizations also. Women/girl engineering students benefit from role models and mentors. The increased representation of women in technical faculty position and higher level roles in industry can fill the dearth for role models and provide a strong voice into policy level decisions.

### **Recommendations**

- The social fabric plays a major role in making career choices for girls in India. Effective policy making is required to encourage girls to take up sciences and engineering as their chosen fields of study in order to catch them young.
- Long term structural and cultural changes are required to encourage and retain women in the engineering field. To achieve them, we must first acknowledge the male gender preference that exists today and make gender equity a concrete goal.
- To nurture workplace where everybody is comfortable and belongs for which we need to challenge stereotypes prevalent in the mindset about engineering as well as about gender.
- Recruitment drives should address to fervor about Mathematics, Science and technology and desire to be practical and not the gender of the engineer.
- It takes some years for the new comers to become full-fledged engineers. Appropriate support and intermediation can make a big difference and attrition ratio of women engineers can be improved.
- Creation of places and spaces for women's voices to be heard. Opportunities for women's leadership in all aspects of institutional life along with high degree of trust and responsibility for their capability
- Gender-diverse recruitment and retention are essential and beneficial to engineering.
- Some Good Practices: Some companies have already implemented policies on sexual harassment, flexible working hours and flexible leave in India along with other conveniences like crèches, parenting workshops and women's forums at some places. Few companies also provide a counselor for female employees and mentorship programs. For example, Infosys organizes workshops specifically for women and created female portals as part of the inclusivity movement.
- IBM has a women leaders' council, which focuses on attracting female employees and ensuring their development and retention. Women are also enabled through networking groups and mentorship programs and receive visibility in conferences as speakers or participants. Special events like Women's Day and Mother's Day are also organized.
- The highly neglected fact that women make powerful brand ambassadors and women represent 80 per cent of all retail and consumer purchasing power any organization can surely be benefited by the leadership of women employees. Microsoft consciously

incorporates women into its engineering design teams, with a view to developing products suitable for women consumers.

- Gender inclusivity provides us with an opportunity to achieve economic growth as well as social justice to allow women to work in professional engineering environment through the specific and unique challenges they face.

Engineers have led the way to many achievements in the present time. Engineers can take lead for gender equity too for adequate economic and social advancement of our country.

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