



Women's participation in industrial science, engineering and technology

'Women exit because one is reliant on a network (who you know, who you play golf with, drink in pubs with). I refuse to compromise. The organisation tried to make me play golf by paying for it, but I don't enjoy it and I don't do it anymore. Many deals are made on the golf course and in pubs and, as a woman, if you are excluded from these events you do not make the same deals as your male colleagues, and you are told that you are not performing. Eventually you give up and leave.'
– Female IT division manager at a state-owned enterprise (SOE)

Context

Although women's entry into higher education in South Africa over the past decade has increased, they remain under-represented within the Science, Engineering and Technology (SET) sector.

The problem is evident particularly at postgraduate degree levels, especially in the field of engineering where fewer women register. Only a small number of South African women end up working in the SET sector. Constant gender imbalances in the workplace, especially in the SET sector, continue to impact negatively on South Africa's global competitiveness and its ability to develop the necessary skills to grow the economy.

The small number of women in the SET sector is a gender and human rights matter, as well as a developmental concern.

The key national instruments designed to drive the development of highly skilled people in the various sectors of the South African economy, do not specifically address the issue of women's participation in the SET sector; neither do they focus on the need for both women and men to benefit equally from SET research, products and services.

Of special interest is the urgency to address existing gender imbalances in the SET sector of South Africa through a systematic process that ensures women's full participation in and benefit from the sector. Once a policy framework has been adopted by all stakeholders, specific problems within each sector, institution or discipline can be addressed at a micro level.

Policy framework

National policy and legislation that guide the development of highly skilled people in various sectors in general, and promotes women's participation in the SET sector in particular, include:

- The White Paper on Science and Technology (1996).
- The Employment Equity Act No. 55 of 1998.
- The National Plan for Higher Education (2001).
- The National Framework for Women's Empowerment and Gender Equality (2001).
- The National Research and Development Strategy (2002).
- The Human Resource Development Strategy for South Africa (2010–30).

In spite of the existence of these instruments and guidelines, women's participation in the SET sector has not increased. It was for this reason that this research study was commissioned to determine which factors contribute to or inhibit women's participation in the SET sector.

'I got such uphill from the guys who were applying for the job and they basically implied that they would make my life an absolute misery if I got it...and it was because I was a woman, but it was also because I was a young Indian woman that they would be reporting to.'

– Senior female at a JSE registered company

'I would agree women do leave the industry because their growth prospects are hampered. They can only reach one level and not beyond that, and that is why, if you look at the large industries in the country today, there are very few women CEOs that actually run large corporations; they are executive directors and they could run the company but they don't.'

– Senior woman at a JSE listed company

Research data and findings

A survey was completed by 16 companies to determine gender representation within the SET sector. The study revealed that women are under-represented in this sector, but more specifically within the industrial context. The following gaps became apparent:

- Only one company reported having a gender equity policy.
- Women are better represented at the lower levels.
- Only one of the companies had a female leader (CEO).
- Shareholding by women is low in the companies that participated.
- Women of colour are less well represented than white women in these companies, especially at executive and management levels.
- Although some of the companies are spending large amounts on social development and other strategies to encourage women's participation in industrial SET, information about women beneficiaries had not been recorded by all of the companies.

The study also researched factors which contribute to or inhibit women's participation in the SET sector. It found the work environment to be the key inhibiting factor. Issues such as remuneration and promotion opportunities, race and gender relations, mentorship and career development, as well as the implications of a career in SET for family life, featured as inhibiting factors.

Other factors included:

- gender stereotypes;
- the masculine image of science;
- gender-blind workplace policies;
- casting women into supportive roles;
- balancing work and family responsibilities;
- sexual harassment;
- the 'glass ceiling';
- the lack of confidence;
- job stress and burnout;
- women's Previously Disadvantaged Individual's (PDI) status, and
- gender discrimination and masculine organisational culture.

Although most of the women's experiences are universal, there are some apparent individual differences across age groups that contribute to or inhibit women's participation in SET. These include life-cycle approach, the industrial SET context and the level of seniority in the organisation.

Recommendations

Figure 1 presents the recommendations grouped into six major areas that should be addressed by the role-players and stakeholders who are able to increase women's participation in industrial SET in South Africa.

Clearly urgent action is necessary to mobilise women as a neglected reservoir of talent within the SET sector. Despite progress, many gaps, barriers and inequalities still persist. Action on several fronts is required to strengthen the role of women within the SET sector. These include:

1. Industry

The following are some practical ways to increase, strengthen and consolidate the recruitment, retention and advancement of women in the SET industry sector:

- Create a work environment in which women can develop their careers according to

'I have a child of two years. On Tuesdays, I have to be at the factory at six o'clock. My child has to wake up at five o'clock so that he can be ready for school. He then has to sit with his father. You get men who can do it and men who can't, and my husband doesn't do it. If my husband isn't there, then I have to drop my child off at my mother at a quarter-to-six, and at work, all they say is sorry.'

– Female senior employee

their life-cycles and where they are measured by their output instead of the hours they spend in office.

- Implement flexi-time arrangements for women across all SET industrial sectors.
- Encourage change in employer attitudes toward social issues affecting women.
- Develop programmes that accommodate women who return after childbirth or family-care responsibilities.
- Develop policies that include maternity and paternity leave, child-care facilities and family-responsibility leave.
- Accommodate the fact that the burden of caring for the ill and aged often falls on women, irrespective of their careers.
- Refrain from treating women as though they are a homogenous group, given that women have diverse histories, experiences and educational backgrounds.
- Acknowledge that differences exist for women from different racial, socio-economic and age groups and across SET sectors that should be evaluated and monitored continuously.

2. National government

The bulk of the burden falls on the state, government departments and select agencies to ensure that the policy framework is conducive and promising for women entering the SET sector.

3. Educational and research institutions

A number of possibilities exist within the high school and post-schooling system to mainstream the role of women in SET and to highlight the importance of women's technical knowledge.

4. Business and entrepreneurial projects

The social value of women's participation in the SET sector is influenced by economic and fiscal conditions that necessitate financing and funding for the sector.

Figure 1: Diagrammatic representation of recommendations to increase women's participation in industrial SET

Research and monitoring

- Study the impact of policies and practices
- Use research to plan and review national policy
- Monitor progress on recruitment, retention and advancement in industrial SET
- Investigate reasons for women exiting SET sector
- Monitor funding for women entrepreneurs in industrial SET
- Record statistics required by government
- Benchmark participation of women nationally and internationally

National level interventions

- Monitor and benchmark the number of women who win bids
- Ensure gender equity on decision-making forums
- Pro-actively encourage applications from women
- Provide facilities for tertiary students to test innovative ideas
- Provide public funds that match private funds

Training and support

- Use technology to facilitate work interface between home and family
- Develop strategies to retain women
- Professional development for women who show potential in SET
- Appoint mentors, especially women mentors for younger women

Increasing women's participation in industrial SET

Workplace policies

- Gender equity policies (e.g. equal pay)
- Family-friendly policies (e.g. child-care facilities; flexi-time; work/life balance; maternity/paternity leave; virtual offices)
- Sexual harassment policies

Re-culturing SET as a field of study and sector

- Debunk the masculine image of science and scientists
- Support initiatives that sell science as socially relevant, especially to the girl child
- Implement initiatives that affirm and reward achievements by women scientists

Creating networks

- Encourage alternative workplace networking opportunities
- National forums and conferences for women
- Identify and promote networking opportunities amongst women entrepreneurs
- Form partnerships with schools and tertiary institutions

'You find these companies that are run predominantly by white males that are not open to give opportunities to engineers out there that have a brilliant mind and can actually meet some of their requirements. It's even more difficult for women, including black and white women, to actually make inroads or penetrate that block.'
– Female general manager at an SOE

In conjunction with the relevant ministries, such as Science and Technology, Education, Minerals and Energy, Trade and Industry, and Labour, as well as private institutions, the following should take place:

- Monitor applications and winners of tender bids by sex.
- Benchmark the number of women supported by other institutions that provide financial support to entrepreneurs.
- Ensure gender equity of forums in which decisions are made about funding in the SET sectors.
- Be pro-active in encouraging applications from women entrepreneurs and women who want to establish part-time businesses.
- Facilitate the establishment of companies by women who have had a period of work interruption.

The political importance of this research is that it will lead to policy changes that could transform and diversify the workforce and develop a new cohort of skills and leadership within this sector. It should also help to curb poverty in the country by improving access to technology, and developing economic resources for women as a disadvantaged group to enable them to pursue careers in SET.

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