

## MEASURING PROGRESS FOR WOMEN IN ENGINEERING, SCIENCE AND TECHNOLOGY - ARE WE THERE YET, AND IF SO, HOW CAN WE BE SURE?

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### ABSTRACT

Many recommendations have been made on how industry can enhance the employment status of women in the workplace, particularly in scientific and technological occupations that traditionally have been dominated by men. Numerous reports have called for measuring, monitoring and reporting on progress. What is now needed is a mechanism or tool that industry can use to determine whether it is making any progress in the recruitment, retention and career advancement of women scientists, engineers, technicians and technologists.

Benchmarking is a continuous process of measuring products, services, and practices against competitors or those companies recognized as industry leaders. It is a concept which could be used as a tool to improve human resource management. This paper presents the results of a preliminary study undertaken by Industry, Science and Technology Canada to develop a benchmarking process that can be used to measure the recruitment, retention and career advancement of women in scientific and technical careers.

### INTRODUCTION

"Corporations cannot manage attitudes, but they can manage behaviour with accountability, rewards and punishment, as in all other important areas of concern. What gets measured in business gets done, what is not measured is ignored."

Edward W. Jones, Jr., *Harvard Business Review*  
quoted in *Breaking the Glass Ceiling*, 1987

The emergence of a global and knowledge-based economy requires that Canada be competitive internationally and develop knowledge-intensive industries. Such challenges can only be met if Canada's workforce is well-educated, particularly in fields which are sources of innovation -- science, engineering and technology.

While Canada's need for highly qualified personnel increases, the number of young people entering Canada's labour force continues to decline. Over the next decade, women, aboriginal peoples, disabled individuals and visible minorities will constitute the majority of new workforce entrants. Women currently make up 45% of the Canadian labour force, yet their representation in certain fields, especially in engineering, science and technology, is very low. Women make up only 7.5% of those employed in engineering occupations, 18.9% in physical sciences, 27.7% in life sciences, and 32% in mathematics, statistics and systems analysis (Census of Canada, 1986 projected to 1991). In 1990, women made up only 3.3% of the certified technicians and technologists in Canada (Canadian Council of Technicians and Technologists). In addition, women are not well represented in senior management in Canadian industry; in 1992, they represented only 25.4% of managers in Canadian companies (*Report on Business Magazine*, June 1992).

Increasingly women are graduating from universities and colleges with degrees or diplomas in scientific and technical areas.<sup>3,4</sup> If Canada is to benefit from the contributions women can make to these fields, it is imperative that their expertise be fully utilized. Systemic and attitudinal barriers may lead to under-employment, hinder career advancement, and even cause women to drop out of scientific and technical careers. These attitudes also hinder the adoption of policies and practices which would prohibit discrimination and harassment in the workplace and place women on an "even playing field" with their male counterparts.

#### Applying Benchmarking to Human Resources

Industry, Science and Technology Canada (ISTC) has embarked on a project to measure progress for women scientists, engineers, technicians and technologists in the workplace. This project is part of a more comprehensive effort to monitor and report on the implementation of the recommendations of the Canadian Committee on Women in Engineering (April 1992), and the report on Women in Trades, Technology, Science and Engineering produced by the Human Resource Committee of the Prime Minister's National Advisory Board on Science and Technology (March 1993). These reports outline steps industry must take to improve the working environments for women in these fields, and call for measuring, monitoring and reporting on progress. However, they do not suggest specific methodologies for carrying out this task. After wide consultation with representatives of several industries and industry associations, it became clear that what is now needed is a mechanism or tool that firms can use to establish benchmarks for the recruitment, retention and career advancement of women in these fields, and then to determine what it can do to build on progress (or success) to date.

Benchmarking, both as a concept and a process, has relevance for measuring and monitoring progress. It has been defined as "a continuous process of measuring products, services, and practices against competitors or those companies recognized as industry leaders".<sup>1</sup> This concept can be adopted as a tool to improve human resource management across companies within specific industrial sectors and even on a cross-sectoral basis, through initial comparisons of the employment status of women and repeat assessments. Benchmarking has often been implemented with the help of a neutral party (e.g. a consultant) who collects specific data from a selected number of firms, compiles it and then distributes it back to participating firms whose confidentiality is protected. Gaps are identified, future performance goals are set, and action plans are implemented to monitor progress.

The first phase of ISTC's benchmarking project resulted in three main outputs: a comprehensive annotated bibliography of quantitative and qualitative sources of information related to the employment status of women in the four occupations under study; a diagnostic tool to collect information on the quantitative and qualitative indicators of the employment status of women in these occupations; and an action plan, with options and cost estimates, to conduct a benchmarking study.

To prepare the bibliography, existing relevant sources were identified through electronic literature searches and a call letter to 80 organizations and individuals. Sources surveyed and analyzed included databases and research on employment status, responsibility levels, salaries and promotion rates of women and men in scientific and technical fields; private and public sector policies, procedures and programs affecting the recruitment, retention and career advancement of women in these occupations in Canada; and research on attitudinal barriers to women's full participation in the workforce. Organizations consulted included federal and provincial government departments responsible for employment equity and the status of women; employee organizations such as professional associations and unions; industry and employer associations; associations of women in science, engineering and technology; and independent policy and research institutions.

From this research, gaps in the knowledge base were identified and ways to use existing information and data to measure progress in the workplace were examined and fed into the development of the second output: a diagnostic tool to collect information on quantitative and qualitative indicators of the employment status of women in these occupations. To design an appropriate tool, the views and practical advice of several key experts from the private and public sectors were sought, particularly their reaction to the measurement variables and specific methodologies under consideration. These key experts included individuals responsible for managing or administering employment equity programs in firms of various sizes and in various sectors (e.g. utilities, information technology, natural resources, pharmaceutical industry), human resources specialists, union

officials and representatives of associations of women in engineering, science and technology.

The diagnostic tool has two sections: the quantitative section is intended to collect data on women's employment status at given points in time, while the qualitative section is intended to assist employers in identifying policies and program areas that may help them enhance their efforts to successfully employ women. Each section contains modules that relate to a specific issue area, and each module comprises a set of forms on which to collect the data or information. The issue areas are overall representation of women, compensation, education and job status, hiring, mobility, professional development/training, leave, performance reviews, working conditions, layoffs, terminations and demotions. A brief explanation of how each issue area is relevant to the employment status of women is also included.

The tool is designed in a user-friendly way so that firms have the flexibility to complete the modules which are important to them -- these are organized according to basic, moderate or advanced level of commitment required. Industry associations and other bodies can use the tool to collect and analyze aggregate information from groups of companies, establish benchmarks and identify best practices that individual firms can use in measuring their progress.

Consultations with key experts were also instrumental in the refinement of the third output which is an action plan, with options and cost estimates, for the conduct in Phase II of the actual benchmarking study to measure progress in the recruitment, retention and career advancement of women scientists, engineers, technicians and technologists. The benchmarking study is intended to examine three areas: stock and flow data on the representation, promotion and retention of women in scientific and technical jobs at all levels, including senior management; existence and enforcement of supportive policies and programs (e.g. proactive recruitment programs, unbiased selection processes, women's advisory committees, career development programs, sexual harassment policies, work and family policies); and existence of attitudinal and systemic barriers to the full participation of women in scientific and technical occupations in the workplace.

The action plan recommends that the phase II benchmarking study comprise two stages. During the first stage, an initial pilot implementation of the diagnostic tool would be undertaken in one industry sector using a team-based approach (government, consultant, industry association, and three private sector firms). Each firm would use the tool to collect information about the status of women; the data would be analyzed at the sector level to develop performance benchmarks, or standards, against which the participating firms (or other firms) would be able to compare themselves. The second stage would involve a broader-based dissemination of the diagnostic tool within the same industry. The end product would be a polished and thoroughly tested diagnostic tool,

testimonies of the value of the tool by a significant number of firms experienced in using it, and a sample set of reports to assist in marketing the tool to other firms and other industries.

The diagnostic tool will be disseminated to industry associations and other bodies that could work with private firms to develop benchmarks for their sectors, and to periodically measure progress against the benchmarks. The tool could also be adapted as a generic tool to measure the progress of women in other types of occupations. Implementation of the tool relies on firms' own willingness to measure progress since there is no direct link between this project and employment equity legislation or other monitoring mechanisms. The ultimate direction the project takes will depend in large part on the level of interest and enthusiasm generated among individual firms, industry associations and other private and public sector bodies with an interest in promoting the employment, retention and career advancement of women in scientific and technical occupations.

### CONCLUSION

The workforce is undergoing dramatic changes in its composition. Not only is the population aging, the labour force pool is shrinking and skills shortages are predicted. As more women enter the labour force in the next decade, employers who actively work towards identifying and eliminating barriers in the workplace to foster a welcoming environment will increase the likelihood of attracting *all* the best qualified candidates and top graduates available to them, thereby improving their organizational performance and competitive edge. Those companies with a reputation as an unfair employer may cause clients and investors to take business elsewhere. By contrast, employers who develop a reputation for being fair and progressive will not only attract better candidates but will experience increased productivity through improved employee morale and lower turnover. Employers with fair and equitable workplaces would achieve greater profits because of lower recruitment and training costs and the existence of a committed and loyal workforce.

Firms today face increasing pressures and many are having to downsize their operations to maintain their competitive position. It will thus be important to underline the benefits which workplace equity can bring to a firm's operations. The concept of benchmarking is a positive and proactive process which can be applied to human resource practices and help managers compare the performance of their firms' human resource function with that of other organizations. This benchmarking tool, once developed and tested, could help individual firms and industry sectors develop a clearer understanding of the progress achieved in attracting, developing and retaining women engineers, scientists, technicians and technologists. This information could also demonstrate the bottom-line benefits and competitive advantage associated with a supportive and equitable workplace.

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