

Increasing Women in SETT: The Business Case



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Canadian Coalition of Women in Engineering, Science, Trades and Technology

Canadian Centre for Women in Science, Engineering, Trades and Technology (WinSETT Centre)

The WinSETT Centre is a catalyst for the sustained employment and progress of women in SETT fields. The Centre achieves its mission by developing and disseminating through collaboration and partnerships, the tools and expertise useful to industry, government, educational institutions, and women in SETT organizations. The Centre was established by CCWESTT in 2009 as an incorporated non-profit entity.

Sponsors of the Centre and its recent activities include Status of Women Canada (Women's Program), the Government of Alberta, the Association of Professional Engineers, Geologists and Geophysicists AB, the NSERC/Petro-Canada Chair for Women in Science and Engineering, Atlantic Region, Suncor Energy Inc., the Canadian Apprenticeship Forum, the NSERC Chair for Women in Science and Engineering, BC/Yukon, the University of Alberta, Vale, and other corporate and institutional partners. The opinions expressed in this document do not necessarily represent the official policy of funders.

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Increasing Women in SETT: The Business Case

Summary of Literature Review and Sector Scan

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Earlier version also available in French

About the Canadian Coalition of Women in Engineering, Science, Trades and Technology

The Canadian Coalition of Women in Engineering, Science, Trades and Technology (CCWESTT), established in 1987, is a national coalition of groups that promotes the full participation of women in SETT to government, business, industry, and educational institutions, and applies new vision to these fields. CCWESTT consists of 19 member organizations across Canada that provide an extensive resource and support network, and disseminate critical information on the integration of women in SETT fields.

Increasing Women in SETT: The Business Case

Summary of Literature Review and Sector Scan

If Canada is to excel in the global knowledge based economy, we have to call up all of our strengths to build and maintain a strong, entrepreneurial science culture that maximizes all of our human resources.¹

Arthur J. Carty, Canada's Former National Science Advisor

Women's increased participation and advancement in the workforce bring significant economic benefits to organizations and to Canada. This compelling business case is articulated by industry and institutional leaders across all sectors and is supported by recent research findings. Enhancing the participation and leadership of women in science, engineering, trades and technology (SETT) fields will generate even greater positive impacts in our knowledge-based, technological and highly competitive global economy. The benefits of gender diversity are described in this review and are supported by direct economic indicators. They include:

- Solution to skills shortages
- Access of employers to a broader base of talent
- Increased innovation potential
- Enhanced market development
- Greater return on human resource investment
- Stronger financial performance
- Improved governance
- Increased national economic growth index

A Solution to Skills Shortages

A strong, technically skilled workforce is key to a successful 21st century economy. Strengthening women's representation in SETT occupations addresses critical national imperatives to meet current and future skilled labour needs and to build Canada's research and innovation capacity.

The pressures of economic, technological and scientific change, combined with an ageing workforce, and intensifying global competition for skilled people, will soon strain our skills development system to the limit.²

Expert Panel on Skills, Advisory Council on Science and Technology.

While some sectors are already experiencing shortages, with the retirement of the 'baby boom' generation and other factors, labour force growth will decline significantly. Consider these snapshots of various sectors:

- Between 1997 and 2008, employment in engineering and technology occupations increased by 45% compared to 24% in all other occupations. Demographic trends are reducing in absolute numbers the pool from which the overwhelming majority of new admissions into engineering and technology programs are recruited.³
- Over the period 2008 to 2015, Canadian employers will need to recruit around 126,400 to 178,800 ICT workers, an average of 15,795 to 22,345 per year, with

the supply of domestic graduates meeting only 49% to 70% net hiring requirements.⁴

- In south-western Ontario's Technology Triangle in late 2009, there were 1,500-2,000 high-tech job openings despite a high unemployment rate in the region's general population.⁵
- 316,000 skilled workers will need to be trained by 2017 in order to replace a retiring workforce and to meet new demand for services in the construction sector.⁶
- The mining sector will have a labour shortfall of 60, 000 to 90,000 unfilled positions by 2017.⁷
- Between 2000 and 2007 there was an 8.8% annual increase in registered apprentices but only a 4.2% completion rate.⁸

Especially for the skilled trades, it is imperative to train, recruit and hire from the widest possible pool. Women, in 2008 at 1.7% of registered apprenticeship completions in the building construction, electrical, industrial and mechanical, metal fabrication, and motor vehicle and heavy equipment trades⁸, and only 6.9% overall working in trades, transport, equipment operations and related occupations⁹, represent the largest currently untapped human resource to meet these needs. Also note that women constitute 51% of all the other groups identified as emerging potential sources of labour supply and designated as contributors to workplace diversity -- Aboriginals, visible minorities, new immigrants, and persons with disabilities.

Canada's construction industry competes with many other industries with similar demographic profiles and which face labour shortages in the future... The industry is looking to all sources of labour to meet its needs for a skilled, competent and adequate workforce in the future, including women.
Construction Sector Council.¹⁰

There are also emerging talent shortfalls in computer science and some engineering sectors in North America. In all regions of Canada but British Columbia, student enrolments in computer science in 2006-07 had declined by 36% to 64% from their peak values in 2002¹¹, with women's participation dropping to 13.6% of undergraduate enrolment in 2007-08.¹² The percentage of women enrolling in Canadian undergraduate engineering programs overall has also been dropping from a peak of ~20% in 2001 to 17.4% in 2009.¹³ *In the absence of measures to change the acute and persistent gender imbalance in admissions, demographic trends will make it difficult to ensure the long-term supply of engineering and technology graduates.*³

In the US, some trends are especially noteworthy with recent reports highlighting a 60% drop in first year computer science students between 2000 and 2004, and an increasing gender gap.^{14,15} That situation is juxtaposed with a projection of 1.5 million new computer- and information-related jobs to be added in the US by 2012.^{14,15} Much of the current discourse about the American technology workforce also emphasizes international competitiveness, with reference to increasing numbers of engineers, scientists and technologists in Asia.¹⁶

It is clearly critical to attract more students and professionals, especially women, to these fields if we are to address shortfalls in the science and engineering workforce and strengthen our global economic competitiveness.

Access by Employers to a Broader Base of Talent

Women have entered universities and the workforce in steadily increasing numbers over the past several decades and now predominate as percentage of new entrants overall. Women's participation continues to grow in many SETT fields and remains significant in others.

- Women were 47.4% of the total workforce in 2006, and 21.9% of the paid workforce in science and engineering occupations.⁹
- Women were 58.1% of the total undergraduate students in Canadian universities in 2007-08, 55.2% of masters students and 46% of doctoral students.¹⁷
- Women received 62% of total university undergraduate degrees in Canada in 2007¹⁸ and 38.3% of bachelor's degrees in science and engineering in 2005-06.¹²
- Women were 37.3% of Masters recipients and 31.6% of PhD recipients in science and engineering in 2005-06.¹²

It clearly makes good business sense for employers in governments, industry, educational institutions and other organizations to have access to this large, well educated and trained source of talent. Employers who wish to build strong organizations will be competing for the best employees, women and men, and they are implementing innovative recruitment and retention practices to do so.

In turn, women and increasingly, men, expect more from their workplace – a supportive environment, professional development opportunities, strong benefit packages, flexibility in work arrangements, and good family policies including access to child-care. For example, a recent Catalyst study documents the strong business case for flexibility for both men and women in the law profession in Canada.¹⁹

The employer who supports women in the workplace will have a competitive advantage in attracting and retaining highly qualified employees from an increased pool of talent and will become an 'employer of choice'.²⁰ Underscoring that assertion, 89% of the companies who responded to a 2001 Catalyst Benchmarking Survey cited 'competitive advantage' as the primary aspect of their business case for diversity.²¹

Increased Innovation Capacity

The dramatic transformation to a knowledge economy over the past decade has created workplaces that are highly integrated with technology and require new ways of thinking, working and communicating.

Attracting the best and the brightest into science, technology and the trades – from all elements of society, including women, visible minorities, new Canadians, aboriginal people and the disabled – is rapidly becoming a key policy challenge for Canada. Not only do we need the numbers; we need the diversity of perspectives at all levels that a more inclusive S&T community can provide.¹

Arthur J. Carty, Canada's Former National Science Advisor

While true diversity flows from *internal* characteristics such as those listed in the next sentence, *outer* differences, such as gender, are useful indicators or proxies for these characteristics.²² For example, because of gendered socialization factors, women typically bring different life experiences, perspectives and values that add to their mix of

knowledge and skills to inspire new approaches to work processes, ideas, solutions, products and services. The introduction of diversity into work settings can also reduce unilateral thinking ('groupthink'), challenge accepted views and create a dynamic synergy which expands possibilities for innovation.^{23,24}

The well documented differences in communication and leadership styles between women and men are also part of that mix. In her comprehensive study of over 600 Canadian professionals, Orser found that women managers are perceived more likely to be consensus builders, nurturing of strong interpersonal relationships, and to consider social and human impacts of decisions.²⁰ The result of this management style was an increased ability to address issues in an informed and creative way and to engage buy-in. Orser also cites a 2000 study of US companies that found that *significant financial gains (a 7.8 per cent increase in market value) were associated with collegial, flexible work environments.*

In *Stepping Up: Skills and Opportunities in the Knowledge Economy*, the Advisory Council on Science and Technology's Expert Panel on Skills states that employers in five technology sectors reported that there is a persistent shortage of people who combine essential skills (communication and teamwork) with technical skills.² Information technology employers in a recent report also stress that they require employees who have the whole 'package' including interpersonal skills.²⁵ Women bring great strength in these essential skills.

Statements about enhanced creativity and innovation are often articulated by industry and institutional leaders in their descriptions of the benefits of a diverse workforce.

*Diversity initiatives have the potential to expand the petroleum industry's labour pool at a time when it is experiencing shortages in some trades...Such initiatives also provide Husky and its contractors access to a wider range of capabilities, improve worker retention, and contribute to healthy and productive working environments.*²⁶ Husky Energy Inc.

This initiative is premised on a strong diversity business case generated by the diversity-of-thought concept, which maintains that different types of thinking stem from different dimensions of diversity. The more demographically, functionally, and culturally diverse an organization is, the more innovative its employees will be. Georgia-Pacific Corporation on its 2005 Catalyst Award-winning "Bridging Cultures, Leveraging Differences" initiative which increases the recruitment, development and advancement of women.²⁷

These views are supported by research studies that conclude mixed groups are more effective than homogeneous ones, for example, in how decisions are made.²⁸ Through the process of addressing and managing internal diversity, an organization keeps itself flexible, well-developed and able to respond to change.²³ This adaptability also feeds innovation.

Expanded Market Development

Whether you are a post-secondary institute serving students or a company selling technology, your clients are becoming increasingly diverse with women being a growing proportion of that base. Women have a significant impact on the economy as wage earners, consumers and business owners.

- Women were 61.4% of undergraduate degree recipients in Canada in 2005-06.¹²
- Women influence 80% of consumer purchase choices in Canada.²⁹
- The number of women entrepreneurs in Canada at 909,900 increased by 292% between 1976 and 2008, compared with a 97% increase for men.³⁰
- The natural and applied sciences led the fields for growth of women's entrepreneurship increasing at over 30% from 1989 to 2004.³¹

There is very strong evidence that an organization whose employees reflect the diversity of its client or customer base responds more effectively in understanding and serving their needs and in identifying new opportunities and markets.

David Thomas' 2004 landmark case study of IBM compellingly illustrates the business case for diversity through its expansion into new markets.³² In 1995, under the direction of their new CEO, IBM established eight task forces each focused on a different diversity constituency in its workforce, one of them being women (another was white men). The goal was to *uncover and understand differences among the groups and find ways to appeal to a broader set of employees and customers*. Explained the CEO, "We made diversity a market-based issue".

One significant outcome was to focus on sales and service support to the fast growing segment of the US economy - women-owned businesses. The result was an impressive increase in revenue in this business division from \$10 million in 1998 to over \$300 million in 2001. *Workforce diversity was the bridge between the workplace and the marketplace.*

An integral part of the taskforce process was to identify ways to welcome and value the various constituencies in the workplace, maximize their productivity, and develop links with external diversity-based organizations. Thus, in addition to expanding business opportunities, the company was able to *focus on talent – attracting, retaining, developing, and promoting the best people*. The example of IBM's business strategy includes highly effective practices, policies and processes that can benefit other organizations.

Return on Investment in Human Resources

One of the greatest economic advantages of a diverse workforce does not show up in the sales revenue column. Rather, it lies in capitalizing on the major investments in human resources by minimizing loss of talent.

Companies, government departments, and other institutions invest significant resources in the recruitment, hiring, training and development of their employees. Australia's Commonwealth Scientific and Industrial Research Organization found that it *cost roughly four times as much to continually hunt for and train replacement staff than it did to provide optimal conditions for job satisfaction and motivation of existing personnel*.³³

There is a very strong economic benefit therefore to *minimize the costs* of employee absenteeism and turnover, and prevent the loss of institutional knowledge and diminished client relationships.

Women, however, tend to leave organizations at higher rates than men particularly at mid-career levels.³⁴ The comprehensive "Athena Report" found that 41% of highly

qualified scientists, engineers, and technologists on the lower rungs of corporate career ladders are female, but more than half (52%) drop out.³⁵ Another seven-year US study found that women in science and engineering occupations are twice as likely as men to leave these fields to pursue other careers, and in the UK, a 2005 study reported that 50,000 women are not using their science qualifications.^{36,37} Creating workplaces that support, offer development opportunities for, provide returning on-ramps for, and retain women employees provides a return on the organization's investment in valuable human resources and saves on the high costs of this differential turnover.

The Conference Board of Canada report "Workplaces that Work" illustrates that workplace cultures that *encourage greater participation by women, share many of the same characteristics as those that maximize employee satisfaction and engagement*, and lessen the costs related to illness, injury and turnover.²⁹ In turn, women also show strong loyalty, commitment and motivation in such environments.²³

While leading companies have advanced significantly beyond a strictly *compliance* approach²¹, successful inclusive strategies do address situations where there are *direct legal* obligations or client / supplier requirements for diversity within the organization. Companies in the European Union, for example, whose nations all have strong gender equity legislation, typically have equity requirements for their workforce. Proactive compliance by strengthening diversity eliminates costs of grievances and any potential legal actions.

In Canada, the Employment Equity Act of 1995 requires Public Service and Federal Contractors to identify and eliminate employment barriers and institute policies and practices to ensure appropriate representation of designated groups in their workforce.³⁸ It is worth noting, however, that the construction industry is exempt from the Act and has the lowest representation of women in its workforce. Provincial legislation can also address these issues. In Newfoundland and Labrador, for example, all large-scale natural resource projects are required to develop, implement and report on gender equity and diversity programs. It is clear that where there are equity regulations in various forms, hiring of women and other equity-seeking groups does increase.³⁹

Stronger Financial Performance

International research highlights the correlation between women in management and profitability. The most often cited recent study that links gender and the 'bottom line' is the 2004 Catalyst study of 353 Fortune 500 companies in the US which found

*...companies with a higher representation of women in senior management positions financially outperform companies with proportionally fewer women at the top. These findings support the business case for diversity, which asserts companies that recruit, retain, and advance women will have a competitive advantage in the global marketplace.*⁴⁰

Specifically, companies with the highest representation of women in their top management teams had a 35.1% higher return on equity and 34.0% higher total return to shareholders than those with the lowest representation.

More recently, a 2007 Catalyst study showed that

...on average, Fortune 500 companies with the highest percentages of women board directors outperformed those with the lowest. Compared to

U.S. companies with the least gender diverse boards, these firms reported a 53 percent higher return on equity (ROE); a 42 percent greater return on sales (ROS), and 6 percent higher return on invested capital (ROIC).⁴¹

In a 19-year study of Fortune 500 companies, Adler also showed the strong correlation of financial performance and women's presence at high levels in the organization.⁴²

Three measures of profitability were used to demonstrate that the 25 Fortune 500 firms with the best record of promoting women to high positions are between 18 and 69 percent more profitable than the median Fortune 500 firms in their industries.

In Canada, research reported by the Conference Board of Canada tracked corporations with at least two women on their board for six years. At the end of that period in 2001, these organizations were ranked more highly as industry leaders than those with all male boards, both in revenues (17th vs. 40th) and profits (10th vs. 17th).²²

Comparable research in the UK and Sweden show similar results.^{43,44} Vinnicombe and Singh demonstrated a high correlation between market capitalization and the presence of women directors in the 100 largest companies on the London Stock Exchange. In a study with a slightly different focus of over 14,000 companies, the Swedish Business Development Agency found a positive correlation between profitability and the degree of 'gender equality' in the organization. The latter was measured by the degree of representation of women and men in the organization as compared to the overall situation in different educational categories in society, and the balance in uptake of parental leave by both women and men. They concluded

...a company with a representatively balanced workforce is organized in such a way that a greater number of staff feel disposed to perform well, that the company takes account of the skills of each individual regardless of gender, and that opportunities for synergy effects are properly exploited.

While correlation doesn't prove causality, Adler proposes that

"Firms exhibit higher profitability because their top executives have probably made smarter decisions...[one of them being] to include women in the executive suite, so that the best brains are available to continue making smart and profitable decisions." Wannamaker in discussing Adler's findings elaborates "Perhaps the more profitable companies are successful because they build inclusionary corporate cultures which give women the same opportunities as men and value their contributions as much as those of their male colleagues. It only makes sense that a company giving all employees a chance to contribute meaningfully to the bottom line will achieve better results than one failing to sufficiently tap such resources."⁴⁵

Studies by Orser and Gibson for the Conference Board of Canada further describe the links between women's leadership, employee satisfaction and corporate performance.²⁰

For those organizations that foster gender diversity at all levels of the organization, the rewards are great – bottom-line results, lower turnover and employment branding that is attractive to talented, successful women, the kind of employees that all Canadian organizations seek.²⁰

Better Management Performance and Corporate Governance

Studies in a number of countries have demonstrated the positive correlation between women in executive management teams and good corporate governance (which in turn contributes to better corporate performance).⁴³ Conference Board of Canada studies provide comprehensive and compelling evidence that Boards with more than two or three women have stronger practices in several key areas of governance.²² These include:

- More regular reviews of non-financial performance
- Greater measurement and implementation of corporate strategies
- Greater attention to audit and risk oversight and control
- Increased presence of conflict of interest guidelines and codes of conduct
- More effective two-way communication with stakeholders
- Greater consideration of measures of innovation and of social and community responsibility

The study also noted the symbolic benefit of women's presence on boards in sending a signal to all stakeholders that their perspectives are important and their voices will be heard at the top.

The *2007 Catalyst Census of Women Board Directors of the FP500* similarly echoed that

*...diversity of thought, perspective and experience on boards enhances the quality of dialogue around the board table, producing more opportunities for innovation and improving the overall quality of governance.*⁴⁶

Also related to performance and corporate governance, two other studies demonstrated positive correlations between female representation on boards of directors of Fortune 500 companies and a company's appearance on the "100 Best Companies to Work For" list and on the "World's Most Ethical Companies" list.^{47,48}

*Success in the new economy depends on new styles of management – those same styles that create workplace cultures attractive to women. And, many of the behaviours in the new styles are traditionally associated with women.*²⁹
The Conference Board of Canada

Increased National Growth Index

The benefits of women's increased participation in the SETT workforce extend beyond the institutional level to national competitiveness in the global economy. A 2005 landmark study by the World Economic Forum measured the gender gap in 58 countries incorporating data on women's participation and opportunities in the economy, educational attainment, political empowerment and health.⁴⁹ Their report noted a correlation between this gender gap index with indices of growth competitiveness and gross domestic product, indicating a link between women's success and a nation's long-term growth opportunity. The authors concluded that "countries that do not capitalize on the full potential of one half of their societies are...compromising their competitive potential".

Another study by the Organization of Economic Co-Operation and Development also linked gender equality (as measured by birth rate and attitudes toward gender roles)

with economic development, noting that attitudinal and institutional change will affect labour supply and its effective utilization and help determine long-term national economic growth.⁵⁰

Next Steps

The Canadian Coalition of Women in Engineering, Science, Trades and Technology (CCWESTT) is a leader in taking action on increasing diversity.

Established in 1987, CCWESTT has a strong history of national and regional projects and partnerships. CCWESTT has led a significant national initiative - *Women in SETT (Science, Engineering, Trades and Technology)* - to engage organizations and influence policy to increase women's participation, retention, and leadership in science, engineering, trades and technology throughout Canada.

Three Regional Consultations held across Canada in 2003-04 were attended by experienced representatives from industry, government, small and medium sized enterprises, universities, colleges, the labour movement, and non-governmental organizations. These invited stakeholders reviewed issues and effective practices, identified priorities, highlighted regional issues, and developed recommendations. Information from the Regional Consultations was brought to a National Forum and Leaders' Meeting in Ottawa in April 2004, and key recommendations were presented to a National Roundtable attended by government leaders in November 2004.^{51,52}

Participants in all meetings agreed on the benefits of increased diversity in the workplace, the important resource that women in SETT careers offer to strengthen Canada's innovation and research capacity, and on the need to increase the numbers of women in SETT as a way to address skills shortages in building Canada's 21st century economy.

In 2005-06, CCWESTT presented this compelling business case and other critical information to decision makers in government, business, sector councils, academia, and other organizations. In June 2006 at a National Forum of SETT stakeholders, CCWESTT presented details of a proposed Canadian Centre to take action to increase women's participation and advancement in SETT. In 2007-08, as pilots of the services to be provided by the Centre, the WinSETT initiative delivered tools and data to employers to strengthen the recruitment and retention of women in SETT fields.⁵³

In 2009, CCWESTT established the Canadian Centre for Women in Science, Engineering, Trades and Technology (WinSETT Centre) with an office in Edmonton, Alberta. The Centre is a catalyst for the increased recruitment, retention, advancement and leadership of women in SETT fields. The Centre will achieve its mission by developing and disseminating through collaboration and partnerships, the tools and expertise useful to industry, government, educational institutions, and women in SETT organizations. The Centre:

- Collects best practices for the recruitment, retention and promotion of women in SETT.
- Develops and delivers the Women in SETT Leadership Program to increase the desire of women to assume leadership in SETT fields and to provide them with tools to succeed.
- Runs Career Awareness Workshops for Aboriginal and immigrant girls and women to increase the pool of these women in SETT.
- Gathers statistics and track trends.
- Monitors the success of its initiatives.
- Communicates and promotes programs, resources and successes.

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