

Engineers Canada's Submission to the Government of Canada on Innovation

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Background information

Engineers Canada is the national organization of the 12 provincial and territorial associations that regulate the practice of engineering in Canada and license the country's more than 290,000 professional engineers. Together, we work to advance the profession in the public interest.

Engineers drive much of Canada's economy. Natural resources, manufacturing, technology and other sectors rely upon the expertise of engineers. As one of the top five exporters of engineering services in the world, the expertise and skill of Canada's engineers contributes to the Canadian and global economies. Engineers work tirelessly in Canada and abroad to keep the public safe and to contribute to strong, prosperous communities.

Engineers Canada is ready and willing to help the government build a better Canada. Among Canada's more than 290,000 members of the engineering profession, there are countless experts prepared to assist the government in strengthening the middle class, tackling innovations and improving the resilience of the country's infrastructure.

Recommendations for Federal Innovation Agenda

Entrepreneurial and Creative Society

STEM Education

1. Federal government support for STEM programs through continued collaboration with regulated professions;
2. Increased federal funding for STEM institutions, research, and education related to the field of engineering;
3. Increased participation of under-represented groups within the engineering profession;
4. Open and transparent collaboration with the provinces and territories to ensure STEM education and programs remain a priority; and
5. Formal national recognition of academics, students, and youth achievements in STEM.

Indigenous Youth Access to STEM

1. Federal support of Indigenous population's engagement in STEM fields;
2. Federal commitment to increase Indigenous representation in STEM professions; and
3. Continued support from the federal government for workplace training opportunities for Indigenous youth in STEM related professions.

Fund and Support Training for Students and Recent Grads: Internships and Co-Operatives

1. Federal government must work with industry and post-secondary institutions to fund and support the training of undergraduate and graduate students through internships and co-operative opportunities.

Accessible Resources

1. Continued collaboration between the federal government and regulated professions to support, develop and promote services / online information points to assist youth and newcomers in their job search.

Global Science Excellence

Increased Target Funding for Research and Development

1. Federal government must support the increased target funding for research and development investments within post-secondary institutions, businesses and professions.

Remove Barriers to Commercialization and Technology Transfers within Program Requirements

1. Federal government must work to ensure that the requirements to qualify for grants and incentives do not include elements or barriers that may be stifling commercialization.

World Leading Clusters and Partnerships

Platform for Innovation

1. Engineering Change Lab as an example and platform for made-in-Canada innovation cluster.

Attracting Global Talent

1. Federal government must modernize the federal skilled worker program and express entry program to attract global talent;
2. In order to attract global talent the federal government must:
 - a. Support equivalency testing abroad;
 - b. Further engage with regulated professions;
 - c. Focus on diversity;
 - d. Fund bursaries, mentorships, apprenticeships; and
 - e. Support foreign credential recognition.

Compete in a Digital World

Stronger Drive to Include Women in the Digital Economy

1. The federal government must:
 - a. Promote and support organizations that build awareness of effective methods that promote digital skills for their employees;
 - b. Examine how STEM industries and professions could become more attractive to a greater talent pool; specifically focusing on bringing women into the profession; and
 - c. Work in collaboration with industries, universities, and organizations to promote mentorship, internship, and co-operative programs to attract and retain women in STEM professions.

Overview

Entrepreneurial and Creative Society

1. *How do we work together to equip youth with the right skills for the future economy?*

STEM Education

Canada is consistently in need of new technologies which makes it extremely important for industries, organizations, and governments to develop and learn new approaches in order to effectively use what we already have in new and innovative ways. Foundational skills in STEM through education will ultimately prepare Canada's youth with the right skills for the future economy and for any career path that students choose to pursue. The federal government has promised significant commitments to areas including: (1) knowledge economy; (2) rebuilding aging infrastructure; and (3) climate change adaptation and mitigation.

"Let's Talk Science," a charitable organization in Canada, outlined in their 2013 report that the federal government spends approximately \$50 billion on kindergarten to grade twelve education; however, "less than 50 per cent of Canadian high school students graduate with senior STEM courses."ⁱ This is an alarming statistic as approximately 70 per cent of Canada's top jobs require STEM education – a percentage that will continue to grow in the coming yearsⁱⁱ. To ensure Canadian youth are prepared to meet the coming challenges in these fields it is vastly important that the federal government invests and supports early childhood STEM education.

STEM education drives innovation, establishes competitive businesses, and creates jobs for long-term prosperity throughout Canada. FedDev Ontario's report entitled "[Archived – Government of Canada Funding Encourages Youth to Pursue Careers in Science](#)" (2012) focused on the Government of Canada's investment of more than \$1.7 million to BrainSTEM, an outreach program launched by the Perimeter Institute of Theoretical Physics in 2012, that worked to promote STEM educational fields for youth across Ontario. The report outlined that "by introducing students to the STEM fields... [the Government of Canada was] encouraging the next generation of innovators, entrepreneurs, and problem solvers to drive innovation" (FedDev, 2012). The report highlighted that STEM programs and education are essential stepping stones towards driving innovation throughout Canada. Government investments for STEM outreach programs allow for students to see the valuable emerging careers in STEM related fields. Continuous government support for STEM programs and educational fields will prepare Canadian youth to become leaders and innovative influencers of the future.

Youth are important in ensuring that Canada makes its innovative mark on the world stage and continues to have the intellectual capital to support our own domestic knowledge-based economy. Government support for STEM programs will foster a culture of innovation, build upon skills that work to embrace rapid global changes, and will encourage Canada's youth to

enter into STEM related professions. The federal government should continue to collaborate with regulated professions, such as engineering, in order to support this endeavour.

Federal government support for STEM initiatives should include federal funding of STEM institutions, continued support towards strengthening the Natural Sciences and Engineering Research Council of Canada (NSERC) and its contribution to STEM at all levels, specifically NSERC's funding for outreach activities like Chairs for Women in Science and Engineering Program (CWSE) and Promoscience. Federal funding should also be directed towards research and education within the field of engineering, as well as support efforts to increase participation of individuals from groups within Canadian society who have been traditionally underrepresented within the engineering profession. The National Science Foundation highlights that, "[s]ignificant advancement of [underrepresented] groups will result in a new generation of promising STEM talent and leadership to secure our nation's future in science and technology."ⁱⁱⁱ

The federal government should continue to have open and transparent collaboration with provinces and territories to ensure that STEM is a priority, and that STEM initiatives are promoted to strengthen Canada's future; specifically through grants and youth education programs. Engineers Canada will be available for consultation with the federal government to provide valuable expertise in achieving these goals.

The federal government must also leverage STEM education to drive Canada's global competitiveness and to promote our innovation agenda internationally. In order to do so, the government should strive to celebrate the achievements of academics, students and youth in STEM related programs and disciplines annually through various national awards and scholarships. The federal government's support for youth achievements across Canada, in STEM related fields, works to sustain their interest in innovative and forward thinking. Government support also works to support youth's interests in disciplines and programs that are required to support Canada's future economic needs. The federal government needs to formally recognize youth achievements or invest in organizations to do so on their behalf. The federal government must collaborate with regulated professions across the country, such as the engineering profession, in order to become more actively involved in highlighting youth strengths and achievements.

Indigenous Youth Access to STEM

Proactive and long-term education strategies must include investments in building students fundamental STEM skills. This strategic approach will help Canada maintain its capacity for producing highly trained and skilled individuals to face the challenges of our rapidly changing world.

Canada is currently facing a severe underrepresentation of self-identified Indigenous youth in STEM related programs at the post-secondary level. Indigenous ways of knowing, philosophies, and educational practices are extremely valuable to the development of Canada's STEM

education. By weaving Indigenous cultures and ways of knowing within STEM education across Canada, it has the potential to promote and strengthen Indigenous youth *engagement* in STEM fields as well as to promote innovative thinking throughout education. The federal government must remain supportive of Indigenous population's engagement in STEM fields and must actively work to support *pathways* that aim to increase Indigenous representation in STEM professions across Canada.

Some organizations are actively working to advance and promote the engineering profession in Canada for underrepresented groups. The American Indian Science and Engineering Society (AISES) strives to have stronger representation of Indigenous North Americans in science, technology, engineering and mathematics (STEM) disciplines in Canada. AISES has continued to be a leader in providing STEM opportunities for Indigenous Peoples, specifically by providing pre-college, college, and professional programs that encourage the representation of Indigenous Peoples representation in STEM disciplines and institutions.^{iv} This organization is supporting pathways that increase Indigenous Peoples representation in STEM.

Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) is also actively promoting innovative thinking through its education programs. CSIRO has designed a five-year Indigenous STEM education program in Australia that is funded by the BHP Billiton Foundation that works to promote Aboriginal and Torres Strait Islander representation in STEM-related fields. According to CSIRO's website, the five-year Indigenous STEM education program "is currently being implemented across Queensland, New South Wales and Western Australia with expansion into South Australia in 2017."^v

CSIRO's five-year Indigenous STEM education program in Australia has worked directly with 45 individual schools across three states within Australia. The Indigenous STEM education "is currently working with these 45 schools to develop, implement and monitor Indigenous science inquiry education resources and teacher professional development..."^{vi}

In order to increase Indigenous youth in STEM programs at the post-secondary level within Canada, Engineers Canada recommends that the federal government adopt educational programs that are *similar* to that of CSIRO's successful Indigenous education program in Australia.

A summer program for science and technology advancement could provide ongoing interactive science inquiry activities that work to continuously engage Indigenous students, specifically in grades 9 and 10, in STEM activities, while simultaneously incorporating Indigenous cultural practices and experiences. Inquiry for Indigenous science students could use hands-on inquiry-based approaches to Indigenous learning while engaging students in science related activities. Science pathways for Indigenous communities could incorporate on-reserve "projects as the context for learning science that is linked to Indigenous ecological knowledge for primary and middle-school students in remote [Indigenous] communities."^{vii} In order to encourage Indigenous students to remain engaged in STEM fields throughout post-secondary education, it

is recommended that the federal government - in partnership with provincial and territorial governments – nationally recognize the ongoing achievements of Indigenous students and academics in STEM subjects.

It is important for the federal government to continuously support STEM education for Indigenous populations as diversity drives innovative thinking. The Organisation for Economic Co-Operation and Development (OECD) outlines that the “production of relevant human capital for innovation will require effective innovation in education and training systems...”^{viii}The absence of a National Indigenous STEM strategy perpetuates a cyclical effect of underrepresentation of Indigenous peoples within STEM related fields. The federal government must support workplace training opportunities for Indigenous youth across Canada in order to equip Indigenous students with the rights skills to succeed in Canada’s future economy.

Fund and Support Training for Students and Recent Grads: Internships and Co-Operatives

In order to better equip Canadian youth with the right skills for the future economy, the federal government must continue to work with industry and post-secondary institutions in order to actively fund and support the training of undergraduate and graduate students in the first four years of their career paths; specifically through internships and co-operatives. Students and recent graduates are now entering into labour markets that require candidates to have greater experiences and the required skills to succeed in positions that they are entering into. Therefore, these individuals need to receive better and more frequent opportunities for on-the-job training in order to gain work experience, valuable networks, and to be better prepared for successful future employment.^{ix}

The federal government should finance programs that include government subsidies for a portion of the salary to encourage employers and professionals to hire and train new staff, hold internship opportunities in in-demand fields and bridging programs. Students who are prepared to enter the workforce will contribute greatly to Canada’s economic growth. Internships and co-operatives prepare Canadian youth with the skills necessary to succeed in entry level positions and for Canada’s future economic needs. Linking post-secondary institutions, employers, and government under one central structure to support the development of skills in line with labour market needs will work to equip Canadian youth with the skills required to succeed in the future economy.

Accessible Resources

In order to prepare youth and newcomers with the right skills for the future economy, there must be accessible and up-to-date resources that provide information about job prospects and career requirements; specifically outlining the necessary skills, credentials and experiences that are required in order for youth to be successful in their desired field of interest. Many professions across Canada have been working diligently to support this endeavour for youth and newcomers, specifically the engineering profession in Canada.

In order to ensure that newcomers better meet the economic needs of Canadian communities and workplaces, it is imperative that visa offices, embassies, pre-arrival services and constituency offices are better equipped with the most accurate information about regulatory licensing requirements and the labour market needs of Canada's provinces and territories. Engineers Canada has developed an online tool known as the [Roadmap to Engineering in Canada](#); a one-stop online tool that provides up-to-date information for international engineering graduates and newcomers. The information provided includes licensing procedures in Canada, required academic qualifications to work as an engineer, as well as resources that are available prior to their arrival to help guide them through the licensing process in Canada. Engineers Canada has also developed [EngScape](#); an online portal providing information about the engineering labour market across Canada. From employment rates and salary, to post-secondary enrolment and immigrant employment, this information is available by province and engineering discipline. Newcomers can browse the portal to determine where in the country their skills might be most needed, and they can use the site's job search tool to view hundreds of engineering job postings from across the country.

These portals are accessible, objective and transparent in order to ensure that newcomers and all Canadians receive the best information to help them become contributing members of the engineering profession and Canadian society. The information provided by these portals assist newcomers in making informed decisions that work for them, their families and the Canadian economy. Engineers Canada believes these tools should be shared with and actively used by all employees of visa offices, embassies and pre-arrival services who could be interacting with prospective newcomers to Canada.

The federal government must continue to work with **regulated professions**, such as the engineering profession in Canada, in order to help support, develop and promote services and online information access points that are specific to assisting youth in their job search. Having accessible resources will equip youth and newcomers with the right skills for the future economy.

Global Science Excellence

1. *How can we increase demand for science, technology, engineering and math graduates?*

Increased Target Funding for Research and Development

Engineers Canada is supportive of government investment in research, development and innovation in Canada, and strongly supports the cooperation between the engineering profession and the federal government. Federal government support for research, development and innovation helps to ensure adequate funds are available to support the procurement and retention of talent and to reinforce the position of Canada as a good place to invest, as well as to develop our domestic intellectual property.

Currently, Canada is seen to be lagging behind other developed nations within the international community in terms of research, development, and innovation investments. The Science, Technology and Innovation Council (2015) delineates that “poor business innovation performance is Canada’s most ‘profound and urgent’ science, technology and innovation challenge.”^x Investing in research and development projects and activities allows businesses and post-secondary institutions to develop new designs and products that improve efficiency, promote environmental stewardship and enhance economic diversity. By providing support, the federal government can help Canadian innovators create products and businesses that promote economic growth and job creation.

The federal government should support the increased target funding for research and development investments within post-secondary institutions, businesses and professions. Increased federal funding should be focused within science, technological, engineering, and mathematics research fields, specifically directed at health, natural and social sciences, innovation investments, and infrastructure projects. The federal government should continue to explore ways in which Canada can improve its competitiveness, output and quality of life for all Canadians.

A clear plan is required to support research and development investments across Canada that works in partnership with non-profit organizations, universities and the private sector. The federal government has a role to play in identifying and directing funding and investment to potentially high value activities and sectors that are known to be areas of strength for Canada in the global market.

Remove Barriers to Commercialization and Technology Transfers within Program Requirements

In 2011, Engineers Canada released a report entitled “Putting the Pieces Together: A Response to the Review of Federal Support to Research and Development.” In this report, Engineers Canada recommended that the federal government work to ensure that the requirements to qualify for grants and incentives do not include elements or barriers that may be stifling commercialization, specifically for various Natural Sciences and Engineering Research Council programs.

The difficulties faced in securing intellectual property ownership of engineering-related research, design and development can limit the commercialization of joint academic and business research and development. Allowing intellectual property costs to be covered by funding programs, and ensuring that the other requirements do not put proprietary information in the public domain before intellectual property issues are resolved, could facilitate the commercialization of much research and development work.

Companies benefit from owning the intellectual property that emerges from their investments in research and development as it increases their evaluation, appears as an asset on a balance

sheet, is expected by their investors and purchasers, and it imposes a barrier to entry for competition. With removed barriers to commercialization and technology transfers within program requirements, the federal government can increase demand for science, technology, engineering, and mathematics graduates.

Maximizing Talent and Knowledge

Overall, Canada's engineering profession is finding it difficult to attract and retain highly qualified professionals for positions. There are some indications of dwindling talent in the areas of computer and information sciences, applied mathematics and computer software engineering. In engineering, mechanical, electrical, and civil engineering remain the disciplines with the largest undergraduate enrolment, in that order. In 2013, the three major engineering disciplines "accounted for 52.4% of undergraduate enrolments [in Canada]. This is down marginally from the 54.0% share of enrolments in 2009."^{xi}

Engineers Canada supports and agrees with the federal government's investment in research, development, and innovation in Canada. By developing a strategic approach to investment, streamlining program delivery helping to create the conditions to attract talent and knowledge both here and from abroad, and by drawing on linkages between businesses, academia, professionals, and the government, the federal government can help foster increased research and development investments in Canada that benefit hard working Canadians.

World Leading Clusters and Partnerships

1. What is the right model for made-in-Canada innovation clusters led by businesses?

As the pace of global change continues to quicken and challenges become increasingly complex, there is a need to more actively evolve the engineer profession in Canada order to unlock its full potential to benefit society. A made-in-Canada innovation cluster, such as the Engineering Change Lab, is one way that the engineering profession in Canada is promoting innovative thinking.

[The Engineering Change Lab](#) is a platform for collaboration to allow individuals and organizations from across the profession to take action to address the systemic challenges (i.e. ethics failures, lack of diversity, and low levels of innovation) that have been holding back the engineering profession's full potential. By addressing systemic challenges to the engineering profession, individuals and organizations work to promote the growth of innovative thinking to push Canada forward as a leader when it comes to innovation.

The Lab Team consists of 40 senior leaders (CEOs, VPs, Deans, Directors) representing 35 organizations from across the engineering profession. They represent a small portion of the Canadian engineering profession: companies, universities, government agencies, associations, and non-profit organizations.

The group convenes three times a year to share their wide range of perspectives in order to deepen a shared understanding of challenges and to promote a portfolio of initiatives aimed to address them. The duration of the Lab is currently open ended, as it is conceived to be an ongoing platform for innovation at the leading edge of the profession.

The current Lab portfolio includes 9 initiatives that are focused on a wide range of topics (i.e. diversity, innovation, ethics, curriculum change, etc.) and targeting different parts of the system (K-12, University, Workplaces, Regulators, and the General Public). The Engineering Change Lab currently focuses on:

1. National Network for Communities of Practice for Engineering Leadership
2. Culture and Diversity
3. Canadian Engineering Education Challenge (CEEC)
4. Expansion of the Engineers in Residence Program
5. Communications Strategies to Shift Perceptions
6. Establishing Clear Pathways from Grade School (K-12) to Engineering Careers
7. Reducing Barriers to Admission to Engineering Degree Programs
8. Industry Innovation: the Engineering Water-Cooler
9. Ethicist On Call

Organizations and individuals who participate in the Change Lab are exercising a powerful and visible role in helping to shape the future of our shared profession and are working to promote innovative thinking across the country. A made-in-Canada innovation cluster, such as the Engineering Change Lab, is one way that the engineering profession in Canada is promoting innovative thinking through collaboration.

2. *How can businesses, institutes and governments attract talent and investments?*

Modernize Federal Skilled Worker Program and express entry programs

In order for Canada to continue to show leadership in global migration and to continue to attract international talent, it is important for the federal government to continue to modernize their immigration policies by introducing changes to the Federal Skilled Worker Program (FSWP) and express entry programs aimed at economic immigrants. This would ensure that applicants receive an open and comprehensive assessment of their experience and professional education credentials. A standard and reasonable time frame should be set for processing applicants without lowering national standards and a level of efficiency should be in place to withstand fluctuations in the volume of applicants. The federal government should support a FSWP system that facilitates and supports the express entry of skilled and experienced immigrants in order to support industries and professions that are facing skill gaps. This will promote economic prosperity for domestic industries and support Canada's overall economy.

Equivalency Testing Abroad

Government funding to make equivalency testing for regulated profession available (abroad) prior to arrival would also greatly support efforts in attracting international talent. Individuals arriving in Canada with their credentials pre-assessed and mandatory testing completed prior to their arrival in Canada would be beneficial in making a smooth licensing process for newcomers. By eliminating processing barriers for international applicants, Canadian businesses and governments would be able to effectively attract international talent in order to support Canada's growing economic needs.

Engaging with Regulated Professions

It is also imperative that the federal government continues to actively engage with regulated professions, like engineering, while they consider policies that could affect the ability of provincial and territorial regulators to effectively integrate qualified internationally trained engineers into the profession. With the ability to effectively integrate qualified newcomers, we strengthen our society, culture, and economy while simultaneously supporting newcomers in their desires to contribute professionally to Canadian communities.

Newcomers are one of the key aspects to innovation in Canada. They bring with them knowledge, enthusiasm, distinctive ideas and unique cultural perspectives that encourage innovative thinking. Research outlines that Canadian businesses and professions witness an increase in innovative thinking and performance with the arrival of newcomers. For example, "[Immigrants as Innovators Boosting Canada's Global Competitiveness](#)" (2010) outlines that immigrants and newcomers to Canada were directly linked to increased innovation performance that benefitted Canada; specifically when analyzing research, culture divisions, business and international business.

However, according to the Conference Board of Canada's 2015 [report](#) Canada currently ranks 14th out of 17 industrialized countries in terms of innovation. Countries throughout the international community are increasingly productive and innovative, which consequently has a large impact on the Canadian workforce and economy.

Innovation is vastly important in the protection of the natural environment, the achievement of high-performing education systems, and the maintenance of a strong and sustainable health care system. Engineers are at the forefront of this innovation and of enhanced productivity throughout countless professional sectors and industries in Canada that are essential to economic growth. Telecommunications, mining, construction and manufacturing, among others, depend on engineering and innovative thinking to remain productive and to uphold public safety. The engineering profession in Canada supports the successful integration of newcomers into the profession as these individuals have a direct link in supporting economic growth and innovation in Canada.

Immigration not only plays a large role in encouraging innovative thinking within Canadian businesses, but it also supports economic growth within Canada; specifically in terms of increased foreign direct investments and trade levels. The Conference Board of Canada outlined in their 2015/2010 report entitled “Immigration is Critical to Canada’s Prosperity,” that foreign direct investment into Canada is greater from those countries that are well represented through immigration. Immigration also positively affected economic growth through trade investments between Canada and the newcomers’ countries of origin.

However, despite the innovative thinking that newcomers bring with them to Canada, as well as their indirect support for Canada’s economic growth, there continue to be several barriers that hinder their ability to effectively contribute to Canadian society. Specifically, newcomers experience a lack of access to many opportunities due to various barriers, including insufficient acknowledgment of their experience abroad and of their foreign qualifications. In order to address these barriers, employers across Canada should create and maintain policies that support the inclusion and retention of immigrants in order to strengthen their innovation agendas.

Engineers Canada has been working diligently to lead the way in order to address these barriers in order to provide support for new Canadians and prospective newcomers looking for successful employment within the engineering profession. Engineers Canada supports the promotion of innovative thinking throughout the profession, to the benefit of both Canada’s economy and society as a whole.

Engineers Canada continuously works with the federal government to ensure that Canada’s immigration system is rigorous, fair and responsive to the economic needs of communities across the country. Engineers Canada also works with the provincial and territorial regulators across Canada to ensure that licensing procedures are transparent, objective and impartial, while simultaneously protecting the public interest. The engineering profession promotes practices that open avenues for newcomers to actively contribute to the labour market, specifically by encouraging diversity within the workforce. Employers who mirror the diversity of their staff to the diversity of the population from which they are chosen are better positioned to meet diverse client or market needs. This can encourage economic growth by strengthening the relationship with diverse international markets and clients.

Focus on Diversity

Engineers Canada is committed to promoting equity and diversity in the engineering profession. In 2012, Engineers Canada committed to the aspirational goal to have 30% of newly licensed engineers (P.Eng.) be women by the year 2030. Engineers Canada is also a member of Canadian Coalition of Women in Science, Trades and Technology (CCWESTT) and supports The National Conference on Women in Engineering (NCWiE).

In 2010, the Assembly of First Nations (AFN) and Engineers Canada signed an agreement to encourage First Nations youth to pursue careers in engineering. Engineers Canada will continue to identify opportunities to work with AFN in order to attract talented individuals from Indigenous populations across Canada.

Governments should support profession's efforts to attract and retain talented individuals from the diverse mosaic which is the Canadian population. The federal government should fund bursaries, mentorship and apprenticeships that encourage members of underrepresented groups to enter into professions across Canada, specifically professions in engineering, science, trades or mathematics. The federal government must continue to work with **regulated professions** in order to help support and promote diversity as a way to attract talented individuals into Canadian professions.

Fund bursaries, mentorships and apprenticeships for underrepresented groups

One of the most effective ways for Canada to retain global talent and skilled international students is to eliminate cultural and employment barriers for newcomers. The federal government should remain active in taking initiative towards funding bursaries, mentorships, and apprenticeship programs that encourage members of underrepresented groups to pursue careers in engineering and STEM-related disciplines. Employers that blend diversity management and inclusiveness in their workforce can successfully attract foreign talent and encourage home-based employees to embrace diversity. Companies and organizations should have a process in place to effectively assist employees and students through the transition process to Canada.

Continued Support for Foreign Credential Recognition

The federal government should invest in a nationally consistent foreign credential recognition system for regulated professions in order to effectively address existing barriers for potential employees. Newcomers should be recognized for their previous professional experiences and education. Non-recognition of their credentials leads to an underutilization of those individuals' talents, experiences, and abilities that are beneficial in growing Canada's economy and society. Prospective immigrants deserve access to credible evaluations of their qualifications and credentials prior to making the important decision to move to Canada.

A framework for a nationally consistent foreign credential recognition system for regulated professions could include:

1. Guiding principles that regulatory bodies, as well as federal, provincial and territorial governments, are all in consensus with will guide the recognition of foreign credentials;
2. A standard established for the timely review of individuals' credentials and qualifications before they arrive in Canada; and

3. A consistent approach that will see applications for licensing and credential assessment processes increasingly begin in the individual's country of origin.

Success story: Recognizing foreign qualifications in the engineering profession

The engineering profession in Canada has gone to great lengths to support and recognize newcomers' foreign qualifications and experiences. Engineers Canada believes that it is a best practice to direct all prospective newcomers interested in practising engineering towards the appropriate professional regulatory body for qualifications assessment prior to immigrating to Canada. Engineering licensing bodies are uniquely qualified to provide the most accurate information to governments during the immigration process of international engineering graduates. Accurate information will also help the graduates be prepared to join the workforce in Canada and will ensure that Canada is in fact getting the skills that it needs to support economic growth.

For more than a decade, Engineers Canada has implemented a project entitled From Consideration to Integration. The goal of this project was to ensure timely licensure for international engineering graduates from when they start considering moving to Canada until the moment they are integrated into both the profession and workforce in Canada. Many initiatives are underway as a result of the success of From Consideration to Integration.

Competency-Based Assessment

solution to a shortage of skilled, professional labour is to improve the integration of foreign-trained professionals into the Canadian workplace. Verifying an individual's work experience can often be seen as a significant barrier to employment for internationally educated professionals – which in turn can deter internationally trained professionals from applying to work in Canada. Engineers Canada has designed a Competency-Based Assessment Project that is designed to develop a competency-based assessment system for the evaluation of engineering work experience. This project works to move beyond joint recognition of licenses between provinces and territories in order to develop a key common definition of the standard for licensure as well as a common assessment method.

This assessment system will help to simplify the licensure process, specifically for the engineering profession, by creating a core set of competencies. The Competency-Based Assessment Project has created a requirement that: (1) ensures only qualified individuals are permitted to practice professional engineering; (2) makes it easier for applicants to understand what information must be submitted prior to working within the engineering profession; and (3) allows assessors to make more objective decisions on whether an applicant has met the requirements to work.

The federal government should support competency-based assessment protocols for regulated professions across Canada. With greater clarity and transparency for applicants, assessors,

employers and the general public through assessment systems, regulated professions can undertake objective assessments of applicants in order to ensure that the high professional standards set in place are met and maintained. With clear expectations and requirements in place, regulated professions can work towards attracting talented professionals from across the country and within the international community.

Roadmap to Engineering in Canada – Academic Tool

Engineers Canada has developed an online resource, known as the [Roadmap to Engineering in Canada](#); a one-stop online tool that provides up-to-date information for international engineering graduates and newcomers. The information provided includes licensing procedures in Canada, required academic qualifications to work as an engineer, as well as resources that are available prior to their arrival to help guide them through the licensing process in Canada. The academic tool provides a comparison of an individual's undergraduate engineering education to Canadian undergraduate engineering education. The sole purpose of this tool is to provide newcomers with information about their undergraduate engineering education in order to assist them in making a decision about immigration to Canada. It is not a part of the formal immigration selection process, nor is it part of the engineering licensure process. This available and accessible information can create a smooth application process for newcomers as it directly outlines what individuals need in order to work in their desired field *prior* to making the decision to immigrate to Canada.

The federal government must continue to support the maintenance of high standards already in place while enhancing international mobility. They must consult regulators when making policy and legislative decisions that could affect the regulators' ability to protect the interests of their stakeholders and ensure public safety. And the federal government should support professions in developing tools that enable the integration of internationally trained newcomers into their desired profession in Canada.

Compete in a Digital World

1. What are innovative ways to develop stronger digital skills among Canadians?

With momentum accelerating for increased innovation and job growth at the same time as the rise of digital skills shortages and global competition for talent, Canada will need a collective effort among industry, associations, academia, and policy-makers to leverage all talent sources.

Stronger Drive to Include Women in the Digital Economy

The CATA Women in Technology Forum outlined in their “Building Digital Skills” Submission (2010) that an “existing and underutilized human resource is Canada’s women. Women [and other diverse people] are under-represented in [information and communications technology] and other advanced technology sectors such as defence and security, and aerospace” (Digital Canada 150: 2010).

It is evident that women in Canada remain behind men when it comes to digital skills and fluency within the workplace; however, improving women's digital skills can close the existing skills gap.

Accenture, a professional services company focused on a range of services in digital, technology, and operations fields, has outlined in their 2016 report entitled, "Digital Skills Help Narrow the Workplace Gender Gap, Accenture Research Finds," that if businesses, organizations, and governments within the international community "can double the pace at which women become digitally fluent, gender equality could be achieved in 25 years in developed nations, versus 50 years at the current pace [in workplaces]" (Accenture, 2016: 2).

In order for Canada to build a stronger talent pool of individuals with digital skills - skills which are often seen throughout engineering disciplines - universities, industries and associations must focus on including women into the digital economy. A balanced workforce is about more than just reflecting Canada's demographics. Successful organizations tend to have a workforce that reflects the diversity of both its customers and society and works to support the development of employee's skills to succeed in the profession.

Recommendations

In order to develop stronger digital skills among Canadians the federal government must work with industries, associations, and universities on methods to help improve the retention of employees, specifically female employees, within science, technology, mathematics and engineering (STEM) professions. The federal government must:

1. Promote and support organizations that build awareness of effective methods that promote digital skills for their employees;
2. Examine how STEM industries and professions could become more attractive to a greater talent pool; specifically focusing on bringing women into the profession; and
3. Work in collaboration with industries, universities, and organizations to promote mentorship, internship, and co-operative programs to attract and retain women in STEM professions.

Proactive Steps: Engineering Profession in Canada

Engineers Canada is dedicated to increasing the participation of women in the engineering profession by identifying initiatives that attract greater numbers of women to engineering, promoting their retention in the profession and demonstrating the value of diversity and inclusivity in engineering education and in the workplace. A key component of this objective is

30 by 30, Engineers Canada's goal of raising the percentage of newly licensed engineers who are women to 30 per cent by the year 2030.

30 by 30 has received national support across all provinces and territories. Engineers Canada collaborates with the engineering regulators and other stakeholders to facilitate a national vision on this issue. Whether it is in academic programs, places of employment or other areas, Engineers Canada seeks to recognize organizations that make significant progress in increasing women in engineering. The engineering profession has taken active steps to include women into the profession, including:

- Assigning a 30 by 30 champion on their Council
- Presenting an Award for the Advancement of Women in Engineering as a means of recognizing and promoting diversity objectives
- Creating Women in Engineering Committees, with specific budgets and reporting at a senior level
- Instituting formal diversity tracking and reporting at every Council meeting

Projects under the 30 by 30 banner also include nationalizing efforts of outreach programs such as the Ontario Network of Women in Engineering (OnWiE)'s Go ENG Girl and collaborating with the WinSETT Centre to increase women's access to leadership training. The federal government should support these nationalizing efforts in order to leverage all talent sources to build stronger digital skills among Canadians.

Fostering STEM Education in Kindergarten to Grade 12 – Focus on Digital Skills

The Information and Communications Technology Council (ICTC) outlined in their 2010 "Digital Skills for Prosperity and Productivity in Canada" submission that a digitally literate population is required for Canada to prosper in the changing international economy. ICTC highlights three main challenges that pose a significant challenge towards the development of digital skills. There are obstacles in place that hinder individual's ability to *access* digital technology, "a school system is ill-prepared to develop digitally literate students... [and there is a] disconnect between the skills that industry needs and the education provided by post-secondary institutions" (Digital Canada 150 [ICTC], 2010).

An innovative approach to support the development of stronger digital skills among Canadians is to introduce digital media literacy and information and communications technology within provincial and territorial education curriculums; specifically integrating digital skills training within Kindergarten to Grade 12.

ⁱ Let's Talk Science (2013). "We're Losing Out- New Report on Science Learning Reveals the Economic Burden of Discounting High School Science Courses." Retrieved online August 30, 2016 from: <http://www.newswire.ca/news-releases/were-losing-out---new-report-on-science-learning-reveals-the-economic-burden-of-discontinuing-high-school-science-courses-513071801.html>.

ⁱⁱ Ibid.

ⁱⁱⁱ National Science Foundation (2016). "Opportunities for Enhancing Diversity in the Geosciences (OEDG)." Retrieved October 4, 2016 from: https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=12726.

^{iv} AISES (2016) "About AISES." Retrieved October 17, 2016 from: <http://www.aises.org/about>.

^v CSIRO (2016). "About I2S2." Retrieved October 4, 2016 online from: <http://www.csiro.au/en/Education/Programs/Indigenous-STEM/I2S2/About-I2S2>.

^{vi} Ibid.

^{vii} CSIRO (2016). "Indigenous STEM Education Program." Retrieved September 15, 2016 from: <http://www.csiro.au/en/Education/Programs/Indigenous-STEM>.

^{viii} OECD (2016). "More About Innovation Strategy for Education and Training." Retrieved September 7, 2016 from: <http://www.oecd.org/edu/moreabouttheinnovationstrategyforeducationandtraining.htm>.

^{ix} National Collaborative on Workforce and Disability (2015). "Engaging Youth in Work Experiences: An Innovative Strategies Practice Brief." Retrieved online October 03, 2016 from: <http://www.ncwd-youth.info/innovative-strategies/practice-briefs/engaging-youth-in-work-experiences>.

^x CBC News (2015). "Canada slipping behind on innovation, says advisory council." Retrieved online October 03, 2016 from: <http://www.cbc.ca/news/business/innovation-report-1.3347081>.

^{xi} Engineers Canada (2013). "Canadian Engineers for Tomorrow: Trends in Engineering Enrolment and Degrees Awarded: 2009-2013." Retrieved September 9, 2016 from: <https://www.engineerscanada.ca/sites/default/files/enrolmentreport2013-en-3.pdf>.