
Innovation and Accountability

A Response to the Government of
Canada's Digital Economy
Consultation Paper

Engineers Canada*
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*Engineers Canada is the business name of the Canadian Council of
Professional Engineers*



Executive Summary

Engineers Canada applauds the governments' commitment to improving Canada's digital advantage and seeking input from stakeholders and the public on a digital economy strategy for Canada. In order to achieve a sustainable digital economy, that is accessible, reliable and globally competitive, Engineers Canada would encourage the government to consider the following recommendations:

- Develop a funding strategy, whether sector specific or broader, that is transparent, and make planned investments to encourage long-term commitments and partnerships between the public, private, and academic sectors. Given the reach of the digital economy, all sectors have a role to play.
- Develop legislative and regulatory frameworks that ensure that the information and communications technologies and infrastructure are safe and reliable, including oversight by trained and registered professionals, including licensed engineers.
- Continue to support improvements to the foreign credential recognition system to improve the availability and retention of engineering talent so integral to the success of information and communication technology firms.
- Invest consistently in research and development to promote innovation in all aspects of the digital economy.
- Work with the private sector to support continuous professional development in digital skills, and work with partners to promote the participation of under-represented groups in the professions that can advance Canada's digital economy.

Innovation and Accountability: A Response to the Government of Canada's Digital Economy Consultation Paper

A submission by Engineers Canada

Engineers Canada is the national organization of the 12 provincial and territorial associations that regulate the profession of engineering in Canada and license the country's more than 234,000 members of the engineering profession.

As early as 1994, the engineering profession was calling on the federal government and its provincial counterparts to ensure that where necessary, professional, licensed engineers are involved in the design, production and services associated with the digital economy.ⁱ

More recently, a group of organizations representing significant segments of the engineering profession, including Engineers Canada signed the Montreal Declaration, which contained a commitment to support research and development, and its commercialization because of the value and importance of such work to the Canadian economy within the context of global competitiveness. The profession committed to focus on core areas of strength including information and communications technology, environmental engineering and technology and health and life sciences.ⁱⁱ

As part of its commitment to helping to ensure a high quality of life for all Canadians, and being an active participant in public policy development, Engineers Canada welcomes the opportunity to provide input on the government of Canada's proposed Digital Economy Strategy. This submission will speak to the policy and legislative considerations associated with the digital economy. Engineers Canada would be pleased to assist the Government in acquiring further technical expertise, should they wish, through our network of professional engineers in all areas of engineering practice.

1. Innovation Using Digital Technologies

When asked if Canada should focus on increasing innovation in key sectors or provide a broader foundation for innovation across the economy, the answer, from Engineers Canada's perspective, is a resounding "yes". The federal government and the private sector must take a strategic approach to improve Canada's digital advantage in sectors where Canada has experience and potential, without undercutting future opportunities.

In terms of investing in innovation, whether it is sector-specific or broad, consistent and strategic funding is key. A clear beginning and end are required if funding or partnerships are targeted to specific sectors or initiatives. A clear plan is needed if the intent is to support rolling investments and partnerships with universities, not-for-profits, and the private sector in fostering innovation. Investment and partnerships in research

and development activities and innovation allows businesses and universities to develop new designs and products that improve efficiency, promote environmental stewardship and enhance economic diversity.

As we have seen with infrastructure spending, particularly at universities, a lack of clarity and consistency can slow the pace of true innovation. The Canadian Council of the Academies defines innovation this way:

Innovation is new or better ways of doing valued things. An “invention” is not an innovation until it has been implemented to a meaningful extent. Innovation is not limited to products but includes improved processes and new forms of business organization.ⁱⁱⁱ

In order to move from theory and science to innovation that can lead to jobs and growth consistent investments and long-term partnerships between the public, academic, and private sectors are required.

The translation of science to practical application is the domain of the engineer. Engineers Canada has long called on the federal government to make strategic investments in research and development and innovation in Canada, and strongly supports collaboration between the engineering profession and the federal government to achieve innovation in the information and communications technology sector, as well as other areas of science and technology.

In terms of what conditions can incent and promote the adoption of information and communications technologies: reliable funding and partnerships are invaluable, as noted above. A level of confidence in the products and processes developed is also required.

The relentless evolution of technology makes it imperative to ensure that new technologies and their applications are properly implemented, with the oversight of trained and registered ? professionals, including licensed engineers. As members of a regulated profession, engineers, by virtue of their education, training and professionalism as demonstrated by their licensure can help to ensure that the right expertise and experience is part of the development of the digital economy. This expertise and the accountability of professional engineers for their work can give the Canadian public confidence in the products and processes that the digital economy relies on.

2. Digital Infrastructure

Investments in both the technology and infrastructure of the digital economy maintain and improve the quality of life for Canadians as well as stimulate job growth and long-term competitive advantages.

The same advances in technology and related infrastructure that drive Canada's economy can also raise concerns about public safety, particularly if new technologies are introduced without appropriate ethical and regulatory mechanisms in place. In instances where the pursuit of the digital economy intersects with the practice of engineering, engineers are well positioned to provide expertise in the development of controls to ensure accountability and public safety.

In the most recent *Speech from the Throne*, the Government of Canada committed to increase access for venture capital and foreign investment in the information and communications sector. While these changes will help to provide Canadian firms with access to the funds and expertise needed to grow Canada's digital infrastructure, it is necessary to ensure that the work and expertise gained is consistent with the high legal, ethical, and professional standards that Canadians expect.

The online digital economy needs to be safe and reliable for the user. To achieve that end, the software and hardware also needs to be equally safe and reliable. In order to get the certainty that Canadians expect, the right experts need to be involved, and in particular, licensed engineers.

While the engineering profession recognizes the need by policy-makers and regulators to ensure that there is a sufficient level of competition and consumer choice in order to maintain continued investment in the networks needed to have a digital economy, the need to quickly obtain large economies of scale should not lead to regulatory or legislative changes that diminish oversight and accountability by qualified professionals.

Engineers Canada is deeply committed to improving the diversity of the engineering profession. One of our key initiatives focuses on increase the involvement of indigenous Canadians in engineering. Many of Canada's indigenous peoples live and work in remote or rural parts of the country. Expanding digital infrastructure to rural and remote communities will help ensure that all Canadians have access to the information and tools they need to know their options in the realm of science and technology, and once educated and qualified, can pursue a higher quality of life in their home communities.

3. Growing the Information and Communications Technology Industry

The government of Canada has asked what would best position Canada as a destination of choice for venture capital and investments in global research and development mandates, and what efforts are needed to address the talent needs in the coming years in the information and communications technology sector. Engineers Canada agrees with the assertion that Canadian firms will have to focus on high value-added activities and be especially innovative and agile to compete globally.

One key area of interest in becoming more competitive globally and more effective domestically is in attracting and retaining highly qualified professionals. As noted in the consultation document, and supported by Engineers Canada's monitoring of enrollment

in engineering programs in Canadian universities, there are some indications of a 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 programs with the largest undergraduate enrolment, in that order. Enrolment in computer engineering continued to drop, declining by 11.1 percent relative to 2007 figures.^{iv}

Engineers Canada has worked tirelessly with the government of Canada to make it easier for employers to obtain the engineering talent they need to remain competitive through improvements to foreign credential recognition, which will help to ensure that international engineering graduates can be a part of growing the information and communications technology industry in Canada.

In particular, addressing the immigrant selection process and foreign qualifications has been a top priority for Engineers Canada for many years. Engineers Canada seeks to ensure that federal government requirements do not duplicate credentialing and licensing processes currently performed under the legislative authority of the provincial and territorial engineering regulatory bodies.

Another important way Engineers Canada is assisting the integration of international engineering graduates is to provide reliable information on Canada's labour market conditions. In June 2009, Engineers Canada proudly released the final report of a two year comprehensive labour market study entitled, Engineering and Technology Labour Market Study, which produced a labour market tracking system to support ongoing monitoring of labour market conditions by region and by technical field, a series of ten individual and cross representational studies, as well as a set of recommendations to address and identify trends affecting the engineering and technology work force.

4. Canada's Digital Content

Professional engineers in many disciplines can help create conditions for the development of digital content by providing the infrastructure – hardware and software – that Canadians can use to engage in the digital economy. Through an ongoing commitment to research and development, the federal government and its partners can encourage innovation that will allow all Canadians, regardless of disabilities or geographic location to participate in and create the content that drives the digital economy.

Engineers Canada has participated in initiatives to develop long-term approaches that allow for sustained growth and prosperity by supporting innovative practices, multidisciplinary research, new techniques, and long-term strategies for managing and designing Canada's infrastructure and will continue to do so in order to help protect Canada's prosperity and leadership in innovation.

5. Building Digital Skills

Engineers Canada agrees that there must be particular attention paid to building digital skills in Canada. By addressing shortages and ensuring that the sector reflects the diversity of the Canadian population, the public sector, and private sector can help ensure that the conditions for a world-class digital economy are in place. Solving these skill shortages will require a range of integrated and targeted efforts coordinated across government, industry and academic partners.

A digital strategy must seek opportunities to increase the participation of under-represented groups, particularly through encouraging more post-secondary enrolment in information and communications technology-related programs, including engineering. In the field of engineering, as with enrolment in undergraduate engineering programs, the problems still exist. For example, ten (Alana see the newest membership survey) percent of professional engineers in Canada are women, and in 2008 females comprised 17.1 percent of total undergraduate enrolment.

Engineers Canada is committed to improving the participation of women in the engineering profession and has undertaken a number of activities to do so including:

- Raising the profile and improving the image of the profession to improve young women's understanding of what an engineering career entails;
- Helping women better prepare for the engineering workforce by promoting and facilitating the availability of existing training programs that may benefit or be of interest to the female engineering population;
- Promoting information-sharing and mentorship programs and on the importance mentors play in attracting and retaining women in engineering; and
- Working with industry on methods to help improve the retention of female engineers in the workforce.

We also are working closely with indigenous communities and leaders to educate, inform, and assist their youth in learning about the potential of a career in science and technology and engineering.

While increasing the involvement and access of all Canadians, including women and indigenous people is important in ensuring a robust digital economy in Canada; all professions must be committed to pursuing continuous professional development to keep up to speed with the pace of digital technology and the global marketplace. In the engineering profession, licensing in fact involves a commitment to continue to evolve and maintain your skills, keeping engineers on the cutting edge of many of the innovations that can lead to a successful digital economy.

The Value of Professional Engineers in Canada's Digital Economy

Professional engineers are committed to continual professional development, and, through licensure, make a commitment to accountability and the public interest.

In a world where technical knowledge can be obsolete in a matter of months, continual professional development is essential and is something that professional engineers are committed to. Professional competence is the cornerstone on which the P.Eng. licence is built. The professions code of ethics requires licensed engineers to be fully competent to undertake the engineering work they do, and to make public safety as well as the protection of the environment their first priority.

Professional engineers commit to a demanding code of ethics, setting public safety as their first priority, and respecting the impact of their work on the environment, property and human life. They understand the legal dimensions of their work, and they know that their licence to practise depends on keeping their promise to act accordingly.

The P. Eng.—or the license—represents the highest standards of engineering knowledge, experience and professionalism in the country. It tells employers around the world that you're committed to engineering excellence; that you have the right skills, education and attitude; and that you're a responsible professional with the proven problem-solving abilities to help their business build business.

Conclusion and Recommendations

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ⁱ Joint Submission by the Canadian Academy of Engineering, Engineers Canada (the Canadian Council of Professional Engineers), The Association of Consulting Engineers of Canada and the Engineering Institute of Canada, *The Role of Engineering in Building a National Strategy in Science and Technology in Canada*, September 1994

ⁱⁱ The Montreal Declaration, Issued at the National Engineering Summit, May 21, 2009, at Montreal, Quebec.

ⁱⁱⁱ Council of Canadian Academies, *Innovation and Business Strategy: Why Canada Falls Short*, April 2009.

^{iv} Canadian Engineers for Tomorrow: Trends in Engineering Enrolment and Degrees Awarded 2004-2008