



Seizing Canada's Moment: Moving Forward in Science, Technology and Innovation
Industry Canada Consultation
Ontario Society of Professional Engineers Submission

February 7, 2014

ABOUT OSPE

The Ontario Society of Professional Engineers (OSPE) is a member-interest advocacy organization. We are the voice of Ontario's engineers, supporting, representing and advancing their interests and promoting engineering excellence for the benefit of the public. We represent engineers who work in many of the strategic sectors of Ontario's economy.

1 BUSINESS INNOVATION

- **Building on the advice provided by the Expert Panel on Federal Support for Research and Development, what more can be done to improve business investment in R&D and innovation?**

Administrative Simplicity: All innovation initiatives that are targeted at industry need to be administratively simple to be effective. Industry does not have the time or expertise to navigate through complex applications and resorting to administrators and consultants to assist with applications reduces the effectiveness of the targeted funding programs.

Consistency of Policy: Adopt a long term, predictable funding strategy which will enable researchers to plan their investments over longer term time horizons.

Financing of Innovation: For Canada to be innovative in the longer term, we must create an innovation environment that is financially attractive:

1. **Tax Policy:** Tax credits work to stimulate investment in R&D, especially for small- and medium-sized enterprises (SMEs), but it is an indirect stimulus measure. In recent years abuse has occurred, and the use of consultants reduces the effectiveness of targeted funding. A legal provision barring use of funds for administrative or advisory functions may correct this issue.

2. **Re-investment in Innovation**: We need to think about a policy that will stimulate re-investment by the private sector. General tax breaks do not necessarily promote re-investment. Investors will often agitate for higher dividends, so there is a negative incentive to re-invest tax savings. Policies promoting lower taxation policy put pressure on the federal government to reduce grant spending on basic/academic research, which has the effect of cutting the body of invention off at the knees.
3. **Venture Funds**: The recent federal-provincial announcement of a new venture capital fund, the Northleaf Venture Catalyst Fund, is appreciated – and much needed – because traditionally there has been an absence of venture funding in Canada.
4. **Market Drivers to Facilitate Commercialization**: It is important to ensure there are market drivers that pull new products into the marketplace. Governments do not have sufficient funds to subsidize both R&D and product sales. For example, in the electricity energy sector in Ontario, many companies are developing smart grid products with government help. However, Ontario's Time-Of-Use (TOU) pricing plan and industrial pricing plans make it difficult – if not impossible – to build a business case to adopt the new technologies. The potential savings are not sufficient to justify the investment. If market drivers exist or are put into place to facilitate commercialization of new technologies, then companies will see the benefit of investing more of their own money into R&D.

- **What actions could be taken, by the government or others, to enhance the mobilization of knowledge and technology from government laboratories and universities, colleges and polytechnics to the private sector?**

Foster Clusters of Talent, Equipment, Industry and Other Institutions: Government and other stakeholders can work together to stimulate innovation and build enthusiasm in a given sector. Canada needs to focus our efforts on key industries where we can make a measureable impact. Examples in Canada include energy, aerospace, information and communications technology (ICT) and health care technologies.

Focus Academics on Collaboration vs. Independent Discovery: In Japan and in the U.S., academic teams of investigators often come under the umbrella management of a lead professor. This aggregation occurs in large part due to the inventiveness and managerial skills of the lead professor. Businesses are created out of these groupings. The formation of organizations such as MaRS, the Spatio-Temporal Targeting and Amplification of Radiation Response (STTARR) program at the University Health Network, the Ontario Institute for Cancer Research (OICR), and the Centre for Probe Development and Commercialization (CPDC) are great examples of clusters which create jobs and value, and were built around strong technical/scientific leadership.

Manage Innovation as a Business:

1. **Encourage Project Management, Intellectual Property and Marketing Skills for Business Innovation:** Project management expertise is needed to drive innovation. Integration of the complex elements of innovation – R&D, funding and regulatory factors – is a project management challenge. The keys to promoting success of new ventures are good project management skills. Project Management Professional-style training of engineers in university should be a priority, in addition to exposure to entrepreneurial concepts and projects. Similarly, instruction on intellectual property and business marketing needs to be communicated to business innovators – a role that could be filled by organizations such as OSPE.
2. **Cultivate Entrepreneurship:** Funding for Entrepreneurial Fellowship (Chairs) should be encouraged to celebrate wins. Awards for top entrepreneurs in selected areas should be widely celebrated as we seek to foster a culture of innovation. The Ontario Centres of Excellence Martin Walmsley Fellowship is a good model. The fellowship supports the commercialization of academic intellectual property by enabling graduate students or recent graduates to create start-ups.

Invest in the Human Capital Required to Promote Research and Innovation:

1. **Continued Funding of Internships is Critical:** Internships, co-ops or apprenticeships are needed. There exists a decreased ability or desire on the part of employers to invest in training for new employees. Due to economic pressures, industry wants to hire job-ready staff. We need to provide more incentives – perhaps spurred on by tax incentives – for business to provide on-the-job training through more co-ops and internships. Internships need to be awarded on a competitive basis – to attract and retain the best talent.

Extend Granting Time Periods: Funding needs to be provided in larger tranches to eliminate the constant need to re-submit proposals, which impacts innovation and increases the amount of time dedicated to completing new program applications.

How can Canada continue to develop, attract and retain the world's top research talent at our businesses, research institutions, colleges and polytechnics, and universities?

Canada must view research in a systemic manner. Talented researchers will be attracted to Canada if they see an ongoing commitment to all areas of research – discovery, development and commercialization.

Clusters of Talent: Substantial emphasis is placed on recruitment of international talent to universities. This enriches the training and research environment, but in some cases Canadians interpret “the world’s top research talent” to mean talent from abroad while local talent is perceived as second best. Canadian researchers are global leaders in areas such as health, aerospace, nuclear, and oil and gas. Canada should make every effort to retain and concentrate these remarkable clusters of talent and also gain a return on our public investment in our own people.

Clusters of Equipment: It is far easier to start up a research program if all the necessary research and equipment tools are at the ready. Clusters of equipment are critical for product innovation of any maturity level but especially new product innovation, e.g. STTARR at UHN, the Automotive Centre of Excellence at the University of Ontario Institute of Technology and the Biointerfaces Institute at McMaster University.

Consistency of Federal-Provincial Cluster Strategies: Consistency between federal and provincial funding agencies on cluster strategies and priorities would enable Canadian innovators to achieve a greater degree of synergy and success. Clusters are typically local within a municipality, such as Waterloo and Toronto or at most a wider region, e.g. Kitchener-Waterloo, Greater Toronto and Hamilton Area (GTHA), etc.

How might Canada build upon its success as a world leader in discovery-driven research?

Is the Government of Canada's suite of programs appropriately designed to best support research excellence?

Latitude for discovery-driven research: Canada has reduced spending in elements of discovery-driven research. The current policy focus in Canada is on innovation and commercialization. Structure is necessarily for commercialization, but freedom in basic science research needs to be maintained for discovery-driven research that culminates in value-added and market-worthy innovation.

Placing industrial-style structures in place around a discovery team creates culture risk and stifles creativity. In these structured environments, people will mostly produce safe solutions (“me-too innovations”).

Investment in Clusters: Canada has a history of investments in targeted clusters of activity. Investments in ICT and aerospace, for example, have paid rich dividends. As recommended above, continuation of this type of targeted approach is worthwhile.

All too often there has been a lack of focus in Canada on emerging technologies. Science-based industry councils are needed to help spearhead policy recommendations on key new initiatives and emerging technologies that can be exploited by Canada in targeted sectors. AUTO21 in the automotive manufacturing sector and the *Consortium de recherche et d'innovation en aérospatiale du Québec* (CRIAQ) are two models in this regard.