



## Canada's Universities: Partners in the business of innovation

Submission to the Expert Review Panel on Research and Development  
by the Association of Universities and Colleges of Canada

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Photo: École de technologie supérieure (ÉTS)

*The purpose of this submission is to outline how Canada's universities, working with government and business, could play a greater role in helping Canadian companies address critical innovation and productivity challenges. Canada's universities recognize that the government's goal for this review is to maximize the returns on its current investments in this area without increasing government expenditures.*

In Canada, lagging productivity growth and low business expenditures on research and development (BERD) are significant causes for concern, particularly as our population ages. Innovation is increasingly understood as the key to a competitive economy. Competitive industries generate wealth from global markets and form a sustainable economic foundation that enriches the standard of living for Canadians. Simply put, innovation lies at the heart of a productive economy and universities are central to innovation.

The Expert Review Panel on Research and Development identified four key inputs that help companies to be more innovative:

- ideas and knowledge;
- talented, educated, entrepreneurial people;
- networks, collaboration and linkages; and,
- capital and financing.

Universities are central actors in this integrated innovation ecosystem. We are making significant contributions within each of these inputs. In partnership with government and business, universities are ready to play a greater role in helping address Canada's innovation and productivity challenges.

The panel's use of these key inputs reflects the growing global consensus that a broad view of innovation is crucial to successful innovation policy. For example, the Organization for Economic Co-operation and Development (OECD) recently advised policymakers to view innovation as more than just a new or improved product, good, service or process. Innovation also includes new approaches to marketing, organizational behaviour, business practices and external relations.<sup>1</sup>

This emerging understanding that national innovation systems are about more than generating new technological products aligns

well with the strengths of Canada's universities across the medical, natural and social sciences and humanities. In addition to excellent R&D capabilities, universities offer world-leading expertise in many areas: design, global marketing, cultural relations, organizational behaviour, and business, financial, legal, and management strategies, to name but a few. These strengths are especially useful to the growing services sector, which already comprises 70 percent of the economy, and to promising small and medium sized enterprises (SMEs), which require innovative processes and products to compete on a global scale. From service providers to goods producers, from start-ups to multinationals, Canadian universities are committed to seeing their multidisciplinary expertise drive greater innovation for the full spectrum of businesses.

### **Building on success**

Universities already play a central role in supporting business innovation. We conduct basic research and generate new knowledge that companies can access, adopt, and build upon in order to develop or enhance their products and services. We train the researchers, professionals and skilled graduates that are hired by the private sector. Increasingly, universities work with industry conducting contract-based research, as well as providing consultation and advisory services. Universities will continue to seek opportunities to link research-based knowledge with market-driven needs.

The R&D Review presents an opportunity to examine Canada's innovation ecosystem in its entirety. Through the Review, universities, governments and businesses can work together to build on Canada's unique strengths and address Canada's weaknesses. In the next sections, Canada's universities have made recommendations that respond to the Panel's four part strategy to improve business innovation.

## Ideas and knowledge

### Balance direct and indirect support for innovation

The Government of Canada directs a substantial majority of its support for business innovation towards tax credits that encourage firms to engage in R&D. The Scientific Research and Experimental Development (SR&ED) Tax Incentive Program costs about \$3.3 billion annually; combined with the availability of a highly skilled and talented labour force, this type of indirect support provides a solid foundation for some Canadian-based multinationals and other companies to conduct research in Canada.

However, there are questions about whether Canada's strong focus on indirect tax measures is the most effective approach to leveraging private sector investments in innovation. The central question is whether a more balanced mix of indirect tax and direct funding approaches would prove more effective. In large part, these questions are driven by the recognition that funding for direct support to the private sector in other jurisdictions has effectively targeted innovative activities and processes that fall outside traditional conceptions of R&D. The relatively low levels of investment in BERD suggest that Canada's strong focus on indirect support through the tax systems is inefficient at generating broader innovation activity.

**The Panel should explore the option of reallocating a portion of the SR&ED tax credit toward direct and targeted support of innovation which will, in turn, leverage a greater range of innovative activities.**

### Support innovation clusters

The Government of Canada also supports business innovation through 19 National Research Council (NRC) institutes, most of which are co-located with universities across the country. These institutes undertake, assist or promote scientific and industrial research in key sectors. Given the overlaps in their programs and those of the research granting councils and Canadian universities, it is increasingly important to ensure that researchers from all sectors are aligned with each other, and with their private sector partners, to maximize the return on their joint investments. **Canada's universities are committed to exploring new**

**means to improve the coordination and collaboration between the NRC and its regional clusters, other federal and regional labs, Networks of Centres of Excellence (NCE) - including Business-led NCEs and Centres of Excellence for Commercialization and Research (CECR)- and industrial partners.**

### Support contract research

University researchers are problem solvers. Their basic research discoveries are the foundation upon which long-term economic progress is built. They also strive to use the expertise and knowledge they generate to solve more immediate economic and social problems domestically and internationally. In this regard, universities conduct almost \$1 billion in contract research annually with the business sector and another \$1 billion per year in research for the not-for-profit sector. In spite of these investments, only a small proportion of research-active companies are working directly with Canadian universities to develop innovative research solutions for their market-based problems. **We need to expand the reach of programs that help the business sector, including SMEs, utilize the skills, talents and knowledge of Canada's universities.**

### Increase access to university research and intellectual property

Universities across Canada are developing and are using standardized templates to fit different intellectual property (IP) needs when working with different industry sectors. The use of these templates is helping to streamline collaborative research activities between universities and businesses so that most IP agreements are negotiated very quickly. In general, universities recognize that there is more work to do to simplify the transfer, management and commercialization of ideas. Experience at our universities leads us to conclude that there is no single IP template that applies to all business collaborations. In some cases, transferring IP rights to companies with simple "windfall" clauses for universities to share in potential gains is what is required, while protecting the rights of students, and allowing researchers to publish in a reasonable time-frame. In other instances, universities maintain ownership but use template agreements to facilitate the rapid transfer of the knowledge or application through licencing agreements. **Universities are committed to**

examining and developing better ways to tailor IP agreements to the specific needs in different sectors to ensure that the research, ideas and knowledge generated by our faculty, students, and graduates are more easily accessible to the business sector.

### Support larger and more strategic research initiatives

Oftentimes, the research strategies of many larger companies extend over longer horizons and involve more risk. As they can have high returns for the Canadian economy, it is worth considering other types of support to incent larger companies to conduct more research in Canada. The success of these types of investments are evident in Canada's economic peers, including the U.S. (ARPA-E), the U.K. (Technology Strategy Board's Innovation Platforms program), Finland (TEKES' Competence Areas program), and Germany (Thematic R&D Programs). These programs support high-risk, high-reward collaborations and they encourage the creation of sustainable, mutually beneficial consortia composed of the private, public, and university sectors. **Building on successful examples, such as Automotive Partnership Canada, the government should expand programs that award funding for large-scale transformational research projects in strategic sectors.**

### Support applied research centres

Another international model for providing effective research support for companies is the Fraunhofer Institutes in Germany and the newly-announced Technology Innovation Centres in the U.K. These co-funded, commercially-focused labs provide a space for leading scientists from all sectors to work explicitly on private sector technical challenges. Experience demonstrates that these **labs function best when they work closely with the universities that supply many of the people and ideas upon which applied research is based.**

### Support innovation through government procurement

Government R&D procurement programs provide a mechanism to encourage SMEs to conduct more market oriented R&D. The new Canadian Innovation Commercialization Program (CICP) makes government the crucial first customer for innovative young companies. Procurement can also be used to capitalize

on university research, particularly as is done successfully by the Small Business Innovation Research (SBIR) program in the U.S. **A portion of the CICP should be allocated specifically to companies that are partnering with universities or are spun-off from universities and public labs.**

### Talented, educated and entrepreneurial people

#### Support globally engaged graduates

One of the greatest services that universities provide is to equip graduates with the skills to succeed both at work and in life. Through their interactions with faculty, researchers, and peers, university graduates attain the necessary creative, analytical, entrepreneurial, managerial, language, technical and scientific skills to be innovative in the business sector and in a host of other environments.

In today's global economy the management of innovation and business strategy requires a deep understanding of global markets, cultures, distribution systems, and financial, legal and management practices. This presents an opportunity for companies to employ the talented graduates from Canadian universities who have a wide range of multi-disciplinary skills and experiences. Canadian students benefit from learning in a culturally-diverse, research enriched environment. For example, approximately 40 percent of all faculty at Canadian universities earned their first or highest degree outside of Canada. They are increasingly engaging in research collaborations with international partners. Through these networks, and by learning alongside more than 90,000 international students from over 200 different countries, Canadian students develop an early appreciation for working and competing in a global environment.

Canada is a middle performer in providing access to bachelor's education, and trails most nations in producing advanced degrees.<sup>ii</sup> According to the Council of Canadian Academies, "there is a higher proportion of U.S. workers with advanced graduate degrees, indicating greater demand for the most technically sophisticated skills. The demand by business for research-level skills is in fact closely correlated with BERD intensity across OECD countries."<sup>iii</sup> **Therefore, introducing more effective measures to increase BERD will increase**

demand for PhDs, MBAs and other advanced degree holders.

### Support for longer-term graduate employment with industry

Canada has several successful short-term internship programs for students. These programs – such as the MITACS-Accelerate and other industrial internship programs offered by the research granting councils – provide valued workplace experiences for several thousand students and recent graduates each year. These programs help to keep talent in Canada and employ the knowledge and expertise developed through university research experience to improve innovation and productivity in the private sector. The U.K.’s Knowledge Transfer Partnerships, NSERC’ Industrial R&D Fellowship program, and the Industrial Associates program in Alberta provide longer term employment experiences for recent graduates with advanced degrees and research training. **Expanding upon programs that create longer-term employment experiences for recent master’s and PhD graduates, across all disciplines, will incent private-sector employers to utilize the innovative skills and talents of these highly qualified graduates.**

### Networks, collaboration and linkages

#### Strengthen university-industry research programs

Relatively new “bridging” programs, such as the Business-led NCEs, CECRs, and NSERC’s Strategy for Partnership and Innovation have been organized around matching businesses with the university experts who are most capable of providing innovative solutions their specific technical or commercial challenges. For example, early evaluations of the *Interaction* and *Engage* programs, launched as part of NSERC’s Strategy for Partnership and Innovation, have proven to be highly successful. In its first six months, the *Engage* program has facilitated close to double the number of collaborative partnerships that had been targeted for the program in the first full year.<sup>iv</sup> This oversubscription is evidence of the private sector appetite for direct programs that use a customer service approach and fast, business-friendly funding cycles to effectively link to high quality expertise at Canadian universities.<sup>v</sup>

Indeed, much of the strength of NSERC’s and CIHR’s current programming is that it offers a suite of programs that support the progression of academic-industrial interaction from initial small-scale connections through to longer-term collaborative and strategic partnership arrangements, such as the Tri-Council NCE initiatives. **These collaborative research and “bridging” programs should be expanded.**

#### Support Canada’s SMEs

Canada’s small- and medium-sized enterprises comprise more than 99 percent of Canada’s 1.1 million businesses. Though the vast majority of SMEs are small research performers (often spending less than \$100,000 annually) the number of Canadian companies that conduct research has grown from 9,600 in 1997 to more than 22,300 in 2007.<sup>vi</sup> SMEs account for more than 97 percent of all companies conducting research in Canada and over 43 percent of the total investment in private sector R&D. **Support to engage SMEs should continue, and be expanded.**

#### Enhance access to innovation support programs through NRC IRAP

The existing federal incentive system for business innovation is both diverse and complex. There are more than 250 federal programs, administered by many different departments, agencies, Crown corporations and federally funded not-for-profit organizations, which support distinct industry sectors, regions, functions, activities, and stages of company development. For any business (particularly SMEs) the time and resources required to navigate the existing support system and examine and apply to each relevant individual program are often prohibitive. **Consideration should be given to the creation of a digital tool that links all federal programs in one central location.**

The NRC’s Industrial Research Assistance Program (IRAP) has been playing a type of matching role in 100 communities across the country. Because 75 percent of IRAP’s Industrial Technology Advisors are co-located in research centres, universities, and other industry association offices, they are well placed to help link SMEs with university expertise. Regional offices of NSERC and the Business Development Bank of Canada (BDC) have begun to play similar roles in recent years. **Coordination is required to**

bring these entities together to act as a network of concierges for SMEs. These advisors would be mandated to identify relevant federal support programs and create customized solutions for SMEs.

## Capital and finance

### Create an SME voucher program to support innovation

One financing tool that has shown promise in Europe, and provincially in Alberta and Nova Scotia, is a small scale innovation voucher. This mechanism provides straightforward, upfront funding directly to innovative SMEs to hire university research teams and access university infrastructure, broadening the impact of public investments made through the granting councils and CFI. **Putting vouchers directly in the hands of the business sector encourages them to ‘pull’ knowledge and expertise from universities.**

### Facilitate access to risk capital for university spin-offs and start-ups

University faculty and their tech-transfer offices, incubators and research parks are often the hubs around which spinoffs, start-ups and other innovative companies cluster. These companies need access to risk capital and financial support throughout their development, for proof-of-concept, seed funding and prototyping stages. The ultimate purpose is to enable them to scale up and mature to become attractive to established investors and venture capitalists.

More can be done to help turn the ideas coming out of universities into viable commercial enterprises. For example, Innovacorp in Nova Scotia uses its Early Stage Commercialization Fund to finance university spin-offs through the initial stages of development, before using its internal venture capital fund to help the most promising companies scale up. **The Panel should consider ways in which the federal government, through the BDC or another mechanism, can work together**

more effectively with university incubators and technology transfer offices to help young companies bridge the capital and financing gap between the initial idea and venture capital stages of their development.

## Conclusion

Canada’s universities have an enviable track record of contributing to innovation, and to Canada’s productivity. But, there is always room for improvement. Universities have identified areas for further collaboration, and are working toward eliminating the challenges SMEs face in partnering with them. Universities are at the table, ready to introduce the kinds of enabling processes that make cross-sectoral collaborations more effective and efficient. We want to work with the Government to assist in increasing private sector innovation by:

- improving access to the results of basic university research;
- conducting more contract research with the private sector;
- working with other institutions to facilitate access to university research and knowledge networks by Canadian SMEs;
- helping the private sector connect to international research collaborative networks;
- working with other institutions to support longer-term student and graduate internships and employment experiences;
- enhancing the international experience of Canadian research and business graduates; and
- achieving a better balance between indirect and direct support for business innovation.

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<sup>i</sup> *Oslo Manual*, OECD, page 46

<sup>ii</sup> According to the latest data from the OECD, Canada ranks 20<sup>th</sup> among OECD nations, behind emerging economies such as Korea, Hungary and Poland, for the proportion of youth who have access to full-time university programs soon after completing secondary school.

<sup>iii</sup> *Innovation and Business Strategy: Why Canada Falls Short* report of the CCA Expert Panel on Business Innovation, page 60 (2009)

<sup>iv</sup> These programs were designed to identify and establish new partnerships between universities and companies (particularly SMEs), by allocating between \$5,000 and \$25,000 for travel, workshops and networking to identify research projects.

<sup>v</sup> There is room to grow as fewer than 2,000 of Canada’s 22,000 research-active SMEs have established relationships with Canadian universities through NSERC ([www.nserc-crsng.gc.ca](http://www.nserc-crsng.gc.ca))

<sup>vi</sup> *Key Small Business Statistics*, Industry Canada, page 41 (July 2010)