University-Industry partnerships:

An emerging model efficiently supporting and enhancing participation in R&D in Canada

Joint submission made by McGill University and École de technologie supérieure (ÉTS) to the Federal Expert Review Panel on Research and Development

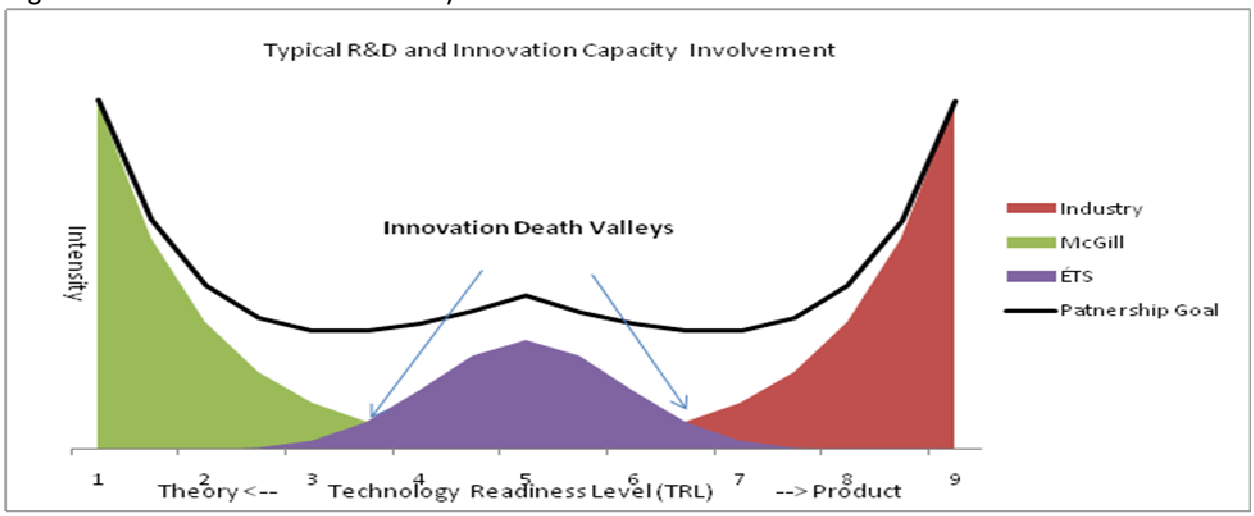
February 18, 2011

Overview

In response to the Government of Canada's review of the current federal programs and initiatives in support of research and development, McGill University and École de technologie supérieure (ÉTS) are pleased to submit this joint response for the panel's review and consideration.

Universities play an important role in the innovation chain through the performance of research and development, by training the next generation of skilled and innovation-oriented workers, by linking with industries to support their R&D needs and through their extensive networks of industrial and international partners. In 2007, universities conducted approximately 36% of the R&D performed in Canada, worth $10.4B. In its 2008 report, *Compete to Win*, the Policy Review Panel reported that the collaboration of universities with the business community is key in making Canada more competitive in the future. In addition, government can play a crucial role in enhancing R&D impact by not only providing funding for R&D but by also being first customer of university and industry commercial outputs through procurement policies. Doing so will result in the government using its investments and contributing to economic impact.

We are proposing, in this joint submission, a new vision for inter University-industry partnerships that can serve as a national model for advancing Canadian Research and Development initiatives and successes. This partnership will fill in the innovation Death Valleys. We will demonstrate how very different institutions can work together with each other and industry for individual and national benefit.



Partnership between McGill and ÉTS

We believe that the construct of the ÉTS model, coupled with the reputation and excellence of McGill University, is a promising avenue for university-industry relations and represents a preferred path for future developments. In addition, both are highly research-intensive academic institutions.
Each institution, in its sphere of competence, responds to very specific needs. ÉTS does significant business with enterprises of all sizes, most of them being small and medium enterprises (SMEs) and is able to respond rapidly to their R&D needs. McGill, for its part, focuses on multi-year research projects and has a greater tendency to develop ties with larger organizations. By working in partnership, McGill and ETS will be able to cover and influence the entire innovation chain, from both idea to innovation and from fundamental research to application.

Our joint vision is based on universities serving as catalysts and levers for the retention and attraction of high quality personnel, and economic development. As such we are creating an ecosystem that is conducive to

innovation, powered by knowledge institutions and situated in the heart of a modern and dynamic city. In this perspective, the two institutions have pooled their resources on several key initiatives to accentuate their partnership.

Quartier de l'innovation: an innovative and promising project

The Quartier de l'innovation (QI) is a new project, initiated by ÉTS in 2009, and is creating significant interest and action in the community. The purpose of the Quartier de l'innovation project is to transform an industrial district – where the ÉTS campus is located – into a dynamic environment where the driving forces of Montreal's technological innovation community can expand and thrive. Largely abandoned for many years, this part of the city — a short walk from downtown Montreal, the Business District, Old Montreal, the Lachine Canal and the Old Port of Montreal — already offers thousands of jobs in cutting-edge multimedia and information technology fields (Cité du multimédia and Cité du commerce électronique). The interest quickly shown by McGill University in this major project allowed ÉTS to broaden its vision and target common objectives with its new partner.

The Quartier de l'innovation will aim to cultivate, foster, and spearhead an innovation spirit in which universities, industries, technologies, scientific , urban, social and cultural components are at the forefront.

The Quartier Innovation seeks to:

- Support scientific and technological leadership;
- Favour university-industry synergy and optimize development potential;
- Stimulate exchanges between industry and university personnel and professionals
- Provide a platform for internships, networking and entrepreneurial training
- Support the competitiveness and productivity of businesses in the Montreal metropolitan region and the province of Quebec by promoting innovation;
- Offer a diversified, high-quality urban living environment;
- Encourage community mobilization and participation in the district's vitality and activities;
- Contribute to the economic expansion of Montreal and Quebec on the international scene.

The intention of the partners is to foster and build upon the talent and growth already happening and revive a major sector of Montreal which, by its unique geographical position and its high creative density, can again become one of the city's key development drivers. We firmly believe that the complementarities of McGill and ETS will accelerate the transformation of this district and give it an international level of prestige and recognition.

Quartier de l'innovation is inspired by a similar project conducted in Barcelona (22@barcelone). Like Barcelona, the Quartier also developed after a decade of unprecedented change: the bursting of the technology bubble, the explosion of growth in the BRIC countries (Brazil, Russia, India, China), the global economic crisis, the growing awareness of issues related to sustainable development, and the telecommunications explosion.

The model proposed by McGill and ETS aligns with the emerging trend in the international academic community. Indeed, in France, Great Britain and the United States, the tendency for traditionally competing universities is now to join forces or develop public-private partnerships giving themselves competitive advantages. In Canada, the McGill-ETS partnership is a first.

The complementarity of the two institutions, their collaborations, and their partnerships will have a structuring impact on their environment and give them the necessary tools to serve society better. In today's system of innovation, collaborations and partnerships are being extended across disciplines, institutions and sectors. They are also often international in nature.

However, McGill and ETS are aware that upgrading the partnerships of university and industrial stakeholders will require additional financial backing in order to truly have these partnerships make an impact in society. Specifically, McGill and ETS propose a five year pilot project to enhance their business-university partnership. To maximize the benefits of these partnerships, it is crucial to support a healthy innovation ecosystem, which includes sustained and full research funding, the creation and maintenance of top-flight research facilities, nimble research funding as well as international and inter-sectoral partnership opportunities.

A new nature of innovation requires completely new, multidisciplinary skills and competencies, and the demand for these new human resources will be immense. Universities, educational institutions and knowledge centres in particular must react and new institutions will appear to address a new nature of innovation.

New partnerships will emerge and be crucial for future innovation. Government and public institution participation in collaborative networks will be vital.

Symbiotic relationships will challenge most public institutions and will call for new mindsets and competencies in the public sector.

The private sector will provide new innovative solutions to a much larger extent because they spot a market for it. In addition, new partnerships will emerge between firms of different sizes in knowledge hubs, regionally, nationally and across the globe.

Public institutions must adapt to the conditions in a new nature of innovation. They will be interdependent of other actors and must also be ready to move away from control-based policy formulation towards more influence-based.

Source : OECD, « The new nature of Innovation », September 2009

The partnership between ÉTS, McGill University, industry and government bodies reflect the recommendations made over the past several years in key reports, such as the CCA Review of Canadian Business Innovation (2009), the Competition Policy Review Panel (2008), and the State of the Nation Report (STIC, 2008) and will address such aspects of training and programs to enhance and sustain the innovation continuum.

Training

One of the prominent missions of Universities, along with research, its translation and services, is the training of the next generation of highly qualified personnel. There are currently several training programmes that allow students to gain experience in industry while carrying out undergraduate or graduate studies. Some gaps still need to be addressed, especially when it comes to partnering with small and medium enterprises. As such, governments should continue to provide targeted competitive support for graduate, post-doctoral students, and universities to provide the needed environment in which to learn and conduct research from as much a scientific as a business perspective. However, if this trained talent cannot find appropriate employment opportunities following their studies, we risk facing a brain drain and losing this talent. In addition, if there is a lack of highly qualified personnel to support our businesses, the correlation remains the same, as businesses need people to grow. It is important to recognize that innovation can also be generated by under graduate students with dedicated scholarships and support that is differentiated from the existing post graduate programs.
The current challenge is to meet the strong demand from industry, since this demand exceeds the supply. Even though there are many close ties with business, both in cooperative education and in R&D partnerships, institutions are often unable to offer optimum support to the industrial community. This is true both regarding the number of engineers trained annually and regarding R&D.

How Universities Contribute:

- Prepare the next generation of talented researchers and scholars for universities, industry and other knowledge employers;
- Recognize industry partnerships as an important factor in hiring, promotion, creation of tenure track positions and merit review;
- Creation of additional interdisciplinary training programs/diplomas related to commercialization (e.g. Business and Medicine/Pharma, Business and Science/Engineering).

Recommendations:

- Leverage current internships into work-experiences (e.g. NSERC Industrial Post-Graduate Program to be leveraged by the employment of internspossibly as tax credits);
- Develop internships for undergraduate and graduate students that are geared to enhancing R&D in SME's;
- Develop Industry Fellowships (industry coming to work in University labs, providing the students with greater opportunities to work closely with corporate partners, leading to entrepreneurship and knowledge transfer on what industry needs and what universities can offer);
- Develop two-year entrepreneurial post doctoral internships based on the current post doctoral fellowships.

Small and Medium Enterprises

One of the main problems for SMEs in Canada is the lack of funds for Research and Development. We need to be attentive to the pre-eminence of risk aversion in Canada, especially with regards to venture capital and start-ups. Key incentives are essential to minimize risks involved in the development of new companies by providing key incentives rapid and flexible programs tailored to the economic viability of the SMEs. This support must be systematic, not cyclical. We need to recognize the importance of advocacy for better communication and talent building with a focus on SMEs, but there exists a lack of recognition of the continuum required.

It is important that in considering the existing programs and in potentially designing new ones that the government keeps in mind the mechanisms to move from one instrument to the other. Too often we have programs that, in and of themselves, provide excellent value and support for innovation, however gaps exist between one program and the next. It is necessary to note that SMEs do not have the capacity to even access the R&D funds due to the administrative requirements and negotiations associated with the tax credit programs. Looking at the innovation system as a whole requires ensuring that there are tools for very early stage engagement; first forays into R&D investment; graduation program/incentives for joint development; and commercialization incentives that recognize the critical needs of seed funding and support for prototype development. In addition, the development base of R&D needs to be emphasized and funded appropriately in order to allow for market and economic impact.

In recent years, the Federal Government, through financing provided by its funding agencies, supported the collaboration between universities and the private sector.

Noteworthy Federal Programmes enhancing university-industry R&D partnerships, especially with SMEs:

- Industrial Research Assistance Program (NRC-IRAP)
- Proof of Principle (CIHR-PoP)
- Idea to Innovation program (NSERC-I2I)
- Collaborative Research and Development Program (NSERC-CRD)
- Industrial Research Chairs (NSERC-IRC)
- Engage Program (NSERC)

- Industrial Partnership Collaborative Research (CIHR / IPCR)
- MITACS Accelerate (industry internship program)

Recommendations:

- Adoption of a ''create and share'' versus an ''own and protect'' vision for intellectual property and partnerships;
- Provide greater assistance with technical and business support of commercialization;
- Provide greater industry support such as management and administration to support R&D funding applications (through universities and government branches);
- Enhance programs that bring mentoring and entrepreneurial experience to universities and professors to commercialize discoveries, including those involved in the founding and assisting of new spin-off companies. Such programs include entrepreneurs-in-residence, CEO and retired CEO mentors and mentors from business and industry;
- Scientific Research and Experimental Development (SR&ED) vouchers (cash up front) as opposed to tax credits to address cash flow issues, innovation incentives and leveraging of funds especially for SMEs
- Improve availability of venture capital, angel financing, seed funding for early-stage technologies and support for proof of concept and prototyping resources to enable the development of the technology;
- Improve support for accessing funding mechanisms (navigating the federal programs) and facilitation of network grant applications and management;
- Revive the Intellectual Property Mobilization (IPM) program, terminated in 2009 as it worked well for universities since funds were going directly to universities to create local capacity to support the transfer of technologies;
- Evaluate the effectiveness of the diverse targeted and sector-specific programs aiming to promote commercialization particularly regarding SMEs (such as NCE Networks and CERC program).

In Closing

The partnership model favored by McGill and ETS is based on the universities' traditional expertise and seeks to combine the strengths of each. It is well aligned with the Government of Canada's Science and Technology strategy and initiatives such as the Quartier de l'innovation will help strengthen Canada's leadership in key priority fields, such as health sciences, ICT, environmental sciences, and energy. In addition, Canada's S&T strategy should be informing all federal agency strategies in order to streamline the innovation continuum and provide a uniform platform for R&D.

We believe that McGill University's expertise in many fields related to engineering – such as personalized medicine or the digital economy, combined with ETS's knowledge of the industrial community and its close ties with the private sector, can lead to R&D projects that are particularly promising for businesses and for society in general. The partnership model we propose is an unprecedented initiative in the Canadian university community, an innovative model for our two institutions, as well as a solution that could have a definite impact on university-business relations and, ultimately, positive economic spinoffs across Canada.

Canada's success and prosperity in the years to come will depend on the commitment and collaboration of the private sector and universities in the endeavour of Research and Development. All actors must play their part and McGill University and École de technologie supérieure (ÉTS) are ready to take on a leading role. The mutually beneficial partnership of knowledge and industry is the path to economic prosperity and it is the only way for our country to face worldwide competition.

Appendix A

ABOUT McGILL UNIVERSITY

Founded in Montreal, Que., in 1821, is Canada's leading post-secondary institution. It has two campuses, 11 faculties, 10 professional schools, 300 programs of study and more than 36,000 students. McGill attracts students from some 150 countries around the world. Almost half of McGill students claim a first language other than English - including over 6,000 francophones - with more than 7,200 international students making up almost 20 per cent of the student body.

ABOUT ÉCOLE DE TECHNOLOGIE SUPÉRIEURE

Founded in Montreal, in 1974, specifically to respond to the growing demand for Quebec engineers, École de technologie supérieure (ÉTS) is one of 10 universities in the Université du Québec network. ÉTS' undergraduate programs are designed to pursue technical and scientific studies at the post-college level. ÉTS accounts for nearly 25% of all Québec undergraduate engineering students, which ranks it first among universities offering this training. In Canada, it is one of the fifth largest engineering schools and faculties. ÉTS has arranged over 15,000 co-op work-terms in 4,000 companies of all sizes. ÉTS has 4,000 of its graduates working in various areas of engineering in North America.

A Complementary Partnership	
ÉTS	**McGill**
Engineering school only	Research-intensive university
20 M of R&D funding.	432M of R&D funding.
Largest ratio of industrial research funding in Canada (40%)	One of the largest patent portfolio in Canada
150 professors	1627 professors
1st in Québec, 3rd in Canada for the number of engineering graduates per year	1st in Canada and 18th globally for overall quality[1]
15 000 engineering alumni	215 000 alumni in all disciplines
6000 students, approximately 1/4 at graduate level (1350)	36,500 students, approximately 1/4 at the graduate level (8300)
Mandatory coop internship in all programs (2400 internship annually out of 3200 offers)	7 300 international students from 160 countries

[1] By QS World UniversityRanking and US News and World Report