

Polytechnics Canada submission to the House of Commons Standing Committee on Finance's 2009 Pre-Budget Consultations**EXECUTIVE SUMMARY**

Polytechnics Canada is a growing national association made up of Presidents of Canada's leading publicly-funded colleges and institutes of technology. These research-intensive, degree-granting, industry-responsive post-secondary education (PSE) institutions are located in most of the key economic regions of Canada: the lower Fraser Valley, the Calgary/Oil Sands corridor, the Kitchener/Guelph/Waterloo high-tech triangle, the Golden Horseshoe, and the National Capital Region. The current nine member colleges and institutes of Polytechnics Canada are: BCIT, SAIT Polytechnic, Olds, Conestoga, Sheridan, Humber, George Brown, Seneca and Algonquin. All members of the association are committed to advancing Canadian economic, social and environmental development through education, training, and applied research for industry. Ensuring our graduates find employment as highly qualified workers in the industry sector of their choice is a paramount motivation.

Canada is facing at least two parallel crises in late 2009: a crisis in innovation and a crisis in labour market. Given the current recession, the weak record of commercial outcomes for government-funded research, and the extent of stimulus funding for PSE institutions already announced in 2009 through the Knowledge Infrastructure Program, the Presidents/Directors of the Board of Polytechnics Canada believe that focused, small-scale and targeted investment is needed to further stimulate small and medium sized enterprise (SME) success and increase economic development. Polytechnics Canada makes the following federal program and spending recommendations to the House of Commons Standing Committee on Finance for consideration in the federal budget of 2010/2011. Fuller explanations are found below.

RECOMMENDATIONS

- 1. SME Commercialization Voucher Program:** The federal government should create a federal commercialization voucher program administered through the NRC's Industrial Research Assistance Program (IRAP) targeted to late-stage commercialization needs at SMEs. Specifically, **\$10 million per year** should be invested on a pilot basis for three years in this voucher program and up to 250 vouchers per year should be made available to SMEs.
- 2. Innovation & Technology Diffusion Centres:** The federal government should invest in a pan-Canadian network of centres for commercialization and technology transfer in 10 locations across Canada. These centres will focus on late-stage commercialization services for Canadian SMEs. Specifically, each centre would require a one-time capital start up investment of \$4.5 million and operating funding in the range of \$ 1 million per centre, per year for three years. Total cost: **\$75 million over three years.**
- 3. Labour Market and Education Data:** Invest in modernizing and improving Canada's Labour Market Information systems. Specifically, the federal government should allocate **\$15 million per year** to create a Learning Information Platform that will maintain, consolidate and increase existing educational data and information surveys, for the benefit of Canadian learners, educators, industry and as a means to enhance integration of newcomers to the Canadian labour market.

OUR ASSOCIATION

Polytechnics Canada is a growing national association of some of Canada's leading publicly-funded colleges and institutes of technology. The unique and distinctive contributions of Canadian polytechnics are their proven track record of industry innovation; the large number of graduates or highly qualified and skilled personnel (including record numbers of newcomers) for the Canadian labour market and industry; and the advancement of the state of practice in all sectors of employment in Canada.

THE INNOVATION CRISIS

Canada's innovation challenge has received considerable attention in recent months; we will not repeat the findings here.¹ The critical link between innovation and improved Canadian competitiveness and productivity has been recognized. A consensus is also emerging on the causes of the problem – at least with respect to the comparatively low business investment in research and development (R&D). Innovation challenges in Canada include the poor record of business/private sector R&D investment and limited marketplace successes. Canada has over one million SMEs, very few of whom have capacity or access to capital for research or research equipment. Business R&D is being conducted by only 25 percent of SMEs yet only 2 percent are considered Innovative Firms - firms that invest more than 20 percent of their total investment expenditures in R&D.

After over a decade of federal support for R&D and science and technology, with consistent support to higher education (universities) to carry out the research, the overall innovation lag is disappointing to many decision makers. Most now agree that translating academic innovation into commercial enterprise is the key challenge for governments, industry, and educational institutions in Canada.

Yet terminology and meaning matter: innovation itself is misunderstood to mean “invention” and not what it should mean: new ways of doing things, new processes, new adaptation of existing technology or application of new technology to new contexts, products and services. Terms such as “R&D” or “commercialization” require clear definition so that federal policy and funding can appropriately target and obtain the intended outcome.

The continuum of research from basic research to applied research is:
Idea→ development of idea→ commercial concept/market analysis→ proof of concept→ creation/registration of intellectual property→ field testing/lab testing/simulation→ manufacturing process design and development→ product enhancement/scale-up/cost avoidance→ market-ready product or service.

Pre-commercialization encompasses stages leading to the creation of intellectual property; late-stage commercialization begins at the testing phase. Most of these latter activities comprise what we refer to as “last mile” services for industry or applied research.

In the continuum of research, universities have significant advantages in the pre-commercialization phase, while polytechnics have a comparative advantage in the late-stage phase. Programs at federal research granting councils, with their emphasis on research excellence by the individual researcher, aiming for world class recognition, have

¹ Continued concern raised by: “We are in need of Canadian renewal”, Konrad Yakabuski, Globe and Mail, August 8, 2009; “Canada's Innovation Gap”, Konrad Yakabuski, Globe and Mail, July 4, 2009; “Business Innovation In Canada”, Council of Canadian Academies April, 2009; “Opportunity in the turmoil”, Report from the Institute for Competitiveness & Prosperity, April 2009; 2009 Science, Technology and Innovation Council report; Conference Board of Canada's “How Canada Performs: A Report Card on Canada” (2008).

undervalued this late-stage commercialization activity. Currently there is virtually no support to scale-up production of innovations and the activities necessary to get them to market. Applied research is essential to implement and sustain discovery oriented basic research - this is a case of complementarity and collaboration, not competing forces. Research excellence has to be balanced by commercialization excellence.

Industry clients for polytechnic institutes range from the independent entrepreneur with a unique prototype idea, to the SME wishing to grow but lacking in-house research facilities or equipment, to established companies and organizations developing new products and services. Polytechnics have witnessed a rising demand from SMEs for innovation/commercialization services in areas such as agriculture, green economy, biofuels, health care, construction and manufacturing processes, software development, digital media, to name only a few. Polytechnics are committed to the success of SMEs by educating and training practitioners capable of being immediately productive and being a source of new ideas and approaches in those companies. Polytechnics encourage entrepreneurialism for Canadian business.

Applied research at polytechnics has several distinctive features which have not been understood, valued or funded by governments as such: faculty are not paid to conduct research, but do so as a result of extensive collaboration with local and regional companies; publishing is not the end-objective – solving industry problems is; most research is conducted in multi-disciplinary teams and not by individuals; a polytechnic runs several short-term projects rather than multi-year projects; hands-on student involvement in research projects is part of the learning experience; we do not “own” the intellectual property of the research; and accelerated marketability outcomes are required by our industry clients.

The critical factors that influence polytechnic success in commercialization and innovation are time, expertise, facilities and funding. Our members and their applied research enterprises are running at full capacity, with no dedicated infrastructure for innovation resulting in the doubled-up use of our existing facilities, equipment and personnel.

The time has come for the federal government to build on innovation best practices in Canada and elsewhere. The recent Innovation Voucher program in Alberta is one provincial success that has national applicability. The longstanding investment by Quebec in the creation of centres collegiaux de transfert de technologie (CCTTs) is an excellent example of government leadership in investment support for late-stage commercialization. Both voucher programs and technology transfer offices have precedence in other OECD countries such as Ireland, Australia and France. As a result, Polytechnics Canada recommends two specific spending initiatives in support of late stage commercialization:

1. SME Commercialization Voucher Program:

The federal government/Industry Canada, should create a federal commercialization voucher program administered through the National Research Council's Industrial Research Assistance Program (IRAP) targeted to late-stage commercialization needs at SMEs, delivered by Approved Service Providers, which will include polytechnic institutes and colleges already active in industry innovation, along with other research facilities and institutions. Specifically, \$10 million per year should be invested on a pilot basis for three years in this voucher program and up to 250 vouchers should be made available to SMEs. The voucher program could be used to help all businesses with product & process research, product testing, certification, proof-of-concept and prototyping services necessary to move product and/or service to market. The program would not fund activities such as market studies, business plan development, counselling and mentoring, training courses and marketing related costs – a variety of federal programs such as the Networks of Centres of

Excellence, the Centres of Excellence for Commercialization and Research, and the Industrial Research Assistance Program already exist for these services.

For an investment of \$10 million per year, 250 vouchers would be available to SMEs on first-come, first served basis after a consultation with an IRAP Industrial Technology Advisor. The voucher program would enable SMEs to work directly with polytechnics through their local NRC - IRAP offices. As an industrial support program, IRAP cannot fund polytechnics directly, but IRAP could issue SMEs a voucher which they could then “redeem” at a polytechnic for applied research and innovation services. Once the project has been completed, the polytechnic would “redeem” the voucher with the federal government for reimbursement. A pilot program providing 175 vouchers of \$25,000 each, and 75 vouchers of \$75,000 each would foster 250 commercialization projects. Each SME would be responsible for funding 25% of the project cost, with a maximum of half of their contribution allowed to be ‘in-kind’. Companies could pool vouchers to access services and equipment on a larger scale. To benefit both the SME and the Service Provider, project spending would have to be completed within 12 months of receipt of the voucher. Such a voucher program would rapidly scale-up Canadian late-stage commercialization activity to help SMEs compete locally and globally.

2. Innovation & Technology Diffusion Centres:

The federal government, through Industry Canada and its regional economic development agencies should invest in a pan-Canadian network of centres for commercialization and technology transfer in 10 locations in Canada². These centres will focus on late-stage commercialization services for industry such as technical assistance services, testing and adapting technological solutions and transferring knowledge, testing market practicality assumptions, technological development through the creation or improvement of products, and training for company personnel and students. **Specifically, each centre would require a one-time capital start up investment of \$4.5 million and operating funding in the range of \$1 million per centre, per year for three years. Total cost: \$75 million over three years.** These centres would have to operate on a self-sustaining basis at the end of the start up/pilot phase.

This kind of funding should be administered outside the existing suite of programs at federal granting councils which are focused on funding the early stages of innovation, i.e. basic research. The four thematic priorities of the federal Science and Technology Strategy could drive the strategic directions of these centres, but they would be function-based in late-stage commercialization activities. The goal of these centres is to enable firms to make more effective use of public applied research facilities in support of industry which will result in increased productivity. Located in polytechnics and colleges and maximizing educational transfer with collaboration as a key operating principle, such centres will be unique in the Canadian research spectrum and produce research-ready highly skilled workers for the new economy.

THE LABOUR MARKET CRISIS:

Canada faces a compounded skills crisis: the short-term distortion caused by recessionary high unemployment and dislocation of labour with mismatched labour market integration, and the looming crisis of a national skills shortage. This complex problem requires coordinated action from all levels of government. One practical role for the federal

² The 10 initial locations we propose are: Vancouver, B.C.; Calgary, AB; Saskatoon, SK; Kitchener/Waterloo, ON; three in the Golden Horseshoe/Greater Toronto Area; National Capital Region; Montreal, QC; and Halifax, NS.

government is to improve labour market information (LMI) and education related data systems in Canada.

3. Labour Market and Education Data:

Canadian higher education statistics are woefully out of date, particularly for the college sector. The current data do not capture the diversity and differentiation that has emerged in the PSE system such as publicly-funded polytechnics. Nor are new trends being tracked such as: the proliferation of applied baccalaureate degrees, transfers amongst institutions, university graduates seeking post graduate college credentials for job preparedness, adult and lifelong learning, and applied research at polytechnics and colleges. The current Statistics Canada Higher Education Research and Development (HERD) data does not capture critical late stage commercialization research activities of Canada's polytechnics, and as a result federal R&D funding continues to focus only on basic research (above). Publicly-funded PSE institutions are not being held to account for their outcomes.

The lack of educational LMI impacts all Canadians. Learners, parents, and policy makers at all levels of government cannot make accurate assumptions. Industry and private sector cannot find the right pool of talent. Immigrants cannot integrate into local labour market where needs are highest because local and granular LMI is not available to them as they make their decisions to enter Canada. For example, in Kitchener/Waterloo, the four largest technology companies alone need to fill 2000 positions in the next 12 months but enrolment in information communication technology programs is down. Potential immigrants with in-demand skills and employers are not being able to connect in a timely manner to improve labour market integration. Our country cannot benefit from comparisons with data from other OECD countries.

Therefore, Polytechnics Canada endorses the recent report by the Advisory Panel on LMI³ and the total costs of \$49.4 million for all of its proposals. We agree that cooperation and leadership by both the federal government and the Forum of Labour Market Ministers is needed. The federal government can provide strategic leadership by creating a Learning Information Platform, which makes local, regional and national educational data available to all users. Further Statistics Canada HERD estimates should include college and polytechnic research outcomes, not just inputs; new measures of applied research are required to assist policy makers to improve Canada's innovation policies and funding programs.

Of all of the proposals put forward by the Advisory Panel, Polytechnics Canada specifically urges the federal government to fund critical surveys relating to education, including the National Graduate Survey, the Postsecondary Information System, the National Apprenticeship Survey, the Programme for International Student Assessment and the Program for International Assessment of Adult Competencies at a cost of \$15 million.

Polytechnics Canada's recommendations have been carefully developed to ensure respect for federal/provincial/territorial jurisdiction, while also addressing the urgent need for improved national outcomes for innovation and skills. Building on the education stimulus funding provided by the 2009 Federal Budget, the three spending measures we have proposed above are well-defined, practical, and intended to lead to self-sustaining outcomes.

- Nobina Robinson, Chief Executive Officer, Polytechnics Canada
- John Davies, Chair, Polytechnics Canada, and President, Humber Institute of Technology and Advanced Learning

³ "Working Together to Build a Better Labour Market Information System for Canada", Advisory Panel on Labour Market Information, May 20, 2009: http://www.imt-lmi.ca/eng/flmm/final_report-eng.shtml