Submission to the Federal Science, Technology and Innovation Review

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AUCC Response to the Federal Science, Technology and Innovation (ST&I) Consultation Paper

- Canada's universities make essential contributions to our national innovation system, from conducting discovery-driven research to partnering with industry on practical solutions to immediate problems. Universities are key economic drivers of regional and national prosperity. They generate the ideas and solutions used by communities, small and medium enterprises, national and multi-national companies and sectors of the economy across the country.
- As a partner of choice for private sector research and development, Canada's universities conduct nearly $1 billion dollars of research for the private sector annually.
- Closely connected to their communities and regions, universities also conduct more than $1 billion of research a year with community and non-profit groups, particularly in the area of health. Universities also frequently partner regionally with colleges and polytechnics, further strengthening regional clusters of innovation.
- Through strategic federal investments in research excellence, the attraction and retention of talent, and research infrastructure, Canada is now successfully positioned as a leader in world-class research and innovation.
- Half of the faculty members teaching at Canadian universities have been hired in the last decade. These new researchers are in the prime of their careers. At the same time, the number of graduate students at Canadian universities has grown almost 90 percent since 2000.
- The Government now has an opportunity to capitalize on an unprecedented pool of talent on campuses across Canada. Investments in research will enable faculty and students to make the groundbreaking research discoveries and acquire the critical skills that will help drive innovation, economic growth and global competitiveness for decades to come.
- To seize this advantage, Canada must commit to long-term and sustainable research funding to ensure that international and home grown talent are retained and cutting-edge state-of-the-art facilities and equipment are utilized to their full potential.
- While all Canadians can be proud that our country is now a globally ranked research performer, global competition is increasing at a breathtaking pace, and incremental change will not be sufficient to keep Canada at globally competitive levels.

Q1: 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?

- Canada's universities play a uniquely important role in our national innovation system. As the performer of most of Canada's basic and discovery research, universities create a foundation of new knowledge that constitutes a reservoir of experimentation and understanding that researchers and innovators – including those in small and medium enterprises, industry, and society-at-large – draw upon for new technological developments, commercial activities or societal advances.
- The expert panel reaffirmed the leading role that Canada's universities play in providing talent, discovery and ideas. It called for a series of measures to create closer links among university research, business and governments in order to create a more dynamic culture of innovation in Canada.
- Universities share the view that more must be done to improve business innovation, and are working to address this by introducing new innovation spaces, new programs in entrepreneurship open to undergraduate and graduate students from all disciplines; and are seeking opportunities to increase co-op and internship opportunities at every level to increase the two-way flow of talent and ideas.
- Since the expert panel reported, the government has made significant progress to introduce measures aimed at enhancing business innovation, including maintaining a strong fiscal climate, reducing red tape, signing new trade agreements, improving procurement policies, enhancing Canada's venture capital system and strengthening the impact of tax incentives.
- Funding announced in Budget 2013 to enhance innovation hubs aimed at "fostering entrepreneurial talent and ideas" will play an important role in helping to further integrate university and business innovation. The incubators and accelerators on university campuses and the funding for a pilot credit note or voucher program will further strengthen links between universities and business.
- Such programs encourage businesses to capitalize on the research expertise and innovation found on Canadian university campuses. Continued attention, long-term support and growth for these programs are key to a strong return on investment.

Q2: 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?

- Universities are central actors in an integrated innovation ecosystem. The emerging understanding that national innovation systems are not only about generating new technological products but perhaps even more importantly, producing the ideas and talent that spark innovation in all sectors, aligns well with the strengths of Canada's universities across the health, natural and social sciences, engineering and humanities.

- A key path to enhancing business innovation is by harnessing the skills of talented university graduates, educated in a culture of innovation, intellectual rigour and lifelong learning, with skills enhanced through hands-on research training, experiential learning and global experiences. As universities train the researchers, professionals and skilled graduates that are hired by the private sector, knowledge is transferred through people and their ideas.
- Half of today's university students benefit from such hands-on learning in the shape of internships, research experiences or community service learning. Integrating students – especially at the graduate level – through enhanced internships makes for even stronger connections with the business community. Master's and doctoral graduates bring their research skills and expertise to every sector of the Canadian economy – from creating new products to help revitalize our forestry sector to developing new medical treatments to enhance the quality of life of Canadians
- To encourage greater mobilization, enhanced support for university-business partnerships, regional clusters, collaborative research networks, internships and vouchers would complement the university learning environment and promote the two-way flow of knowledge and research ideas between universities and the private sector.

Q3: 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?

- Through the Government of Canada's significant investments in programs aimed at attracting talent – including Canada Research Chairs, Canada Excellence Research Chairs, Vanier and Banting scholarships – Canada has considerably improved its ability to attract top students and researchers from around the world.
- Supportive immigration policies, such as the Canadian Experience Class and the PhD stream of the Federal Skilled Worker Program, also enable the top international research students to remain after their studies and to transition smoothly into being productive members of the Canadian labour force.
- However, we need to be more aggressive in the global race for talent. Canada's universities, aided by the federal and provincial governments, are creating conditions that attract top minds from around the world, and allow Canadians to make global contributions from their home base.
- The most important factor in retaining the world's top research talent is support for research excellence. Commitment to a principle of sustained, predicable research funding in the core budgets of the federal research granting agencies, at globally competitive levels, will send a strong signal globally about Canada's ambitions for research leadership.
- Universities also believe the time is right for strategic investments in research excellence,that will allow Canada to build and leverage on its past investments in postsecondary research and innovation.

Q4: How might Canada build upon its success as a world leader in discovery-driven research?

- Canada is recognized as a leader in discovery-driven research around the world. The Council of Canadian Academies' State of Science and Technology in Canada highlights the breadth of research taking place at Canadian universities in a wide range of fields, and emphasizes the growing influence of Canadian researchers on the international stage. These strengths provide a research foundation that holds enormous potential for social and economic benefit.

- The C.D. Howe Institute June 2013 report, *From Curiosity to Wealth Creation: How University Research Can Boost Economic Growth,* underscored that university research is "the source of the basic building blocks of many of the core sectors of the economy, in everything from information technology to pharmaceuticals to much more." Countries around the world recognize the need to invest in university research in all its stages, from the most fundamental parsing of the human genome to developing a new and improved way to manufacture a consumer product. At its heart, university research is about creativity. In all disciplines – and often across disciplines – researchers at Canadian universities advance knowledge, often working collaboratively and virtually.

- To maintain and build on Canada's momentum, we must resolve to make growth in research funding a fundamental principle. To leverage our success in discovery-driven research, Canada should commit to the principle of multi-year, sustainable and predictable research funding for the federal research granting agencies, coupled with increases to the Indirect Costs Program over time to ensure that universities have the resources they need to run the labs, technology transfer offices, libraries and data systems that underpin research excellence. Investments in research excellence will allow Canada to build on the best of our research talent, scholarship, innovation and graduate programs, and on existing competitive programs.

- Funding is needed to help Canada attract and maintain the talent required to improve our research standing on the increasingly competitive international stage. Canada must take steps now to secure a permanent legacy of innovation and create momentum to attract and retain top talent; stimulate ground-breaking discoveries; establish Canadian universities as preferred partners for the best international research institutions; and improve Canadian universities' efforts to reach out to businesses and help make them more globally competitive.

- Moreover, sustained, predictable and long-term funding for research infrastructure will allow researchers to push the boundaries of knowledge, explore the unknown and generate outcomes recognized around the world. The Government of Canada should commit to such support for state-of-the-art research infrastructure through the Canada Foundation for Innovation.

Q5: Is the Government of Canada's suite of programs appropriately designed to best support research excellence?

- The current suite of programs can be enhanced through strategic investments in research excellence that would support a world-class research system, so that Canada can continue to have a vibrant, innovative and competitive economy in the face of global competition.
- Such investments will allow Canadian universities to achieve global leadership in specific fields – often aligned to regional economic growth – and attract the talent required to maintain and improve our research standing in the world.
- Canada's universities have proposed the creation of the Advantage Canada Research Excellence (ACRE) Fund. Such a fund should be open, competitive and supplementary to current funding, investing in universities whose investigators succeed in rigorous, peer-reviewed competitions established through the three federal granting councils. Mindful of the current aim of eliminating the federal deficit, Canada's universities propose that the government implement the fund over a multi-year timeframe commencing with an investment of $100M per year and rising to $400M annually over four to five years, as fiscal capacity allows.
- For Canada's universities to build and leverage on investments, the underfunding of the indirect costs of research shouldered by institutions remains a significant challenge.
- Canadian universities also need to be responsive and nimble in developing international research linkages. The international research community responds quickly to signals, and will easily move elsewhere if it believes Canadian universities are not ready to engage in partnerships. Combined with the fact that the toughest and most pressing research problems transcend borders, the Government should support international research collaboration to avoid missed opportunities.

New directions in innovation

- The Government of Canada's ST&I strategy has served our country well. In the CCA's *State of Science and Technology in Canada* report, it was found that on a field-by-field basis, the world's leading researchers rank Canada in the top five countries globally. Given our relative size, we're clearly punching well above our weight in terms of our research strengths. Through the Government's continued support, Canada's universities will make essential contributions to maintain Canada's position on the world stage.
- As Canada looks to continue creating jobs, strengthening its economy, and widening prosperity in the years ahead, research and discovery will remain key elements. However, the global competition for ideas and the nature of discovery-driven research are changing.

- Increasingly, consensus is emerging that innovation is a dynamic and unpredictable process, challenging our understanding of the linear model of innovation. The major policy challenge for Canada, therefore, is to build on the strengths in our system, while allowing for sufficient flexibility and risk to permit innovation to flourish. As a recent OECD report writes, we need to move "beyond the mode of idea-patent-license [to develop] policies for knowledge transfer and commercialization [that] have expanded and are often combined with higher education, economic and regional policies to allow for broader systemic impacts and synergies."
- Moreover, Canada must keep up with changes in open access and open research data policies that are taking place in a number of other jurisdictions, including our own. We all have an interest in deriving maximum public benefit from government investments in research and eliminating barriers to international research collaboration.
- The Government of Canada has stated that Canada's ambition must be to seek and seize innovative solutions to remain well positioned in the global race for excellence, talent and prosperity. Canada's universities firmly agree. Our ability to train innovative graduates, to attract the best and brightest minds from around the world, and to conduct world-class research along the full spectrum of inquiry are of fundamental value for Canada's long-term economic growth. University research and innovation help to position Canada on the world stage. We welcome the opportunity to be partners in innovation.