SUBMISSION TO THE HOUSE OF COMMONS STANDING COMMITTEE ON FINANCE
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Presented by the Partnership Group for Science and Engineering (PAGSE)
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SUMMARY

For several years, the focus of Canada's support for research has been to increase the competitiveness of Canadian businesses through research, development, innovation and commercialization. The emphasis in the public sector has been primarily on the first three stages of this sequence, with commercialization left to the private sector. In the last six years, government policy towards innovation has emphasized development of partnerships among universities, institutes and corporations. This brief suggests that such partnerships must be further encouraged, not only to enhance the prospects for innovation, but also to further the potential contributions of many Canadians through education and training.

The key point is that urgent consideration is required now, early in the innovation chain to support university-based researchers working at a fundamental level. Partnerships frequently emerge from progress in basic research. The recent emphasis on partnerships has reduced support at the basic level in relative terms. This situation has led both to a stifling of research activity at stages well before commercial interests can be stimulated; and concentration of basic research in fewer institutions, removing the innovation experience from many bright young Canadians. The principal proposal contained in this submission is support for basic, as well as applied, engagement in all engineering and natural sciences disciplines in conjunction with student training. It is from this research that partnerships with business emerge.

The Partnership Group for Science and Engineering (PAGSE) recommends the federal government:

- **Address the relative erosion of support for research to stop declining student engagement in fundamental research, and to ensure a broadly-based innovation culture flourishes across the country.**
  This recommendation addresses the following themes: Supporting families and helping vulnerable Canadians by focusing on health, education and training; increasing the competitiveness of Canadian businesses through research, development, innovation and commercialization; and maximizing the number and types of jobs for Canadians.

- **Expand partnership programs to facilitate interchange of faculty as well as graduate students between universities and industries and to facilitate its development in the North.**
  This proposal addresses the same themes as the first recommendation, as well as that of ensuring prosperous and secure communities, including through support for infrastructure.

INTRODUCTION

The Partnership Group for Science and Engineering (PAGSE) is an association of 24 professional and scientific organizations representing greater than 50,000 members from academia, industry and government sectors. It represents the Canadian science and engineering community to the Government and seeks to advance research and innovation for the benefit of Canadians. PAGSE is not a lobby group, but a cooperative partnership that addresses broad issues of science and engineering policy at the national level.

PAGSE has engaged its member societies over several months to ensure their input into this brief. We present you with a consensus statement addressing matters raised across our representation. In this brief we raise several points that are now articulated in government programs, but require further strategic development in order that the full potential of the programs be realized. We concentrate on two themes: the upstream end of the innovation chain and the flexible development of innovation partnerships.

SUPPORT FOR UNIVERSITY-BASED RESEARCH

Canada has recently adopted a robust approach to identifying and supporting outstanding research leaders, largely visible through the Canada Research Chairs and Canada Excellence Chairs programs. This is a significant achievement that has helped to address gaps between Canada and the United States and Europe in terms of attracting and retaining star researchers at the pinnacle of their careers[1]. However, the national investment in broadly-based innovation has stagnated and has declined in relative terms, especially via inflation. The landscape of excellence that has been fostered through the celebration of the outstanding individuals, risks becoming a monotonous plain, with concentrations of achievement and relatively little between them. The danger for our country stems from the fact that these concentrations are spatially dispersed and there are broad areas and regions which become relatively impoverished in the innovation market place. This is particularly significant for young Canadians who do not happen to attend our larger universities and are thereby denied full access to innovation mentors and exemplars.

[1] Science-Metrix. 2010. Tenth-Year Evaluation of the Canada Research Chairs Program: Final Evaluation Report. Retrieved on 15 July 2014.

The main tool that has sustained the landscape of excellence throughout the country has been the Natural Sciences and Engineering Research Council of Canada (NSERC)'s Discovery Grants Program. Every time this program is reviewed, including twice in the last seven years, it is consistently found to be an exemplary mechanism for generating the ideas that evolve into innovations. The program supports research across the natural sciences and engineering in universities throughout Canada. In the last ten years, two forces, inflation and renewal of the professoriate, have placed extreme pressure on the program, lowering the grant allocation rate, especially in smaller schools. The program has not grown with the renewal of the professoriate across Canada so that, while we now have a disproportionate number of young and energetic research faculty members, the means to realize the potential of graduate students under their guidance is under great pressure. Rather than fostering the stability in which excellent research thrives, this situation has begun to imperil research accomplishment everywhere, especially outside the large research universities.

Budget 2014's reinvestment has been excellent, but when considered over three or more years, there has been inflationary erosion of the Discovery Grants Program in real terms. Small, regional universities are losing their capacity for basic research, while fluctuations in researcher support at the larger institutions compromise the ability to offer long-term programs and the ability of these researchers to involve graduate students in their research and thereby to provide the country with a continuing cadre of highly qualified graduates. The Discovery Grants Program operates across the board, so the pressures on innovators are acute in disciplines as diverse as Electrical and Computer Engineering and the Geosciences. They affect both our long-term future in IT and data management, and in development of our natural resources, as well as in all other aspects of a knowledge-based economy. If students are exposed to fundamental research, they will acquire the foundation for long-term innovation in their sector. An emphasis on partnerships allows focus on a specific problem and, combined with basic research experience, the production of graduates well able to transfer knowledge and to innovate in their careers. PAGSE does not advocate erosion of partnership and targeted support; quite the opposite. We see that erosion of the system supporting basic research is creating significant adverse effects that will stifle supply of expertise to the innovation chain, if not addressed.

A meaningful investment in research support, such as a 2% increase in current investments over three years, would create the most focussed benefits for idea generation and would reverse the erosion of investment that imperils our research leadership in the G20. Research, throughout the country needs a stable environment to thrive, to drive innovation, and to generate opportunities for partnerships with business. Research support through programs such as NSERC's Discovery Grant program, is the key mechanism nourishing this environment.

LONGEVITY OF INNOVATION PARTNERSHIPS

The last six years have seen increasing emphasis on innovation partnerships in federal support for research. One of the most popular sources of funding is NSERC's Engage Grants, which yields $25k support for short periods for researchers to tackle problems that industry cannot tackle on its own. The premise of the program is the seed money will lead to long-term relationships and larger, integrative projects. Dedicated analysis of ENGAGE is required to determine if it achieves meaningful outcomes that stimulate the economy and contribute to long-term innovation.

PAGSE favours long-term initiatives that allow partnerships to flourish. We urge the committee to emphasize long-term support in its allocation of resources for innovation. We appreciate the need for short-term start-up programs, but we also acknowledge the time scale and resources required to make partnerships work for individuals in separate institutions and companies.

LINKING INDUSTRY WITH RESEARCH IN THE NORTH

In Canada's North, the private sector is relatively undeveloped and concentrated in services and resource development. Almost all engineering in the North is publicly funded, including for the transportation network. A key requirement for northern development is an innovative transportation infrastructure. Similarly, public institutions are responsible for mine-site remediation, as at the Giant Mine in Yellowknife, and other major works. Northern development is therefore heavily dependent on a publicly-funded platform on which private interests may develop.

A government-supported agency linking industry with researchers in post-secondary institutions, such as Mitacs, facilitates the development of partnerships that explicitly address problems facing industry and, in many cases, assists development of products that can be brought to the market place. These programs form an important part of Canada's innovation infrastructure both because of the linkage to industry and because they support graduate student and post-doctoral training. They enable coordination of graduate student programs with industry objectives, creating paths for young Canadians towards long-term employment.

The philosophy Mitacs operates under requires explicit engagement by the private sector. In southern Canada, this is an entirely appropriate condition. At present, the North, however, is not a place for which such programs are well configured, and the economics of the North prohibit engagement in many areas where innovation is currently critically required. PAGSE urges the government to **make programs such as Mitacs sufficiently flexible for its deployment on a range of northern projects**, thereby releasing the power of innovation into northern development.

Second, a program should be created to **assist interchange of faculty-level, public-sector employees, as well as students, between the private and public sectors.** This program would facilitate high-level integration of priorities and

deeper collaboration in the long run than may occur strictly in the context of graduate student projects. This interchange might occur outside the normal cycle of sabbatical leave for periods of three months. It would enable mentors to develop a reliable appreciation for the skills their students will need and it will create conditions for inter-sector collaboration to be part of a normal working life in the innovation sector.

CONCLUSION

The priority of the government to enhance and assist innovation is widely recognized and appreciated in the knowledge sector. Programs established by the government, including Mitacs, stimulating partnerships between researchers along the innovation chain, have flourished. Opportunities exist for further development of these programs, in particular where there are clear opportunities to integrate innovation in northern development with these tools. Nevertheless, the science and engineering research community is unanimous that, over time, the relative slippage in support for basic research is becoming detrimental to both the ability to create initial ideas for innovation and for the continual supply of young innovators graduating from our universities. PAGSE urges the committee to consider most seriously increasing the amount of money allocated for basic research so that promising young people throughout Canada may be inspired by innovation and may bring this motivation into their careers in business.