The House of Commons Standing Committee on Finance

Pre-Budget Consultations 2016

Submission by the federal granting agencies:

the Canadian Institutes of Health Research (CIHR),

the Natural Sciences and Engineering Research Council (NSERC), and

the Social Sciences and Humanities Research Council (SSHRC)

With the support of :

the Canada Foundation for Innovation (CFI)

CIHR, NSERC, SSHRC and the CFI are the federally funded agencies at the heart of Canada's vibrant research ecosystem. Together, they support Canada's top research talent and state-of-the-art research infrastructure at universities, colleges and health research organizations across the country.

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Social Sciences and Humanities Research Council of Canada / Conseil de recherches en sciences humaines du Canada

In our interconnected world, our collective well-being will be determined not by GDP or by the number of billionaires a nation can claim, but rather by our ability to empower citizens to reach their potential and to contribute to the societies in which they live. Only by enabling and harnessing that potential will we truly prosper, and build the smarter, more caring nations and the fairer, more just world to which we aspire.

Governor General of Canada His Excellency the Right Honourable David Johnston, delivered at an event in India focused on the next generation of innovators and researchers, 2014

ISSUE

Canada has invested significantly over the past two decades in building an impressive ecosystem that supports world-class research. Our ecosystem has allowed Canadian researchers to push the boundaries of knowledge in all disciplines and produce the ideas that fuel innovation in all sectors – public, private and not-for-profit. Canada has invested in the development of research talent through programs that target graduate students and postdoctoral researchers, and, at the other end of the spectrum, has established new programs to enable well-established researchers and institutions to turn their strengths into breakthroughs with global impact. There is an important opportunity now to invest in early career researchers – the generation of researchers and innovators ready to marshal their talents and expertise into productive programmes of research. As they are entering their most crucial and productive research years, they are poised to have significant influence on the future of research and innovation in this country. Yet, they find themselves facing barriers to launching successful research careers. They are in ever greater competition for increasingly limited research funding through the mechanisms designed to best support the research in this stage of their careers. Mobilizing this next generation of researchers is essential to maintain and reinforce Canada's position as a leading-edge, global knowledge economy and to address important societal, environmental, economic and health challenges of Canadians.

RECOMMENDATION

In order for Canada to sustain its capacity for research and maintain its hard-earned research reputation on the world stage, the CFI, CIHR, NSERC and SSHRC recommend that the Government of Canada invest in early career researchers by enhancing the existing funding programs of the three federal research granting agencies.

CONTEXT

Canada can strengthen its economy and improve the quality of life of its citizens by effectively marshalling the talents of our early career researchers. This generation represents the future of research excellence.

Enabling and harnessing the potential of early career researchers is particularly important as the early stage in a researcher's career may in fact be the most innovative and creative. A recent analysis of more than 20 million biomedical papers over the past 70 years indicates younger researchers are more likely to explore new ideas and emerging areas of research. In addition, more mature researchers published more innovative work when collaborating with younger scientists.[1]

Moreover, a new generation of researchers brings new ideas and sensibilities to their work. These researchers have been trained in a research environment that sees the value of both fundamental and applied studies. They have learned that multidisciplinarity and partnering with users in all sectors of society can yield significant results. They have benefited from a post-secondary landscape that has been built up with state-of-the-art labs and equipment. They think globally and know the benefits of collaborating with colleagues across the country and around the world to solve today's complex issues.

This generation also represents a significant, cumulative investment by academic institutions, industries and all levels of government throughout their training as undergraduates, graduate students, interns and postdoctoral fellows. By providing adequate funding to support the early career phase of our researchers, Canada will capitalize on these past investments, foster novel insights and innovations, and will realize our capacity for future research excellence.

Canada has an opportunity to invest strategically in the next generation of researchers

The Government of Canada has established new programs to support the most promising graduate students and postdoctoral fellows, such as the Vanier Canada Graduate Scholarships and the Banting Postdoctoral Fellowships. At the other end of the spectrum, it has established new programs to enable well-established researchers and institutions to turn their strengths into breakthroughs that have global impact, such as the Canada Excellence Research Chairs and the Canada First Research Excellence Fund. It has also renewed important funding for the infrastructure necessary to conduct world-class research through the CFI.

[1] Packalen, M. and Bhattacharya, J. (2015). "Age and the trying out of new ideas". *NBER Working Paper Series: Working Paper 20920.* Retrieved on July 22, 2015 from: http://www.nber.org/papers/w20920.pdf

Despite these successful initiatives, since 2007, overall federal investments in research through the three federal granting agencies have remained relatively stable. With inflation factored in, it is clear that these investments have not kept pace.

There is evidence that this is having a disproportionate effect on early career researchers, and is creating barriers for early career investigators to launch successful research careers – and similar trends are being identified in countries around the world (see sidebar). Early career researchers, with their doctoral and postdoctoral experiences having prepared them to conduct world-class research and to marshal their talent and ideas to create new value in all sectors, can be stalled by several demographic factors that are becoming structural. There is increasing competition for limited funds for research. Senior researchers are staying productive in research longer, and are retiring later. There is some evidence that the age of Canadian researchers at the time of their first tri-agency grant is increasing – for instance, the average age of researchers receiving their first grant as a principal investigator through CIHR's Open Operating Grant Program has increased from 39.6 years in 2000 to 42.7 years in 2013. These three years represent a lost opportunity for these researchers to launch productive programmes of research, and lost time to explore promising ideas, create new knowledge and contribute to innovation. The urgency is also illustrated by the percentage of grant-holders under 35 years of age funded in 2013: for CIHR, this is 5%; for NSERC, 8%; for SSHRC, 13%.

> "A number of distressing trends, including a decline in the share of key research grants going to younger scientists, as well as a steady rise in the age at which investigators receive their first funding, are now a decades-long feature of the US biomedical research workforce… the trajectory of our funding regime away from young scientists has only worsened." Proceedings of the National Academies of Science (United States), 112(2),

Canada's three federal granting agencies have the appropriate and proven mechanisms to support this cadre – mechanisms that are flexible, enabling and effective in identifying and cultivating research excellence. CIHR, NSERC and SSHRC have a long history of implementing mechanisms that recognize research excellence through competitive merit review by national and international experts. The three granting agencies already have in place a range of mechanisms to support the spectrum of research modes, from short-term exploratory projects to full-scale multiyear projects, to multi-sector, multi-partner research networks. Mechanisms such as CIHR's Foundation Grants, NSERC's Discovery Grants and SSHRC's Insight Program offer the greatest degree of flexibility for early career researchers.

Conclusion: To protect and maximize return on Canada's investment in developing research talent, we have an opportunity now to provide strong support for early career researchers to explore new ideas, develop world-class expertise and establish a successful track record in research.

Canada can be proud of the investments it has made in the development of research talent throughout the training stage – from providing research-enriched training experiences at the undergraduate and graduate levels, to providing training environments with world-class research infrastructure, to providing direct support through programs like the Canada Graduate Scholarships. This cadre of researchers, now securing positions in Canada's universities and colleges, is poised to realize the full potential of its skills, make important discoveries, train the next generation of innovative researchers, and engage across disciplines, sectors and national boundaries to maximize the impacts of its research and contribute to Canada's economic prosperity.

> "In business we understand that risk and reward go hand in hand. We celebrate the risk-takers, the ones who stake it all on something nobody else sees. We need to do the same in science… We need to continue to give [young scientists] the freedom and support to push on into the strange, the apparently useless, the utterly new. We cannot be so blinded by the urgency of our problems that we take for granted how important, how powerful the combination of curiosity and reason really is." Mike Lazaridis, Meeting of the American Association for the Advancement of Science, Vancouver, 2012.

This will, in due course, create the highly skilled and successful researchers – the people, their ideas and research expertise – that we need to make the most of Canada's recently established research funding platforms, such as the Canada First Research Excellence Fund. By investing now in the system, we will ensure that early career researchers can become what today's established researchers and institutions represent: the brainpower behind one of the best performing research nations in the world. In response to similar trends, Germany has recently announced plans to invest €100 million annually in the research of early career researchers.[2] Like Germany, Canada must realize that now is the time to ensure our future remains as strong as our present.

Balanced, sustainable investment across the spectrum will ensure Canada has a reservoir of talent and ideas that will enable us to respond to the opportunities and challenges of the future. New investments in the three federal granting agencies will provide the funding needed

[2] "Germany's researchers welcome €5-billion funding boost." *Nature News* 17 April 2015. http://www.nature.com/news/germany-s-researchers-welcome-5-billion-funding-boost-1.17353

to support early career researchers, ensure the research leadership of the future, and thus sustain research excellence throughout the system for decades to come.

Canada's three federal research granting agencies, along with the Canada Foundation for Innovation, implement federal investments in science and innovation through rigorous and highly competitive merit review processes that ensure that the invested funds support only the strongest research talent and the proposals with the best chance of creating valuable new insights for application in all sectors. These investments in people, knowledge and innovation foster the development of highly qualified personnel, the generation of insights, and the flow of ideas and applications between the academic, private, public and not-for-profit sectors. The support of high-quality research and research training is imperative to sustaining Canada's success in science, technology and innovation, and to increasing productivity, the employment of a highly skilled workforce and the quality of life of Canadians in all communities across the country.