

The Naylor Report and Support for Science in Budget 2018 and Beyond

A pre-Budget submission to the House of Commons Standing Committee on Finance

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Recommendations:

- The Federal Government should accept, and the 2018 Budget should implement, the Naylor Report's recommendation to increase the current base of research funding by 6.6 per cent per year over 4 years, amounting to a total increase of \$485 million by year 4.
- Budget 2018 should commit to allocating 70% of Federal funding to investigator-led programs and 30% to strategic and partnership programs, as recommended by the Naylor Report.

Rationale:

The Naylor Report of April 2017¹ gives an excellent overview of science funding in Canada over the last several years. I sincerely hope that the Federal Government will adopt many of its recommendations. I am concentrating this submission on one issue: restoring the funding balance between investigator-led and priority-driven partnership programs that was grossly distorted by the previous Government. Budget 2018 can set Canadian science back on track by increasing support for investigator-led basic science funding programs. Halfway through the present Government's mandate, it is difficult to see any fundamental change in Canada's science funding landscape. **Following the Naylor Report's recommendations in Budget 2018 and beyond would demonstrate the present Government's commitment to rational, evidence-driven science policy.**

This submission concentrates on NSERC and its Discovery Grant (DG) program, although Budget 2018 must support the entire Tri-Council system. I speak about the NSERC DG because I carried out 17 years of productive investigator-led research in organic chemistry funded only by modest grants. I was unable to find industrial partners mainly because the kind of science I did was not a priority for Manitoba, while companies in other parts of Canada told me they preferred to collaborate with local scientists. My funding from NSERC was cut short in 2010-11, as a result of the changes that the previous Government forced on NSERC. I am not arguing on my own behalf, because after losing NSERC DG funding, my laboratory has been dismantled and I am no longer active in research. I am writing this submission because I want to ensure that my younger colleagues can pursue science where the discoveries take them, and not be slaves to current short-term priorities.

New investment is essential to rebuild a healthy science ecosystem in Canada.

Support for investigator-led research was discounted under the previous Government, as most of their much-touted new investment was earmarked for "strategic" programs. The Naylor Report notes:

"By 2015-16, priority-driven research accounted for 42 per cent of spending... While these new investments helped to grow the postsecondary research ecosystem... the failure to match these investments with adequate growth in investigator-led funding has resulted in rapidly declining success rates in investigator-led grant competitions, declining grant size, or both." (Naylor Report, p. 112).

"...in 2015-16 the real resources available per researcher were down by 31 per cent from the peak. This does not argue for reallocation within the envelope but simply for a major reinvestment in the research enterprise." (Naylor Report, p. 114)

In the laboratory sciences such as chemistry, grants have not kept pace with the costs of chemicals and equipment. Early-career researchers and those working in have-not provinces struggle to achieve anything with the small grants they typically are awarded. New investment in programs like the NSERC

DG might allow larger grants across the board, but these increases would be better spent in getting young scientists off to a running start. It is also arguable that the value-for-money equation favours increasing funding for middle-level researchers rather than those already drawing the largest grants. Be that as it may, no improvement can be expected without a multi-year commitment to increasing Federal funding for investigator-led programs like the NSERC DG.

Investigator-led research is the main source of advanced training in scientific fields.

“The Panel welcomes the role taken by universities and academic researchers in addressing strategic priorities or supporting innovation in the public or private sphere; however... these activities are only as strong as the foundation of investigator-led, discovery research on which they are built. Therefore, a careful balance must be maintained between the two types of research...” (Naylor Report, p. 112).

The training of Highly Qualified Personnel (HQP) is not simply a classroom exercise; it requires hands-on laboratory experience very much like the apprenticeship system used in many of the skilled trades. Postsecondary science students only get this “apprenticeship” by working in funded research laboratories alongside graduate students and postdoctoral fellows. The shift in funding emphasis under the previous Government closed the doors to this kind of scientific apprenticeship for students in many parts of Canada as small-scale researchers and those whose work was not of immediate interest to local industry were cut out of the funding system. It is programs like NSERC’s DG that provide Canadian postsecondary students the opportunities to enter the world of high technology. Without DG funding, Canadian researchers whose subject is not of immediate local industrial interest cannot give students the training they need to participate in the modern economy.

New discoveries come from investigator-led research.

“[Universities perform the bulk of investigator-led discovery research]... Shifting postsecondary research from discovery to application accordingly leaves a research gap that no other sector is equipped to fill. Similarly, the granting councils are Canada’s primary instrument to support investigator-led research. Focusing council resources on priority-driven and partnered research leaves a funding gap for investigator-led research that no other organizations are able to fill.” (Naylor Report p. 113).

The previous Government apparently believed that priority-driven partnerships were more beneficial than what is often labeled “curiosity-driven research”. The problem with academic-industrial partnerships is that most companies today have little interest in fundamental science at all. The World Economic Forum noted in 2016 that **the amount of basic scientific research carried out by or for industry has declined worldwide in recent years²** and called on industry and governments to reverse this trend. These international business leaders recognized the value of basic scientific research, but they naturally were making the case for more industry-sponsored science. However, as the Naylor Report makes clear, while industrial partnerships programs are important and valuable, they should not be the primary vehicle for national science funding.

What is wrong with partnership programs in the context of a national strategy? Ultimately it is the impossibility of picking winners in advance. Using partnerships with industry to replace investigator-led inquiry reduces the scope of investigation to those things that are already well-known enough to be the basis for products.

Industry is understandably concerned with research that is directly related to its short-term bottom lines. Companies direct their support to and build partnerships mainly with researchers who already have substantial resources, and can deliver specified outcomes on pre-determined timelines. They also tend to favour researchers who are located close to their offices or manufacturing sites. And typically only head offices will engage in such partnerships; manufacturing and branch facilities typically have neither the authority nor the budget for such activities.

Unequal access to partnerships

The strategic grants programs established under the previous Government implicitly assumed that good researchers would always be able to find Canadian corporate partners, and that if they could not find such partners their work was irrelevant or unworthy of funding. But the pharmaceutical industry in Canada is a good example of the problem of letting industrial priorities decide who is allowed to pursue science. R&D spending by the pharmaceutical industry in Canada declined by 20% from 2001 to 2015,³ so right off the top there are fewer opportunities for academic scientists to partner with pharmaceutical companies. Further, pharmaceutical investment in R&D was highly geographically concentrated: 81% was in Ontario or Quebec (primarily along the Toronto-Montreal axis), while the entire West received only 17.2% and the Maritimes a mere 1.8%. **Thus researchers in Western Canada or the Maritimes do not have anything close to equal access to partnership funding.** Science policy must reflect the fact that training of HQP and research are intrinsically linked, so when researchers are cut off from funding opportunities, the development of talent from that region is reduced or even halted.

Budget 2018 is an opportunity to reverse the decline in Canada's research capacity that resulted from the narrow focus of the previous Government's policies. **Investigator-led programs like the NSERC DG are the best ways to provide balanced support for excellent science throughout Canada and should be the priority for support in Budget 2018 and beyond.**

¹ [http://www.sciencereview.ca/eic/site/059.nsf/vwapj/ScienceReview_April2017-rv.pdf/\\$file/ScienceReview_April2017-rv.pdf](http://www.sciencereview.ca/eic/site/059.nsf/vwapj/ScienceReview_April2017-rv.pdf/$file/ScienceReview_April2017-rv.pdf)

² <https://www.weforum.org/press/2016/01/improving-the-outlook-for-science-depends-on-basic-research-and-better-use-of-talent/>

³ https://www.ic.gc.ca/eic/site/lsg-pdsv.nsf/eng/h_hn01703.html