



Value From Investing In A Creative Environment

Introduction

The Canadian Federation of Biological Societies (CFBS), representing 13 national Life Science organizations with approximately 9,000 members from industry, government and academic sectors, was founded in 1957. Its purpose is “To promote the acquisition, facilitate the dissemination and encourage the utilization of knowledge of the biological and biomedical sciences, and to contribute in a substantive way to the development of a forward-looking science and technology policy for Canada.” Each year CFBS organizes a national scientific meeting to “show case” the best in Canada’ life science research.

Executive Summary

Following the large contributions from the Federal purse to support creative activities it may be wise to assess what has been accomplished and determine whether improvements can be made to the system to ensure that taxpayers’ dollars are used to their maximum effect. In this brief, therefore, efforts will be made to assess what has been achieved and to suggest improvements that will not only make Canada more competitive in the world of ideas but also to indicate how funds can be more effectively utilized.

The following issues highlight **Canada’s needs**.

1. **Availability of Creative Personnel**
2. **An Attractive Research Environment**
3. **Value for Research \$ Invested**
4. **An Effective Voice for Science in Cabinet**

General Comments

Since 1997 the Federal Government has invested significantly in the research activities of the scientific community. The level of contribution over this period has amounted to ~\$15 billion. The creation of the Canadian Institutes of Health Research, the Canadian Foundation for Innovation, the Canadian Research Chairs and the program of support for “Indirect Costs of Research” are among the newer developments and include increased funding for the Natural Sciences and Engineering Research Council. These initiatives have created the underpinning for future economic and social development in Canada. Continuous investment is required, however, to maintain the climate for creativity since our global competitors are increasing their investments in knowledge-based economies.

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Canada’s Needs

5. Availability of Creative Personnel
6. An Attractive Research Environment
7. Value for Research \$ Invested
8. An Effective Voice for Science in Cabinet

1. Availability of Creative Personnel

The raw material for innovation is the availability of creative individuals. The past 8 years have witnessed marked changes in the research environment resulting in the attraction and retention of highly qualified investigators. Canada is currently seen as “a place to do research”¹. Given that Canada, like other nations, competes in the world of ideas, this has been a very satisfactory accomplishment. Nevertheless it is not the time to be complacent since the various industrialized countries also invest in the search for new ideas and individuals who can contribute to that search. Concurrently, both China and India have been investing heavily in Post Secondary Education with the intent of retaining their creative scientists. In the past many institutions in the western world benefited from the availability of students/scientists who came to North America to study and eventually stayed to work here. More recently this source has been drying up.

To ensure a continuous supply of creative personnel, it is important to ensure that the institutions/universities that train/educate the next generation of scientists are attractive places to work. The investments in innovation by the Federal Government during the recent past have helped considerably in this regard. At the same time, however, the operating budgets of universities have dropped significantly over the past two decades resulting in these institutions having difficulty ensuring a high quality

¹ National Post, N. Kohler, Nov. 8, 04

educational experience for their students. Measured in constant dollars, grants to universities declined by about 19% in the decade between 1991 and 2001. It should also be noted that the Federal Department of Finance's data reveal a 40% decline in federal cash support for post secondary education between 1992 and 2004. Consequently, **the number of full-time faculty members dropped 9% between 1992 and 2002 during which time the number of students increased by 5% thus producing increases in class size.**

Over the past several years CFBS has encouraged the Federal Government to develop a more effective dialogue with the Provinces in an attempt to create a common strategy to deal with the challenges of innovation. Identification of a minister in the Federal cabinet who would be responsible for the ongoing dialogue with Provincial ministers of education would ensure a consistent voice at the Federal level and a more meaningful Federal response to the needs of post-secondary education in Canada. Using the Health Accord with the provinces as a model, the federal government would be well advised to consider a similar arrangement with regard to transfers for post-secondary education. Given that the current Social Transfers program which contributes to post-secondary education does not monitor how these funds are spent, a more transparent system is needed to track how transfers are used.

With recent announcements by the Provinces for a dialogue regarding a specific education transfer, the time appears ripe for action. Success in these negotiations would assist Canada in ensuring quality education for its undergraduates and greater attraction of creative graduates for graduate programs. At the same time it would make universities more attractive to potential faculty members.

2. An Attractive Research Environment

The experience of the last 8 years has been, in large part, positive for Canada in its ability to attract and retain creative scientists. The Federal Government is to be applauded for identifying innovation as a high priority. **Federal investments in research have not only provided evidence that Canada considers itself an “innovative society” but also, in the life sciences area, created the opportunity for rapid growth of the Biotech Industry in this country.**

What is evident to those who have witnessed support for research over the past 40 years is that this support has varied significantly. Consistent investment is needed to sustain an attractive research environment. Canada needs to be aware that without solid commitment such an environment is fragile. Given the investments of other western countries and the emergence of China and India as nations with great competitive potential, requires that the underpinnings of our future development are nurtured. Consequently, it is not a time for complacency.

The next decade, because of the turnover from retirements of scientific personnel, will be crucial for Canada to expand its appeal for creative personnel. **To secure Canada's position, we would encourage the Federal Government to continue to nurture the Federal Granting Agencies (CIHR and NSERC).** Increases in the Canadian Institutes

for Health Research (CIHR) budget to \$1 billion by 2007 - 08 and the Natural Sciences and Engineering Research Council (NSERC) budget to \$915 million by 2007 - 08 are recommended.

At the same time the Indirect Costs Program should be continued and expanded to cover the real costs of managing the Direct Costs of Research (ie. from the current~20% to 40%) by universities and research institutes. While the indirect-cost program has been a great benefit to these institutions, a transparent reporting mechanism is essential to ensure that these funds are spent for the purposes designed.

The life sciences community has applauded the Government in creating the Canadian Foundation for Innovation (CFI). While CFI has resulted in huge benefits in the development of research infrastructure in Canadian universities and research institutes, **the cost of maintaining these new facilities beyond the initial 3 year phase that is covered by CFI, is placing increased pressures on research agencies to contribute towards equipment maintenance.** With the large investment in infrastructure, it is important that it be properly preserved.

In addition to post secondary institutions, **the Government should recognize the value of its own research infrastructure.** In an era of dramatic global change, what is required is effective monitoring of events which impact the Canadian population. These include the need for expertise to deal with major challenges in the areas of infectious disease, climate change, energy, drug safety and national security. Government departments and agencies exist that can fill this role, however, they need the financial support required to meet these challenges effectively. During this period of personnel turnover, an attractive research environment will assist in recruiting the most creative scientists.

3. Value For Research \$ Invested

The costs of high quality research born by the Canadian taxpayer requires that this investment not only be closely monitored but also be dispensed by the granting agencies in a manner that allows them to operate most efficiently. Currently, granting agencies receive their yearly allocations following reading of the federal budget. These allocations must be spent before the end of the fiscal year for which they were designated with no allowance for carry-overs to the next fiscal year. Granting agencies normally make awards to researchers for periods of ~ 4years. Consequently, if government allocations fail to rise significantly, in a particular year, the only funds available for disbursement by the agencies accrue from turn-over of grants awarded 4 years earlier. In considering how budget allocations are made to federal granting agencies, we continue to make the following two suggestions: **i) allow carry-overs of up to 10%** and **ii) consider escalating allocations over a three year period.** From discussions with the auditor general's office we have learned that there is a precedent for carry-overs. **These two changes would allow greater opportunity for forward planning by granting agencies, ensure efficient use of funds and permit a more uniform distribution of available funds to scientists applying each year.**

Of recent concern to the scientific community is the issue of the co-funding requirement by a number of the Award Programs (Tyers et al Science 308: 1867, (2005)). The strategy behind this type of Program is to encourage Canadian Corporations to become more heavily involved in research in this Country. It has been noted, for example, by Agriculture and Agrifood Canada, that only 17% of investment in agricultural research and development come from the private sector with the remaining 83% derived from federal and provincial sources. While the purpose behind the co-funding strategy appears reasonable in its attempt to lever additional funds to support Canada's research capacity a number of issues have been raised concerning this approach and questions whether this is the most effective way of increasing corporate investment in research.

Of paramount importance to researchers and for future benefits to society, awards made should be based on the scientific excellence of proposals. This has been the overriding criterion applied by granting agencies to applications for curiosity-driven research. In the case of proposals that require co-funding, for a variety of reasons, outstanding proposals are not always funded. The reasons include: 1.) **In the case where the Province is asked to contribute financially the ability of each province to do so varies considerably.** Presently, with few exceptions, the Federal Budget is in better financial shape than those of most provinces. As a consequence, **excellent proposals can be denied because of the absence of appropriate partners.** 2.) In Industry-Academy partnerships, it has been the opinion of exceptional researchers that **strategic grants are often 2nd rate projects; industry keeps its best projects under wraps** and joins with academic investigators in more speculative projects in order to reduce risk. In other jurisdictions, furthermore, the absence of corporate sponsors often precludes researchers receiving awards. 3.) There appears not to be a set of uniform criteria covering funding and accounting etc. for the various co-funding opportunities. **In some instances management of the project appears to be more important than the scientific criteria as a reason for an award.** The implication reached by some scientists is that research is becoming over-managed and scientific excellence as the prime criterion is being lost and money which could otherwise be used for science is being diverted to non-productive bureaucratic exercises. One could argue that, ideally, corporate Canada be required, for applied/strategic projects, to contribute to a science research fund that should be distributed to the three research agencies for allocation since they have arm's length peer review in place. This would help insure that corporate Canada's highest quality scientific applications were funded.

There are at the same time arguments to be made for the co-funding programs. Dr. Arthur Carty, the National Science Advisor, has documented some of these in a recent letter in the scientific journal "Science" (Science 309 875 (2005)) in which he articulated how co-funding opportunities have contributed by raising large amounts of money to support Canada's research enterprise. Other Canadian scientists have also indicated some of the benefits when funds are awarded under appropriate conditions.

While the government is to be praised for its efforts in developing programs designed to persuade Canadian companies to invest in research, it is questionable whether the current approach has been effective in bringing corporate Canada to the table. What needs to be

determined, therefore, is what are the major impediments to Canadian industries from contributing to their own research enterprise. In Canada a major impediments to the creation or nurturing of new industries includes the paucity of venture capital. **CFBS recommends examination of the co-funding programs to determine “best practices” in the allocation of funds and an investigation of other avenues designed to encourage Corporate Canada’s contribution to research.**

4. An Effective Voice for Science In Cabinet

Research and Development are now core requirements for all developed societies. Furthermore, allocations to these creative activities will continue to increase globally. Consequently, Canada cannot be complacent in view of this international competition. **Good public policy related to investment in science and research is dependent upon credible information from a reliable source and will be critical in discussions that direct our future.** Establishing the office of a National Science Advisor is an important step in assisting federal decision-makers. To do his job effectively, however, the government should ensure that his office is appropriately funded. The recent creation of the Canadian Academies of Science will be an additional useful resource for the Science Advisor to draw upon in contributing to government’s decisions.

Recommendations

The current recommendations are made with the intent of addressing Canada's continuous need for creative personnel through support of the research enterprise and those institutions that provide post-secondary education/ training. At the same time it is essential that certain programs be revisited to assure funds are spent in the most effective manner. **CFBS recommends:**

1. The federal government partners with the provinces to develop a strategy regarding post-secondary education to ensue a continuous supply of well-trained and creative individuals.
2. Investment in the Federal Granting Agencies, to provide the support for creative activities, should be increased by 2008 – 09 to \$1 billion for CIHR and to \$1.2 billion for NSERC. During this period of research scientist renewal, due to retirements, this support is necessary to meet the demands of new recruits into universities. Minimum increases of 8 - 10% in the next federal budget are necessary.
3. Continued support for the “indirect costs of research program” with an eventual target of 40% from the current ~ 20%. This support will reduce financial strains on university operating budgets.
4. The federal government permits federal granting agencies to function more effectively by allowing them to carry over up to 10% of their federal allocations from one fiscal year to the next. Increased allocations to federal granting agencies should be factored in over a 3 year period to allow greater opportunity for forward planning.
5. A reexamination of the current co-funding programs to establish “best practices” to ensure that resources are applied to projects of the highest scientific quality.
6. A level of support for the office of the National Science Advisor that allows it to perform its function effectively. This office should be encouraged to address the funding situation in federal government laboratories.