



SUSTAINING AND EXPANDING INNOVATION

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EXECUTIVE SUMMARY

The initiatives of the Federal Government over the last 7 years related to innovation with its emphasis on the support of research bodies well for the future economy of this Country. These initiatives, including the creation of CIHR, Genome Canada, CFI and the Research Chairs program, have resulted in attracting and retaining in Canada outstanding creative scientists. These individuals will spur scientific advances in fields critical to Canada's economic and social development.

While the Life Sciences community has applauded the direction the Federal Government has taken, we also recognize that large investments in research are being made by many of our international competitors. Consequently we can not be complacent.

If, therefore, Canada is to be amongst the top countries involved in innovation it requires that wise forward-looking policies be devised and that we have outstanding highly qualified creative personnel to achieve the goals associated with advancing this country's well-being.

This brief is presented, therefore, to encourage the government in its efforts to promote Canada as an effective innovative player in the international arena. The following are 7 recommendations that focus on issues that we believe require attention if Canada is to achieve the aims it desires.

RECOMMENDATIONS:

1. Ensure that the Office of the National Science Advisor (NSA) to the Prime Minister is funded at a level to permit it to function effectively.
2. Establish a budget for the Canadian Academies of Science to assist and provide expertise to government and the NSA.
3. Continue to increase the investments in the research agencies-CIHR and NSERC- at a rate that recognizes the value of innovation in Canada's social and economic future.
4. Provide the Federal Granting Agencies with greater flexibility for forward planning by considering a multi-year approach to government's funding allocations including a 10% carry-over between years.
5. To help ensure common purpose in the need for highly qualified personnel (HQP), develop better communication with the provinces by designating one federal ministry with the permanent responsibility for interacting with the Provincial Ministers of Education.
6. Expand the number of higher value graduate awards to ensure that outstanding creative students are not deterred from entering graduate programs for financial reasons.
7. To attract/retain creative scientists in government laboratories, recognize the contributions that these individuals make to Canada's well-being by providing incentives through a peer-review research grants program (similar to that of university scientists) that they can access.

Initiatives of the Federal Government through investments in research and innovation have created the underpinnings for future economic growth in Canada. To ensure that the goals of this strategy are realized it is essential that continuous investment is forthcoming to maintain the climate for creativity and thus provide the engine for the success of this policy.

During the past 50 years Canada has witnessed a remarkable evolution in its support of science. During this same period, however, this investment has not always been sustained to the detriment of our country being behind in many of the leading-edge technologies that are important to our economic well-being.

During the 1950's and 60's Federal Government support of research was not well established. Agencies such as the Defense Research Board and NRC provided limited funds for academic laboratories at that time. Many investigators with advanced training, consequently, left this country in search of laboratories where they could practice their skills and obtain the funds required to develop their research careers.

It was not until later in the 1960's that the Natural Sciences & Engineering Research Council (NSERC) and the Medical Research Council (MRC) were created to provide support for the life sciences. These actions by the Federal Government provided a degree of recognition to the value of the research enterprise. The result of these actions was to attract a number of expatriate Canadians back to Canada to pursue their research work.

With the drop in investment in the creative endeavours of Canadian scientists during the early 90's increasing numbers of outstanding individual researchers emigrated realizing that research activities were more highly rewarded in institutions south of our border. This inconsistent approach to the research enterprise has had its unhealthy consequences not only on the morale of the research community but also on the corporate sector which depends upon having a creative and highly trained population of researchers. What is critical, therefore, is that the underpinning of the research enterprise be maintained and sustained to reinforce the belief that Canada values the contribution of the talents that will provide the basis for the future well-being of Canadians. An additional requirement is how government decides on policy to chart the future innovation on which the Canadian economy depends.

Current Innovation Climate

The initiatives developed over the past 7 years have been effective in improving the research environment in this Country, not only by providing additional funding but also by attracting creative investigators back to Canada who otherwise would have remained in the U.S.A. or in other locations where research support was more reliable. The current challenge, therefore, is to ensure that Canada retains and continues to generate the highly qualified personnel required to sustain and expand innovation in this Country.

Even with the recent positive initiatives it is impossible to remain complacent since many of our global competitors also recognize the value of research investment. The massive outlays that occur south of our border frequently entice many of our most outstanding scientists. Furthermore, others including the U.K, Asian countries, Australian and the E.U. are substantially increasing their investment in research. "In an as yet unpublished report, a group of European Commission analysts have identified a direct link between higher economic growth rates and increased investment in research, development and innovation. The paper concludes that one new research position can generate between 100 and 400 new jobs".*1

Four Current Problems and Potential Solutions

Issue 1: Science and Government Policy

The Life Sciences Community believes that good public policy, related to scientific investment, is dependent upon credible information from a reliable source. Our membership has, therefore, applauded the appointment of a National Science Advisor (NSA). Similar offices have long been present in both the U.K. and the U.S.A. It will be important, however, for Canada's NSA to have adequate financial support for it to function effectively.

To assist the NSA, by providing expert and independent advice related to science and societal issues, we would encourage the government to take the necessary steps in the creation and funding of the Canadian Academies of Science. This institution would not only provide valuable input for the NSA but also provide an international voice for Canadian science and technology. Many technologies are too expensive to employ for a single nation but can frequently be developed by the cooperation of international partners.

Issue 2: Current Funding Capacity of Granting Agencies

The current decade will witness retirement of a large number of highly qualified personnel (HQP). This exit from the workforce is occurring in universities, government laboratories and in the corporate sector. To ensure that individuals are available to replace those retiring will require the presence of an attractive work-environment with the elements necessary for researchers to perform their investigative work.

The perception of Canada as an innovative society has been greatly enhanced by the creation, by the Federal Government, of programs including the Canada Research Chairs, Canadian Foundation for Innovation (CFI), Genome Canada and the Canadian Institutes for Health Research (CIHR) – to name but a few. The result of these initiatives has been to attract many young researchers back to Canada because they believe that government is committed to sustaining this country's research capacity.

New recruits to Canada's universities tend to be more research-active than those retiring. Consequently, the demand on the research agencies by first-time applicants has increased dramatically. The funds needed to satisfy this demand are, at present, inadequate thus resulting in either lower levels of support and/or fewer grants for eligible researchers. Failure to obtain adequate funding at this stage can abort or reduce an individual's capacity to initiate a successful research career. Given the expectation of these new investigators this situation would be most unfortunate and would defeat Canada's attempt to promote this country as a society that values innovation.

What are the options available to ensure that the perception is not lost that Canada is serious about sustaining the climate for innovation? It must be recognized that both CIHR and NSERC are in a transition period regarding demands on their funds. CIHR was created, from the Medical Research Council, with the mandate to broaden the areas of its research support, with the expectation that its funding would reach \$ 1 billion in order to accomplish this goal. A steady increase each year would, therefore, allow CIHR to forward plan and ensure an equal amount of money available to researchers competing for funds. It would be expected when the \$ 1 billion target was reached that turnover of funds, from termination of grants, would then satisfy the needs of researchers applying for support. This would be defined as a "soft landing" and allow for the more orderly turnover of funds to support the research enterprise.

Recognition of the increased demands on NSERC has also been indicated. This has occurred as a result of newer and more research-active recruits into the various university laboratories. The initiatives of the Federal Government which have resulted in attracting these recruits through the Canada Research Chairs and other programs designed to make Canada an innovative society have had the desired result. Consequently, NSERC is experiencing an increase in the number of requests from many of these research scientists.

During this transition, therefore, it is important that the right signals be given, by government, to retain the excellent researchers that have been attracted to Canada and to continue to attract the personnel that will be needed during the next decade.

Issue 3: How Government Makes its Allocations to Granting Agencies

To assist the Granting Agencies, during this transition phase, to be more effective the Federal Government should, we believe, reconsider the manner it makes its allocations to the Granting Agencies. The reason for making the following suggestion is that the Granting Agencies normally award grants to researchers for periods of ~four years. Consequently, if government allocations fail to rise significantly, in a particular fiscal year, the only funds available for disbursement by the Agencies accrue from the turn-over of grants awarded 4 years earlier. A helpful modification would be for the government to provide its allocations to Funding Agencies on a three-year rolling average during this transition phase. Such a modification would help agencies in forward planning. The effect of these above changes would permit a more even distribution of research funds, especially, during this period of increasing demand.

Currently, research agencies must disburse the government funds allocated by the end of the fiscal year for which they were awarded. Carry-over of these funds by granting agencies is not permitted. The Granting Agencies would be greatly assisted, in their forward planning, by being allowed to carry-over up to 10% of the government's yearly allocation.

Issue 4: Canada's Need for Highly Qualified Personnel

The underpinning of success in creating an environment which promotes innovation is the availability of highly qualified personnel (HQP). To ensure individuals are available to fill the positions that become vacant during this decade requires a vibrant university community. Although major moves have been made to strengthen the research enterprise, similar moves to improve the learning environment in universities have not taken place in parallel. The last two decades have seen deterioration in university funding and reduction of operating budgets to the point that many science majors receive little or no "hands-on" laboratory training. The drop in investment in our universities is puzzling since our need for such well-trained individuals continues to grow. Furthermore, it has occurred when the Federal Government has invested heavily in scientific research, thus compromising Canada's ability to achieve the goals it has established which depend upon the availability of well-educated highly qualified personnel.

At the same time we have observed, in most provinces, an escalation in tuition and other costs such that undergraduate students now graduate with higher debt-loads than were previously seen. The effect of these debt-loads has been to act as a deterrent to some capable students from entering graduate school and delaying /or aborting their ambitions of working for an advanced degree. The new scholarship program for doctoral students announced last year has been a major positive step. The number of awards, however, is limited. Expansion of this program would encourage those capable of advanced training.

What, therefore, are the available options?

To ensure that our country has available the personnel (at the BSc and PhD levels) that it requires, there should be harmony between the direction of the Federal and Provincial Governments regarding Canada's HQP needs over the next decade. The Federal Government would benefit by having a designated Minister with responsibilities to interact with Provincial Ministers of Education. This appointee could then interact, on a regular basis, to discuss issues of mutual interest and determine how the Federal and Provincial Governments can act in concert for the benefit of the country.

Over the past two decades universities have had to deal with deteriorating operating budgets which have dropped to the point that the standard of education has suffered significantly. To partially overcome this budget's shortfall universities, in most provinces, have increased tuition

fees to compensate. Thus, the lack of adequate government funding has resulted in a downloading of university expenses onto students for an education of a lower standard.

Given the ever increasing costs of health care that is reducing the money available for other government programs, methods must be devised to overcome the escalating costs of health care. To compensate for this continuous erosion it is essential that an approach be developed which will involve the partnership of Federal, Provincial Governments and students. In this approach it will be important to ensure that postsecondary education captures all qualified individuals and is not reserved only for families of the affluent.

Recently, the U.K parliament passed legislation authorizing a loan program which would see government subsidizing the cost of borrowing so that students would not have to pay interest. Repayments would be based on income rather than the amount owed and would commence after graduation and when the graduate had earned more than ~ \$ 36,000/annum. To launch this program a means test would be initiated which would mean lower fees for low income families and more grants would be available to low income students and no student would have to pay up front. Such a program in Canada would help ensure that all capable students have the opportunity of a post-secondary education. In the absence of increased Provincial funding for post secondary education and a reduction in student expenses the above U.K. program is a reasonable alternative. It provides for a partnership between the consumer, the student, and the taxpayer. It should be recognized that for the students to continue to participate in the current system will require that governments reverse the low level of funding that has contributed to the erosion of quality education. In summary, therefore, action should be taken to ensure a quality educational experience for students at the undergraduate level with financial condition that allow/encourage excellent candidates to enter graduate programs.

Is Canada supporting creative scientists sufficiently in all its constituencies?

Creative individuals are found in university, government and industrial laboratories. Because of budget cuts over many years the opportunities for government scientists have been hampered by inadequate infrastructure support and inability to access funds that would allow them to invest in research related to their departments' mandate. This situation has occurred at a time when the need for innovative individuals is great given the retirement of large numbers of scientific personnel. Making government laboratories more attractive by providing the opportunity for their researchers to apply for research funds in a manner now open to other members of the research community would seem to be a necessity. We would suggest that a mechanism be established and managed by the Federal Research Agencies to allow government scientists to apply. These applications would be vetted in the same way as applications from individuals who are currently eligible, using a peer-review system similar to that used by the Granting Agencies. As a consequence government scientists would be seen to be subjected to the same quality control assessment as their colleagues in other jurisdictions.

RECOMMENDATIONS:

1. Ensure that the office of the National Science Advisor to the Prime Minister is funded at a level to permit it to function effectively.
2. Establish a budget for the Canadian Academies of Science to assist it to provide expert advice to the government and the NSA.
3. Continue to increase investment in CIHR and NSERC at a rate that recognizes the value of innovation in Canada's economic future.
4. To provide the Federal Granting Agencies with greater flexibility for forward planning government should consider a multi-year approach to its funding allocations with the option of 10% carry-overs between years.

5. To ensure common purpose in the need for HQP develop better communication with the provinces by having one of the federal ministries designated the permanent responsibility for interacting with the Provincial Ministers of Education.
6. Expand the number of awards in higher value graduate scholarship program to help ensure that financial considerations are not the main deterrent for capable students wishing to enter graduate programs.
7. Recognize the contribution that creative government scientists make by providing greater incentives by establishing a peer-review research grants program that they can access.

*1 Herald Tribune, El Pais Insert, Thursday April 8, 04