ENSURING CANADA=S SUCCESS IN THE THIRD MILLENNIUM

A brief submitted to

the House of Commons Standing Committee on Finance

by

the Canadian Consortium for Research

September 2000

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EXECUTIVE SUMMARY

This brief identifies the current pressing needs of the post-secondary education and research communities and recommends an approach to address them, namely:

> **The CCR recommends that the federal government develop and implement a *multi-year* funding program to address the following:**
>
> - **the need for increased federal transfers in support of post-secondary education,**
> - **the needs of each of the granting councils for increased funding of direct cost programs,**
> - **the correction of the historical underfunding of SSHRC, and**
> - **the needs of its own internal S & T activity, in keeping with the most recent Speech from the Throne, including the provision of adequate funds to enable the NRC to effectively diminish the innovation gap.**

In addition

> **The CCR endorses, with the provisos below, an effort by the federal government to devise a fair and equitable formula, which is acceptable to the players involved, for funding the indirect costs of research.**

These provisos are:

- such funding is not considered to be a replacement for the core funding of universities. A significant increase in core funding would do more to help the research community than any other initiative the government could take. A properly designed program to cover indirect costs would be a useful supplement to core-funding increases.

- such funding must not be allowed to undermine increases to the g ranting council base budgets.

- such funding must not skew federal support away from small universities or away from the social sciences and humanities.

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INTRODUCTION

It has been said that change is inevitable - but survival is not. Institutions within society have always had to adapt to change or else become irrelevant or bankrupt. The same is increasingly true for economies and therefore for countries. Change is now more and more driven by knowledge and research. Harnessing this force is crucial to securing Canada's place in the world. The challenge for governments in responding to this change includes:

- ensuring the existence of an accessible and high-quality post-secondary education system,
- funding quality research and innovation in the university sector,
- engaging in research and technology development itself in areas where it can contribute most effectively to social and economic health, and
- encouraging the private sector to actively engage in productive research and technology development (S & T).

On-going benefits require on-going and systematic investments.

These needs are not new, but their importance is increasing dramatically as economies become more knowledge-based. Failure to respond adequately will have progressively undesirable consequences. An effective response is essential.

The purpose of the Canadian Consortium for Research (CCR) very much resonates with this challenge. One of its prime objectives is to help the federal government determine the most effective policies and mechanisms to support research and technology development and post-secondary education. This purpose was adopted to achieve the goals enumerated above and to earn world-wide respect for Canada's contribution to science and technology. It is an essential aspect of creating a vibrant and creative society in all its aspects.

BACKGROUND

The federal government has taken several steps in recent years aimed at strengthening Canada's research capacity. These include, but are not limited to, the creation of the Canada Foundation for Innovation (CFI), the Canadian Institutes for Health Research (CIHR), and the Canada Research Chairs program. Other important funding decisions have also been made. These include the permanent continuation of the Networks of Centres of Excellence and of the National Research Council's (NRC) Industrial Research Assistance Program (IRAP), increased funding for the granting councils, and further funding for the CFI, among a number of other initiatives.

The increased research activity generated by some of these programs has created greater pressure on the granting councils. Other sectors, such as the government's internal research program, have not received much attention in recent years. Thus, while recent government initiatives have been significant and have improved Canada's research performance, they have not produced an optimal balance of the overall government S & T funding. There are some significant gaps which must be addressed over time if maximum benefits to Canada from the increased federal funding to date are to be realized.

In a global economy, we must assess the health of the Canadian research enterprise against that of other countries now and in the future. Sustaining Canada's position in education, research and innovation will be very difficult if our investments in these areas lag behind those of other nations.

This brief identifies current education and research needs, relates them to the Finance Committee's objectives, and then offers recommendations for the government's response to these needs. It is clear that these needs must be addressed; deciding *when and how* is the responsibility of Parliament.

THE ISSUES/NEEDS

POST-SECONDARY EDUCATION: Core Funding

The federal government has historically played an important role in the support and development of post-secondary education. There is good reason for this support; the health of

a modern society is crucially dependent on an adequate supply of highly-educated people. It is from this cadre that we obtain our most highly-developed creative abilities. In a time of globalization, this national resource is becoming increasingly important. A dynamic society is more and more dependent on the existence of a vibrant post-secondary education sector. A healthy economy is one attribute of a dynamic society and sustaining that economy is, in part, a federal responsibility.

In recent years, with the creation of the Canada Health and Social Transfer (CHST), federal transfers to the provinces in support of post-secondary education (PSE) were cut, contributing to the elimination of the federal deficit. The situation has changed dramatically. Federal budget surpluses are now a reality. Resources are therefore now available to address pressing problems.

The historic federal role in post-secondary education is to support the synergism between education and research. World class research in our universities combines with first class teaching to provide students with the depth of education essential to a modern society, particularly as it moves into the new knowledge-based economy.

What are the pressing problems faced by the post-secondary education sector? Reduced federal resources have contributed to a dramatic change in the relationship between Canadians and their universities, exemplified by:

- *Significantly increased student fees*. These increases have diminished access to PSE and have increased the size of student debt at graduation. The latter is an impediment to equal access to university by Canadians and a serious disincentive to students who would like to carry on into graduate programs, with a consequent loss to Canada's innovation capacity.

- *A diminution in the number of faculty by almost 10%* with consequent increased teaching loads and decreased time for research. The recent initiative of the federal government in faculty replacement will not overcome this deficit.

- *Deferred maintenance of physical infrastructure*, which has accumulated to alarming levels. A recent Canadian Association of University Business Officers (CAUBO) commissioned report concludes that the accumulated deferred maintenance at Canadian universities is

now $3.6 billion, with the warning that this total is likely an underestimate[1]. The learning, living and research environments on campuses have deteriorated, thereby constraining Canada's innovation capacity.

- *Significant cutbacks in library acquisitions.* The actual library material purchasing power per student has dropped by 23.6% since 1994[2]. Between 1990 and 1999 the journal purchasing power of Canadian research libraries declined by 42%[3] and preliminary projections for 2001 are for a cost increase of 9.%[4]. University research cannot be sustained without a reversal of this funding history.

- *Diminished ability*, at a time when the need for technical infrastructure in the learning sphere is increasing and its lifetime is decreasing, *to maintain a level of expertise competitive with that in other countries.*

Increased faculty teaching loads have contributed to the fact that Canadian university researchers now generally have less time to do research. Lack of adequate university core funding has not only diminished the ability of the university sector to produce the highly-educated personnel so necessary to a modern society, it has also diminished research output relative to what it would

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[1] See, for example, http://www.aucc.ca/en/comm/caubo.pdf

[2] Canadian Association of Research Libraries/Association des Bibliothèques de research du Canada, *1998-99 Statistics/Statistiques*. The commentary may be read at http://www.carl-abrc.ca

[3] *External Data on Scientific, Technical and Medical Journal and Monograph Costs.* (CISTI Internal document 2000-07-24).

[4] RoweCom Canada Annual Price Index. www.faxon.ca/english/cp2001-02.htm

otherwise be.

If universities are unable to produce adequate numbers or quality of highly-educated people, our society will suffer. As a result, the performance o f the Canadian economy will ultimately be less than what it could be, tax revenues will be diminished and the federal government's ability to provide the programs which it and the Canadian people desire will also be diminished. In short, lack of adequate university core funding is a societal issue.

One example of the consequences just described arises in the health care system. An effective health care system is one of the key indicators (along with education, safe communities/criminal justice system, rule of law, innovation, etc) of a successful modern society. In the longer term, our ability to sustain the health of Canadians relates directly to economic health which, in turn, depends on our ability to produce the highly-educated people necessary to sustain economic health in a strong and just society.

Demand for spaces in our universities is expected to increase by perhaps 20% over the next decade (AUCC projection). This growth will exacerbate the problems identified above. Since the future health of our society depends upon the existence of a vibrant PSE sector, rectification of the problem must involve both the federal and provincial governments, as has been traditional.

> **The CCR urges the federal government to recognize and immediately address the need for increased federal cash transfers in support of post-secondary education.**

RESEARCH: A Goal of the House of Commons Standing Committee on Industry

The House of Commons Standing Committee on Industry, in a recent report[5], recommended

> *That the Government of Canada's innovation agenda commit to a five-year plan of increasing expenditures for research and development, ensuring that all of these increases are larger than the expected rate of inflation, with the objective of reinforcing the upward trend in Canada's R&D-to-GDP ratio established in the 1900's and to raise it above the G-7 country average.*

[5] *Productivity and Innovation: A Competitive and Prosperous Canada*, Ottawa, April 2000.

Using data from Figure 7.1 of that report (Gross Domestic Expenditures on Research and Development [GERD] as a percentage of Gross Domestic Product [GDP]), the annual increase in the GERD to GDP ratio over five years to reach the OECD average is 6.67%. In 1999 the GDP grew by 4.5% in real terms. With inflation at 1.7%, the combined growth rate was 6.3%. Estimates for the next couple of years average close to this value. Therefore, to achieve the Industry Committee's goal, the GERD will have to experience an average yearly increase of greater than about 13.4%. This corresponds to essentially a doubling over five years. However, during that time, the OECD average GERD to GDP ratio may also increase, requiring an even greater increase in Canada to achieve the Industry Committee's goal.

The CCR agrees with the Committee's view that research is crucial to Canada. The goal of increasing research investments at greater than the rate of inflation, if acted upon, will see a real growth and hopefully a diminution of the gap between Canada and its major competitors.

The CCR supports the Industry Committee's goal, particularly to raise the R&D-to-GDP ratio above the G-7 country average over five years, and urges the federal government to take the action necessary to achieve it.

RESEARCH: Granting Councils

The government has increased the base budgets of the three granting councils several times in recent years. These increases have been very important. However, they were applied to a base which had been seriously eroded previously.

One realistic measure of the health of granting council funding is obtained by comparing average grant sizes in Canada with those in the US. Canadian grants are about a third of the size of US grants, even after adjusting for the fact that US grants contribute to the indirect costs of research[6].

The granting councils themselves have recently assessed their budgetary needs in order to effectively meet the meritorious demand upon their funds. These studies reveal that the need for

[6] Robitaille, J.-P. and Y. Gingras, The level of funding for university research in Canada and the United States: Comparative study, *Research File* (AUCC), Vol 3, No 1, May 1999.

additional funds is significant. The councils will outline their needs to the Finance Committee more fully and eloquently than is possible in this brief. The CCR underlines the critical role and excellent record of the councils in support of Canada's research enterprise. Their assessments of future requirements deserve serious consideration.

The historical underfunding of the Social Sciences and Humanities Research Council (SSHRC) deserves special attention. SSHRC supports work related to, among other things, economic performance, socio-cultural development, legal, social and ethical issues (eg, genome research), the social and cultural aspects of health (eg, intervention/service/system evaluation and the determinants of health), and research involving social statistics. SSHRC research initiatives with, for example, Statistics Canada, the Canadian Institutes for Health Information and Human Resource Development Canada are critical to the development of effective public policy necessary to sustain a vibrant society. SSHRC primary needs include:

- The need to fund a reasonable portion of the Community/University Research Alliance (CURA) proposals. In the first competition, there was only enough money to fund 22 out of 72 detailed proposals invited from 178 letters of intent. Adjudicators recommended funding of several others but there was not enough money. CURAs are university/community partnerships designed to address a local issue. The funding is for three years and competitions are held annually.

- The need to bring SSHRC's percentage of funded researchers in line with the percentages found in the two other granting councils. SSHRC's current rate is 40%, well below CIHR's and NSERC's rates.

- The need to support a greater percentage of deserving graduate students at levels comparable to those of the other two councils, including those embarked on masters degree studies.

- The need to form strategic partnerships with organizations such as Statistics Canada, the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the World Health Organization (WHO).

The CCR therefore

urges the federal government to seriously assess the current needs of the three

granting councils and correct the historic under-funding of SSHRC.

RESEARCH: The Costs of University Research

As noted above, the constraint on core funding for universities has had a negative impact upon research because of diminished resources available to maintain, renew and expand the infrastructure necessary to sustain the university research enterprise. Ironically, these pressures have increased as a consequence of recent federal government efforts to strengthen research and innovation in Canada. Every grant or similar funding a university professor receives represents an unfunded expense to the host university.

In other countries (eg, the US and the UK), part or all of the indirect costs of federally funded research are covered in addition to the direct costs. In Canada only the direct costs are funded by the federal government, except when the research is contracted. In the latter case, the total costs are covered.

The Advisory Council on Science and Technology's (ACST) Expert Panel on the Commercialization of University Research urged a program for funding indirect costs (Recommendation #6)[7]. *Budget 2000*, the report of the House of Commons Standing Committee on Finance recommended that "a research infrastructure fund be established that would finance institutions' research-related costs flowing directly from other federal research grants". The House of Commons Standing Committee on Industry has also supported such funding[8]. The CCR itself has stated that attention should be given to this recommendation of the ACST Expert Panel.

While it continues to support the development of the concept of the federal government covering the indirect costs associated with its direct funding of university research, the CCR does so with several provisos, namely that

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[7] *Public Investments in University Research: Reaping the Benefits*, Report of the Expert Panel on the Commercialization of University Research, Ottawa, May 1999.

[8] *Research Funding - Strengthening the Sources of Innovation*, Nineteenth Report of the Standing Committee on Industry, Ottawa, June 1999.

- such funding is not considered to be a replacement for the core funding of universities. A significant increase in core funding would do more to help the research community than any other initiative the government could take. A properly designed program to cover indirect costs would be a useful supplement to core-funding increases.

- such funding must not be allowed to undermine increases to the granting council base budgets.

- such funding must not skew federal support away from small universities or away from the social sciences and humanities.

The CCR endorses, with the provisos above, an effort by the federal government to devise a fair and equitable formula, which is acceptable to the players involved, for funding the indirect costs of research.

RESEARCH: Government Science and Technology

In its 1999 brief[9], the CCR noted that science and technology activity within government plays a key role in Canada's innovation system. One consequence of Program Review was a weakening of this contribution. That brief expressed the hope that the examination then occurring under the Council of Science and Technology Advisors (CSTA) of the "roles of the federal government in performing science and technology, and its ability to fulfill these roles" would produce constructive recommendations.

The report resulting from this study is now public[10]. It notes that there is a critical role for the federal government in performing S & T to fulfill several mandates. It further suggests that the management of this role must be accomplished in an environment of continuous and accelerating change. The report concludes that the role of the government in S & T has not

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[9] *Launching Canada into the Third Millennium*, Ottawa, September 1999.

[10] *Building Excellence in Science and Technology (BEST): The Federal Roles in Performing Science and Technology*, Council of Science and Technology Advisors, Ottawa, 1999.

been diminished by increasing activity in the university and private sectors but it has changed and needs to be more focussed. The key government S & T roles identified include:

- Support for decision making, policy development and regulations.
- Development and management of standards.
- Support for public health, safety, environmental and/or defense needs.
- Enabling economic and social development.

Accelerating change and the globalization which it has facilitated have increased the importance of these roles to Canadian society.

The government has, in effect, recognized the need described in the ACST report. The most recent Speech from the Throne contained the following words:

> *"The Government will also ensure that it has a modern and effective research and science capacity to promote the health, safety and economic well-being of Canadians."*
>
> **The federal government must assess its current internal S & T needs in order to follow through with its stated intention as expressed in the most recent Speech from the Throne**.

The House of Commons Standing Committee on Industry has commented on one aspect of this issue in two recent reports[11,12]. In both it recommends increased funding for the National Research Council (NRC). Some of this funding has subsequently been provided. The NRC is attempting to bridge an important gap, the innovation gap, between research which is too applied to suit most university researchers and too far from a marketable product to interest the private sector. This bridge is required to ensure that what is learned by the former can

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[11] *Research Funding - Strengthening the Sources of Innovation*, Nineteenth Report, Ottawa, June 1999.

[12] *Productivity and Innovation: A Competitive and Prosperous Canada*, Ottawa, April 2000.

ultimately benefit the latter, where appropriate. Currently one proposed thrust of the NRC is to expand its regional cluster activity. A beginning has been made with the recent announcement of the Atlantic Regional Initiative ($110M over 5 years) but much remains to be done.

The NRC must receive adequate funding of its programs if it is to effectively diminish the innovation gap.

RELATIONSHIP OF THESE NEEDS TO THE FINANCE COMMITTEE'S OBJECTIVES

Needs rather than proposals or recommendations are presented above. Recommendations are presented below. First, however, we examine the needs in respect of the Finance Committee's objectives.

To ensure that Canada remains a major player in the new economy.

The new economy requires a variety of inputs to function vigorously. These include increasing numbers of well-educated and adaptable people and a good supply of ideas which might lead to innovation. Satisfaction of any of the needs identified above will contribute to at least one of these requirements.

We caution, however, against perceiving the need for well-educated people, including knowledge generators, in too narrow a light. The need for engineers and scientists comes immediately to mind, of course, but many other disciplines produce well-educated people also needed in the new economy. Professor Robert Allen of the University of British Columbia and the Labour Education and Training Research Network at York University investigated this issue in the context of British Columbia. He found that during the economic boom of the 1990s, graduates in the social sciences were the most sought after of university graduates. The new economy needs people of many and various skills.

To provide Canadians with equal opportunity to succeed.

Addressing the core funding need will increase the accessibility to PSE to all Canadians. Current

tuition levels and subsequent student debt discourages most greatly those with lower financial resources from seeking a university education. The more effective the discouragement, the greater the diminution of equal opportunity. As the forces of the knowledge-based economy become more prevalent, the greater will be the social impact of this problem.

Canadians not only desire an equal opportunity for success among themselves but they also want an equal opportunity for Canada to succeed relative to other nations. We seek success in the world marketplace. Research and innovation are crucial. If we do not provide research and innovation opportunities competitive to those provided elsewhere, Canada will have a diminished likelihood of success compared to that of other societies. Responding to the research needs identified above will contribute to Canada's ability to remain competitive with other societies.

To create an economic and social environment where Canadians can enjoy the best quality of life and standard of living.

Addressing the needs outlined above will, as noted, facilitate the strengthening of the economy. Coupled with effective tax and social policy, this will produce a broadly-based increase in the standard of living. That, in turn, will stimulate the creation of the conditions necessary for improvements to our quality of life.

Many factors determine quality of life. Economic success is but one of several key ingredients of a prosperous modern, democratic society. Other ingredients include literacy, health, the fairness of the judicial and economic systems, and human development. It is the sum of these ingredients which makes Canada one of the best countries in the world. A healthy economy is necessary to achieve this state but it is not sufficient. We must also sustain and nurture the other components. Research across the spectrum (including the humanities, social, medical and natural sciences and engineering) is critical. All have roles to play. We must avoid distorting the balance of academic disciplines by taking too restricted a view.

RECOMMENDATIONS

The needs of the post-secondary and research communities have been determined above. The CCR has the following recommendations in respect to them:

The CCR recommends that the federal government develop and implement a *multi-year* funding program to address the following:

- **the need for increased federal transfers in support of post-secondary education,**
- **the needs of each of the granting councils for increased funding of direct cost programs,**
- **the correction of the historical underfunding of SSHRC, and**
- **the needs of its own internal S & T activity, in keeping with the most recent Speech from the Throne, including the provision of adequate funds to enable the NRC to effectively diminish the innovation gap.**

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