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MOBILIZING SCIENCE AND TECHNOLOGY: THE NEW FEDERAL STRATEGY

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MOBILIZING SCIENCE AND TECHNOLOGY: THE NEW FEDERAL STRATEGY

INTRODUCTION

Science, research and development underpin Canada's position in the knowledge economy, where strength depends on capacity to innovate and to stay ahead of the technological curve. Over the past decade, federal government policies have aimed to foster world-class research programs in universities and research institutes and to encourage industrial investment in research and development (R&D). The 2007 strategy document, *Mobilizing Science and Technology to Canada's Advantage*, reiterates these goals. This paper summarizes the recent history of science policy in Canada,(1) compares Canada's R&D intensity with that of other countries, and summarizes and comments on the new strategy.

RECENT HISTORY OF SCIENCE, RESEARCH AND INNOVATION IN CANADA

During the early and mid 1990s Canada's science infrastructure was aging, and research funding was low enough to compromise scientific competitiveness.(2) Significant funds began to be directed toward science and innovation activities in 1997 when, after the fiscal restraint of the mid 1990s, Canada launched a series of new policies that increased science funding, repatriated Canadian researchers and attracted world-leading scientists.(3) However, Canada continues to lag behind other countries in the OECD (Organisation for Economic Co-operation and Development) with respect to research intensity.

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(1) Details of policies up to and including the 1996 report *Science and Technology for a New Century* are contained in Daniel Brassard, *Science and Technology: The New Federal Policy*, BP-414E, Parliamentary Information and Research Service, Library of Parliament, Ottawa, April 1996.

(2) Jean-Pierre Robitaille and Yves Gingras, "The level of funding for university research in Canada and the United States: Comparative Study," *Association of Universities and Colleges of Canada Research File*, Vol. 3, No. 1, May 1999, pp. 1-8, http://www.aucc.ca/_pdf/english/publications/researchfile/1999/vol3n1_e.pdf.

(3) Canada Research Chairs, "General Statistics of Current Chairholders," May 2007, http://www.chairs.gc.ca/web/about/stats/may2007.pdf.

Major federal science initiatives over the past decade are outlined in Appendix A. With hindsight, some of the most influential of these have been: the increases in research council funding; the Canada Research Chairs program; the creation of foundations, particularly the Canada Foundation for Innovation; and the focus on partnerships – both within research silos through the Networks of Centres of Excellence program and through the leveraging of federal funds to encourage provincial and private-sector matching investments in research activities.

Beginning in 1997, the creation of a series of science-funding foundations represented a departure from a traditional granting-council model for research funding. Foundations are independent, not-for-profit organizations with an arm's-length board of directors. Foundations that directly support Canadian R&D activities include the Canada Foundation for Innovation, Genome Canada, Sustainable Technology and Development Canada, and the Canadian Foundation for Climate and Atmospheric Sciences. They receive lump sums from the government, which they draw on to fund eligible projects. This gives them greater financial stability than government agencies, which depend on year-to-year budget announcements. Concern has been expressed by the Auditor General over the lack of accountability of the federal government for the funds they disburse through foundations. Another Library of Parliament publication covers foundations in detail.(4)

SPENDING ON RESEARCH AND DEVELOPMENT

A. Funders and Performers of R&D

The relationship between funders and performers of Canadian R&D is complex, even when simplified (see Fig. 1). The federal government funds about 18% of R&D performed in Canada. Historically, most federally funded research was performed by federal government laboratories, but since 2003 the higher education sector (mainly universities) has become the main performer.(5) As alternative management structures are developed for some laboratories, the proportion of federally funded research performed directly in federal facilities is likely to decrease further.

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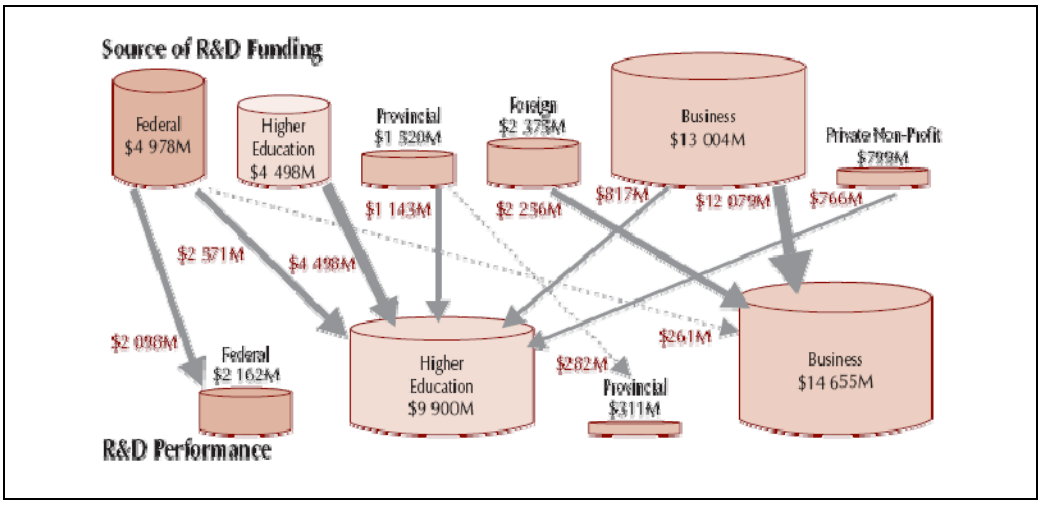
(4) Jean Dupuis, *Foundations: An Update*, PRB 05-17E, Parliamentary Information and Research Service, Library of Parliament, Ottawa, April 2005, http://lpintrabp.parl.gc.ca/LopImages2/prbpubs/bp1000/prb0517-e.asp.

(5) Industry Canada, *Science and Technology Data – 2005*, Ottawa, March 2007, p. 11, http://innovation.gc.ca/gol/innovation/site.nsf/vDownload/Data%20Book%202005_PDFs/$file/Data%20_Book_2005_E_Final.pdf (cited hereafter as "S&T data (2005)").

Figure 1 – Major Flows of R&D Funding in Canada, 2005*[6]



* Only flows higher than $120M are shown in the figure.

Source: Statistics Canada, *Estimates of Canadian Research and Development Expenditures (GERD), Canada, 1995 to 2006, and by Province 1995 to 2004*, Cat. No. 88F0006XIE No. 009, September 2006.

In addition to direct funding, the federal government provides about $3 billion per year in tax credits to companies performing R&D. A recent international comparison of 36 countries found that Canada has the third highest tax credit rate for R&D[7] (behind Spain and Czech Republic). Most of this derives from the Scientific Research and Experimental Development tax credit, which aims to encourage investment in R&D activities. Finance Canada is currently conducting a review of this tax credit.

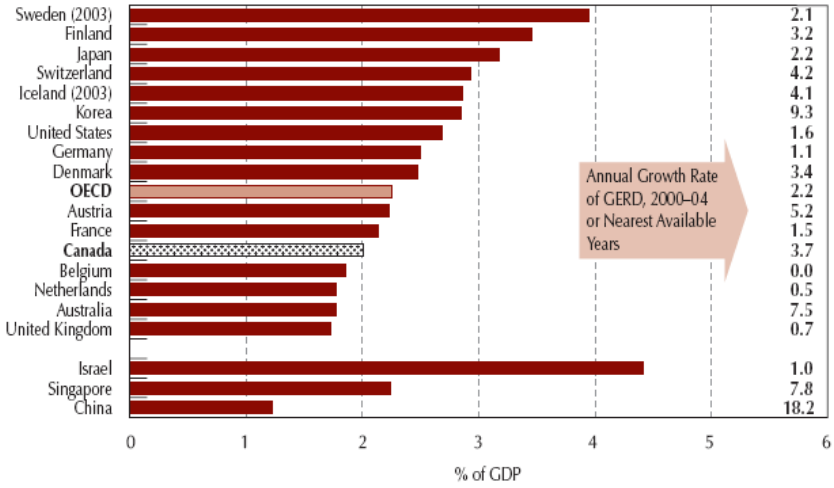
B. International Comparisons of R&D Intensity

Research spending as a proportion of GDP (gross domestic product) is often used as a measure of R&D intensity to compare commitment to R&D over time and between countries. When compared with other OECD countries, Canada's ratio of gross expenditure on research and development (GERD) to GDP is below average (Fig. 2). After rising in the latter part of the 1990s, Canada's GERD–GDP ratio has hovered around 2% for the past 5 years, despite increases in government investments. In part this may reflect stagnation in industrial R&D investment by the ICT sector, particularly Nortel.

(6) S&T data (2005), p. 9.

(7) John Lester, André Patry and Donald Adéa, *An International Comparison of Marginal Effective Tax Rates on Investment in R&D by Large Firms*, Working paper for Finance Canada, September 2007.

**Figure 2 – GERD as a Percentage of GDP,
Top OECD and Selected Non-OECD Countries, 2004**(8)



Source: OECD, *Main Science and Technology Indicators 2006/2*, December 2006.

Apart from GERD, two other measures of research intensity are often cited: business and public spending on R&D. With respect to business expenditure on research and development (BERD), Canada performs weakly in an international context,(9) ranking lower than for GERD. Most industrial R&D is performed by only a handful of companies; and, as shown in Appendix B, the top two R&D spenders last year accounted for more R&D funding in 2007 than the next eight combined.(10) This low diversity makes Canada's BERD vulnerable to the fortunes of those particular companies. For example, Nortel Networks spent $5.95 billion on R&D in 2000, more than the total of the top ten R&D spenders in 2006.(11) Even though it has increased its research intensity from 13% to 17% of revenue in the past six years, Nortel's falling fortunes affect R&D measures across Canada.

(8) S&T data (2005), p. 6.

(9) S&T data (2005), p. 18.

(10) From Re$earch Infosource Inc., *Canada's Top Corporate R&D Performers 2007*, http://www.researchinfosource.com/2007-top100.pdf.

(11) In 2000 dollars. For details see Re$earch Infosource Inc., *Canada's Top Corporate R&D Performers 2001*, http://www.researchinfosource.com/top100-2001.pdf.

In its ratio of higher education expenditure on R&D (HERD) to GDP, a surrogate measure for public expenditure on R&D, Canada leads the G7 and is behind only Sweden in the OECD.(12) Proud of Canada's position as a leader in HERD (a measure the government has control over) but concerned about our weakness in GERD and BERD (which it does not directly control) the government has convened a number of expert panels and initiatives in recent years, including the Innovation Strategy,(13) the Rotman review,(14) and the business innovation assessment being undertaken by the Council of Canadian Academies.(15) The aim is to increase industrial spending on R&D by developing strategies to foster an increased sense of entrepreneurship among Canadian scientists and institutions, to support successful commercialization of discoveries, and to create a tax and regulatory environment that encourages R&D. The new strategy again puts the desire for increased private sector investment in R&D front and centre.

THE NEW STRATEGY: MOBILIZING SCIENCE AND TECHNOLOGY TO CANADA'S ADVANTAGE

A. Process Leading to the New Strategy

Budget 2006 announced that the Prime Minister was asking the ministers of industry and of finance to develop a new strategy for science and technology in Canada.(16) The Council of Canadian Academies was commissioned to prepare a report on the state of science and technology in Canada,(17) and Maxime Bernier, then industry minister, held a series

(12) S&T data (2005), p. 24.

(13) Industry Canada, *Achieving Excellence: Investing in People, Knowledge and Opportunity*, Ottawa, January 2001, http://www.innovationstrategy.gc.ca.

(14) Joseph L. Rotman, et al., *People and Excellence, The Heart of Successful Commercialization*, Industry Canada, Ottawa, April 2006, http://strategis.ic.gc.ca/epic/site/epc-gdc.nsf/vwapj/Volume_I_e.pdf/$FILE/Volume_I_e.pdf.

(15) Council of Canadian Academies, *Summer News*, Ottawa, July 2007, p. 6, http://www.scienceadvice.ca/documents/Council_News_Summer_2007_Newsletter.pdf.

(16) Finance Canada, *Budget Plan 2006*, Ottawa, May 2006, p. 85, http://www.fin.gc.ca/budget06/pdf/bp2006e.pdf.

(17) Council of Canadian Academies, *The State of Science and Technology in Canada*, Ottawa, September 2006, http://www.scienceadvice.ca/documents/The_State_of_Science_and_Technology_in_Canada.pdf.

of roundtable meetings with invited scientists and business leaders. Industry Canada received submissions from universities and industry groups and consulted with advisory groups, but there was no formal process for public consultation during the development of the strategy.(18)

B. Summary of the New Federal Science and Technology Strategy

The new strategy, *Mobilizing Science and Technology to Canada's Advantage*,(19) was launched by Prime Minister Harper at the Perimeter Institute for Theoretical Physics in May 2007. The 100-page strategy aims to foster three science and technology (S&T) "advantages" for Canada: an "Entrepreneurial Advantage," a "Knowledge Advantage" and a "People Advantage." The main thrusts of the strategy are to:

- **Encourage greater private-sector investment in S&T**. As identified earlier, Canada's BERD is below the OECD average. Initiatives to encourage industry investment include:
  - Creating five research networks led by the private sector under the Networks of Centres of Excellence program;(20) $11 million in funding was committed in Budget 2007 for this activity.
  - Establishing new centres to promote commercialization in S&T priority areas; $350 million over three years was committed in Budget 2007, of which $155 million was earmarked for eight institutions selected non-competitively by the Government, with the remaining $195 million available through a competitive process run by the Networks of Centres of Excellence.(21)
  - Utilizing the tax system via the existing Scientific Research and Experimental Development tax credit and a target to establish the lowest tax rate on new business investment in the G7.

(18) Policy Group, Industry Canada, personal communication.

(19) Industry Canada, *Mobilizing Science and Technology to Canada's Advantage*, Ottawa, May 2007, http://www.ic.gc.ca/cmb/welcomeic.nsf/vRTF/PublicationST/$file/S&Tstrategy.pdf.

(20) See Appendix A for more details of the NCE program.

(21) The eight centres identified by the government in the strategy are the Perimeter Institute for Theoretical Physics ($50 million), the Brain Research Centre at the University of British Columbia, the Canada School of Sustainable Energy at the University of Lethbridge, the Li Ka Shing Knowledge Institute at the University of Toronto, the Heart and Stroke Foundation Stroke Recovery Centre, the Montreal Neurological Institute, the National Optics Institute in Quebec City and the Life Science Research Institute in Halifax ($105 million to be shared between them).

- **Focus on S&T priority areas** that are "in the national interest from a social and economic perspective." The areas identified correspond to Canadian strengths identified by the CCA report on "The State of Science and Technology in Canada":
  - environmental S&T
  - natural resources and energy
  - health and related life sciences
  - information and communications technologies.

- **Maintain Canada's position as a leader in publicly performed R&D**. As described earlier, Canada has the highest HERD–GDP ratio in the G7. Budget 2007 committed $510 million to the Canada Foundation for Innovation, $120 million to CANARIE, $10 million to the Canadian Institute for Advanced Research, and $15 million to the Indirect Costs of Research Program. There were no commitments to increases in granting council budgets, except in priority areas.

- **Consider alternative management arrangements for non-regulatory federal R&D labs**. A task force(22) has been set up to identify laboratories that could be better managed outside of the federal government and report back in fall 2007. Some National Research Council laboratories, particularly those already co-located with universities, are likely to be part of considerations.

- **Consolidate the advisory councils into the Science, Technology and Innovation Council**. This new council replaces the Advisory Council on Science and Technology, the Council of Science and Technology Advisors, and the Canadian Biotechnology Advisory Committee. Membership of the council has been announced and is drawn from the academic and business communities across Canada.(23)

- **Create additional funding opportunities for S&T students** through a new industrial R&D internship program and increased investments in scholarship programs.

C. Response to the Strategy

Statements of support for the strategy came from university presidents, research councils, industry groups and others. The major funding announcements had already been made in Budget 2007, and so there was nothing unexpected in the strategy, which attracted little media coverage. There were some questions from research sectors left out of the priority group as well as calls for more support for both basic research and late-stage product development.

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(22) Treasury Board, "Canada's New Government Announces Independent Expert Panel on Federal Laboratories," News release, Ottawa, 13 August 2007, http://www.tbs-sct.gc.ca/media/nr-cp/2007/0813_e.asp.

(23) Science, Technology and Innovation Council, "About Us," http://www.stic-csti.ca/epic/site/stic-csti.nsf/en/h_00004e.html (accessed 8 November 2007).

D. Discussion

The S&T strategy reinforces the commitment to science and innovation activities. It emphasizes the need for greater industrial investment in R&D and identifies priority areas for research spending. However, a number of questions remain unanswered:

- How will efforts be focused on the four priority areas of environmental sciences, natural resources and energy, health and related life sciences, and information and communications technologies? For example, one of the 2007 funding announcements was $50 million to the Perimeter Institute for Theoretical Physics. There are no obvious links between theoretical physics and any of the four priority areas. Similarly, how does the ongoing investment in aerospace research fit with the priority areas?

- What does success look like? With no hard targets such as increasing R&D intensity, or numbers of graduate students to certain levels, the success or failure of this strategy may be difficult to measure.

- There is no discussion of how to engage in large international research projects. Large facilities for conducting scientific research are often, by necessity, international endeavours requiring huge amounts of funds for long-term, often high-risk, research. Examples include the ALMA Telescope project (in which Canada is a full partner), the ITER nuclear fusion research project (which Canada left in 2003), or the CERN Large Hadron Collider (in which Canada has only a third-tier status).

- What funding can S&T expect in the next few years? Long-term commitments of levels of funding for the granting councils (NSERC, SSHRC, CIHR),[24] allow them to make strategic forward plans. Higher funding also creates an optimistic environment for university researchers and allows them to hire and train personnel on long-term contracts, developing a highly skilled workforce and nurturing the next generation of researchers. The statement that "Canada's federal government will enhance accountability and value for money from the granting councils" seems unlikely to reassure researchers that increased funds are on the horizon.

- What is the role of the National Science Advisor, whose office moved from Privy Council to Industry Canada in 2006. The National Science Advisor no longer provides advice directly to the prime minister, and there is no mention of his or her role in providing advice or leadership to Canadian science. Similarly, the role of chief scientists within departments is not discussed.

(24) The Natural Sciences and Engineering Research Council, the Social Studies and Humanities Research Council, and the Canadian Institutes of Health Research.

CONCLUSION

A vibrant S&T sector is crucial to Canada's knowledge economy. Recognizing this, the government has launched a range of initiatives over the past decade to reinvigorate Canadian research. The 2007 strategy, *Mobilizing Science and Technology to Canada's Advantage*, sets a direction for government investment in S&T for the coming years.

The strategy aims to focus resources on sectors identified in the Council of Canadian Academies report, *The State of Science and Technology in Canada*, as areas where Canada is a world leader: environmental S&T, natural resources and energy, health and related life sciences, and information and communications technologies. However, what it means to be a priority sector, what happens to research activities that are not given priority, and whether there will be long-term changes in the configuration of S&T research funding are questions that remain to be resolved by funding bodies.

Canada lags behind other OECD countries in its GERD–GDP ratio, mainly as a result of low BERD. The new strategy focuses on increasing business R&D and introduces a number of measures to stimulate investment, including business-led Networks of Centres of Excellence, centres to promote commercialization, and the Scientific Research and Experimental Development tax credit. At the same time, Canada leads the G7 in its HERD–GDP ratio. The strategy makes a commitment to maintain this, and to continue investment in scholarships and fellowships, while ensuring accountability and value for money from the research councils. Measuring the success of the strategy in terms of increased BERD will be difficult without an indication of what constitutes success for the various programs being funded, or without a target for the GERD–GDP ratio.

The effect of the policies outlined in the strategy may become apparent only in hindsight. S&T is a dynamic and unpredictable sector in which innovation and advancement are often driven by individual research teams or research institutes. The government has a role to play in creating conditions that encourage business research and development, provide access to world-class equipment and facilities in universities, research institutes and government laboratories, attract world-class talent, and develop the next generation of researchers. The strategy outlines how the government aims to do create these conditions, and members of the academic, business, and research communities have expressed their support and enthusiasm to work in partnership with the government on S&T activities. The next decade of Canadian S&T promises to be, like the last, a period of change.

APPENDIX A

Major Federal S&T Initiatives Since 1996

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Major Federal S&T Initiatives Since 1996

Year	Activity
1996	The release of the federal government report *Science and Technology for the New Century*(1) launched Technology Partnerships Canada and provided funding to the Networks of Centres of Excellence program.
1996-2006	Technology Partnerships Canada, designed to support industrial R&D by providing conditionally repayable loans, wound down at the end of 2006, by which time it had committed $3.7(2) billion to private companies performing R&D.
1997-	Significant increases were made to research council budgets. The NSERC budget increased from $435.5 million in 1997-1998 to $904 million in 2006-2007.(3) The SSHRC budget has increased from $87 million in 1997-1998 to $306 million in 2006-2007.(4) The budget of the CIHR or its predecessor, the Medical Research Council, increased from $271.4 million in 1998-1999 to $809 million in 2005-2006.(5)
1997-	The Networks of Centres of Excellence were established as a permanent program. Overseen by the research councils and Industry Canada, the program supports networks linking researchers across Canada. High-profile networks include ArcticNet, the Stem Cell Network, and MITACS.(6) The networks' budget has grown since inception, and is now at $82.4 million per year,(7) not including the announcement in the 2007 Budget of $11 million to fund networks led by the private sector.

(1) Industry Canada, *Science and Technology for the New Century*, Ottawa, March 1996, http://strategis.ic.gc.ca/pics/te/e-strat96.pdf.

(2) The final amount may be less than $3.7 billion if there are any failed technologies or other reasons not to disburse committed funds, pers. comm., Technology Partnerships Canada. See http://tpc-ptc.ic.gc.ca/epic/site/tpc-ptc.nsf/en/h_hb00027e.html for more details.

(3) Natural Sciences and Engineering Research Council, "Facts and Figures," http://www.nserc.gc.ca/about/stats/2004-2005/figures_e.asp (accessed 8 November 2007).

(4) Social Sciences and Engineering Council, "Facts and Figures," http://www.sshrc-crsh.gc.ca/web/about/stats/tables_e.asp (accessed 8 November 2007).

(5) Medical Research Council, *Report of the President 1998-1999*, Ottawa, December 1999, p. 25, http://www.cihr-irsc.gc.ca/e/documents/1rotp9899.pdf (accessed 8 November 2007).

Canadian Institutes of Health Research, "Current Budget," Ottawa, September 2005, http://www.cihr-irsc.gc.ca/e/22953.html (accessed 8 November 2007).

(6) Mathematics of Information Technology and Complex Systems.

(7) Networks of Centres of Excellence, "About Us," http://www.nce.gc.ca/about_e.htm (accessed 8 November 2007).

Year	Activity
1997-	The Canada Foundation for Innovation (CFI) was launched to renew Canada's aging research infrastructure. Seen as a major success story, the CFI, through its various programs, funds all types of infrastructure, from new microscopes and genetic sequencing equipment to the Canadian Light Source synchrotron. The CFI normally funds 40% of project costs with matching funds from other sources. In many cases this is from provincial funds, which encourages the provinces to institute their own mechanisms for funding research. Founded in 1997, the foundation has disbursed $3.75 billion to fund infrastructure projects.(8) A further $510 million was pledged in Budget 2007.
2000-	The Canada Research Chairs (CRC) program was instituted to attract and retain world-class research talent. The program costs $300 million per year and has awarded 1,848 chairs since 2000.(9) Thirty percent of award holders were attracted to Canada from overseas. CRCs allow holders to limit their teaching duties and to focus exclusively on their research; they also provide access to CFI infrastructure funding support for equipment.
2000-	Genome Canada is a foundation created to further genetic research. Since inception it has received over $700 million in funding to advance research into genomics and proteomics.(10) Genome Canada has taken a rather different approach than other foundations and has established regional genome centres (Atlantic, Quebec, Ontario, Prairie, Alberta and British Columbia), which administer funding and create clusters in their province or region according to their own models – for example, Genome Quebec has used its funding to create state-of-the-art science and technology platforms, whereas other centres have chosen to act more like granting agencies.
2000-	The CIHR, formed to replace the Medical Research Council as Canada's granting agency for health research, took a novel approach to health research, creating 13 virtual institutes, each with its own scientific director.(11)
2001	The Innovation Strategy(12) outlined ambitious targets for science, research and innovation in Canada. The strategy came at a time when the country's GERD–GDP ratio appeared to be rising rapidly and goals such as ranking among the top 5 R&D performers in the world by 2010 seemed possible. In fact, 2001 was a high point for the GERD–GDP ratio and, in 2007, it seems unlikely that Canada will make it into the top 5 in the next few years. Other long-term aims of the Innovation Strategy included:

(8) Canada Foundation for Innovation, "CFI Overview," http://www.innovation.ca/about/index.cfm?websiteid=5 (accessed 8 November 2007).

(9) Canada Research Chairs, "Program Statistics," http://www.chairs.gc.ca/web/about/statistics_e.asp (accessed 8 November 2007).

(10) Genome Canada, "About Genome Canada," http://www.genomecanada.ca/xcorporate/about/index.asp (accessed 8 November 2007).

(11) Canadian Institutes of Health Research, "CIHR Institutes," http://www.cihr.ca/e/9466.html (accessed 8 November 2007).

(12) Industry Canada, *Achieving Excellence: Investing in People, Knowledge and Opportunity*, Ottawa, January 2001, http://www.innovationstrategy.gc.ca.

Year	Activity
	• developing at least 10 internationally recognized technology clusters by 2010 • ensuring that high-speed broadband access is widely available in Canadian communities by 2005 • increasing the number of graduate students by 5% by 2010.
2001-	Sustainable Development and Technology Canada is a foundation that funds R&D into technologies that provide solutions to environmental issues such as climate change, air and water pollution. Until 2007, it had received $550 million,(13) and another $500 million was promised in 2007.
2001-	The Canadian Foundation for Climate and Atmospheric Sciences(14) received $110 million over 10 years to fund research in climate and atmospheric sciences. One of the least conspicuous foundations, it has now allotted most of its funds and unless it receives additional monies will begin winding down activities.
2004-	The Office of the National Science Advisor was created, with Dr. Arthur Carty beginning work as the inaugural advisor in April 2006. With a team of around six people, he was based in the Privy Council Office and provided advice directly to the prime minister. In the autumn of 2006, his office moved to Industry Canada, reporting to the industry minister. Carty remains Canada's science representative on international bodies such as the Carnegie G8 meetings of science ministers, but domestically his role is less well defined.
2005-	The Council of Canadian Academies was formed in 2005 with $30 million over 10 years to oversee science-based assessments for the government. The first assessment commissioned, *The State of Science and Technology in Canada*, fed directly into the formulation of the 2007 Science Strategy.(15) The council will conduct up to five expert assessments per year on topics requested by the government.
2006-	International Polar Year (IPY) is a 24-month intensive international effort focusing research on the polar regions. Canada's IPY budget is $150 million over 6 years (plus $6 million of NSERC funds(16)). Coordination is provided by an IPY program office located in Indian and Northern Affairs. Research funded must investigate either climate change in the Arctic, or the health of Arctic people.(17)

(13) Sustainable Technology and Development Canada, "SDTC Profile," http://www.sdtc.ca/en/about/index.htm (accessed 8 November 2007).

(14) Canadian Foundation for Climate and Atmospheric Sciences, "Overview," http://www.cfcas.org/overview_e.html (accessed 8 November 2007).

(15) Council of Canadian Academies, *The State of Science and Technology in Canada*, Ottawa, September 2006, http://www.scienceadvice.ca/documents/The_State_of_Science_and_Technology_in_Canada.pdf.

(16) For information on NSERC funded projects, see Natural Sciences and Engineering Research Council, *International Polar Year*, http://www.nserc.gc.ca/northern_research/InternationalPolarYear_e.asp (accessed 8 November 2007).

(17) International Polar Year Secretariat, "Frequently Asked Questions," http://www.api-ipy.gc.ca/qstn/index_e.html#qstn1 (accessed 8 November 2007).

APPENDIX B

Industrial Spending on Research and Development in Canada

APPENDIX B

Industrial Spending on Research and Development in Canada, 2006

Rank	Company	R&D Expenditures $000	% Change from 2005	Revenue $000	R&D as % of Revenue
1	Nortel Networks Corporation	$2,199,020	-2.2	$12,949,153	17.0
2	BCE Inc.	$1,394,000	-13.0	$17,713,000	7.9
3	Magna International Inc.	$652,108	-20.8	$27,422,538	2.4
4	Pratt & Whitney Canada Corp.	$481,000	1.9	$3,000,000	16.0
5	ATI Technologies Inc.	$458,157	1.5	$2,758,417	16.6
6	IBM Canada Ltd.	$360,000	5.0	$5,000,000	7.2
7	Alcan Inc.	$249,502	-9.3	$26,811,258	0.9
8	Atomic Energy of Canada Limited	$246,144	-6.8	$390,116	63.1
9	Bombardier Inc.	$196,199	-7.5	$16,802,825	1.2
10	Alcatel-Lucent	$187,167	-3.5	nd	nd
11	Research In Motion Limited	$178,767	45.8	$2,342,875	7.6
12	Apotex Inc.	$178,757	-2.4	$1,018,159	17.6
13	GlaxoSmithKline Canada	$177,008	30.6	$1,020,995	17.3
14	Ericsson Canada Inc.	$152,000	-24.4	$553,000	27.5
15	Abitibi Consolidated	$150,000		$4,851,000	3.1
16	EnCana Corporation	$140,488	44.9	$18,598,105	0.8
17	Pfizer Canada Inc.	$131,764	-26.3	$2,189,793	6.0
18	Cognos Incorporated	$130,127	1.4	$995,173	13.1
19	TELUS Corporation	$130,000	4.0	$8,681,000	1.5
20	Tembec Inc.	$118,900	25.9	$3,332,000	3.6

Source: Excerpted from Re$earch Infosource Inc., *Canada's Top Corporate R&D Performers 2007*, http://www.researchinfosource.com/2007-top100.pdf.