



Natural Sciences and Engineering Research Council of Canada



For the
period ending
March 31, 1997



Improved Reporting to Parliament —
Pilot Document

Canada

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Foreword

On April 24, 1997, the House of Commons passed a motion dividing what was known as the *Part III of the Estimates* document for each department or agency into two documents, a *Report on Plans and Priorities* and a *Departmental Performance Report*. It also required 78 departments and agencies to table these reports on a pilot basis.

This decision grew out of work by Treasury Board Secretariat and 16 pilot departments to fulfil the government's commitments to improve the expenditure management information provided to Parliament and to modernize the preparation of this information. These undertakings, aimed at sharpening the focus on results and increasing the transparency of information provided to Parliament, are part of a broader initiative known as "Getting Government Right".

This *Departmental Performance Report* responds to the government's commitments and reflects the goals set by Parliament to improve accountability for results. It covers the period ending March 31, 1997 and reports performance against the plans presented in the department's *Part III of the Main Estimates* for 1996-97.

Accounting and managing for results will involve sustained work across government. Fulfilling the various requirements of results-based management – specifying expected program outcomes, developing meaningful indicators to demonstrate performance, perfecting the capacity to generate information and report on achievements – is a building block process. Government programs operate in continually changing environments. With the increase in partnering, third party delivery of services and other alliances, challenges of attribution in reporting results will have to be addressed. The performance reports and their preparation must be monitored to make sure that they remain credible and useful.

This report represents one more step in this continuing process. The government intends to refine and develop both managing for results and the reporting of the results. The refinement will come from the experience acquired over the next few years and as users make their information needs more precisely known. For example, the capacity to report results against costs is limited at this time; but doing this remains a goal.

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Performance Report

for the period ending March 31, 1997

Natural Sciences and Engineering Research
Council of Canada

Recommended:

T.A. Brzustowski, President

Approved:

The Honourable John Manley, M.P.
Minister of Industry

Section I: Minister's Message

The Industry Portfolio brings together under the Minister of Industry 13 departments and agencies (see box) with responsibilities for science and technology (S&T), regional development, marketplace services and micro-economic policy. With many of the micro-economic levers available to government, as well as 41% of the S&T funding in the

The Industry Portfolio is ...

Atlantic Canada Opportunities Agency
Business Development Bank of Canada*
Canadian Space Agency
Competition Tribunal
Copyright Board Canada
Federal Office of Regional Development - Québec
Industry Canada
National Research Council Canada
Natural Sciences and Engineering Research Council of Canada
Social Sciences and Humanities Research Council of Canada
Standards Council of Canada*
Statistics Canada
Western Economic Diversification Canada

** Not required to submit Performance Reports*

federal government, the Industry Portfolio offers a versatile tool kit for meeting the challenges of the knowledge-based economy as Canada moves into the 21st century.

The establishment of the Portfolio has also created a new capacity for partnership and innovation, both among its members and with stakeholders in the private and public sectors. This capacity can be exploited in every region of the country, since the Industry Portfolio provides programs and services to businesses and consumers with about 15,000 staff, over 500 points of service in every province and territory, and numerous sites in cyberspace.

As Minister responsible for the Industry Portfolio, I have directed the Portfolio members to actively seek opportunities to exploit the synergies available to them as members of a team of organizations with similar objectives and complementary programs. This continuing emphasis on improving collaboration and partnership has helped to ensure that limited resources are focused more effectively on the priority areas identified for the Portfolio: promoting S&T, encouraging trade and investment, and helping small and medium-sized enterprises (SMEs) to grow. Working in partnership in these areas has enabled the Portfolio to make a significant contribution to meeting government objectives.

Of the 13 members of the Portfolio, all except the two crown corporations (the Business Development Bank of Canada and the Standards Council of Canada) are required to provide annual Performance Reports. Reporting on performance is an important element of program management in the Portfolio. Identifying concrete objectives for programs and services, and measuring and reporting on progress over time, provides an accountability framework that enables Portfolio members to assess their effectiveness. As the 11 individual Performance Reports demonstrate, the Portfolio members have solid results to report for 1996-97.

Taken together, these reports provide a comprehensive picture of the Industry Portfolio's performance. I would particularly like to highlight the following key Portfolio achievements:

- { the 29 very successful SME Conferences and InfoFairs held across the country, attended by almost 51,000 Canadians;
- { the publication of *Your Guide to Government of Canada Services and Support for Small Business 1996-1997*, a compendium of all the services and support available to small businesses from the federal government (over 250,000 copies in circulation);
- { the strengthening of the Regional Trade Networks and Regional Trade Plans, which bring federal and provincial governments and the private sector together at the regional level to generate new international opportunities for local businesses;
- { the coordinated approach to S&T across the Portfolio as reflected in the Portfolio S&T Action Plan—the Portfolio members have taken action on 45 of its 49 initiatives;
- { the S&T Forum, which brought together, for the first time, the members of all the boards and councils providing expert advice to the Portfolio departments and agencies; and
- { innovative approaches to service delivery building heavily on partnerships, such as the Canada Business Service Centres.

Natural Sciences and Engineering Research Counciling (NSERC) highlights over this period include: support to advances in science and engineering, creating new knowledge that will improve the lives of all Canadians; support to training of highly qualified people, providing Canada's talented youth with a better chance for a fulfilling career; and provision of access to international technologies, knowledge and expertise. NSERC has strengthened Canada's businesses and encouraged industry to invest in research and development, technology and innovation for the benefit of all Canadians.

Over the coming year, the Industry Portfolio will continue to build on its synergies and to improve the services and support provided to its wide array of clients.

The Honourable John Manley

Section II: Overview

1. What is NSERC?

NSERC - the **Natural Sciences and Engineering Research Council** - is Canada's leading agency making strategic investments in our capabilities in science and technology. In practical terms, NSERC is an arm's-length agency of the federal government, funded directly by Parliament and reporting to it through the Minister of Industry. NSERC was created in 1978 by an Act of Parliament, and given a mandate to "... *promote and assist research in the natural sciences and engineering, other than the health sciences; and advise the Minister in respect of such matters relating to such research as the Minister may refer to the Council for its consideration.*"

In January 1994, the Council adopted the following mission statement: "*The Natural Sciences and Engineering Research Council fosters the discovery and application of knowledge through the support of university research and the training of scientists and engineers. The Council promotes the use of this knowledge to build a strong national economy and improve the quality of life of all Canadians. NSERC fulfils its mission by awarding grants and scholarships through a competitive process and by building partnerships among universities, governments, and the private sector.*"

NSERC is governed by a Council (a Board of Directors) whose members are drawn from industry and the universities, as well as from the private non-profit sector, and appointed by the Governor-in-Council. Members are part-time, and receive no remuneration for their participation. The President is full-time, and functions as the Chair of the Board and the Chief Executive Officer of the Council. Section IV.A shows Council's committee structure, and the organisation of its staff.

As one of the arm's-length agencies reporting to Parliament through the Minister of Industry, NSERC is a part of the Industry Portfolio. The federal science and technology strategy, *Science and Technology for the New Century*, commits the federal government to three related goals for building a dynamic Canadian innovation system: sustainable job creation and economic growth; improved quality of life; and advancement of knowledge. NSERC is committed to these goals and to working towards them within the coherent strategy of the Industry Portfolio's *Action Plan*.

NSERC focuses on the university sector. Universities play a vital role both in the creation of new knowledge and in putting this new knowledge to productive use, as well as in providing young people with the skills to contribute to these essential activities. It should be noted that only researchers at Canadian universities are eligible to receive NSERC funding; researchers in government, in the private sector, and abroad do not receive direct support from the Council.

Canada can take pride in the accomplishments of its research scientists and engineers. Research and research training in Canada, funded through NSERC, leads to many benefits: research results lead to new or improved products and processes; highly qualified young people, educated through research, know how to use knowledge productively; companies are established to take advantage of these advances, thus creating jobs and adding to Canada's prosperity, while more mature companies use these advances to compete in the global market; and technological and scientific competence is bolstered, assuring Canada's competitiveness.

Communication - with the research community and with the public - is a priority. The Council is taking steps to encourage NSERC-funded researchers to make their results and activities widely known in a way that the public will understand. Among other initiatives, NSERC's World Wide Web site (<http://www.nserc.ca>) contains a guide for researchers who wish to become involved in communicating with the public. In addition, in 1996-97, the Council instituted a requirement that researchers submit brief "plain language" summaries of the research for which they are applying for funding; summaries of research approved for support will be posted on the web site. Success stories arising from NSERC-supported research are also available on-line.

2. Activities and Subactivities

During the period covered by this *Performance Report*, NSERC was organised around two Activities, ***Grants and Scholarships***, and ***Administration***. The Grants and Scholarships activity supports three subactivities:

- { basic research, supported by grants to university researchers;
- { project research, supported through inter-sectoral partnerships; and
- { the advanced training of scientists and engineers, supported both directly by scholarships and fellowships, and indirectly through grants to professors.

These subactivities provide strong support to the government's goals of advancing knowledge and creating jobs and growth in Canada.

The Administration activity provides management and administrative support to the Grants and Scholarships Activity, supporting all operations of Council and its committees, and the administration of grants, scholarships, and fellowships; it includes the Human Resources, Finance, Administration, and Information Management and Systems functions.

For a more detailed description of NSERC's activities and subactivities, please see NSERC's *Part III of the Main Estimates* for 1996-97 and 1997-1998.

3. NSERC's Programming and Funding

NSERC's programming is developed in consultation with the Canadian research community, in the context of the challenges facing the Canadian university research system, now and in the future, and in light of Canada's needs and government policy, including the S&T Strategy and the Industry Portfolio Science and Technology Action Plan. NSERC funding is awarded through a rigorous process of peer review, a process that can be usefully compared to stringent quality control (a more detailed description of the peer review process can be found in NSERC's *Part III of the Main Estimates for 1997-1998*.) The peer review system ensures that funds go only to the best researchers and students, and the best research programs and projects. NSERC's involvement guarantees objective and fair review of applications for support; the Council's staff are expert in administering the process of peer review of applications for grants and scholarships.

Information regarding specific NSERC programs, as well as eligibility guidelines and other regulations, can be found on our Web site.

Section III: Performance

NSERC's business is the support of university-based research in the natural and physical sciences (that is, all science except the medical and social sciences, which are supported by the Medical Research Council and the Social Sciences and Humanities Research Council respectively), and in engineering. NSERC's performance measurement effort is focused on evaluating the **programs** of research and training support, not the actual research that is funded. The research itself is evaluated rigorously through peer review when an application for new funding is received, as well as through project reviews in the case of project research. Council evaluates its programming to ensure that it is meeting its objectives, and that these objectives continue to be relevant to Canada's needs and those of Canada's university researchers.

A detailed discussion of issues surrounding the performance measurement of university research support programs can be found in NSERC's *Part III of the Main Estimates for 1997-1998*.

1. Performance Expectations

Figure 1: NSERC's Operational Plan, 1990-91 to 1999-2000¹

NSERC Expenditures (millions of dollars)										
	1990-1991	1991-1992	1992-1993	1993-1994	1994-1995	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000
Research Grants Programs	252.9	264.6	271.3	267.9	277.2	263.1	256.6	248.0	241.6	243.1
Research Partnerships	120.7	120	124.8	121	116.2	119.1	114.4	110.1	94.4	87.7
Training	64.9	70.9	76.4	78.1	73	67.6	60	57.9	56.1	55.4
General Support	10.4	10.3	10.1	9.7	8.6	2	1.7	1.2	1.2	1.2
GRANTS AND SCHOLARSHIPS	448.8	465.8	482.7	476.7	475	451.9	432.7	417.2	393.3	387.4
ADMINISTRATION	17.4	16.3	16.6	18.1	17.6	17	16.9	16.7	16	16.2
TOTAL EXPENDITURES	466.2	482.1	499.2	494.9	492.6	468.9	449.6	433.9	409.4	403.6

¹ Planned expenditures

Figure 2: Authorities for 1996-1997, Part II of the Estimates:
Financial Requirements by Authority (\$ millions)

	1996-1997 Total Authorities	1996-1997 Actual
FTEs¹	183	190
Vote 95 -- Operating Expenditures	15.6	15.6
Vote 100 -- Grants	432.7	434.7
Statutory	1.3	1.3
Total Agency	449.6	451.6

¹ The difference in FTEs between Planned and Actual 1996-97 is due to an under-estimate of FTEs required for 1996-97.

Figure 3: Departmental Planned versus Actual Spending by Activity
(\$ millions)

Activity	Actual 1993-1994	Actual 1994-1995	Actual 1995-1996	Total Planned 1996-1997	Actual 1996-1997
Grants and Scholarships	476.7	475	451.9	432.7	434.7
Administration	18.1	17.6	17	16.9	16.9
Total	494.8	492.6	468.9	449.6	451.6

Explanation of Change, 1996-1997 Actual versus Planned: the difference in Grants and Scholarships expenditures is due mainly to the program of Networks of Centres of Excellence (Phase II).

Summary of Performance Expectations

The following table summarises NSERC's goals, and the indicators that it intends to use to demonstrate achievements.

A: Significant Canadian discoveries in natural science and engineering, and knowledge transfer from universities to other sectors	
<p>An advanced knowledge base which is vital as a source of economic and societal benefits for Canada, in the short and long term</p> <p>-----</p> <p>Creative and productive use of knowledge for new products and services, leading to new jobs and businesses.</p> <p>-----</p> <p>Application of knowledge leading to new policies, standards and/or regulations.</p>	<p>High quality research results, as assessed by internationally-accepted standards, contributed to the global pool of scientific and technological knowledge.</p> <p>National and international prestigious awards and honours gained by university researchers in recognition of excellence in their fields of expertise.</p> <p>-----</p> <p>Trends in the numbers of collaborative partnerships supported by NSERC, between the university and private/public sector.</p> <p>Economic impact (or potential impact) of NSERC-supported research (as indicated by e.g. new products, processes, start-up companies and impact on existing businesses).</p> <p>-----</p> <p>Incidence and impact of contributions of researchers and/or their research results to the formulation of public policies, regulations and standards.</p>
B: Strong human resources trained through research in the natural sciences and engineering	
<p>Contribution to the provision of a highly skilled workforce, with a base of expertise across the fields of natural sciences and engineering, so that Canada can compete on the global scene.</p>	<p>Investment in undergraduate awards, postgraduate scholarships and postdoctoral fellowships from NSERC funds, for research studies: trends in numbers, type of award, level of study, stipends, fields of study.</p> <p>Trends in employment and career status of former scholars and fellows; subsequent hiring of students trained on partnered research projects, by the partner organisations; hiring of former Industrial Research Fellows by private sector organisations.</p> <p>Supply-demand studies on Highly Qualified Personnel for the purposes of reallocation of funds for research and training purposes.</p>

2. Performance Accomplishments

In assessing NSERC's performance, the environment in which the Council operates should be taken into consideration. Important changes have taken place in the university research system since NSERC was established in 1978. Among these changes are:

- { Some Canadian companies have become dependent on university basic research for their stock of new ideas for the long term.
- { NSERC has become almost the only source of support in Canada for basic research in the natural sciences and engineering, and the principal source of public support for the research partnerships between the universities and the private sector.
- { The cost of doing research has increased in many areas.
- { University infrastructure support has decreased, pushing many costs formerly covered by universities onto research grants from the councils.
- { The government of Canada has created the Canada Foundation for Innovation (CFI) to trigger the renewal of research infrastructure in the universities and research hospitals.
- { Research undertaken in co-operation with industry has increased.
- { There has been a trend towards larger research teams, who tend to deal with large, multi-disciplinary problems.
- { International co-operation among researchers has increased substantially.

Although these changes are for the most part outside NSERC's control, they have a strong impact on university research, and on the demand for NSERC funding. At present NSERC's budget (Figure 4) is strained to the limit (for example, NSERC can no longer meet the demand in its university-industry partnerships programs), and with it the Council's ability to meet its objectives. While it is certain that Canada's policies and programs for university research are working -- Canadian researchers are recognised as excellent, at home and abroad, Canadian researchers and industry work together effectively, and industry and government recognise the importance of university research -- without additional resources for this excellent effort, Canada and Canada's R&D efforts will fall behind their foreign counterparts. Charts illustrating some of these effects are given in Section IV.B of this report.

Figure 4a: NSERC's Budget²

² Includes administration and the Networks of Centres of Excellence program

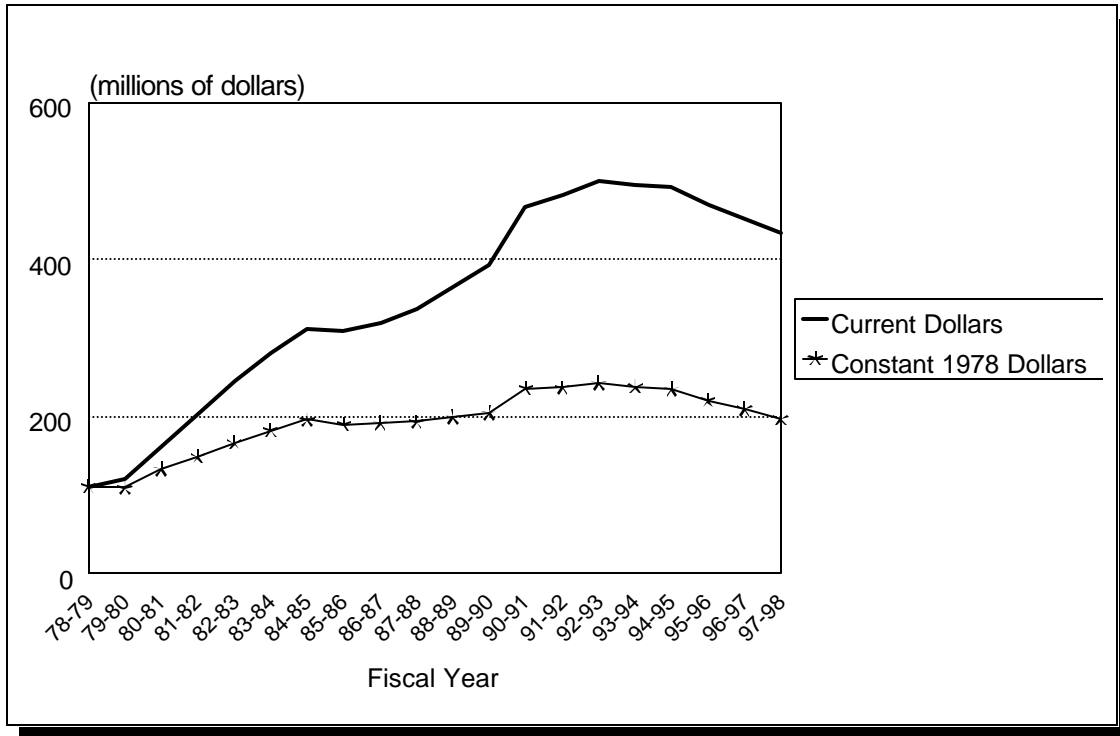


Figure 4b: Comparison of Total Planned Spending to Actual Expenditures 1996-97 by Business Line

Business Line	FTEs	Operating ¹	Capital	Voted Grants and Contributions	Subtotal: Gross Voted Expenditures	Statutory Grants and Contributions	Total Gross Expenditures	Less: Revenue Credited to the Vote	Total Net Expenditures
NSERC	183	16.9	--	432.7	449.6	--	449.6	--	449.6
	190	16.9	--	434.7	451.6	--	451.6	--	451.6
Totals	183	16.9	--	432.7	449.6	--	449.6	--	449.6
	190	16.9	--	434.7	451.6	--	451.6	--	451.6

¹ Operating includes contributions to employee benefit plans and ministers' allowances

Other Revenues and Expenditures	Total Net Expenditures
Revenue credited to the Consolidated Revenue Fund	0.06
	0.11
Cost of services provided by other departments	1.73
	1.73
Net Cost of the Program	451.3
	453.3

Note: Shaded numbers denote actual expenditures/revenues in 1996-97. Due to rounding, figures may not add to totals shown.

Objectives and Strategies

The Council's overall objective is to enhance Canada's ability to succeed in the increasingly technology-oriented global economy through research and scholarship in the natural sciences and engineering.

Council achieves this objective through three mechanisms (subactivities), underpinned by the Council's Administration activity. These subactivities are discussed below.

a. Basic Research

The primary objective of NSERC's basic research subactivity is the promotion of significant Canadian discoveries in important areas of the natural sciences and engineering. NSERC invests across the entire spectrum of natural science and engineering research. This broad investment, and its long-term payoffs, present significant challenges in performance measurement and program evaluation. The benefits of basic research are often realised in the longer term, often years or decades after the original research was performed, and the links between research and the products of its eventual application can be complex.

A report dealing with performance indicators for the Research Grants program, NSERC's principal program supporting basic research, was presented to Council in June 1997. Figure 5 outlines the indicators, and the recommendations presented to Council; the report itself is available from NSERC on request.

Figure 5: Performance Indicators Recommended for the Research Grants Program³

Program Objectives:	Impacts and Outcomes of the Program:
Excellence (of research)	Leverage of funds from other sources
Diversified Base (of high quality research capability)	Technological and economic impact
Research Training Environment	Societal impact
<i>The report recommends that Council adopt the following set of performance indicators for the Research Grants program, for use in monitoring the Research Grants program:</i>	
To measure:	Indicators:
Excellence	Publications, number and impact Patents, Awards and prizes Membership on editorial boards of journals Grant size and its distribution
Diversified base	Distribution of funds among disciplines Age profile of the funded population Length of time grantees remain in the system
Research training environment	Contribution to training of highly qualified personnel (numbers supervised by grantee, career status of former students) Expenditures on stipends
Leverage of funds from other sources	Funds levered directly by Research Grants
Technological and economic impact	Patents, Start-up companies
Societal impact	Membership on boards of professional societies

The report also recommended that Council:

- { take appropriate steps to extend bibliometric analysis to the research output of the program, as the number of publications and their impact represent a critical performance indicator for the Research Grants program.
- { re-examine the wording of the objectives of the Research Grants program with a view to clarifying them.

Council has postponed a decision on these two recommendations until their implications are understood more fully.

³ The derived performance indicators are presented in terms of the six *performance areas* with which they are primarily associated. These areas fall into two categories, the first relating directly to the stated program objectives and the second encompasses impacts and outcomes of the Research Grants Program.

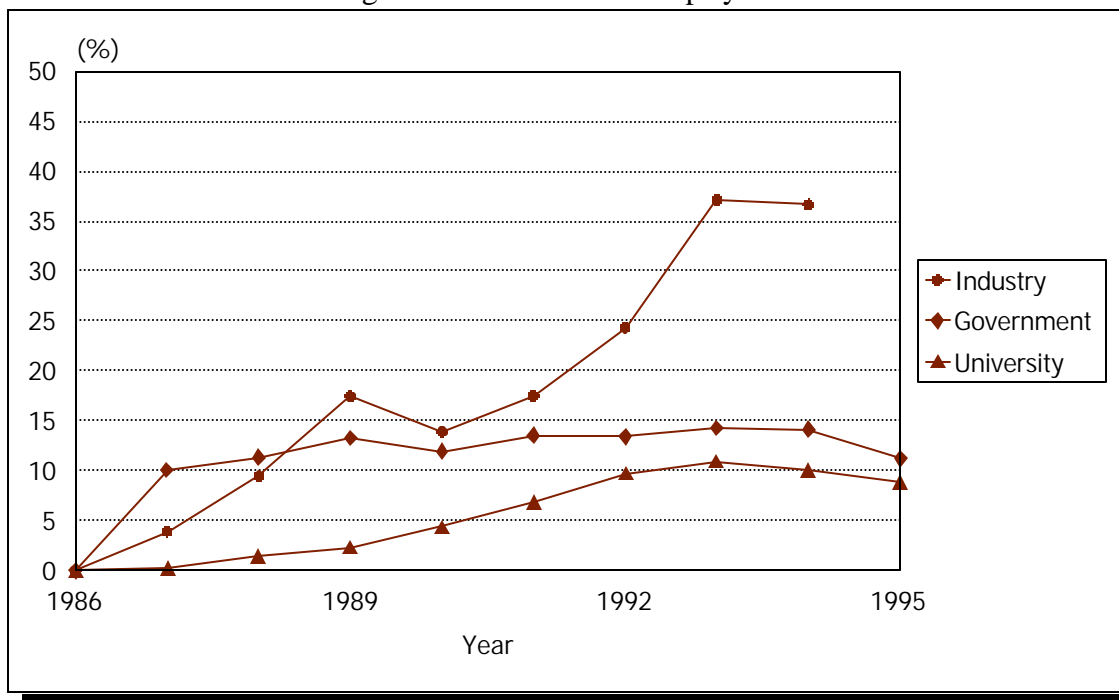
b. Project Research

The aim of project research is to solve problems which require new knowledge for their solution, particularly but not exclusively in the private sector. The desired outcome is the productive use of new knowledge in the economy and in society. NSERC is preparing a Performance Framework for the Research Partnerships program which will permit the Council to monitor its performance in project research. This framework will be discussed in future planning and performance documents.

c. Training

Measuring NSERC's performance in the training of highly qualified personnel is perhaps the most straightforward of the evaluation challenges facing the Council. The outputs - numbers of people with advanced knowledge and technical skills - are easily measured, and their impact on the economy and on society is both short and long term. Figure 6 illustrates demand trends for highly qualified personnel in the public, private, and university sectors.

Figure 6: Trends in R&D Employment⁴



⁴ Normalised to 1986

One important measure that the Council uses is the "employability" of those with advanced degrees. To this end, a survey of former holders of the Council's postgraduate scholarships is conducted annually. NSERC has completed surveys for three years of former Postgraduate Scholarship winners. The objectives of the surveys were:

- { to determine the career progression of scholarship winners; and
- { to gauge the importance students placed on NSERC funding.

The career status of former scholars and the importance that they attach to NSERC funding to undertake or continue with their studies, indicate that the postgraduate scholarships programs are achieving their goals. Surveys are planned to continue on an annual basis for the foreseeable future.

NSERC surveyed those who received first-year Postgraduate Scholarships in 1985, 1986 and 1987, as well as all those who received 1967 Science and Engineering Scholarships in 1985, and all those receiving new 1967 Science and Engineering Scholarships in 1986 and 1987. The major findings of the first three surveys can be summarised as follows; the detailed survey is available from NSERC.

- { The unemployment rate for respondents is very low, estimated to be between 1.9% and 2.4%.
- { 77% of the respondents (employed or self-employed individuals in a full-time position in Canada) have an annual salary greater than \$45,000.
- { 72.2% of respondents feel that their graduate training was "critical" to their careers.
- { 135 respondents (17% of the total) were living outside the country at the time of the survey. One-half of these respondents intend to return to Canada.
- { 96% of the respondents completed the degree (master's or doctorate) for which they received NSERC funding.
- { 90.5% of the respondents said that NSERC funding was at least moderately important in their decision to undertake or continue their studies.
- { Just under half (47%) of the respondents added remarks to the Comments section of the questionnaire. Most were "positive" -- expressing gratitude for the scholarship, and appreciation of NSERC.

d. Administration

NSERC is also addressing performance issues in its Administration activity, including quality service initiatives and possible ISO 9000 certification. The goal of the Administration activity is to support and underpin the Council's function; performance issues therefore revolve around

efficiency and quality service to both Council's staff and the research community. Performance in Administration will be discussed in future Performance Reports, after performance baselines have been established.

4. Key Reviews

Networks of Centres of Excellence

NSERC, as one of the three granting councils participating in the NCE program, assisted in this evaluation, which was led by the Social Sciences and Humanities Research Council.

The evaluation showed that the NCE program is very successful in reaching its objectives, and is likely to lead to substantial social, environmental, health and economic benefits to Canadians. The scientific returns also promise to be significant. Overall, the goals and objectives of the program are appropriate as well as its general administrative and management mechanisms. However, the study also found that the networks' grant periods were too short to ensure adequate technology transfer. As well, uncertainty about the future of the program resulted in some reluctance on the part of potential university and industry partners and researchers to participate in the networks.

These issues have been addressed: the program was made permanent in the February 1997 budget, and the grant duration for networks has been extended to seven years, with a review at the mid-point to assess progress.

Section IV: Supplementary Information

A. Council Structure

Figure 7: Council Organisation

(Note: Corporate Administrative Services are shared with SSHRC)

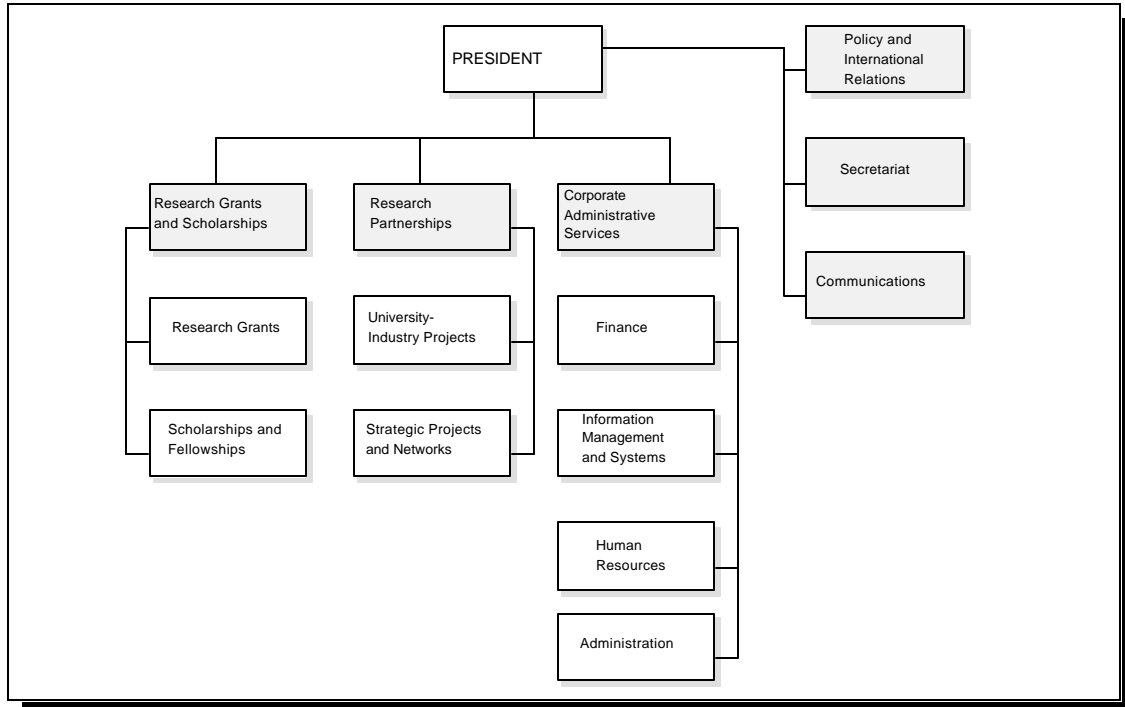
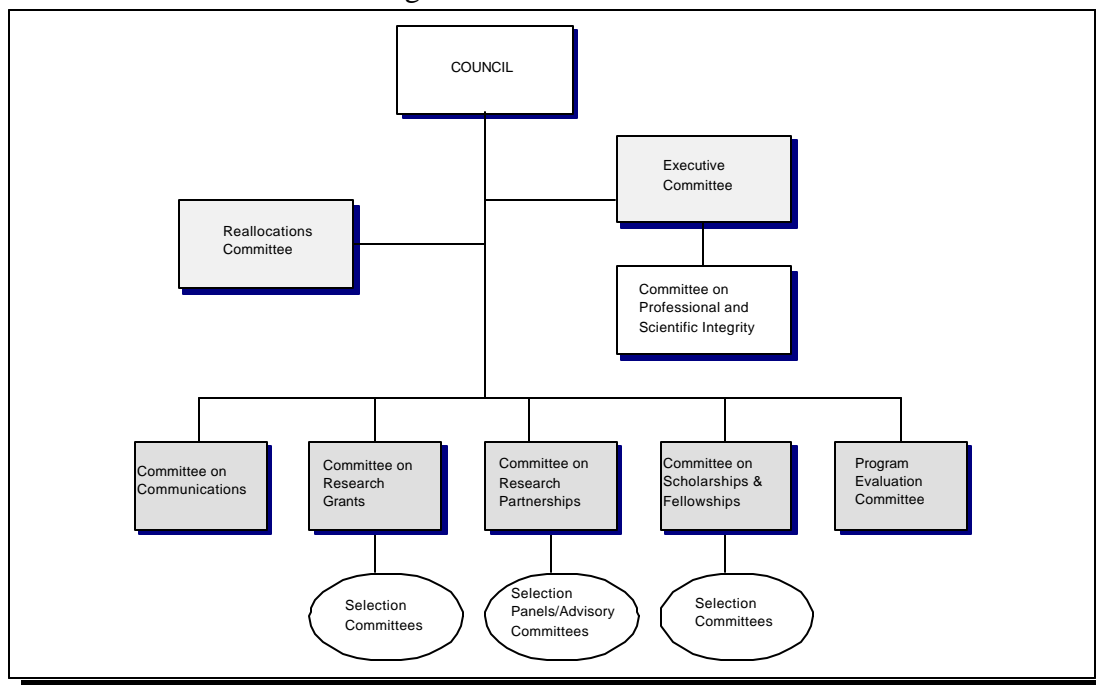


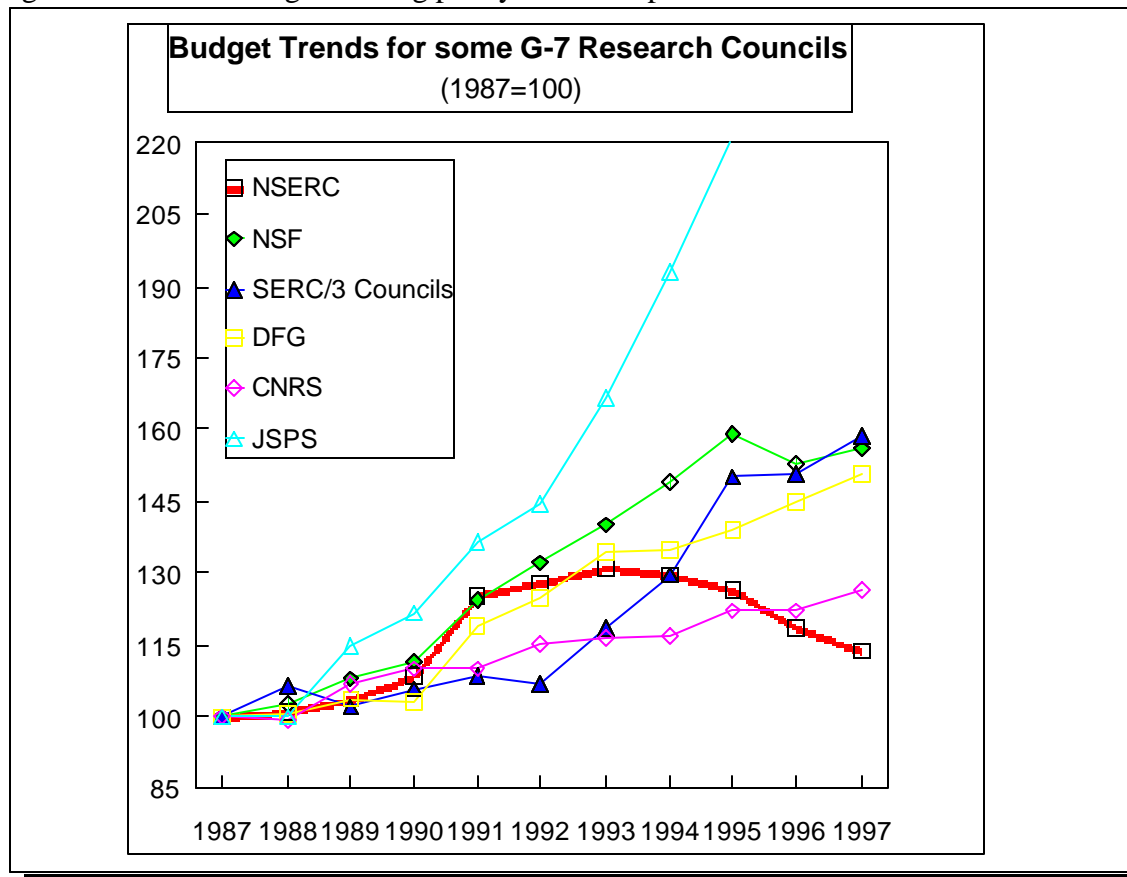
Figure 8: Council Committees



B. Trends in the University Research Environment

1. International Trends

Figure 9: NSERC's budget is faring poorly when compared to other G-7 research councils



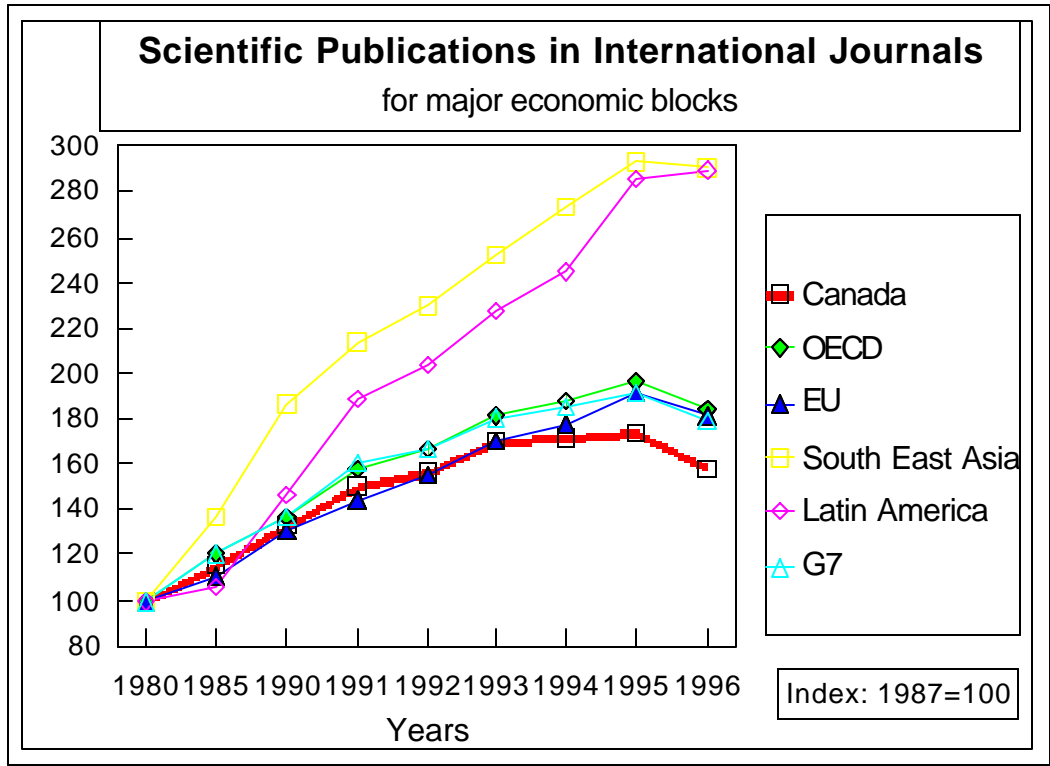
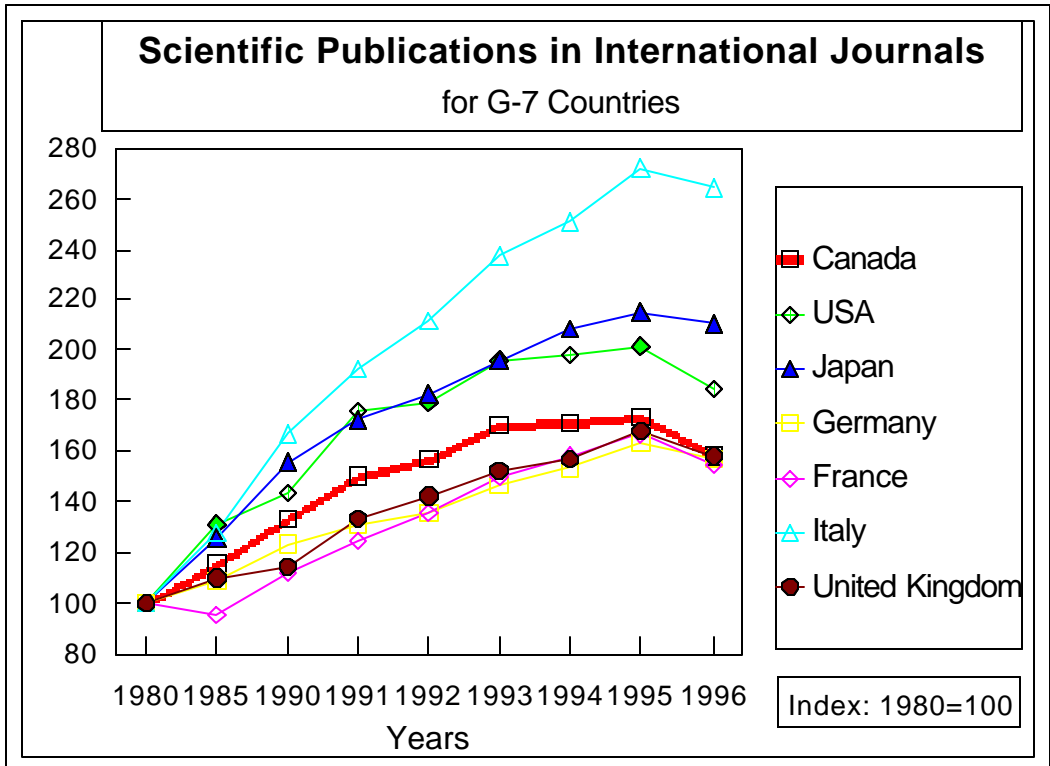
Index estimated from agencies' budgets in constant value terms
 NSF (US); SERC/3 councils (UK); DFG (Germany); CNRS (France); JSPS (Japan)

Figure 10: Canada's world share of scientific publications is declining.

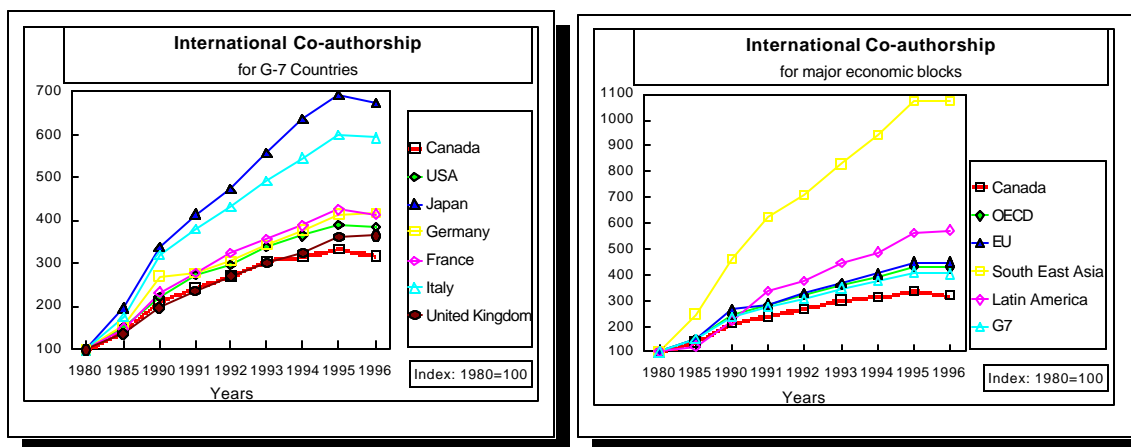
World share of scientific publications	1980	1985	1990	1991	1992	1993	1994	1995	1996
Canada	4.60%	4.42%	4.43%	4.35%	4.37%	4.37%	4.25%	4.14%	4.04%
USA	32.60%	35.30%	33.90%	36.26%	35.43%	35.79%	34.88%	33.91%	33.53%
Japan	6.92%	7.17%	7.81%	7.54%	7.66%	7.60%	7.80%	7.73%	8.07%
Germany	8.05%	7.22%	7.14%	6.65%	6.62%	6.63%	6.67%	6.86%	7.00%
United Kingdom	9.02%	8.17%	7.40%	7.56%	7.75%	7.68%	7.68%	7.88%	7.89%
France	6.16%	4.90%	4.97%	4.85%	5.09%	5.17%	5.27%	5.33%	5.30%
South East Asia *	7%	8%	10%	10%	10%	10%	11%	11%	12%

South East Asia: China, Indonesia, Japan, Malaysia, Singapore, South Korea, Taiwan, Thailand.

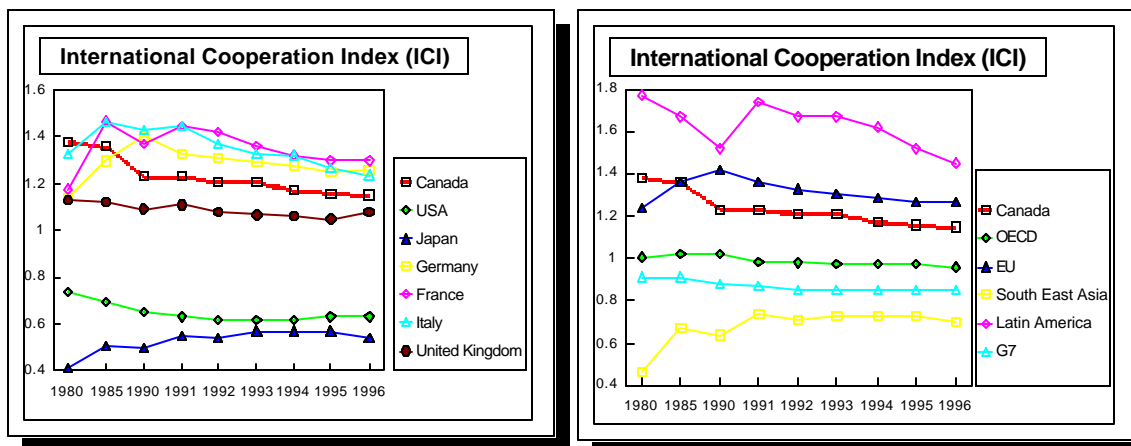
Figures 11 & 12: Canada's scientific output is declining relative its major competitors, as measured by publications in international journals.



Figures 13 & 14: Canada is losing ground against major competitors with respect to international cooperation, as measured by international co-authored papers.



Figures 15 & 16: Canada's level of international research cooperation, although still above the world average, is declining.



An international cooperation index⁵ of 1.4 in 1980 means that Canada's participation in international scientific exchanges, as measured by bibliometric indicators, was 40% higher than its relative expected contribution, taking into account its real weight in world-wide scientific production. This index had declined to 1.2 by 1996.

⁵ ICI: Canada's world share of internationally co-authored publications/ Canada's world share of publications

2. Domestic Trends

Figure 17: Employment in the Natural Sciences and Engineering⁶

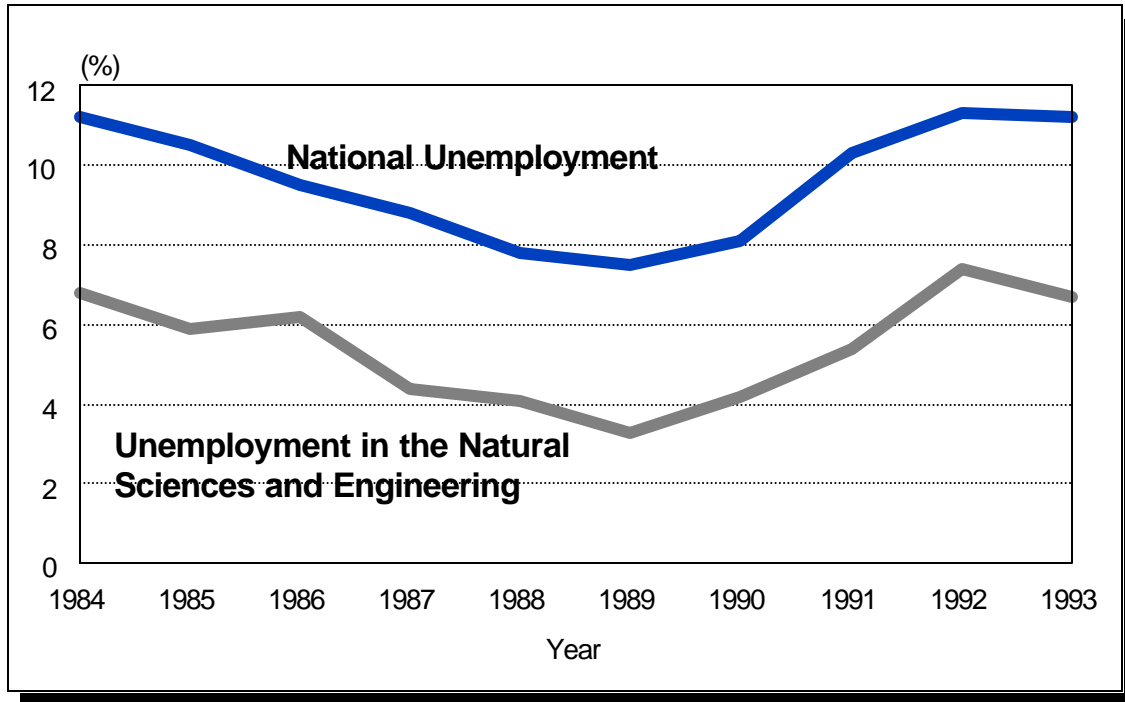
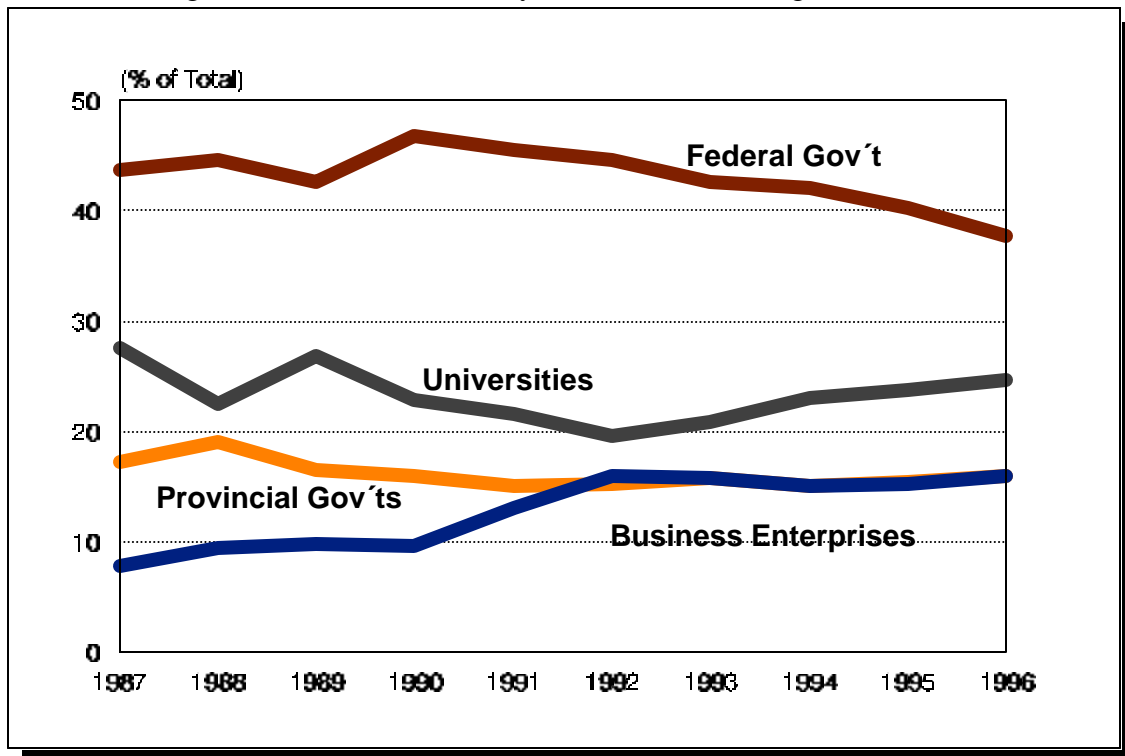


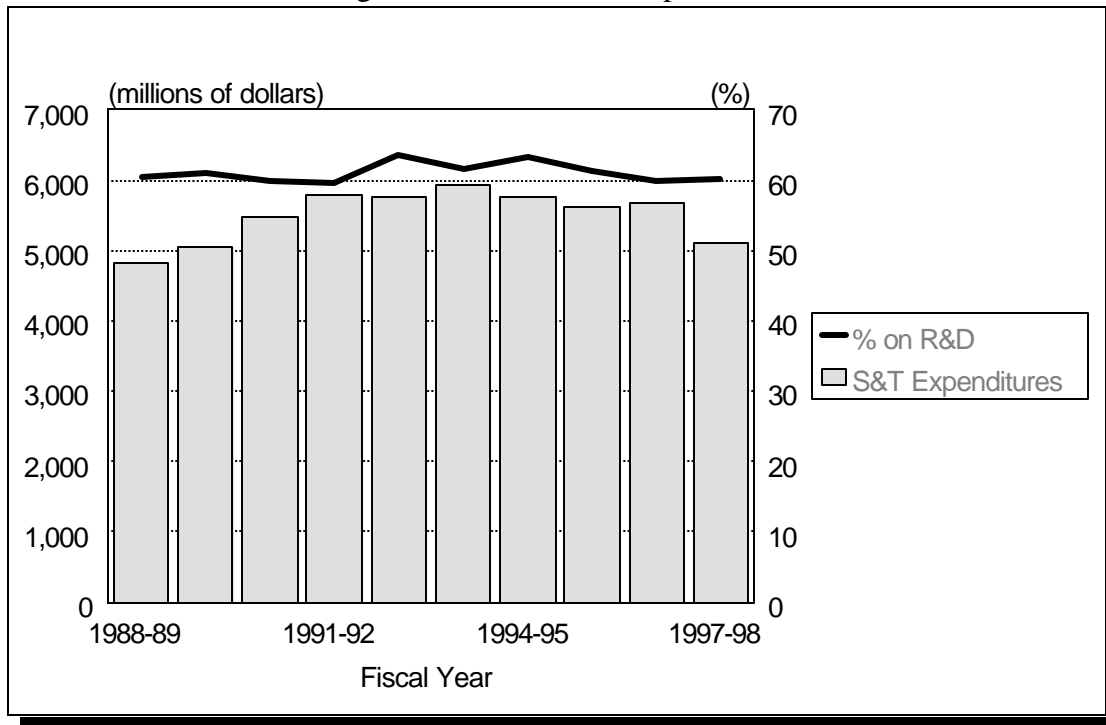
Figure 18: Canadian University R&D (NSE) Funding, 1987 - 1996⁷



⁶ Source: Statistics Canada

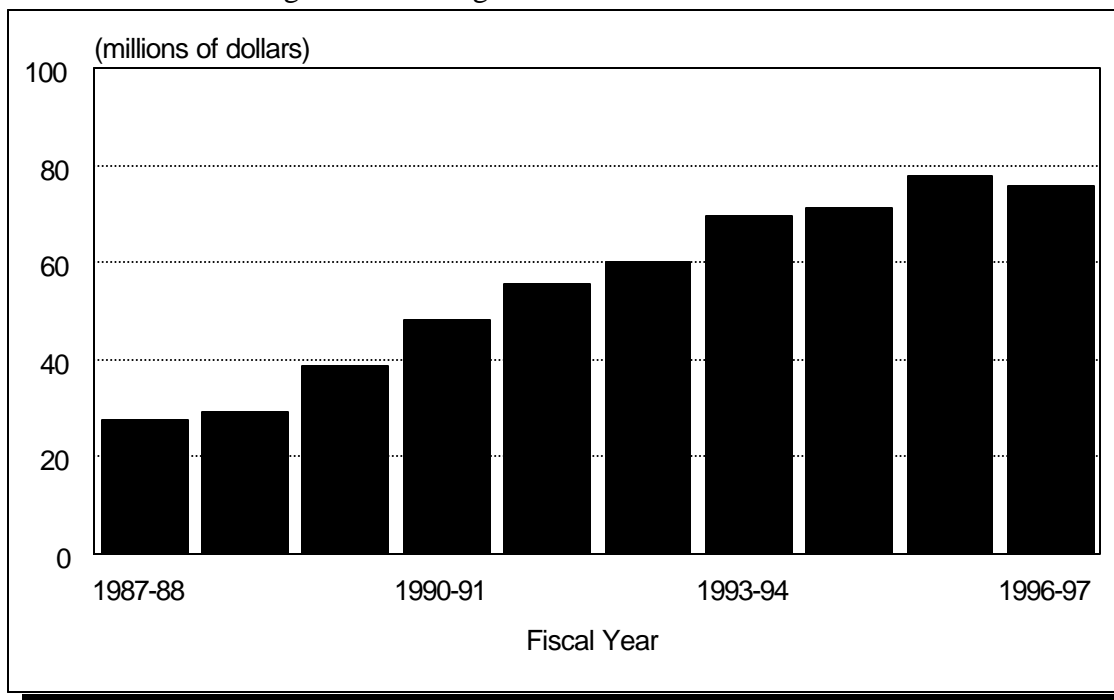
⁷ Source: Statistics Canada

Figure 19: Federal S&T Expenditures⁸



3. Partnership Trends

Figure 20: Funding Levered from NSERC Partners⁹



⁸ Source: Statistics Canada

⁹ Includes University-Industry, University -Government, USRA, IRF, and IPGS programs

Figure 21: Leverage Ratio for NSERC Program Funding¹⁰

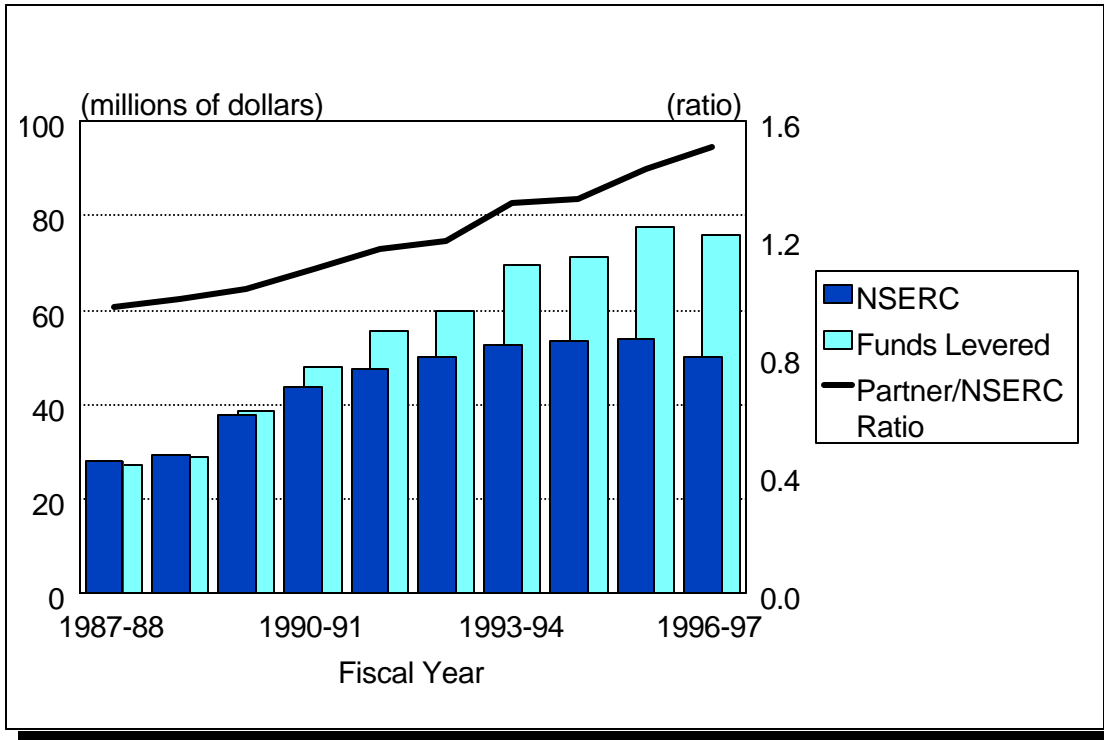
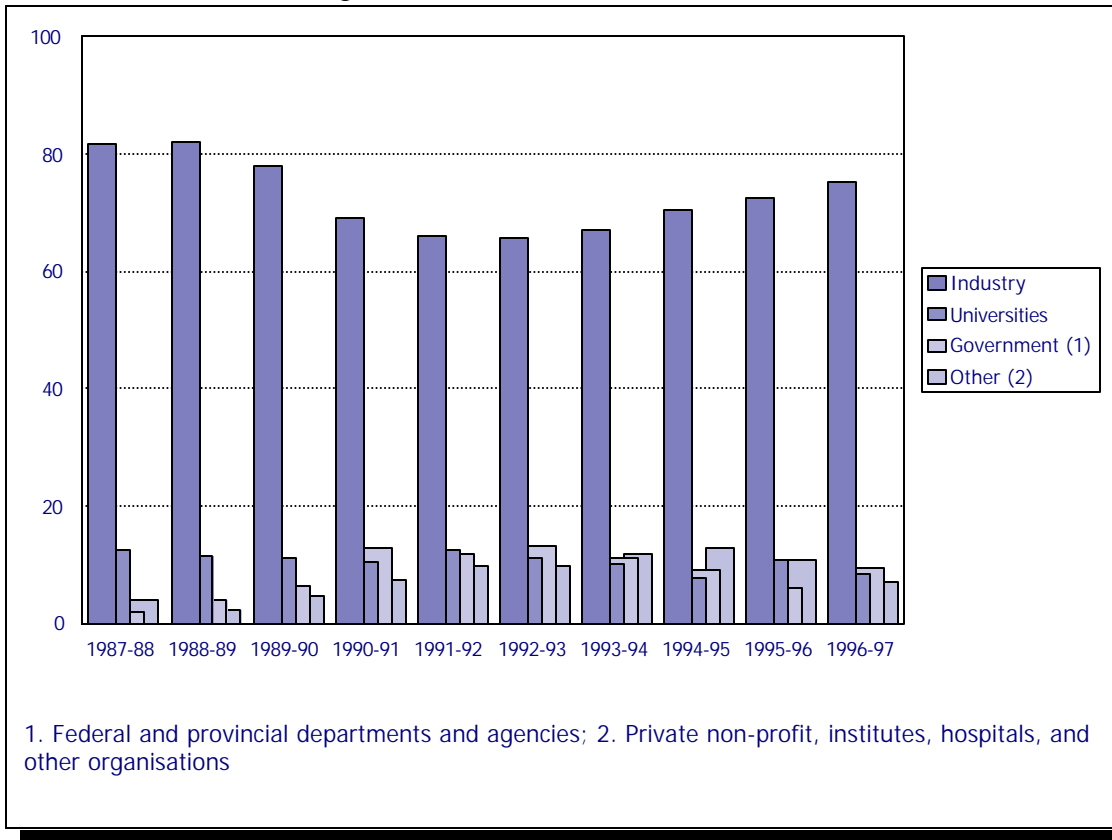


Figure 22: Source of Partner Contributions



¹⁰ Includes University-Industry, University-Government, USRA, IRF, and IPGS programs

C. Supplementary Financial Information

Figure 23: Revenue to the Consolidated Revenue Fund (\$ thousands)

	Actual 1993-1994	Actual 1994-1995	Actual 1995-1996	Planned 1996-1997	Actual 1996-1997
Natural Sciences and Engineering Research Council	60	161	395	60	105

Explanation of Change: The difference between the Planned and Actual revenue to the CRF for 1996-1997 is due to greater than anticipated repayment of grants and scholarships terminated for a variety of reasons, and proceeds from the disposal of surplus Crown Assets.

D. Statutes Administered by NSERC

NSERC does not administer any legislation.

NSERC was created by the *Natural Sciences and Engineering Research Council Act* 1976-77, c. 24, s. 24.

E. References

Part III of the Main Estimates, NSERC, 1996-97

Part III of the Main Estimates, NSERC, 1997-98

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