



Backgrounder

The State of Science & Technology in Canada

COUNCIL OF CANADIAN ACADEMIES

To address issues such as the control of infectious diseases, climate change, and the new possibilities opened up by genome science, governments should have access to credible, independent assessments of the underlying science.

In the late 1990s, the Royal Society of Canada, the Canadian Academy of Engineering and the Canadian Institute of Academic Medicine jointly initiated efforts to create a new national organization with a mandate to conduct such assessments and report the results to the public.

Their efforts led to a proposal to create the Canadian Academies of Science (CAS). Discussions with representatives of the three originally initiating academies, as well as with other interested parties, culminated in a \$30 million founding grant from the Government of Canada announced in the February 2005 budget. The grant is to sustain the basic operation of the organization for 10 years, through 2015.

The CAS appointed its inaugural president in February 2006, and in March 2006 the Board of Governors agreed to change the name of the organization from the Canadian Academies of Science to the Council of Canadian Academies, to better reflect its role to oversee science-based assessments rather than the traditional academy function of honouring exceptional achievement in various fields.

The Council of Canadian Academies is a not-for-profit organisation registered under the *Canada Corporations Act*. The primary objective of the Council is to provide for Canada an independent and authoritative way to build public confidence that policy and regulatory decisions are based on the best available scientific knowledge. The Council will also provide a focal point for dealing with academies from around the world regarding scientific assessments and other related matters.

The Council addresses the broad spectrum of knowledge – encompassing the natural, social and health sciences, engineering, and the humanities.

Its primary activity is to manage the conduct of assessments of the science that is relevant to matters of public importance, via independent expert panels. Assessments will be undertaken initially in response to requests from the Government of Canada, and eventually upon request from provincial governments, foundations, NGOs and the commercial sector. Once a proposal for a study is conveyed to the Council, it is reviewed by a Scientific Advisory Committee appointed by the Council, and then referred to the Council's Board of Governors for final approval.

The Council establishes panels of independent experts – primarily from the academic sector – to undertake assessments. Membership on the panels include both Canadian and international experts. The Council pays the costs of carrying out an assessment, but panel members serve *pro bono* – i.e. without fee. Expert panel assessments undergo formal peer review to ensure quality and objectivity. The sponsor of an assessment – whether the federal government or otherwise – does not participate in the conduct of an assessment, thus ensuring the complete independence of the process. Final reports will be disseminated to the public.

The Council provides Canada with a standing capability to deal with the science aspects of complex issues. This will complement the role of existing advisory bodies to the Government of Canada, such as the Prime Minister's Advisory Council on Science and Technology and the Council of Science and Technology Advisors. These bodies provide explicit policy recommendations to government on a variety of S&T-related matters.

The Council is governed by a 12-member Board, a majority of whom are appointed directly or indirectly by the Canadian Academy of Health Sciences, Canadian Academy of Engineering, and RSC: The Academies of Arts, Humanities and Sciences of Canada.

INAUGURAL REPORT – THE STATE OF SCIENCE & TECHNOLOGY IN CANADA

The first report of the Council of Canadian Academies is entitled *The State of Science & Technology in Canada*, and responds to a request from the federal Minister of Industry in the context of the government's consideration of S&T policy. Specifically, the Council was asked to investigate and report on:

- The scientific disciplines in which Canada excels in a global context
- The technology applications where Canada excels in a global context
- The S&T infrastructure that currently provides Canada with unique advantages
- The scientific disciplines and technological applications that have the potential to emerge as areas of prominent strength for Canada and generate significant economic or social benefits.

To undertake the study, the Council's Board appointed the following 10-member expert Committee on the State of Science & Technology in Canada:

Elizabeth Dowdeswell, Chair
Special Advisor, Nuclear Waste Management Organization
Toronto, ON

Tom Brzustowski
RBC Financial Group Professor in the Commercialization of Innovation,
University of Ottawa
Ottawa, ON

David Dolphin
CEO, BC Innovation Council
Vancouver, BC

Don Drummond
Senior Vice President and Chief Economist, TD Bank Financial Group
Toronto, ON

Jean Gray
Professor of Medicine (Emeritus), Dalhousie University
Halifax, NS

Peter Grütter
Professor of Physics, McGill University
Montreal, QC

Richard Hawkins
Professor and Canada Research Chair (Tier 1) in Science,
Technology and Innovation Policy, University of Calgary
Calgary, AB

Susan A. McDaniel
Professor of Sociology, University of Windsor
Windsor, ON

Charles W. Wessner
Director, Technology, Innovation and Entrepreneurship, The National Academies
Washington, DC

Joseph D. Wright
Retired President and CEO, Pulp & Paper Research Institute (PAPRICAN)
Montreal, QC

As there is no single “best practice” for assessing a nation’s S&T strengths the committee chose four different approaches, or “lenses,” to evaluate the questions posed:

- **Opinion Survey:** A large-scale, online survey of the opinion of Canadian S&T experts. These informed opinions represent, collectively, a broad and integrated picture.
- **Metrics:** An analysis of bibliometric data (the quantity and quality of published research in scientific journals) and technometric data (patents granted). This gives a narrower, but more precise, internationally comparable perspective.
- **View from Abroad:** A summary of reports and comments obtained from foreign sources that complements the self-assessment of the opinion survey.
- **Literature:** A review of relevant publications, including internationally comparable indicators of important aspects of S&T strength at the national level.

Findings are based primarily on the first two of these lenses, and most extensively on the survey, the principal source of new insight in this study. In the time available, it was not possible to survey the many foreign scientists who collaborate with Canadian researchers, so formal collaboration agreements had to serve as a very limited proxy. It turned out that there was little published literature dealing with Canada’s comparative S&T strengths both comprehensively and in detail.

The target respondents for the online survey were senior people considered to be well informed on S&T in Canada, including those with both broad and highly specialized backgrounds. Access to the survey was distributed by the Council through a network of contacts in universities, governments, the private sector and in the Council’s member Academies. In total, 1,529 surveys were completed over a three-week period between July 17 and August 8, 2006. The survey was managed by EKOS Research Associates Inc.

The reported results of the survey are not the views or the interpretation of the committee or of the Council of Canadian Academies. They are the views of a significant fraction of Canada’s senior S&T community. The overall picture of S&T strengths portrayed by the survey results is remarkably consistent whether based on the responses of the university community; of those associated with business; or with government. The survey numbers speak for themselves and should be regarded as an amalgam of fact, informed judgment and aspiration.

The study also draws upon an extensive analysis of published research literature in a broad range of scientific fields to determine, based on international data, where Canadian researchers are publishing most intensively and in the most widely-cited journals. The study complements this bibliometric analysis with detailed data on Canadian patents granted over the past decade as one indicator of strength in technology development.

In some areas the views seen through the two main lenses – survey and bibliometrics – are not in complete accord. It will, therefore, be important for Canada’s S&T community to examine their particular disciplines, determine the reason for any such discrepancies, and take this into account in their strategic planning.

The State of Science & Technology in Canada seeks to identify Canada’s current S&T strengths, and the trend of those strengths – are we gaining or losing ground? – as compared with other economically advanced nations. The report does not make recommendations on S&T policy nor on the allocation of government support for S&T. Since the state of Canada’s S&T strengths and capabilities had not been comprehensively catalogued before – or at least not for many years – it was logical to begin with the stock-taking described in this report. The government, and Canadians, are now equipped with baseline information as context for S&T strategy and policy making.

For the complete report please visit the Council’s website at www.scienceadvice.ca.