Science Policy- Nuts and Bolts

CSPC workshop
November 20,
Paul Dufour, University of Ottawa- PaulicyWorks

50 years later

- We’ve been debating science policy in public for over 50 years now--- ever since the Glassco Commission said that " the failure to build on the basis of a cohesive program has not inhibited the spending of public money", the report offered some recommendations designed to strengthen the organization of science, including the establishment of a Science Secretariat within the Privy Council Office.

Who was Canada's first and only female science minister?

- Jeanne Benoit
- Jeanne Sauvé
- Roberta Bondar
- Julie Payette
- Avril Lavigne
- Ursula Franklin

1983– 30 years ago

- The Technology Policy for Canada statement had four broad objectives:

- 1) to strengthen the Canadian economy through creation, application and diffusion of state-of-the-art technologies;
- 2) to make Canadians aware of the opportunities and problems that might arise from the process of technological change;
- 3) to ensure that the benefits of technology development are shared equitably among all Canadians in every region;
- 4) to encourage a social climate that places a premium on scientific and technological excellence, curiosity and innovation

Was it just a front?

Continuous Partial Attention–Some Key Policy Reports

- Measures to Strengthen and Encourage Increase R&D in Canada–1978
- A Technology Policy for Canada–1983
- InnovAction: National S&T Policy –1987
- Inventing Our Future –Action Plan for Canada`s Prosperity–1991
- S&T for a New Century–1996
- Innovation Strategy –2002
- Federal S&T Strategy–2007
- Federal science, technology and innovation Strategy–2013

Careful with the fine china

- *``One thing that science does not react to well: constant tinkering by the state in program design, funding support and rules of the game guiding assistance to research. Institutional re-design of the governance of science is often counter-productive as Ministers for science come and go.*

- *What is needed is sound institutional memory to ensure that policy learns from its mistakes and successes. Pluralism and experimentation has been the hallmark of success in science policy.``*
  (de la Mothe and Dufour, Daedalus, 1992)

The Optics of Knowledge Culture

- 60s looked at science as a cultural and educational tool
- 70s saw science culture as an instrument for affecting technological change and its impact on labour- social concerns also important
- 80s viewed science culture through a lens of productivity as well as people and pipeline issues
- 90s witnessed focus on competitiveness, innovation and prosperity.. and brain drain
- 00s highlighted job creation, economic development, and the rise of entrepreneurship

Compare the Speeches– Separated at Birth

``For too long, our national science strategy has failed to effectively harness market forces in the pursuit of scientific progress. As a result, private sector investment in research and development has fallen well below that of most of our major international competitors.`` (PM Harper, Waterloo, May 5, 2007)

``The private sector has to do more research and development, and take up a greater share of the national effort in science and technology. Private sector R&D spending in Canada is much lower than most of our major economic competitors.`` (PM Mulroney, Waterloo, March 4, 1987)

The R&D story

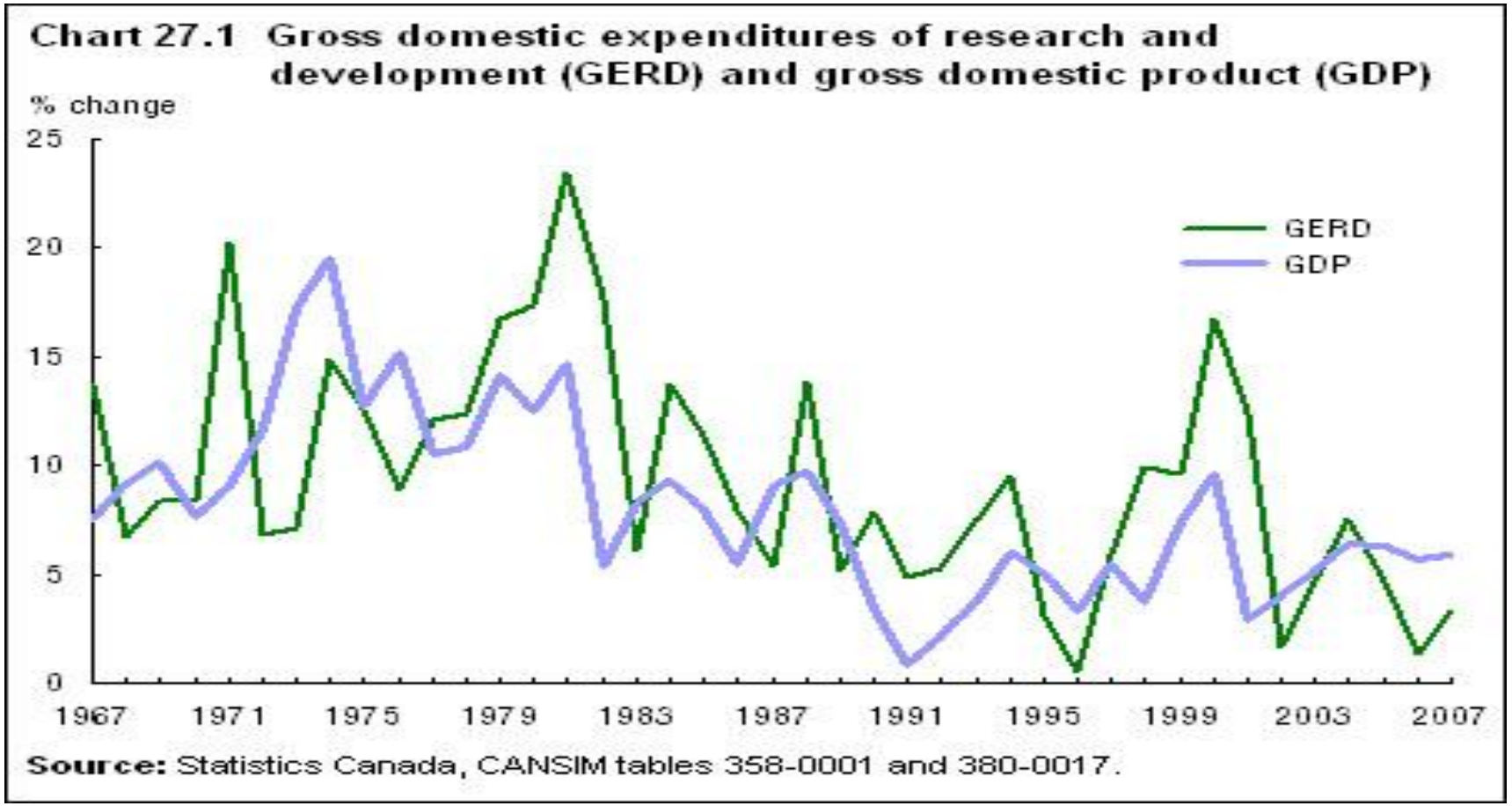


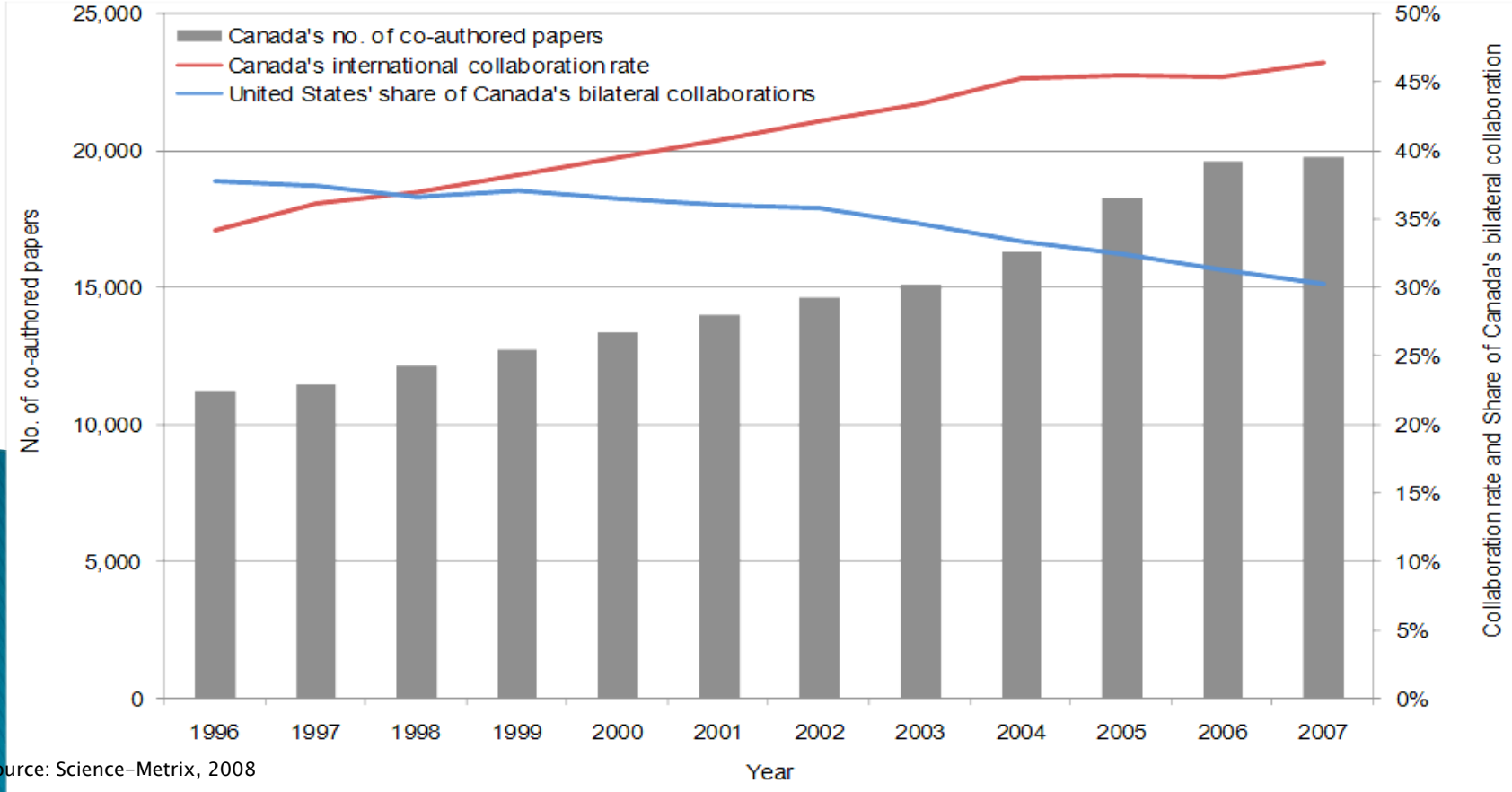
Chart 27.1 Gross domestic expenditures of research and development (GERD) and gross domestic product (GDP)
% change
25
20
15
10
5
0
1967
1971
1975
1979
1983
1987
1991
1995
1999
2003
2007
GERD
GDP
Source: Statistics Canada, CANSIM tables 358-0001 and 380-0017.

Some global research trends

- More global focus via research councils (Belmont, GRC, Grand Challenges)
- Greater attention to impacts and results- applied and strategic thrusts (UK, Japan, Singapore)
- Increased linkage to key technology areas (UK, Australia, Finland)
- Greater synergy promoting critical technologies and disciplinary research (synbio, nano, genomics)
- Emergence of prizes as inducements to research (Longitude, X-Prizes, etc)
- National R&D targets being set (USA, Korea, Japan, China, Finland)
- Experimentation with new research governance structures (Japan, UK, Norway, China)
- Greater effort at leveraging national linkages (Germany, Australia)
- Emphasis in attracting foreign talent through inducements and awards (Finland, Japan, Singapore, Canada)

Shifting Tide:
Evolution of International S&T Partnerships

- **Canada's international collaboration on scientific research as measured by co-authored papers almost doubled**
- **However, the share of cooperation with the U.S. has decreased by approx. 10% over 10 years – where is the shift going? . . .**



Source: Science-Metrix, 2008

So What are the Trends--

- Universities (and colleges-CEGEPs) surrogates for industrial research
- New models for federal lab-university partnerships
- Impressive ramp up of infrastructure, but can the demand for talent and skills keep up; toll on indirect costs and emerging two-tier university system
- New instruments to push commercialization and shield government from accountability
- But no foresight to speak of; with strategic technologies funded piece-meal; no big science plan
- Little international outreach linked to domestic priorities
- Weak science culture efforts at virtually all levels
- Strained fed-provincial relations with provinces showing more leadership in key areas; few examples of interprovincial cooperation

What Trends--2

- Vencap and tax credits—where next
- Philanthropy almost non-existent (PI and IQC exceptions)
- Private sector professional associations not engaged
- Science community poorly organized and weak politically, but new advocacy groups emerging
- Science advisory apparatus thin and closed
- Community-based innovation and clusters taking foothold
- Little national concern on STEM
- And of course, continued analysis of why we are still where we are (see Decalogue)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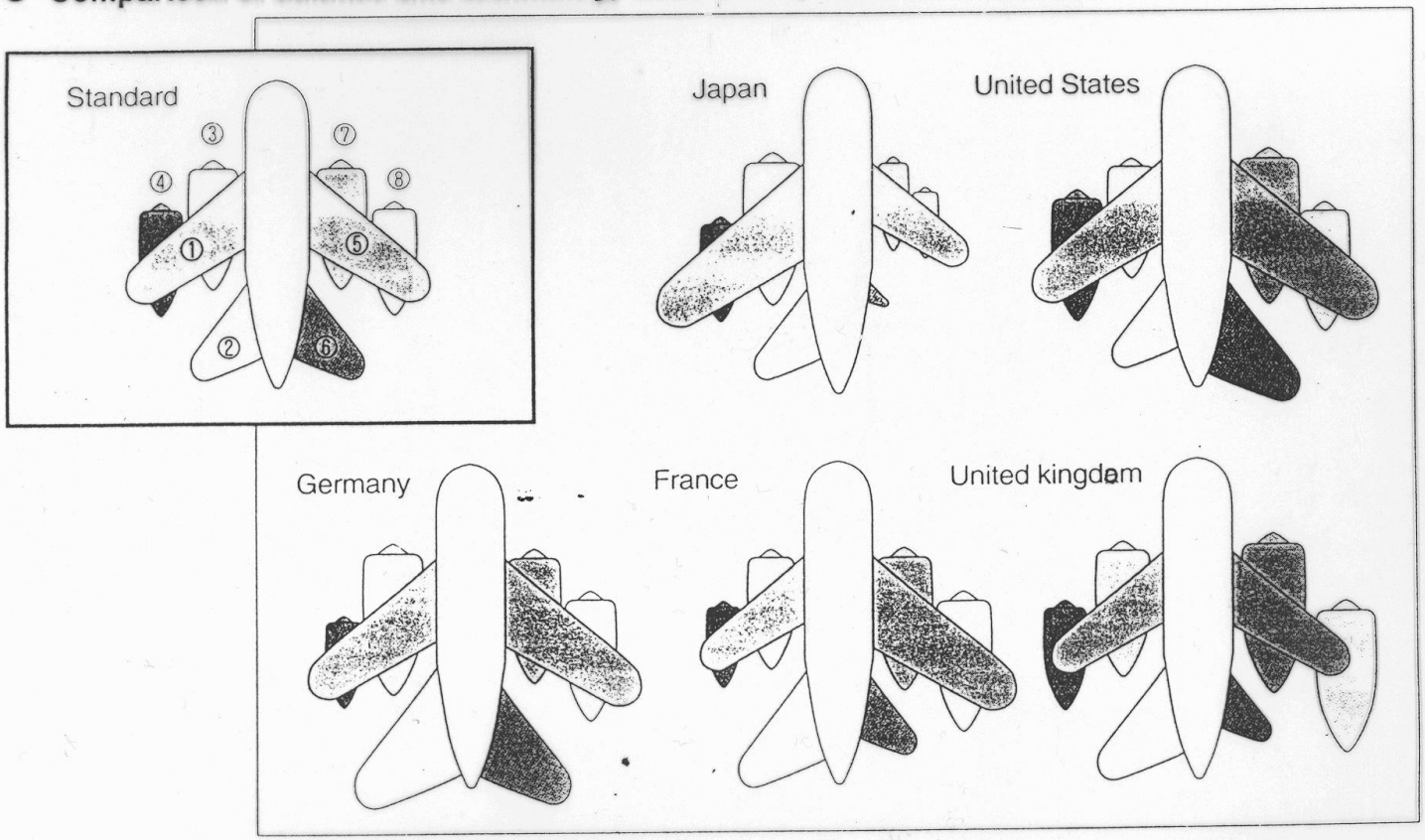
Culture Matters

● **Comparison of science and technology activities by selected countries**



Notes) 1. Each figure indicates relevant countries' scales in science and technology activities compared with its national power(GNP)
("Standard" figure indicates the normal form (in area) when one country has equal ratio of scale in relevant science and technology activities to its national power.)

2. ① R&D expenditure financed by private sector (1991)
② Number of patents granted abroad (1991)
③ Value of exports in high-tech products (1986)
④ Value of exports in technology trade (1991)
⑤ R&D expenditure financed by government (1991)
⑥ Number of Nobel prize laureates (1984～1993)
⑦ Number of citation (1984～86) in papers from abroad
⑧ Number of papers co-authored with foreign researchers (1981～85)

Questions we should always ask

(after Sarewitz)

- What are the values that motivate a particular science and technology policy?
- Who holds those values?
- What are the actual goals that the policy is trying to achieve?
- What are the social and institutional settings in which the information , innovation or products will be used?
- What are the reasons to expect that those are settings for effectively translating the results of knowledge into the goals that justify the policy?
- Who is most likely to benefit from the translation of the research results into social outcomes?
- Who is unlikely to benefit?
- What alternative approaches (through either other lines of research or non research activities) are available for pursuing such goals?