The State of Industrial R&D

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Council of Canadian Academies
The Council of Canadian Academies’ Report on the State of Industrial R&D

- Panel of experts (mostly business)
- Comprehensive examination of input and output statistics on business R&D (all industries)
- Strengths:
  - ICT
  - Aerospace
  - Oil and gas extraction
  - Pharmaceuticals
What are the data on ICT?

• In separate NAICS industries
• Data talk to industry performance as a whole, not individual companies
• Draw lessons from Canada’s overall R&D performance
• Data inhibits closer look at some aspects of ICT R&D
Statistical challenges

• Timeliness (nominal GDP, OECD)
• Assignment of firms to NAICS industries (wholesale trade, R&D services)

• There are detailed data on patents. Reinforce view of Canadian strength in ICT
What were the findings of the CCA?

For R&D as a whole:

- Concern over trend
- Proportionately less R&D in manufacturing than in other countries
- R&D intensity in Canadian manufacturing overall is lower than in U.S.
Evolution of R&D in “ICT manufacturing” and pharma.

- Communications equipment manufacturing
- Pharmaceuticals
- Semiconductor and other electronic component manufacturing
- Computer and peripheral equipment manufacturing
Evolution of R&D in “ICT services”
Reasons for gap with U.S.

- Smaller R&D-intensive industries
- Larger share of Canadian manufacturing in paper, wood products, non-metallic minerals, etc.
- Autos ??

- Data are increasingly difficult to compare with U.S. on an industry basis
R&D Intensity and size:
Office, accounting and computing machinery (2006)
R&D Intensity and size: Radio, television and communication equipment (2006)

**Relative size**

- Korea
- Finland
- Japan
- Sweden
- United States
- Canada
- Germany
- France
- Netherlands
- Finland
- Korea
- Japan
- Italy

**R&D intensity**

- United States
- Sweden
- Canada
- Netherlands
- Germany
- Finland
- United Kingdom
- Korea
- Japan
- Italy
R&D Intensity and size: High-technology manufacturing industries

### Relative size

- Korea
- Finland
- Sweden
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- United States
- United Kingdom
- France
- Finland
- United Kingdom
- France
- Germany
- Netherlands
- Korea
- Canada
- Italy

![Bar chart showing the relative size of GDP share for different countries.](chart1)

### R&D Intensity

- United States
- Sweden
- Japan
- Finland
- United Kingdom
- France
- Germany
- Netherlands
- Korea
- Canada
- Italy

![Bar chart showing the R&D Intensity using production for different countries.](chart2)
R&D by firm size, all industries

Figure 2.8
BERD by Firm Employment Size in Canada and United States, 2009
The figure compares the distribution of BERD across different firm sizes in Canada and the United States. A greater share of IR&D expenditures tends to take place in larger firms in the United States.

*Canadian data are for firms with more than one employee. U.S. data are for firms with five or more employees.
Data source: Panel calculations based on Statistics Canada (2012b) and Rausch (2010)
Paradox Lost

“[A]s more Canadian firms, out of sheer necessity, develop strategies that focus on innovation, they will create a much more powerful ‘business-pull’ on Canada’s strong S&T capacity.”
Implications for ICT

• Canadian firms in ICT are highly R&D intensive
• Statistics suggest high rate of patenting
• Relatively a small part of the economy
• Proportionately smaller firms (?)