

SCIENCE AND
TECHNOLOGY DATA

1999



Government
of Canada

Gouvernement
du Canada

Canada

SCIENCE AND TECHNOLOGY DATA — 1999

Innovation Policy Branch
Industry Canada
Tel.: (613) 993-7589
Fax: (613) 996-7887
E-mail: mercure.marie-josee@ic.gc.ca
Web site: <http://strategis.gc.ca/S-Tinfo>
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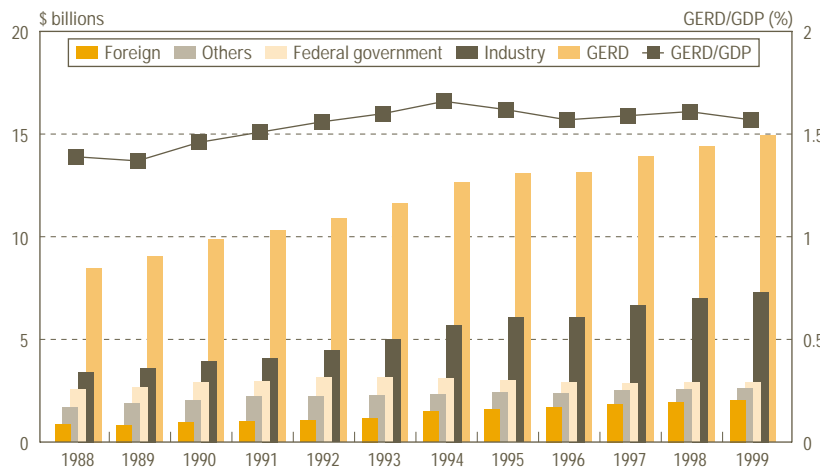
- 35 References

Abbreviations

| | |
|----------------|---|
| BE | Business enterprise |
| BERD | Business enterprise expenditure on research and development |
| GDP | Gross domestic product |
| GERD | Gross domestic expenditure on research and development |
| GOVERD | Government expenditure on research and development |
| HE | Higher education |
| HERD | Higher education expenditure on research and development |
| IT | Information technology |
| OECD | Organisation for Economic Co-operation and Development |
| PNP | Private non-profit organization |
| PRO | Provincial research organization |
| R&D | Research and development |
| S&T | Science and technology |

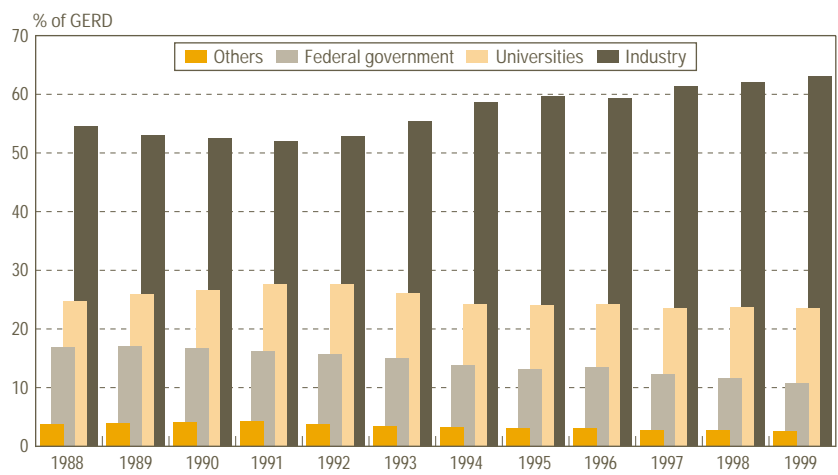
A publication of this type is a snapshot, freezing information at a particular point in time. New data are constantly becoming available and old data are constantly being revised. Data in tables and figures may not add to the totals shown due to rounding.

GERD by Sources of Funds, 1988 to 1999



Source: Statistics Canada

GERD by Performing Sectors, 1988 to 1999



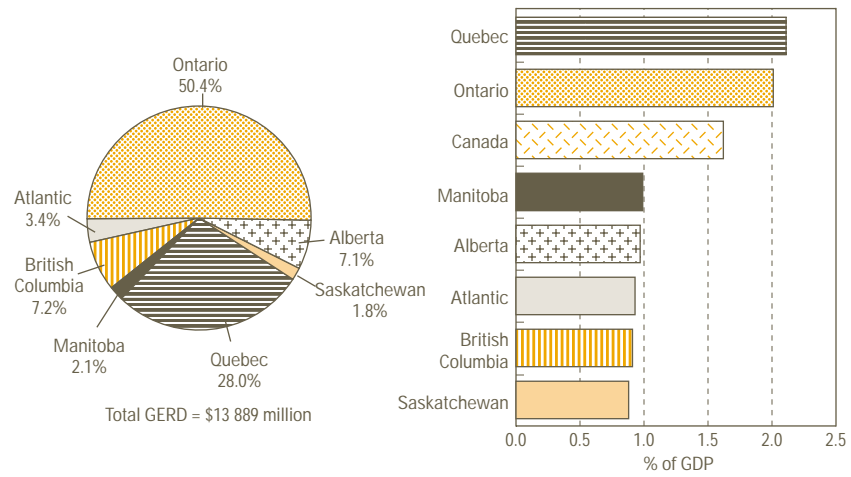
Source: Statistics Canada

GERD by Performing and Funding Sectors, 1999

| Performer | | | | | | | | |
|--------------------|---------------|------------|-----------|--------------|--------------|------------|---------------|--------------|
| Funder | Federal | Provincial | PRO | BE | University | PNP | Total | Distribution |
| | (\$ millions) | | | | | | | (%) |
| Federal | 1 571 | 0 | 4 | 365 | 931 | 28 | 2 899 | 19 |
| Provincial | 3 | 156 | 33 | 132 | 389 | 25 | 738 | 5 |
| PRO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BE | 30 | 0 | 21 | 6 888 | 380 | 24 | 7 343 | 49 |
| University | 0 | 0 | 0 | 0 | 1 459 | 0 | 1 459 | 10 |
| PNP | 0 | 0 | 0 | 0 | 326 | 90 | 416 | 3 |
| Foreign | 0 | 0 | 5 | 2 002 | 38 | 11 | 2 056 | 14 |
| Total | 1 604 | 156 | 63 | 9 387 | 3 523 | 178 | 14 911 | 100 |
| Share of total (%) | 11 | 1 | 0 | 63 | 24 | 1 | 100 | |

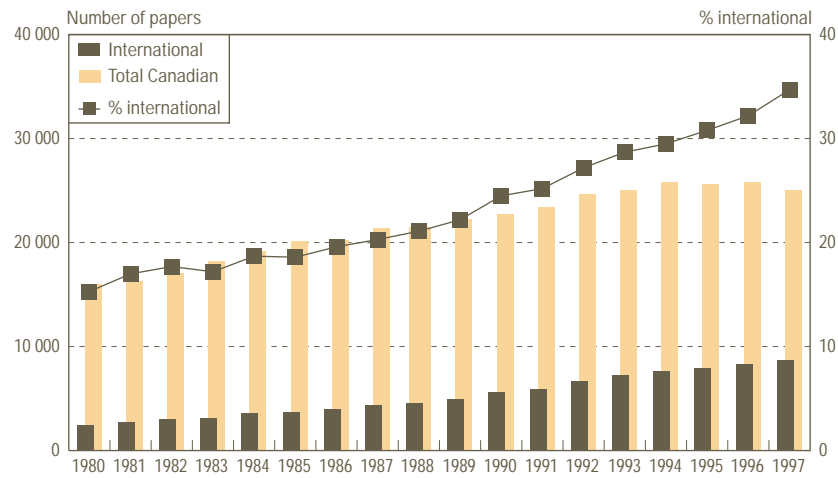
Source: Statistics Canada

Regional Distribution of Canada's GERD, 1997



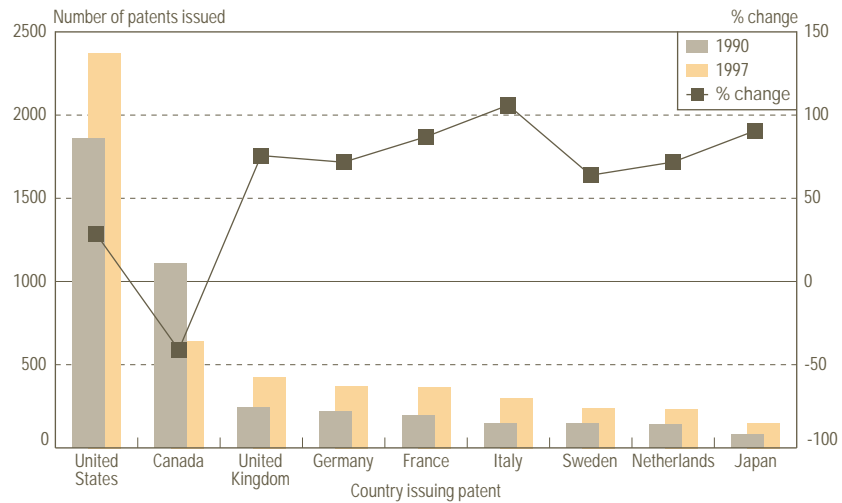
Source: Statistics Canada

Internationalization of Canadian Scientific Research, 1980 to 1997



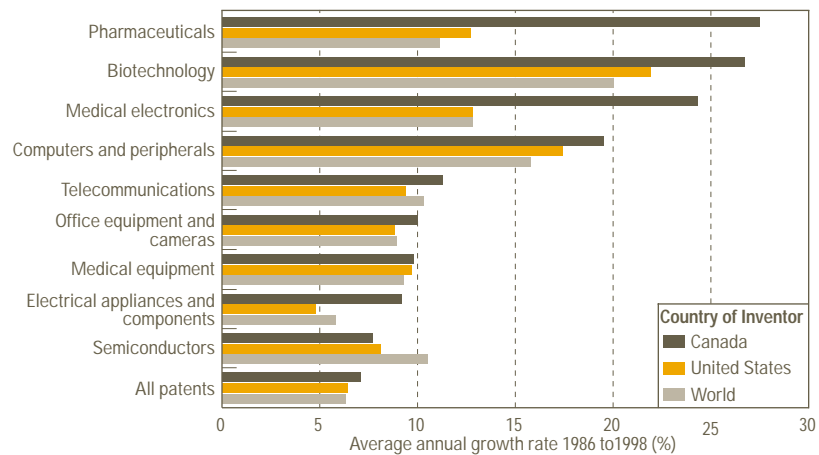
Source: Observatoire des sciences et des technologies

Patenting of Canadian Inventions at Home and in Selected Countries, 1990 and 1997



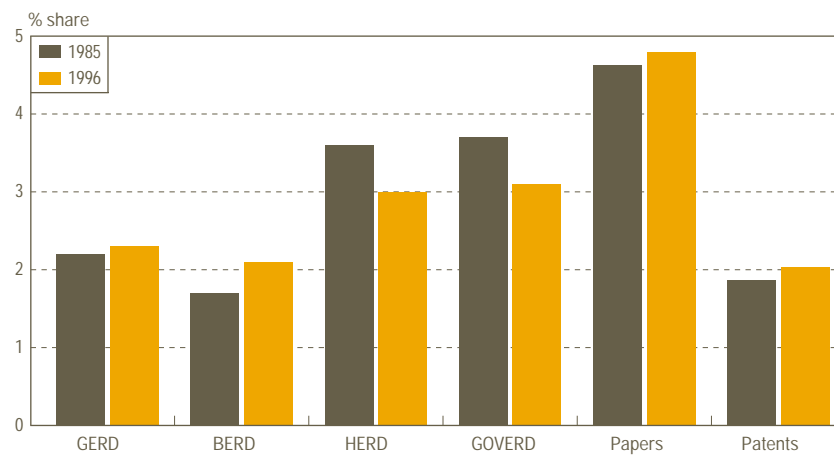
Source: World Intellectual Property Organization

Growth in U.S. Patents on Canadian Inventions in Selected Technology Areas, 1986 to 1998



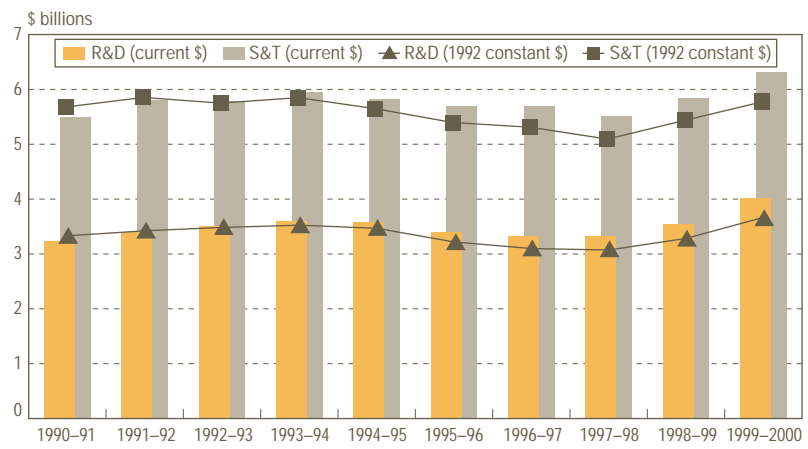
Source: CHI Research

Canada's Share of the OECD's R&D Spending,
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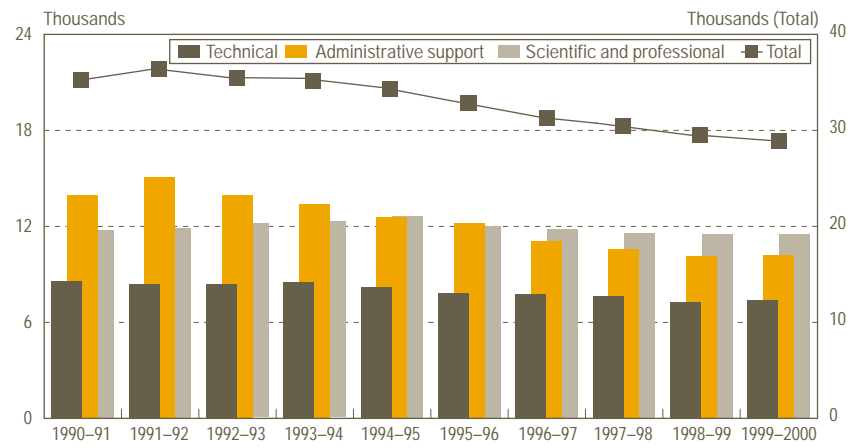
Sources: OECD, Observatoire des sciences et des technologies, and U.S. Patent and Trademark Office

Federal Budgetary Expenditures on S&T and R&D, 1990-91 to 1999-2000



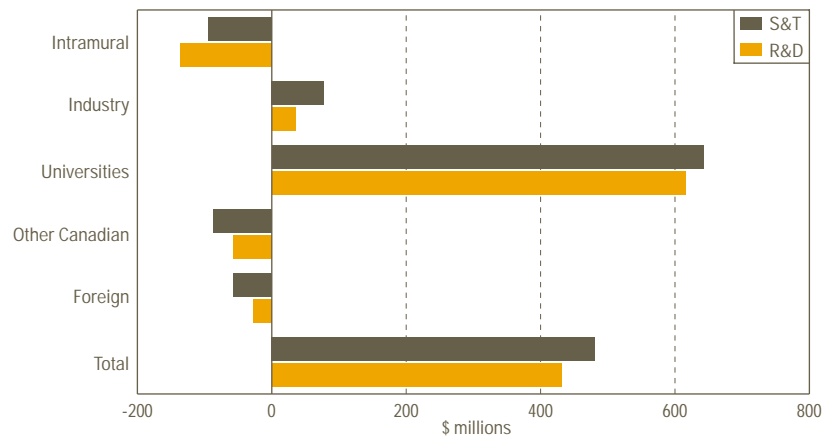
Source: Statistics Canada

Federal S&T Personnel by Category, 1990-91 to 1999-2000



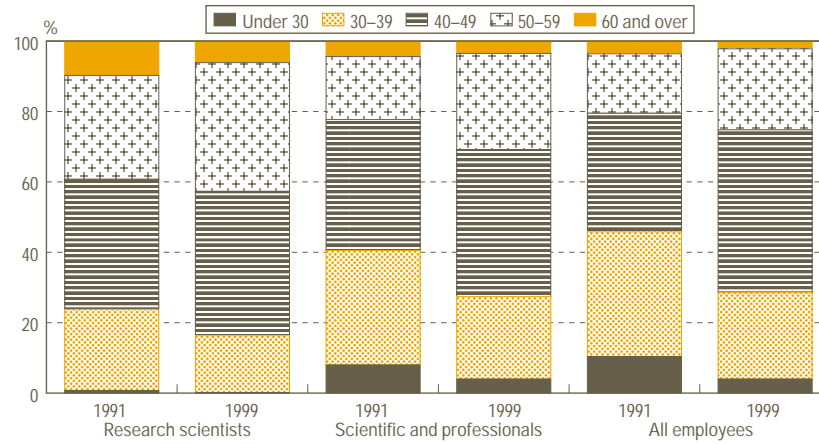
Source: Statistics Canada

Growth in Federal S&T and R&D Expenditures by Performing Sectors,
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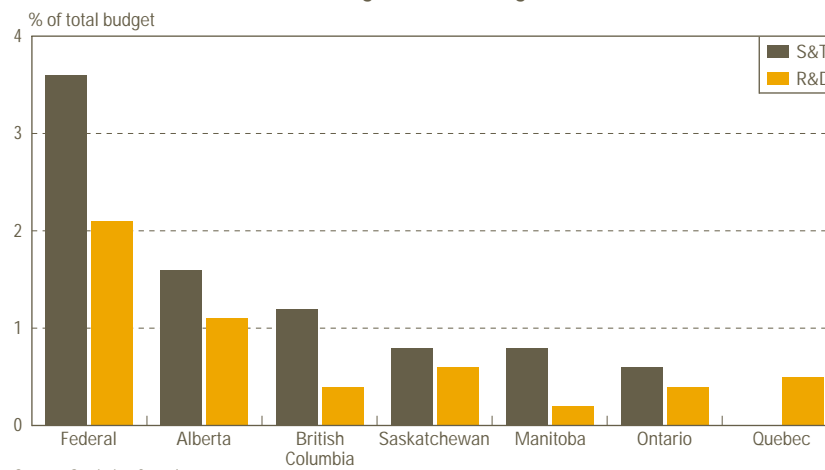
Source: Statistics Canada

**Age Distribution of Federal Employees in Selected Categories
as of March 31, 1991, and March 31, 1999**



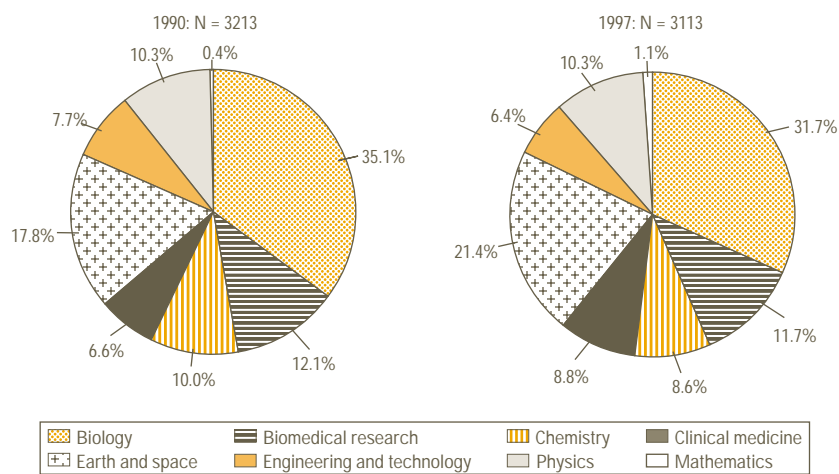
Source: Public Service Commission

Federal and Provincial Governments' S&T and R&D Spending
as a Percentage of Total Budget, 1996-97



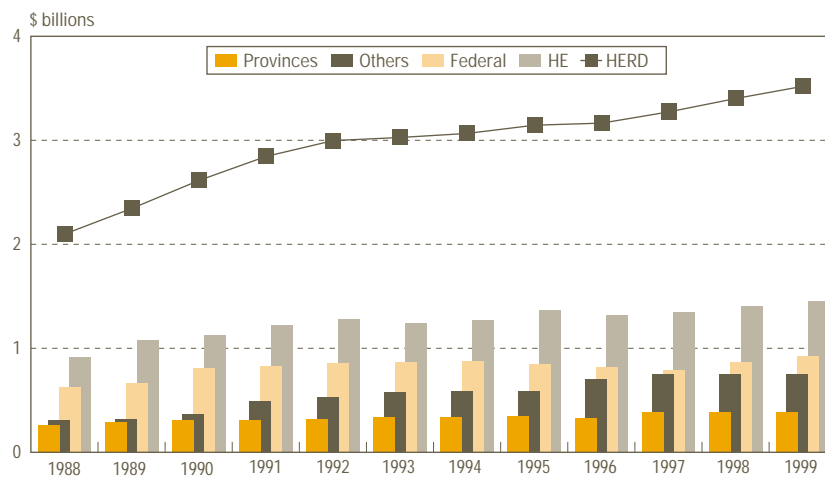
Source: Statistics Canada
No data for the Atlantic provinces

Federal S&T Publications by Research Areas, 1990 and 1997



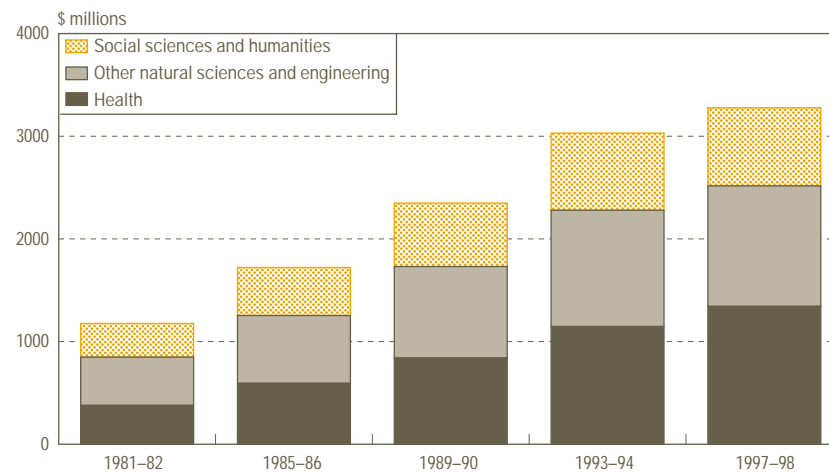
Source: Observatoire des sciences et des technologies

HERD by Sources of Funds, 1988 to 1999



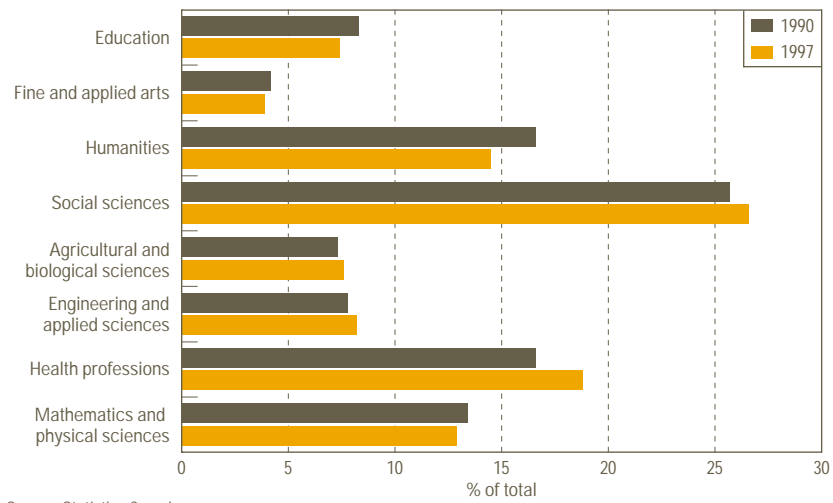
Source: Statistics Canada

HERD by Field of Science, Selected Years from 1981-82 to 1997-98



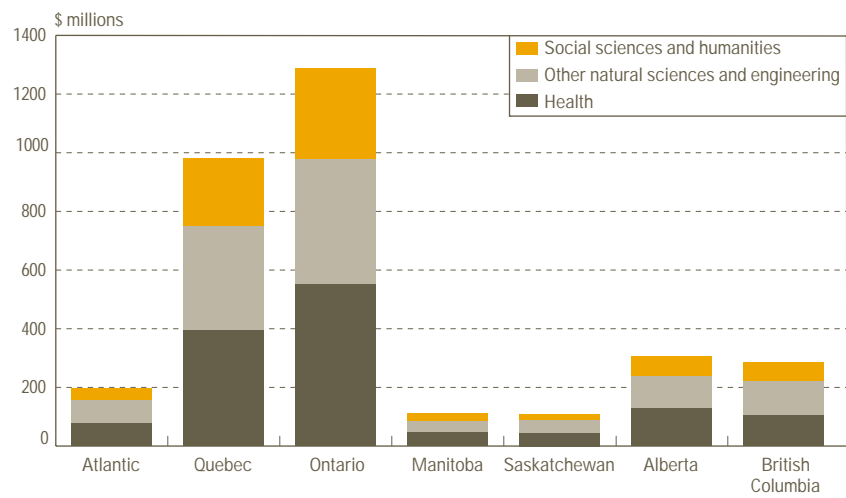
Source: Statistics Canada

Distribution of Full-time Faculty by Field of Science, 1990 and 1997



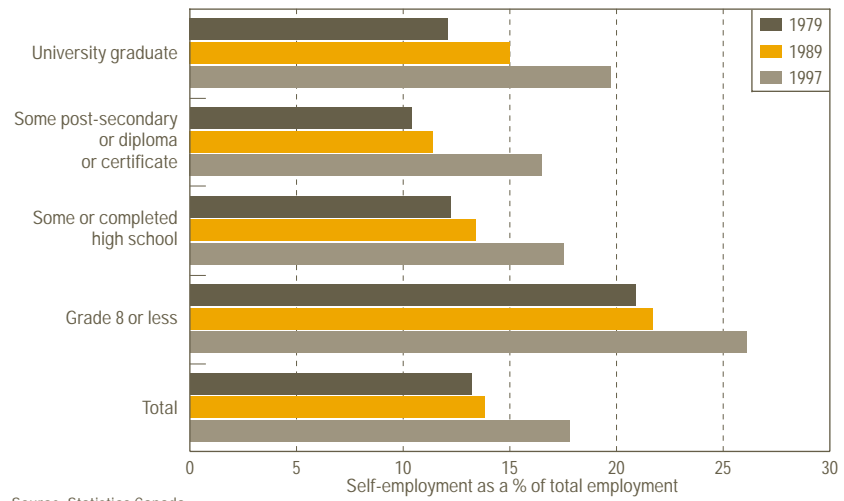
Source: Statistics Canada

HERD by Province or Region and Type of Science, 1997-98



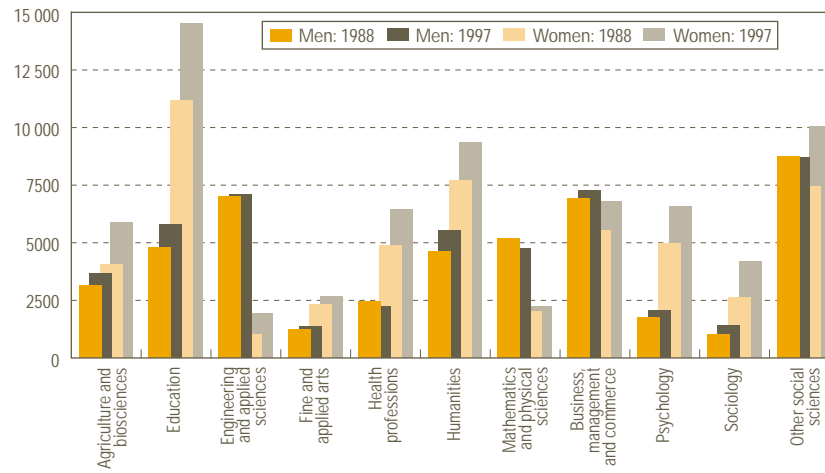
Source: Statistics Canada

Self-employment Rate by Level of Education, 1979, 1989 and 1997



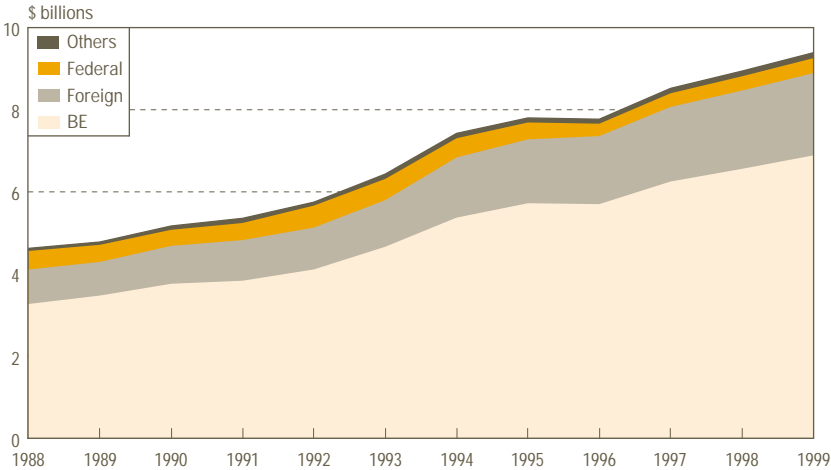
Source: Statistics Canada

First Degrees by Field of Study and Gender, 1988 and 1997



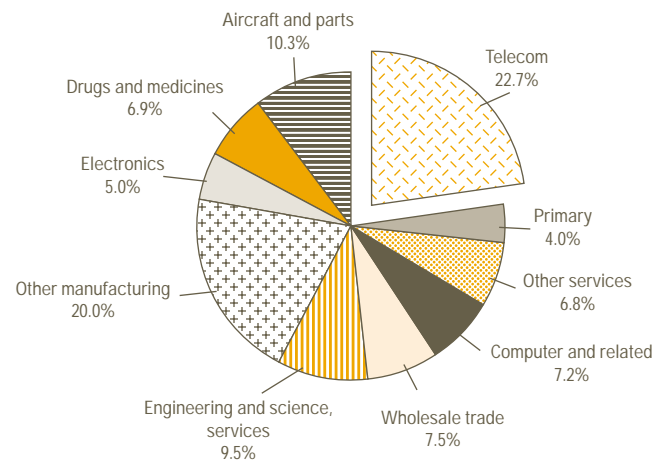
Source: Statistics Canada

BERD by Sources of Funds, 1988 to 1999



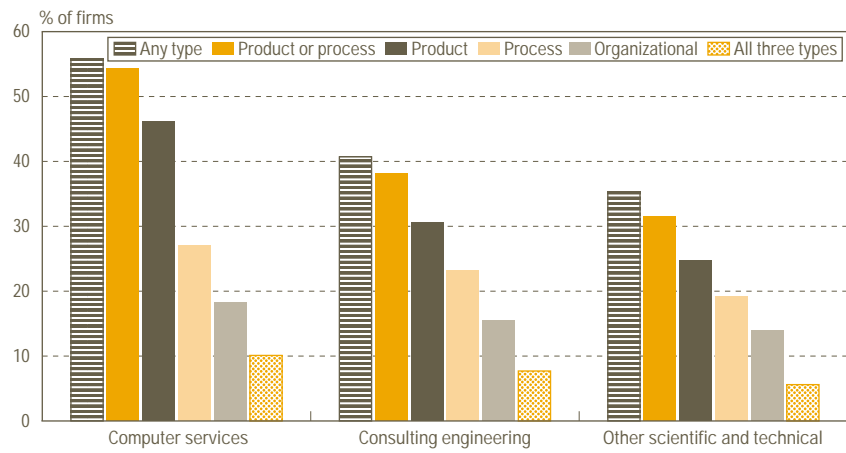
Source: Statistics Canada

Total Intramural R&D Expenditure by Industry Sector, 1999



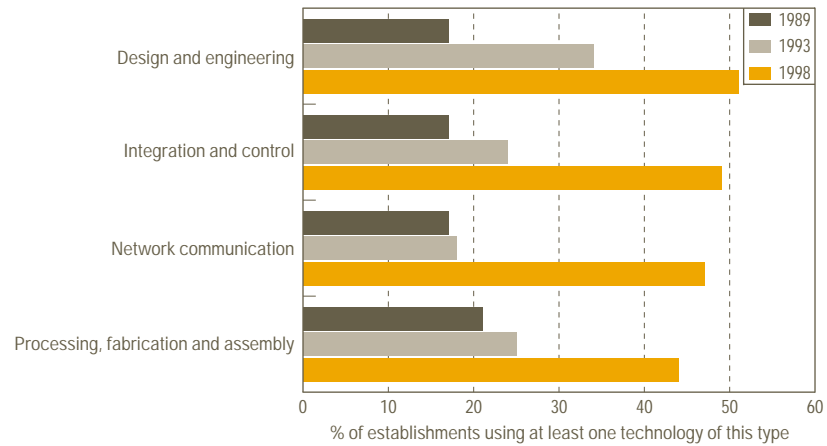
Source: Statistics Canada

**Innovation Rates in Selected Business Services by Type of Innovation,
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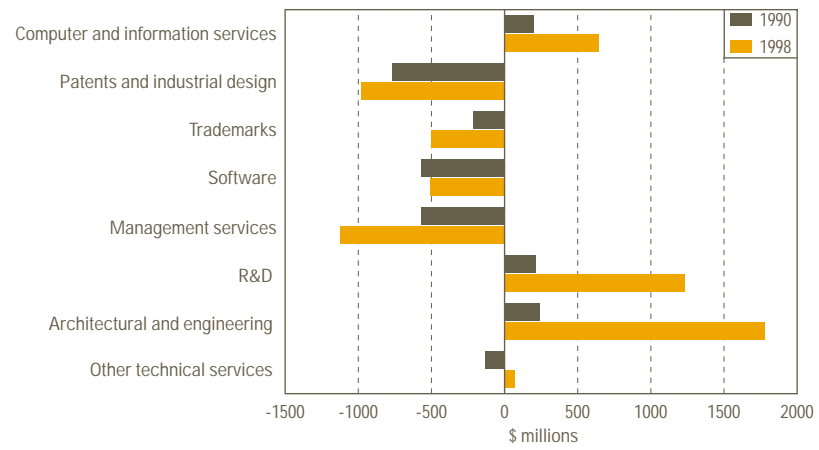
Source: Statistics Canada

Use of Advanced Technology in Canadian Manufacturing by Technology Type, 1989, 1993 and 1998



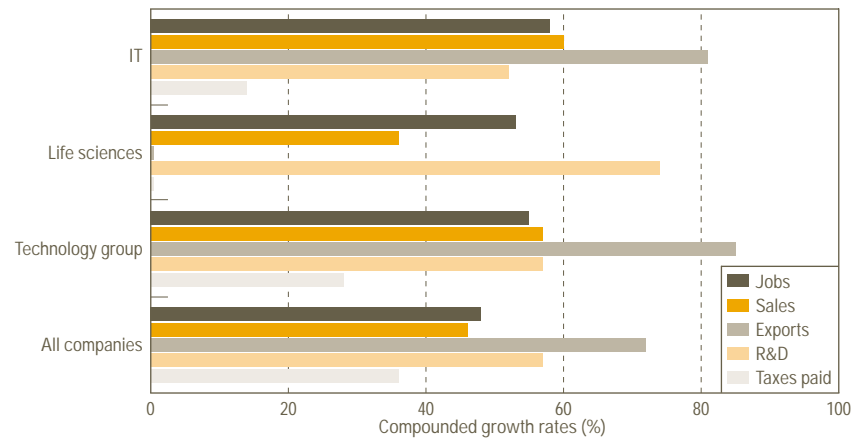
Source: Statistics Canada

Trade Balance in Selected High-knowledge Services, 1990 and 1998



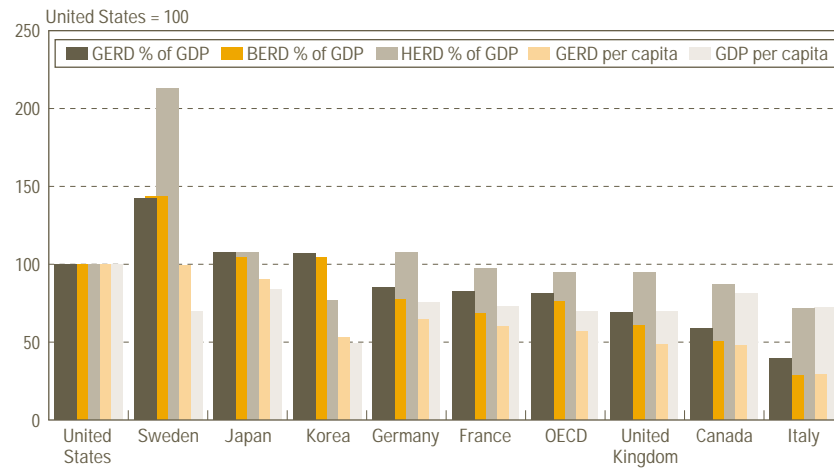
Source: Statistics Canada

Economic Performance of Companies First Venture-capitalized in the Period 1994 to 1998



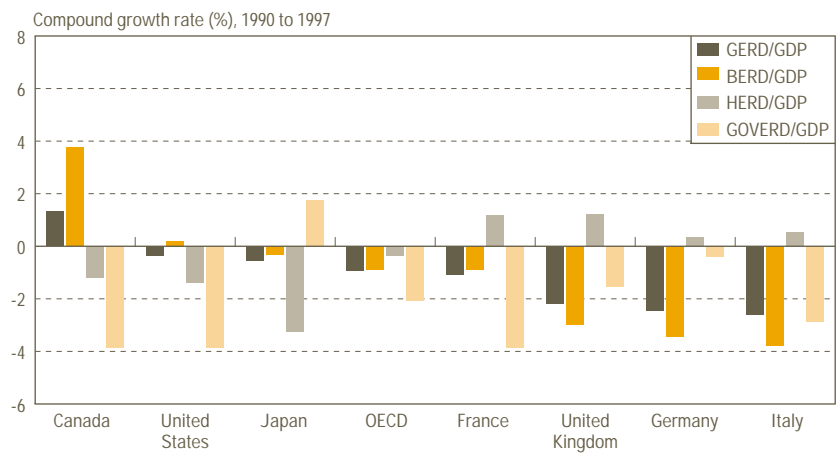
Source: Business Development Bank of Canada

Indicators of R&D Expenditures, Selected Countries, 1997



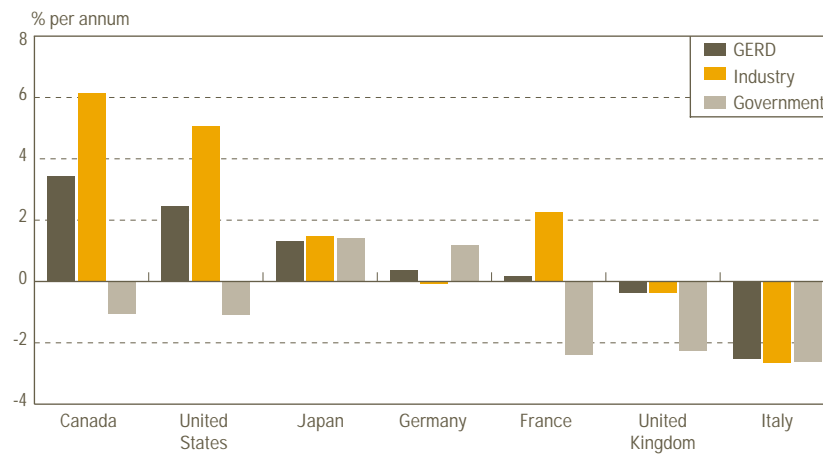
Source: OECD

Average Annual Change in GERD, BERD, HERD and GOVERD as a Percentage of GDP



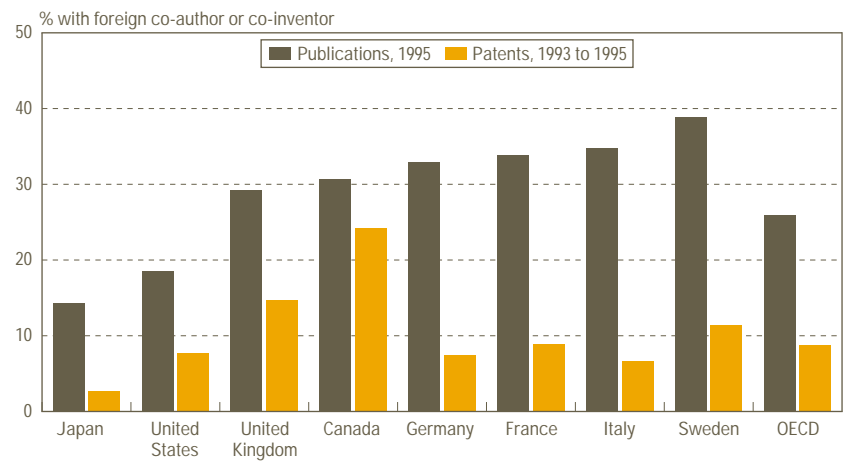
Source: OECD

Average Annual Real Growth in GERD by Major Sources of Funds, 1990 to 1997



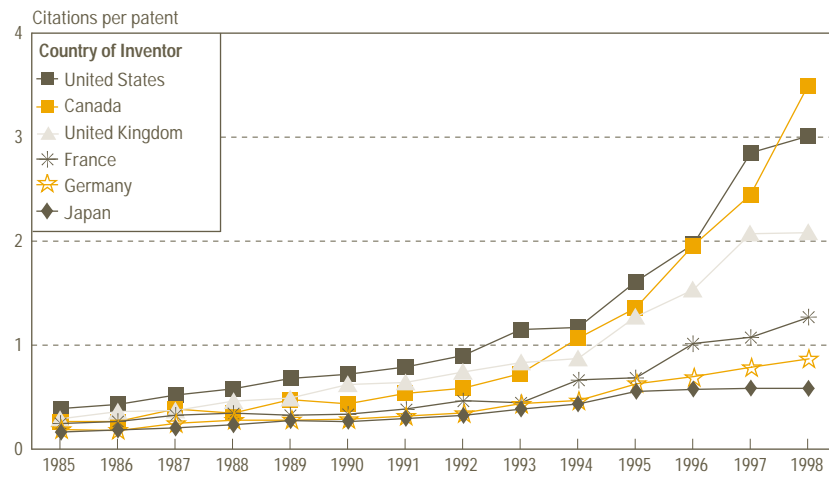
Source: OECD

International Cooperation in Science and Technology



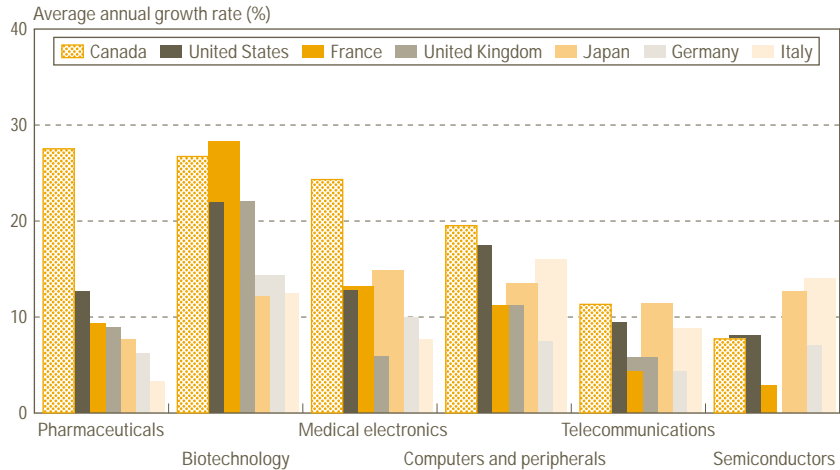
Source: OECD

Citations from U.S. Patents to the Scientific Literature, 1985 to 1998



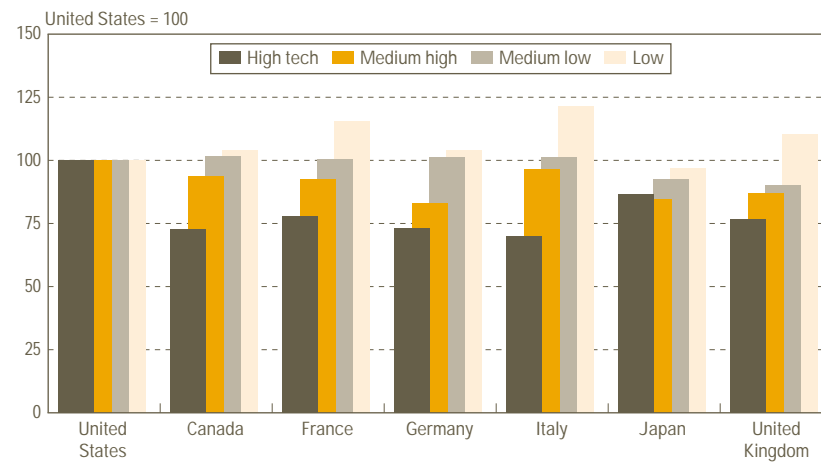
Source: CHI Research

Growth in U.S. High-tech Patents by Country of Inventor, 1986 to 1998



Source: CHI Research

Labour Productivity in the Manufacturing Sector by Technology Group, 1996



Source: OECD

References

- Business Development Bank of Canada (<http://www.bdc.ca>), *Economic Impact of Venture Capital*, 1999.
- CHI Research, T-2 Patent Statistics Database, 1980–1998.
- Observatoire des sciences et des technologies (<http://www.ost.qc.ca>), private communication.
- Organisation for Economic Co-operation and Development, *Basic Science and Technology Statistics*, February 2000.
- Organisation for Economic Co-operation and Development, *Main Industrial Indicators*, November 1999.
- Organisation for Economic Co-operation and Development, *Main Science and Technology Indicators*, 1999-2.
- Organisation for Economic Co-operation and Development, *Science, Technology and Industry Scoreboard*, 1999.
- Public Service Commission, private communication, May 2000.

Statistics Canada, *Canada's International Transactions in Services, 1998*, Cat. No. 67-203-XPB, July 1999.

Statistics Canada, *Education in Canada, 1998 and other years*, Cat. No. 81-229-XPB.

Statistics Canada, *Estimates of Canadian Research and Development Expenditures (GERD), Canada, 1988 to 1999e, and by Province, 1988 to 1997*, Working Paper 88F006XIB99008.

Statistics Canada, "Estimates of Gross Expenditures on Research and Development in the Health Field in Canada, 1970 to 1998," *Science Statistics*, Cat. No. 88-001-XIB, Vol. 23, No. 4, July 1999.

Statistics Canada, *Estimation of Research and Development Expenditures in the Higher Education Sector, 1997-98*, Working Paper 88F0006XIB99009.

Statistics Canada, "Federal Government Expenditures on Scientific Activities, 1999-2000," *Science Statistics*, Cat. No. 88-001-XIB, Vol. 23, No. 5, October 1999.

Statistics Canada, "Federal Government Personnel Engaged in Scientific and Technological (S&T) Activities, 1990-1991 to 1999-2000," *Science Statistics*, Cat. No. 81-001-XIB, Vol. 24, No. 1, March 2000.

Statistics Canada, *Growth of Advanced Technology Use in Canadian Manufacturing During the 1990s* by John Baldwin, Ed Rama and David Sabourin, Analytical Studies Branch, Research Paper No. 105.

Statistics Canada, "Industrial Research and Development, 1995 to 1999," *Science Statistics*, Cat. No. 88-001-XIB, Vol. 23, No. 9, December 1999.

Statistics Canada, *Innovation Rates in Selected Business Services by Type of Innovation*, Daood Hamdani, private communication.

Statistics Canada, *Scientific and Technological Activities of Provincial Governments, 1990-91 to 1998-99e*, Working Paper 88F0006XIB99007.

Statistics Canada, "Self-employment in Canada and the United States," *Perspectives on Labour and Income*, Cat. No. 75-001-XPE, Vol. 11, No. 3, Autumn 1999.

United States Patent and Trademark Office (<http://www.uspto.gov>).

World Intellectual Property Organization, "Industry Property Statistics (Part 1: Patents, Utility Models)," various years.

Note: Statistics Canada research papers are available at <http://www.statcan.ca/cgi-bin/downpub/listpub.cgi?catno=88F0017MIB> or from the Analytical Studies Branch at <http://www.statcan.ca/cgi-bin/downpub/listpub.cgi?catno=11F0019MIE>.

Working papers from the Science, Innovation and Electronic Information Division are available at <http://www.statcan.ca/cgi-bin/downpub/listpub.cgi?catno=88F0006XIB>.