

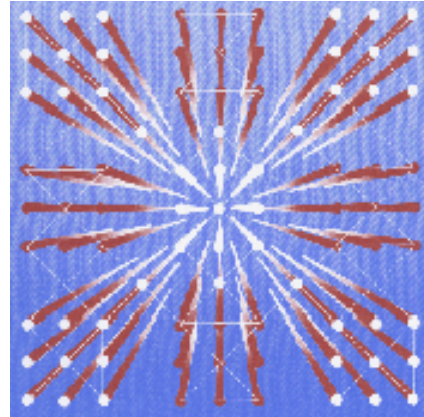


Catalogue no. 88-202-XIE

# Industrial Research and Development

2005 intentions

(with 2004 preliminary estimates and 2003  
actual expenditures)



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- . not available for any reference period
- .. not available for a specific reference period
- ... not applicable
- 0 true zero or a value rounded to zero
- 0<sup>s</sup> value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
- <sup>p</sup> preliminary figures
- <sup>r</sup> revised figures
- x suppressed to meet confidentiality requirements of the Statistics Act
- <sup>E</sup> use with caution
- F too unreliable to be published

## Other symbols

- <sup>e</sup> estimates, as a complete survey was not conducted
- <sup>i</sup> spending intentions

## Note

Due to rounding, components may not add to totals.



Statistics Canada  
Science and Innovation Surveys Section  
Science, Innovation and Electronic Information Division (SIEID)

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## Note of appreciation

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## Foreword

Innovation is essential to economic progress. Properly applied in developing new products and services, innovation may also conserve resources, preserve the environment, and add to our quality of life. The innovation process involves a number of elements concerned with the generation, dissemination and application of new knowledge: research and development (R&D) to provide new ideas; education and information services to develop the required personnel; and design, engineering and marketing services to incorporate the new ideas into the production and distribution systems.

R&D statistics, therefore, measure only part of the effort necessary for innovation. However, R&D is at the heart of the innovation process.

While R&D is also carried out by other sectors, such as governments and universities, industrial R&D is most clearly linked to technological innovation and, hence, economic growth. Canada does not, of course, rely only on domestic R&D for new ideas and innovation. A great deal of information comes from abroad in the form of information embodied in new machinery and equipment, in the minds of scientists and engineers, in scientific and technical journals, and in designs, drawings, tooling and manufacturing specifications. Some data are presented on the acquisition of R&D from abroad, but much of the flow of technological information cannot be measured.

In many ways it is more efficient to acquire the results of R&D performed by others since the cost of securing such information is usually less than the cost of duplicating it. However, some indigenous R&D is necessary not only to ensure that new inventions are appropriate to Canadian industry and market conditions, but also to ensure that foreign R&D can be properly assimilated, i.e., understood and adapted. It also provides Canadian firms with a better bargaining position for exchanges of technological information. Domestic performance of R&D is, therefore, necessary even if we wish only to be effective imitators and adapters.

Statistics Canada has collected data on R&D in Canadian industry for 49 years. Maintaining the continuity and comparability of these data over time is of considerable importance. This publication, the nineteenth issue of an annual series, summarizes industrial R&D activities in Canada. It presents historical and current statistical information on industrial research and development activities for the years 1963 to 2005. Actual data for 2003 expenditures, 2004 preliminary estimates, and 2005 spending intentions are derived from the survey "Research and Development in Canadian Industry" conducted in 2004.

Firms that perform or fund R&D in Canada may apply for a tax credit to the CRA under the Scientific Research and Experimental Development (SR&ED) program. Under the current regulations, the filing must take place within 18 months of the expenditure. Once the claims are submitted, they are processed and forwarded to Statistics Canada. This means that data can arrive up to two years after the expenditure was made.

Beginning with the 1996 survey, a new methodology was introduced for estimating R&D expenditure in the business sector in Canada. The new approach substitutes the use of administrative data from the Canada Revenue Agency (CRA), in place of survey data, for any firm funding or performing less than \$1 million worth of R&D. This enabled the elimination of 9,634 questionnaire mail-outs for the 2003 survey, thus substantially reducing the survey reporting burden.

This initiative resulted in an understatement of the total value of intramural expenditures and of the total number of R&D personnel, for the most recent years reported. The understatement was a result of the different time frame for the collection of the survey and the administrative data. Beginning this year a new estimation system has been put into place to impute values for these outstanding data. The estimation system uses industry trends and Statistics Canada's extensive Business Register database, to ensure the company is active, before applying an estimate. Counts of performing enterprises are not provided in this report as they are subject to future revisions.

In an effort to provide timely data on R&D activities, the release of the estimates relies mostly on data from the surveyed firms (those spending more than \$1 million on R&D). Included in the estimates are all available data, including revisions for past years, that have been processed from the CRA records up to that point in time.

We are grateful to the responding firms who cooperated in this survey. We realize that the data requested are generally not readily available and require considerable effort to prepare. Any suggestions from these firms, or other users, for modifications to either the questionnaire or publication will be carefully considered.

This publication was written by Michèle Lanoue, Senior Statistical Officer – Private Sector, under the direction of Robert Schellings, Subject Matter Manager, Science and Innovation Surveys Section, Science, Innovation and Electronic Information Division.

Enquiries regarding this publication should be directed to the Science, Innovation and Electronic Information Division.

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## Highlights

- At 1.0% of Gross Domestic Product (GDP) in 2003, business enterprise expenditures on R&D (BERD) were similar to those of the middle rank OECD countries.
- Industrial R&D spending is set to rise 1.6% to \$13.8 billion in 2005 according to reported intentions. While this signals a third consecutive annual increase, industrial R&D spending remains 3.3% below the peak level of \$14.3 billion observed in 2001.
- In 2004, the business enterprise sector continued to be the largest performing sector in Canada with 54% of all Canadian R&D, followed by Higher Education (35%) and the Federal Government (9%).
- R&D spending in 2005 includes several industries reporting growth; Aerospace products and parts (+3.6%), semiconductor and other electronic components (+3.4%), communication equipment (+1.8%), and scientific research and development services (+3.3%).
- Quebec and Ontario remained the most heavily concentrated regions for R&D activity in 2003. Together they accounted for 84% of total intramural expenditures.
- The dominant industries in Quebec and Ontario continued to be Aerospace products and parts and communications equipment respectively. Eighty two percent of the R&D in the Communications equipment industry was performed in Ontario, while Quebec's portion of R&D activity in aerospace products and parts was 58%.
- R&D personnel in 2003 were heavily concentrated in four industries: Computer system design and related services; Information and cultural industries; Communications equipment; and Scientific research and development services. These industries accounted for just more than one-third of the 116,293 person-years in 2003.
- In 2002, a new Health R&D expenditures by therapeutic class survey was launched in partnership with Health Canada. Data from this survey is presented for the first time.(Chapter 5)

### Note to users:

A new estimation system has been put in place for 2003. Data for outstanding administrative records have been estimated thereby reducing the previous understatement of R&D and in particular R&D employment counts. The new estimation system has projected data for more than 2,000 firms. The estimation of these records is also reflected in the 2004 planned expenditures and the 2005 spending intentions.

Counts for 2003 are excluded from this report because although data values were projected for these outstanding firms, estimations of the number of R&D performers are sensitive, especially when allocated to the provinces. Expenditures and personnel data, while also projected, should not be influenced to the same degree as the counts. Nevertheless these data should always be considered preliminary.

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# **Chapters 1 to 5**

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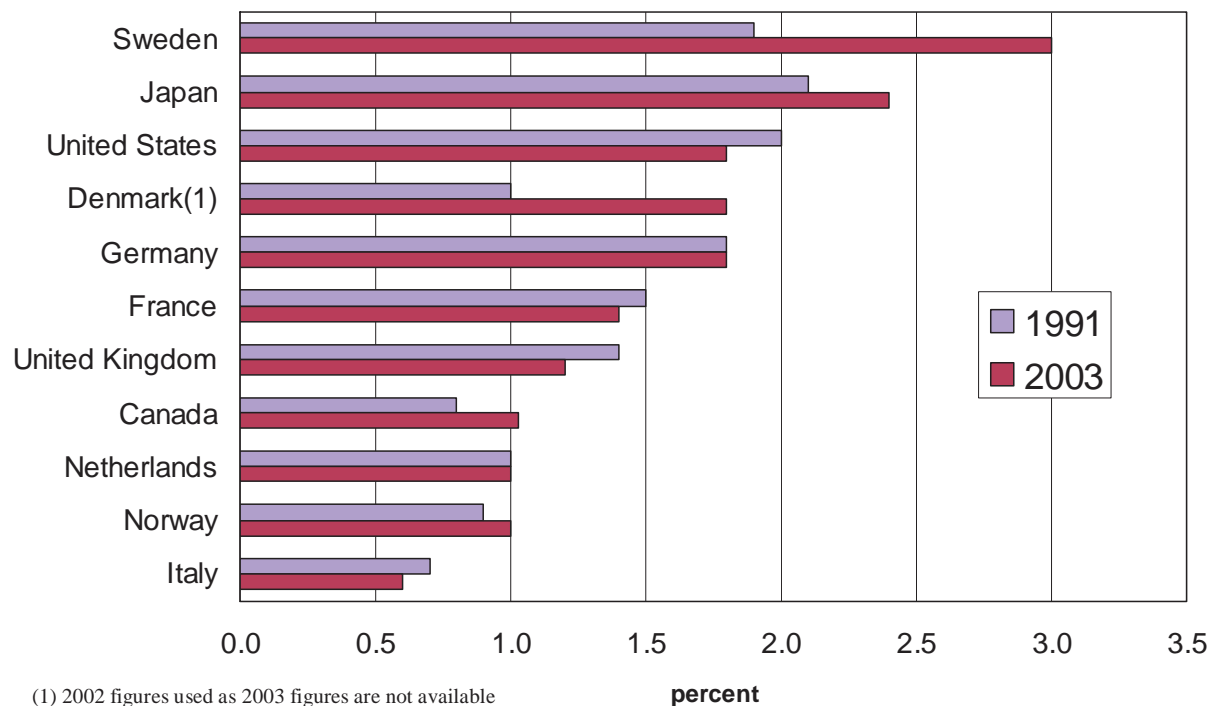
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## 1. R&D expenditures

### International comparisons

- Business enterprise spending on R&D (BERD) for 2003 has remained stable at 1.0% of Gross Domestic Product (GDP). Canada is in the “middle rank” of OECD member countries with BERD/GDP ratios similar to countries such as Norway and the Netherlands. Countries with the highest ranking BERD/GDP ratios continue to be Sweden and Japan, as shown in table 1.1.
- Many countries, including Canada, have increased their industrial R&D effort since 1991. While Sweden and Denmark have shown the largest increases, certain countries such as France, the United Kingdom, Italy and the United States are currently at a lower level of BERD/GDP than in 1991 as demonstrated by chart 1.1.
- Table 1.2 shows the current level of company-funded R&D in Canada and the United States over the last 5 years.

**Chart – 1.1 BERD as a percent of GDP, by selected OECD countries, 1991 and 2003**



Source: OECD, *Main Science and Technology Indicators*, volume 2005/1

	BERD/GDP				
	1999	2000	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>r</sup>
	percent				
Sweden	2.7	..	3.3	..	3.0
Japan	2.1	2.1	2.3	2.3	2.4
United States	2.0	2.0	2.0	1.9	1.8
Germany	1.7	1.8	1.8	1.8	1.8
Denmark	1.4	..	1.7	1.8	..
France	1.4	1.4	1.4	1.4	1.4
United Kingdom	1.3	1.2	1.2	1.3	1.2
<b>Canada</b>	<b>1.1</b>	<b>1.2</b>	<b>1.3</b>	<b>1.1</b>	<b>1.0</b>
Netherlands	1.1	1.1	1.1	1.0	1.0
Norway	0.9	..	1.0	1.0	1.0
Italy	0.5	0.5	0.6	0.6	0.6

Source: OECD, *Main Science and Technology Indicators*, volume 2005/1

	1999 <sup>r</sup>	2000 <sup>r</sup>	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>p</sup>
United States <sup>1</sup>	160,176	180,421	181,606	175,294	176,415
<b>Percentage change</b>	<b>10.5</b>	<b>12.6</b>	<b>0.7</b>	<b>-3.5</b>	<b>0.6</b>
Canada <sup>2</sup>	6,968	8,128	10,417	10,587	10,437
<b>Percentage change</b>	<b>8.9</b>	<b>16.9</b>	<b>28.2</b>	<b>1.6</b>	<b>-1.4</b>

1. In millions of U.S. dollars.

2. In millions of Canadian dollars.

Source: National science foundation NSF 05-308 July, 2005 / SRS, survey of industrial research and development: 2003

## Compared to GERD

- The largest performing sector in 2003 was business enterprises. In 2005, this sector is expected to perform about 53% of all Canadian R&D, often referred to as GERD (gross domestic expenditures on research and development).
- Over the period 1984-2005, the business enterprise sector's participation (natural sciences and engineering only) in GERD has increased from 48% to 53%, peaking at 62% in 2001. The federal government share has fallen by more than half, from 21% to 8%, while the higher education sector's participation grew from 27% to 37% over the same time period.

**Table 1.3 GERD by performing sector, 1984 to 2005**

Year	Federal government	Provincial governments	Business enterprises <sup>1</sup>	Higher education	Private non-profit organizations	Total
			percent			
1984	22	3	48	26	1	100
1985	19	3	52	25	1	100
1986	19	3	53	24	1	100
1987	17	3	55	24	1	100
1988	16	3	51	30	1	100
1989	16	3	50	30	1	100
1990	16	3	50	30	1	100
1991	16	3	50	31	1	100
1992	15	3	51	31	1	100
1993	14	2	53	30	1	100
1994	13	2	57	28	1	100
1995	13	2	58	27	1	100
1996	13	2	58	27	1	100
1997	12	1	60	27	1	100
1998	11	1	60	27	0	100
1999	11	1	59	29	0 <sup>s</sup>	100
2000	10	1	60	28	0 <sup>s</sup>	100
2001 <sup>r</sup>	9	1	62	28	0 <sup>s</sup>	100
2002 <sup>r</sup>	9	1	57	32	0 <sup>s</sup>	100
2003 <sup>p</sup>	9	1	56	34	0 <sup>s</sup>	100
2004 <sup>p</sup>	9	1	54	35	0 <sup>s</sup>	100
2005 <sup>p</sup>	8	1	53	37	0 <sup>s</sup>	100

1. Excludes R&D in the social sciences and humanities

## Trends

- Industrial R&D activity is made up of current intramural expenditures and capital expenditures. Since individual companies do not regularly purchase land, buildings or major R&D equipment, capital expenditures can fluctuate considerably from year to year. Current intramural expenditures cover the costs of wages and salaries plus other current costs associated with workers who are usually permanent employees. This acts as a good indicator of a firm’s commitment to R&D and therefore, analysis of trends in R&D activity will concentrate on current intramural expenditures.
- Table 1.4 shows that current intramural expenditures have grown steadily every year between 1984 and 2001 with the exception of a slight decline in 1996. The first significant decline in expenditures in more than 40 years of publishing these statistics occurred in 2002. Preliminary estimates for 2003 and spending intentions for 2004 and 2005 indicate a consistent albeit small growth in current expenditures. The level of current intramural expenditure increased at an average annual rate of 7.9% from 1984 to 2004. However, when the expenditures are converted to 1997 constant dollars, the change in real terms is less than that. By using the implicit price index of the Gross Domestic Product, the annual compounded growth rate between 1984 and 2004 is 6.0%.

**Chart - 1.2 Current intramural R&D expenditures, 1984 to 2005**

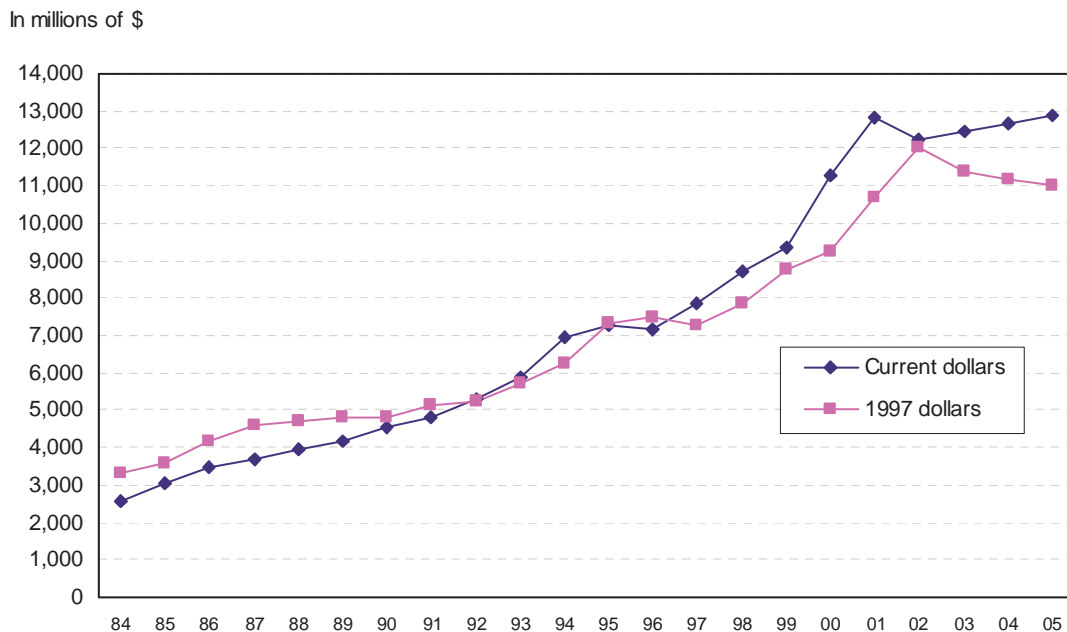


Table 1.4 Summary of industrial R&D expenditures, 1984 to 2005					
Year	Current intramural expenditures (current dollars)	Capital expenditures (current dollars)	Total intramural expenditures (current dollars)	Current intramural expenditures (1997 dollars)	GDP Implicit price index (1997) <sup>1</sup>
		in millions of \$			percent
1984	2,540	482	3,022	3,583	70.9
1985	3,054	579	3,633	4,172	73.2
1986	3,447	575	4,022	4,572	75.4
1987	3,691	649	4,340	4,684	78.8
1988	3,980	643	4,623	4,831	82.4
1989	4,155	624	4,779	4,826	86.1
1990	4,541	628	5,169	5,108	88.8
1991	4,812	543	5,355	5,259	91.5
1992	5,286	457	5,742	5,702	92.7
1993	5,878	546	6,424	6,253	94.0
1994	6,938	629	7,567	7,296	95.1
1995	7,286	705	7,991	7,496	97.2
1996	7,159	837	7,996	7,246	98.8
1997 <sup>r</sup>	7,874	865	8,739	7,874	100.0
1998 <sup>r</sup>	8,727	955	9,682	8,762	99.6
1999 <sup>r</sup>	9,361	1,039	10,400	9,241	101.3
2000 <sup>r</sup>	11,255	1,194	12,450	10,668	105.5
2001 <sup>r</sup>	12,820	1,501	14,320	12,015	106.7
2002 <sup>r</sup>	12,257	1,109	13,367	11,370	107.8
2003 <sup>p</sup>	12,432	960	13,391	11,159	111.3
2004 <sup>p</sup>	12,644	986	13,630	11,023	114.7
2005 <sup>i</sup>	12,878	970	13,848	..	..

1. Source: CANSIM table 380-0056



---

## Concentration among companies

- Over half of the industrial R&D in Canada is performed by a relatively small number of companies. Although the degree of concentration is still high, it has decreased over the last 30 years. In the revised 2002 estimates 12,272 companies which reported performing R&D, 100 (or 0.8%) accounted for 56% of the total R&D performed (see table 1.5). This is the lowest concentration level observed in the last 30 years, 2003 preliminary data shows an increase to 57%.
- Even more notable is the concentration among the top 10 performing companies, who have averaged 33% of total intramural R&D over the twenty years covered in table 1.5. Generally speaking, there is a trend towards less concentration among companies down to 24% in 2005. Results for 2002 mark the first significant single year drop in the concentration of the top 10 companies in the period. Figures for 2003 and preliminary for 2004 and 2005 indicate the top 10 companies will remain near this same level of concentration.
- When companies are grouped by NAICS 2002 (North American Industrial Classification System) code, there are generally few companies in each code (see table 28 for the 2002 counts). In this report, companies are grouped into 46 industries in order to maintain the confidentiality of individual returns. The concentration of R&D can have dramatic effects on expenditures. The decisions of a few companies can significantly alter overall R&D expenditures and particularly industry totals. Companies' R&D decisions are affected by government policies on defence, transportation and communications, as well as by national and international economic trends and their own financial positions.

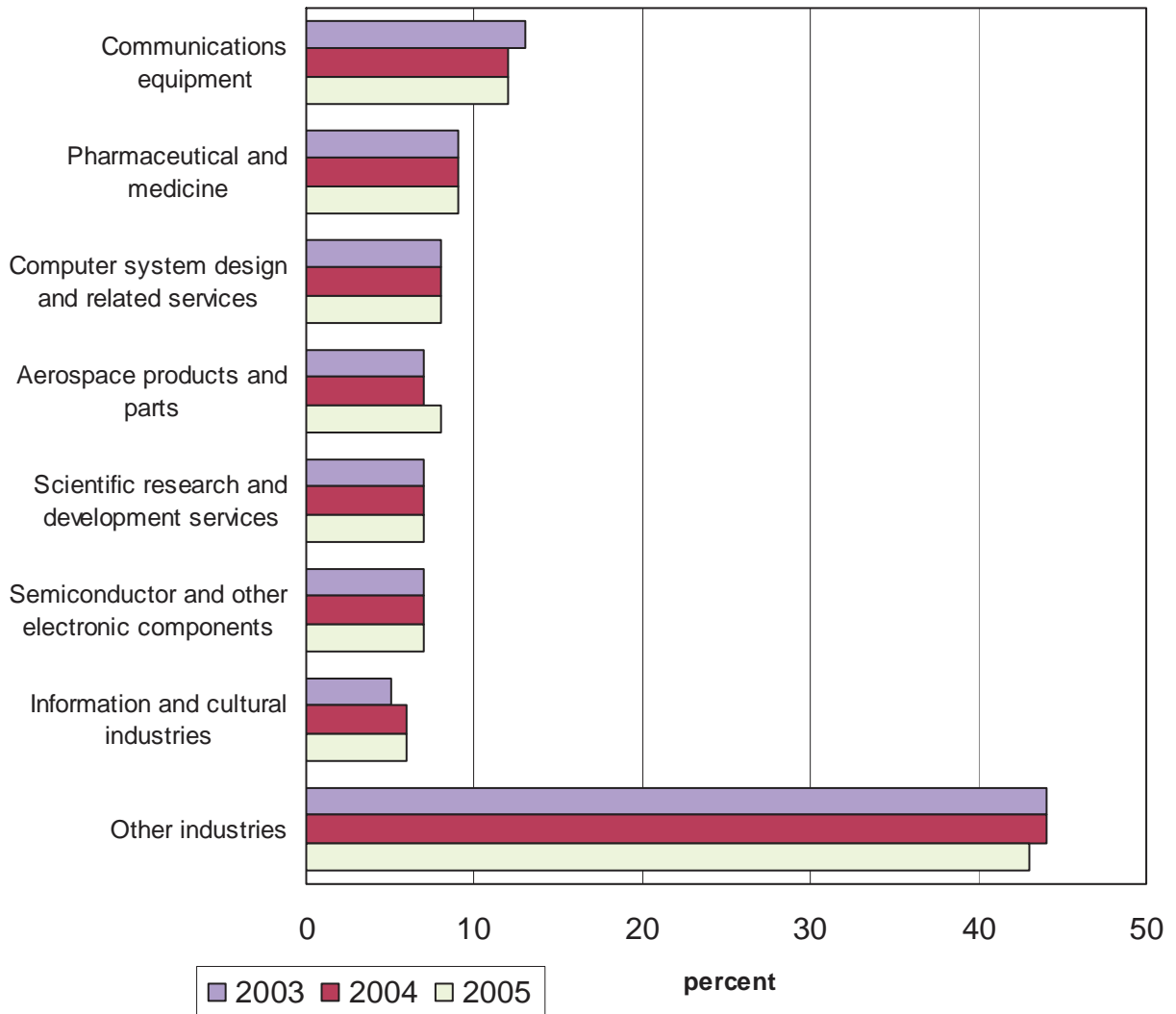
## Concentration among industries

- As a consequence of the concentration among companies, research and development expenditures are also concentrated within industry classifications.
- In 2003, the top five major industries represented \$5,769 million or 43% of all intramural R&D. These industries – communications equipment; pharmaceutical and medicine; computer system design and related services; aerospace products and parts; and scientific research and development consistently dominate the industrial R&D sector over the past six years as demonstrated by table 1.6 and chart 1.3. Significant changes for 2002 onward are noted in both the communications equipment and the pharmaceutical and medicine industries, those changes continue in 2003. While still the largest industry, communications equipment has dropped from 15 to 13 percent of total intramural expenditures. Pharmaceutical and medicine remains stable in 2003 at 9 percent of total intramural expenditures.

Year	Top 10	Top 25	Top 50	Top 75	Top 100	Total intramural expenditures
	percent of total intramural expenditures					in millions of \$
1984	36	51	61	68	73	3,022
1985	34	48	58	64	68	3,066
1986	33	47	57	63	67	4,022
1987	36	49	58	64	67	4,340
1988	35	49	59	64	68	4,623
1989	34	48	59	64	68	4,779
1990	34	47	58	64	68	5,169
1991	34	47	57	63	67	5,355
1992 <sup>e</sup>	32	45	55	60	64	5,742
1993	30	43	54	60	64	6,424
1994	28	39	49	54	58	7,567
1995	30	39	48	54	58	7,991
1996	31	41	50	56	61	7,996
1997 <sup>r</sup>	34	44	53	59	63	8,739
1998 <sup>r</sup>	36	46	55	60	64	9,682
1999 <sup>r</sup>	34	44	54	59	63	10,400
2000 <sup>r</sup>	36	46	54	60	64	12,450
2001 <sup>r</sup>	31	40	49	55	59	14,320
2002 <sup>r</sup>	24	35	45	51	56	13,367
2003 <sup>p</sup>	23	34	45	52	57	13,391
2004 <sup>p</sup>	24	35	46	53	58	13,630
2005 <sup>i</sup>	24	35	46	53	58	13,848

Selected industries	2000 <sup>r</sup>	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>p</sup>	2004 <sup>p</sup>	2005 <sup>i</sup>
	percent of total intramural expenditures					
Communications equipment	25	22	15	13	12	12
Pharmaceutical and medicine	6	6	9	9	9	9
Computer system design and related services	6	8	8	8	8	8
Aerospace products and parts	3	5	7	7	7	8
Scientific research and development services	2	4	5	7	7	7
Semiconductor and other electronic components	7	7	7	7	7	7
Information and cultural industries	7	6	6	5	6	6
Other industries	44	42	43	44	44	43
	in millions of \$					
<b>Total expenditures, all industries</b>	<b>12,450</b>	<b>14,320</b>	<b>13,367</b>	<b>13,391</b>	<b>13,630</b>	<b>13,848</b>

**Chart - 1.3 Estimated relative R&D spending for selected industries as a share of total R&D spending, 2003 to 2005**



## By company size

- The amount that a company can afford to spend on research and development is, up to a point, dependent on its size. Company size can be defined in several ways. The two most common comparison variables are company revenue and number of employees.
- On average, companies with higher revenue figures also show higher R&D expenditures. As shown in table 1.7, the average total intramural R&D expenditure of companies with revenues greater than \$400 million was \$35.8 million in 2002. This category included only 169 (or 1.4%) of all firms reporting R&D in the year. At the other end of the spectrum companies with less than \$1 million in revenues spent an average of \$0.2 million on intramural R&D in 2002. This category represents 5,966 (or 48.6%) of all reporting firms.
- Average R&D expenditures show comparable increases as employment size rises. As shown in table 1.8, companies with 5,000 or more employees had an average total intramural R&D expenditure of \$79.2 million for 2002. For smaller companies, this number steadily declines as the employment size decreases.

**Table 1.7 Average total intramural R&D expenditures, by revenue size, 2002<sup>1</sup>**

Revenue size	Number of firms	Expenditures	Average expenditures
	number	in millions of \$	in millions of \$
Non-commercial firms	18	163	9.1
Less than \$1,000,000	5,966	1,032	0.2
\$ 1,000,000 to 9,999,999	4,334	1,873	0.4
\$ 10,000,000 to 49,999,999	1,271	1,652	1.3
\$ 50,000,000 to 99,999,999	253	884	3.5
\$100,000,000 to 399,999,999	261	1,704	6.5
Greater than \$399,999,999	169	6,058	35.8
<b>Total</b>	<b>12,272</b>	<b>13,367</b>	<b>1.1</b>

**Table 1.8 Average total intramural R&D expenditures, by employment size, 2002<sup>1</sup>**

Employment size	Number of firms	Expenditures	Average expenditures
	number	in millions of \$	in millions of \$
Non-commercial firms	18	163	9.1
1 to 49	9,609	1,844	0.2
50 to 99	1,125	1,145	1.0
100 to 199	708	1,183	1.7
200 to 499	441	1,235	2.8
500 to 999	155	1,259	8.1
1,000 to 1,999	114	1,862	16.3
2,000 to 4,999	59	1,269	21.5
> Greater than 4,999	43	3,406	79.2
<b>Total</b>	<b>12,272</b>	<b>13,367</b>	<b>1.1</b>

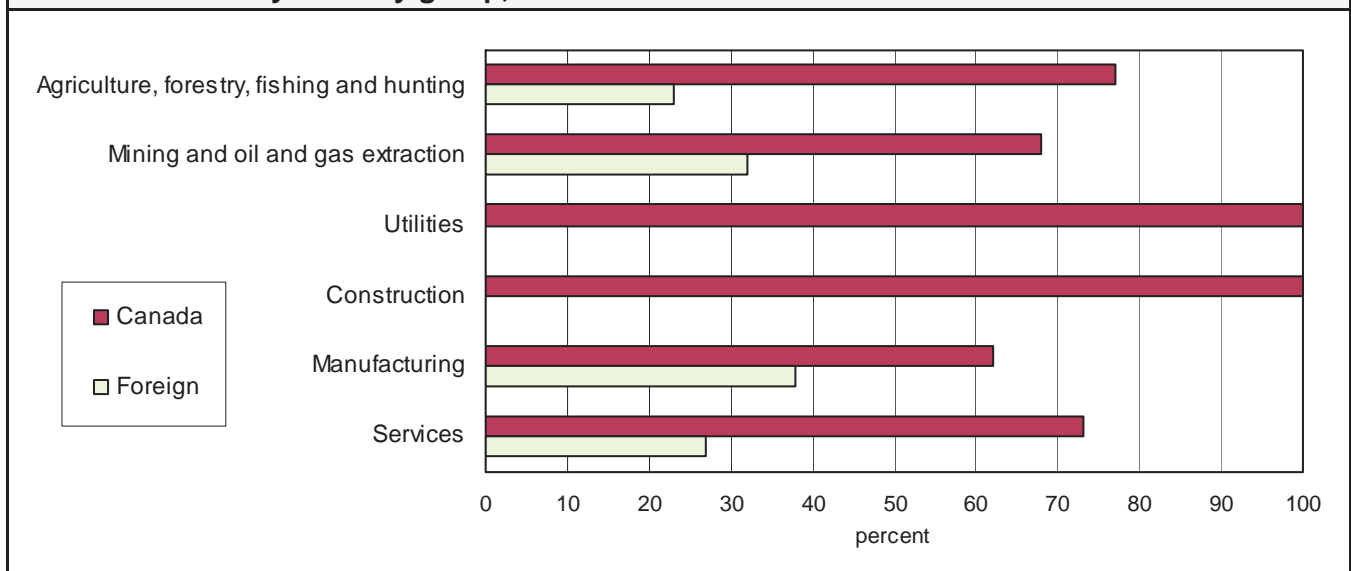
### By country of control of performers

- The existence, size and nature of an R&D program in a company may be affected by who controls the company and the links which may exist with affiliated firms.
- Although the percent of total intramural R&D performed by Canadian controlled firms has remained relatively stable over the past several years, preliminary data for 2003 indicate a slight drop (see table 1.9). In terms of total R&D expenditures, the manufacturing industry group is by far the largest group. However, it has the lowest concentration (62% of total intramural R&D) of Canadian controlled firms of all the industry sectors for 2003. The manufacturing group is dominated by the following industries; communications equipment; pharmaceutical and medicine; computer system design and related services; and aerospace products and parts.

**Table 1.9 Intramural R&D expenditures of Canadian-controlled companies compared to industry totals, by industry group, 1999 to 2003**

Industry groups	1999	2000	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>p</sup>
	percent				
Agriculture, forestry, fishing and hunting	62	65	73	76	77
Mining and oil and gas extraction	67	80	70	70	68
Utilities	100	100	100	100	100
Construction	81	74	89	100	100
Manufacturing	67	69	68	63	62
Services	69	72	74	73	73
<b>Total</b>	<b>68</b>	<b>71</b>	<b>70</b>	<b>67</b>	<b>66</b>

**Chart - 1.4 Distribution of intramural R&D expenditures, by country of control of performers and by industry group, 2003**



### By size of R&D program

- The proportion of R&D activities performed by the “large” performers, i.e., those with R&D expenditures of \$1 million or more, has decreased slightly from 1999 to 2003. This group represented 87% of total intramural R&D expenditures in 1999 and 86% in 2003. (table 1.10)
- Table 1.11 reviews the sources of funds for intramural R&D in accordance with the size of R&D expenditures in each company. As in prior years, the 2003 results indicate that the larger R&D performers obtained a greater proportion of their funding from foreign sources than did the smaller R&D performers. While companies performing less than \$1 million tended to be mostly self-funded, the larger performers received approximately 17% of their funding from foreign sources.

R&D size <sup>1</sup>	1999 <sup>r</sup>	2000 <sup>r</sup>	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>p</sup>
			in millions of \$		
Less than \$50,000	98	100	107	108	109
\$50,000 to 99,999	140	163	175	182	196
\$100,000 to 199,999	249	286	314	320	338
\$200,000 to 399,999	348	387	440	410	483
\$400,000 to 999,999	516	608	721	700	725
Greater than \$999,999	9,050	10,907	12,564	11,646	11,540
<b>Total</b>	<b>10,400</b>	<b>12,450</b>	<b>14,320</b>	<b>13,367</b>	<b>13,391</b>

1. R&D size is based on current intramural expenditures

R&D size <sup>1</sup>	Performing company	Federal government	Provincial governments	Other Canadian sources	Foreign sources	Total
			percent			
Less than \$50,000	96	1	0	2	1	<b>100</b>
\$50,000 to 99,999	96	1	0	1	0	<b>100</b>
\$100,000 to 199,999	96	1	0	2	1	<b>100</b>
\$200,000 to 399,999	93	2	0 <sup>s</sup>	3	2	<b>100</b>
\$400,000 to 999,999	92	2	0 <sup>s</sup>	3	3	<b>100</b>
Greater than \$999,999	75	2	1	5	17	<b>100</b>
<b>Total</b>	<b>78</b>	<b>2</b>	<b>0<sup>s</sup></b>	<b>5</b>	<b>15</b>	<b>100</b>

1. R&D size is based on current intramural expenditures

### Compared to performing company revenues

- The proportion of current intramural R&D expenditures to company revenues increased from 1.7% in 1999 to 2.1% in 2003. (table 1.12) It is apparent that the proportion of R&D expenditures to revenues decreases as R&D performers gets larger. The largest companies by revenue size, those with revenue over \$400 million, have had R&D/revenue ratios of less than 2% for the last five years.
- Table 1.13 demonstrates that Canadian controlled firms had a slightly higher R&D/revenue ratio than foreign controlled firms. Ratios for both categories were higher in 2003 than they were in 1999.

**Table 1.12 Current intramural R&D expenditures as a percent of company revenues, by company revenue size, 1999 to 2003**

Revenue size	1999 <sup>r</sup>	2000 <sup>r</sup>	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>p</sup>
			percent		
Less than \$1,000,000	41.7	63.5	51.2	63.8	73.5
\$1,000,000 – 9,999,999	8.3	8.7	10.5	11.3	11.1
\$10,000,000 – 49,999,999	4.5	4.2	5.1	5.3	4.9
\$50,000,000 – 99,999,999	3.3	3.5	3.6	4.5	4.6
\$100,000,000 – 399,999,999	2.3	2.2	2.7	3.2	3.6
.Greater than \$399,999,999	1.1	1.3	1.3	1.2	1.2
<b>Total</b>	<b>1.7</b>	<b>2.0</b>	<b>2.1</b>	<b>2.1</b>	<b>2.1</b>

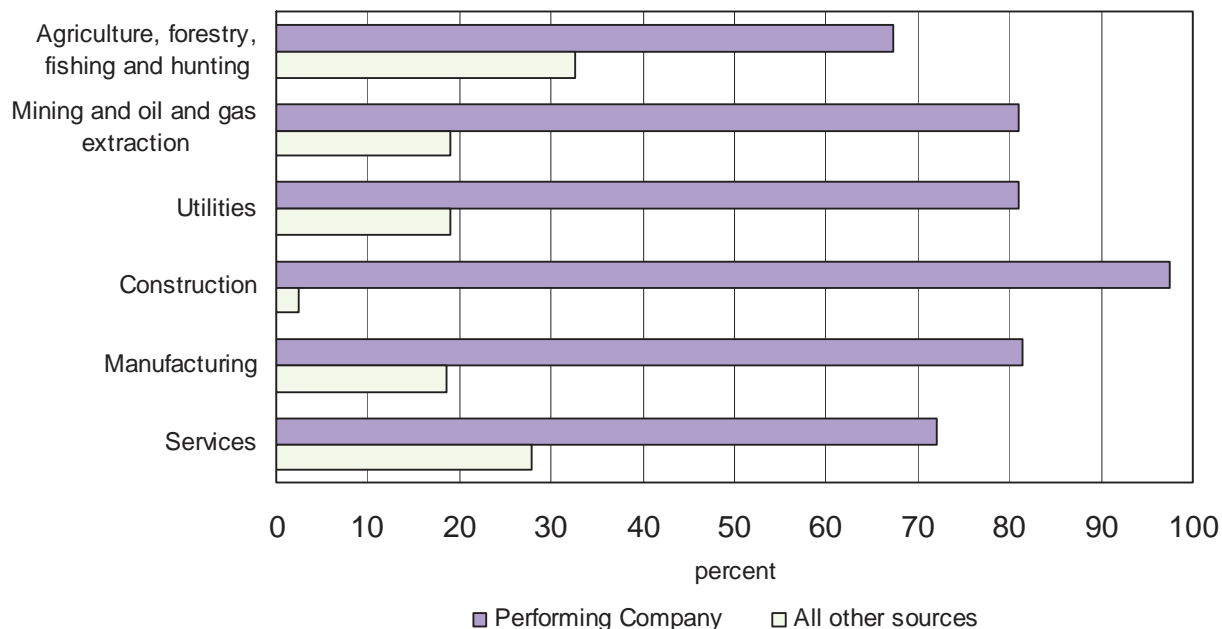
**Table 1.13 Current intramural R&D expenditures as a percent of company revenues, by country of control, 1999 to 2003**

Country of control	1999	2000 <sup>r</sup>	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>p</sup>
			percent		
Canada	2.0	2.4	2.5	2.6	2.6
Foreign	1.3	1.3	1.5	1.6	1.6
<b>Total</b>	<b>1.7</b>	<b>2.0</b>	<b>2.1</b>	<b>2.1</b>	<b>2.1</b>

### By sources of funds

- Table 1.14 shows the proportion of intramural R&D expenditures supplied by different funders from 1999 to 2003. The most significant source of funds continues to be the performing companies themselves, 2003 results show self funding at 78%. A breakdown by major industry groups is shown in chart 1.5 below. If you examine individual industries, (see appendix II, table 20) the percentage of funds originating from the performing company ranges between 36% and 100%.
- The second largest source of funds for industrial R&D is still foreign sources, which financed 15% of the total intramural R&D in 2003, up slightly from 2002.
- The federal government provided 2% of total intramural R&D funding in 2003. As with the self funding, individual industries vary widely in percentage of government funding. For example, the forestry and logging industries received 21% of its R&D funds from the federal government while more than half of all other industries received less than 1% of their funding from federal sources. Taxes foregone as a result of income tax incentives for R&D are not considered direct government support and are not attributed to the federal government.
- The remaining 6% of R&D expenditures was provided by other Canadian sources including: parent, affiliated and subsidiary companies, provincial governments, contracts from other Canadian companies, and Canadian universities.

**Chart - 1.5 Sources of funds for intramural R&D, by industry group, 2003**





<b>Table 1.14 Sources of funds for intramural R&amp;D, 1999 to 2003</b>					
<b>Sources</b>	<b>1999</b>	<b>2000<sup>r</sup></b>	<b>2001<sup>r</sup></b>	<b>2002<sup>r</sup></b>	<b>2003<sup>p</sup></b>
	percent				
<b>Canadian:</b>					
Performing firm	67	65	73	79	78
Federal government	3	2	3	2	2
Provincial governments	1	0	0	0	1
Other	4	4	4	5	5
<i>Sub-total</i>	<i>75</i>	<i>72</i>	<i>80</i>	<i>86</i>	<i>85</i>
<b>Foreign</b>	<b>25</b>	<b>28</b>	<b>20</b>	<b>14</b>	<b>15</b>
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

### By province

- Research and Development establishments are the smallest entity primarily organized for R&D, i.e., with their own budgets and staff. Most companies perform their R&D in only one province; however, there are some with R&D establishments located in several provinces.
- R&D establishments are heavily concentrated in Ontario and Quebec. These establishments accounted for \$11.2 billion or 83% of the total intramural R&D expenditures in Canada in 2003. The majority of the remaining establishments were in the western provinces of British Columbia and Alberta which totalled \$1.9 billion or 14% of total intramural expenditures. All other provinces had a minor share of the total industrial R&D for 2003.
- Table 1.16 shows the distribution of intramural R&D for the dominant provinces of Quebec and Ontario, for selected industries in 2003. Ontario represents about 53% of all R&D activity in Canada, with the largest concentration being in the communications equipment industry. This industry performed 82% of its R&D activities in Ontario. Quebec represents 31% of total Canadian industrial R&D and is most concentrated in the aerospace products and parts industry, which conducts 58% of its R&D in this province.

<b>Table 1.15 Provincial distribution of intramural R&amp;D expenditures, 2003</b>			
<b>Region</b>	<b>Current expenditures</b>	<b>Capital expenditures</b>	<b>Total expenditures</b>
		in millions of \$	
Newfoundland and Labrador	18	1	19
Prince Edward Island	6	1	7
Nova Scotia	74	4	78
New Brunswick	42	1	43
Quebec	3,810	304	4,115
Ontario	6,622	444	7,066
Manitoba	121	5	126
Saskatchewan	78	5	83
Alberta	675	104	779
British Columbia	986	90	1,075
Yukon, Northwest Territories and Nunavut	1	0	1
<b>Total</b>	<b>12,432</b>	<b>960</b>	<b>13,391</b>

<b>Table 1.16 Distribution of intramural R&amp;D expenditures for Quebec and Ontario, for selected industries, 2003</b>				
<b>Selected industries</b>	<b>Quebec</b>	<b>Ontario</b>	<b>Other provinces</b>	<b>Canada</b>
		in millions of \$		
Communications equipment	209	1,399	98	1,706
Pharmaceutical and medicine	449	536	181	1,166
Computer system design and related services	250	605	198	1,053
Scientific research and development services	251	443	237	931
Aerospace products and parts	528	377	9	914
Information and cultural industries	232	489	189	910
Semiconductor and other electronic components	85	546	99	729
Other industries	2,112	2,672	1,199	5,983
<b>Total</b>	<b>4,115</b>	<b>7,066</b>	<b>2,211</b>	<b>13,391</b>

## 2. R&D personnel

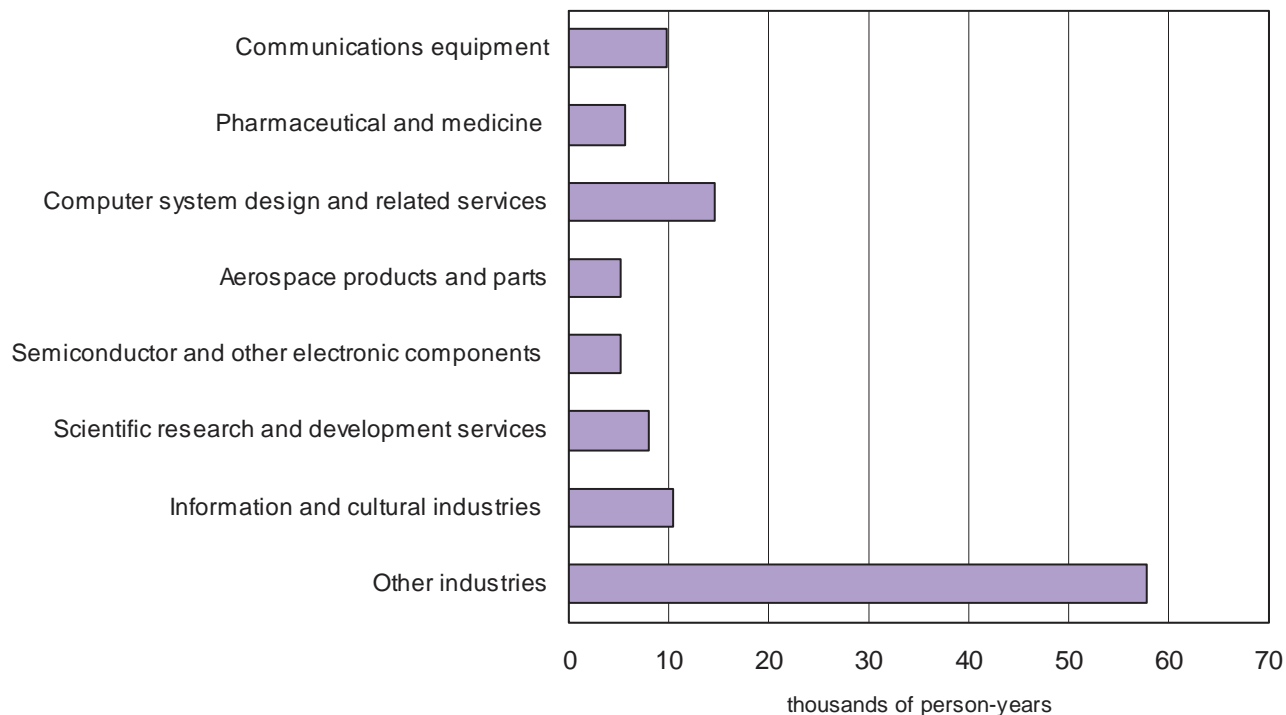
It is generally easier to get satisfactory data on R&D expenditures than on personnel engaged in R&D, mainly because of more extensive financial accounting. Although data on personnel are collected with data on expenditures, the latter are believed to be more reliable. However, because the personnel data may be compared to expenditures and especially to wages and salaries, personnel statistics should be at least a good approximation. It should be noted that prior to 1982, personnel data for all companies performing R&D are available for odd years only.

### By industry of employer

- According to table 2.1, in 2003 one half of all industrial R&D personnel are concentrated in the seven major R&D industries – communications equipment; pharmaceutical and medicine; computer system design and related services; aerospace products and parts; semiconductor and other electronic components; scientific research and development services; and information and cultural industries. Chart 2.1 demonstrates the relatively high concentration of R&D personnel in the computer system design and related services industries.

<b>Table 2.1 Number of persons engaged in R&amp;D, by selected industries, 1999 to 2003</b>					
<b>Selected industries</b>	<b>1999<sup>r</sup></b>	<b>2000<sup>r</sup></b>	<b>2001<sup>r</sup></b>	<b>2002<sup>r</sup></b>	<b>2003<sup>p</sup></b>
	percent of total R&D personnel				
Communications equipment	15	14	12	10	8
Pharmaceutical and medicine	3	4	4	4	5
Computer system design and related services	11	13	14	13	12
Aerospace products and parts	6	6	4	5	4
Semiconductor and other electronic components	5	5	5	5	4
Scientific research and development services	3	4	6	7	7
Information and cultural industries	4	5	6	7	9
Other industries	52	50	49	49	50
	person-years				
<b>Total</b>	<b>90,839</b>	<b>104,316</b>	<b>115,638</b>	<b>113,408</b>	<b>116,293</b>

**Chart - 2.1 R&D personnel, by selected industries, 2003**



**By occupational category**

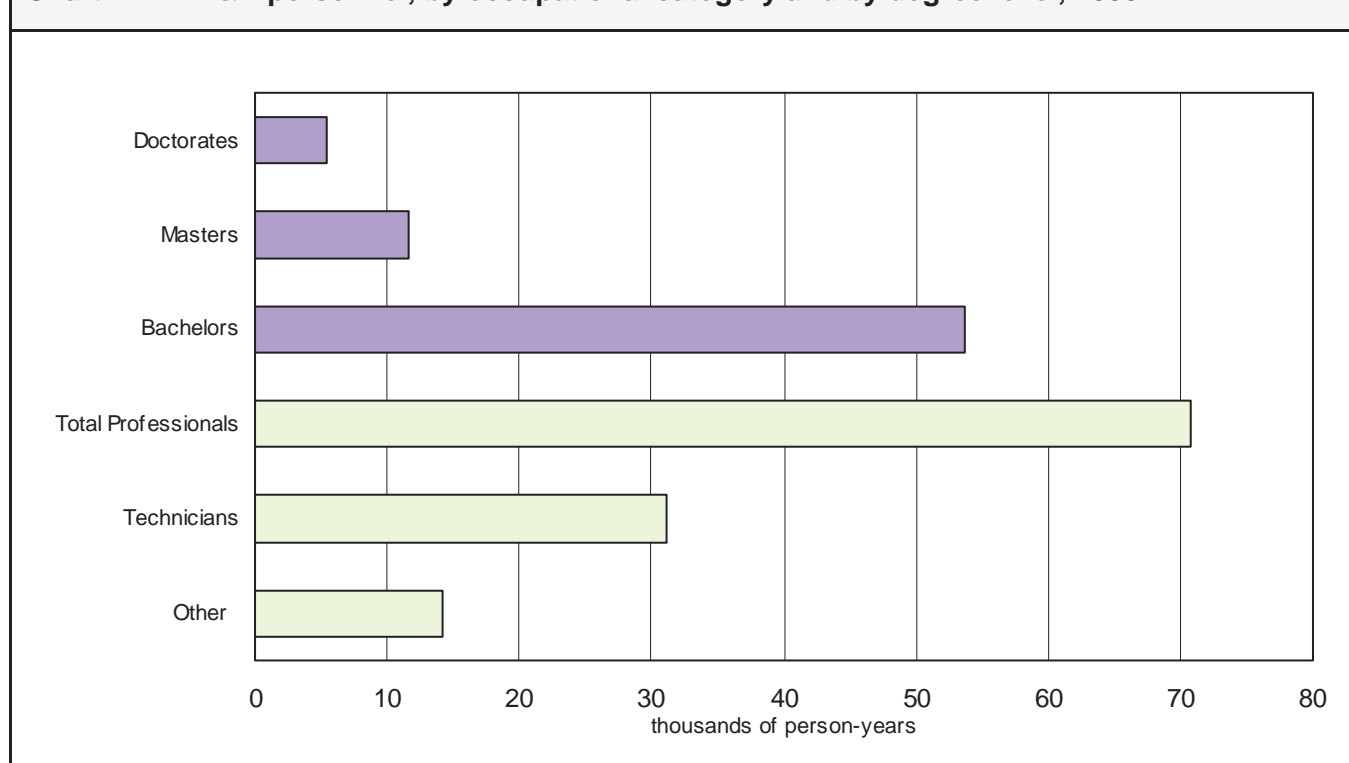
- The 2002 revised R&D personnel data increased by 12.5% in comparison to the previously released 2002 data. A new estimation system has been put in place for 2003. Data for outstanding administrative records have been estimated as explained in appendix 1. As a result of this estimation, understatements of R&D and in particular R&D employment counts should not be subject to such large revisions in subsequent years when final data are released.
- Table 2.2 shows the number of persons engaged in R&D by occupational category. The proportion of professionals (scientists and engineers) engaged in R&D was 61% of total R&D personnel in 2003. This has remained relatively stable over the five years shown. Similarly, the proportions of technicians and other personnel to total R&D personnel (27% and 12% respectively) have remained relatively stable over the period 1999 to 2003.
- Table 2.3 shows a breakdown of the professional category of R&D personnel into the three degree levels: bachelors, masters, and doctorates. Similar to the breakdown by category, there is relative stability in the proportion of personnel by degree level. In 2003, 76% of professional personnel had a bachelor’s degree, 16% a master’s and 8% a doctorate. Chart 2.2 illustrates the values of both table 2.2 and 2.3 for the year 2003.

**Table 2.2** Number of persons engaged in R&D, by occupational category, 1999 to 2003

Occupation	1999 <sup>r</sup>	2000 <sup>r</sup>	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>p</sup>
	person-years				
Professionals	57,994	67,270	73,509	70,689	70,796
Technicians	22,813	26,754	29,260	29,626	31,227
Other	10,032	10,292	12,509	13,093	14,270
<b>Total</b>	<b>90,839</b>	<b>104,316</b>	<b>115,638</b>	<b>113,408</b>	<b>116,293</b>

**Table 2.3** Professional personnel engaged in R&D, by degree level, 2001 to 2003

Year	Bachelors	Masters	Doctorates	Total
	person-years			
2001 <sup>r</sup>	60,672	8,594	4,243	<b>73,509</b>
2002 <sup>r</sup>	57,099	9,078	4,512	<b>70,689</b>
2003 <sup>p</sup>	53,760	11,597	5,439	<b>70,796</b>

**Chart - 2.2** R&D personnel, by occupational category and by degree level, 2003

### By province

- Table 2.4 gives a provincial distribution of personnel engaged in R&D.
- According to this table, most R&D personnel employed are in Quebec and Ontario, with 84% of R&D personnel being located in these two provinces. British Columbia has 8% of the total R&D personnel, Alberta follows with 4%. All other provinces have a minor share of the total personnel engaged in R&D.
- About 49% of all R&D personnel are located in the province of Ontario. As shown in table 2.5, the dominant position of this province is particularly apparent in the Communication equipment industry: 78% of this industry's R&D personnel are located there. The province of Quebec on the other hand, is predominant in the Aerospace products and parts with 64% of the industry's R&D personnel.

<b>Table 2.4 Provincial distribution of R&amp;D personnel, by occupational category, 2003</b>			
<b>Region</b>	<b>Professionals</b>	<b>Other personnel</b>	<b>Total</b>
		person-years	
Newfoundland and Labrador	188	108	<b>296</b>
Prince Edward Island	66	44	<b>110</b>
Nova Scotia	616	346	<b>962</b>
New Brunswick	296	244	<b>540</b>
Quebec	22,495	18,732	<b>41,227</b>
Ontario	36,898	19,615	<b>56,513</b>
Manitoba	662	549	<b>1,211</b>
Saskatchewan	465	479	<b>944</b>
Alberta	3,060	1,686	<b>4,746</b>
British Columbia	6,050	3,692	<b>9,742</b>
Yukon, Northwest Territories and Nunavut	0	2	<b>2</b>
<b>Total</b>	<b>70,796</b>	<b>45,497</b>	<b>116,293</b>

<b>Selected industries</b>	<b>Quebec</b>	<b>Ontario</b>	<b>Other Provinces</b>	<b>Canada</b>
		person-years		
Communications equipment	1,568	7,580	620	9,768
Pharmaceutical and medicine	1,912	2,862	773	5,547
Computer system design and related services	4,887	7,048	2,601	14,536
Scientific research and development services	3,057	2,787	2,109	7,953
Aerospace products and parts	3,341	1,836	49	5,226
Information and cultural industries	3,374	5,139	1,900	10,413
Semiconductor and other electronic	919	3,555	654	5,128
Other Industries	22,169	25,706	9,847	57,722
<b>Total</b>	<b>41,227</b>	<b>56,513</b>	<b>18,553</b>	<b>116,293</b>

### 3. Payments for technological services

- The technological balance of payments (TBP) may be described as the summary of all transactions relating to the purchase and sale of technological services, information and rights which are recorded in a country's balance of payments. It is an indicator of the flow of proprietary technology into or from a country. Unfortunately, the operations associated with the transfer are not always recorded in the balance of payments statistics and the indicator can only be approximate.
- The statistics in tables 3.1 and 3.2 are acquired through the survey of industrial R&D rather than from balance of payments surveys. The payments and receipts for technology, other than R&D, are therefore incomplete, since data from firms not included in the R&D survey are not available.
- In the survey of industrial R&D, respondents are reminded that payments should be recorded as R&D performed by others if they pay while the R&D is being carried out. The normal case is a levy to support a central R&D facility located abroad or a Canadian parent's support of the R&D of a foreign subsidiary. Payments for other technology may include reimbursement for R&D carried out in the past.
- For any industrialized country, there will be technology inflows and outflows. Some, such as the United States, have a net outflow of technology and hence receipts exceed payments. Other countries import more technology than they export. From table 3.1 it is apparent that since the early 1980's, more money has been provided by foreigners for R&D performed by Canadian firms than has been paid out. In 2003, Canada continued to show a net outflow of technology (\$1,177 million), up from a sharp decline in 2002.
- Table 3.2 shows that there are differences in the balance of technological services by industry. For 2003, industries such as Mining and oil and gas extraction, Petroleum and coal products, and Chemical products were all net importers of technology. On the other hand, industries such as Computer and peripheral equipment, and Communications equipment were net exporters, or had a net outflow of technology for the same year. The larger dollar amounts found in the latter industries help to contribute to the overall net outflow of technology for Canada.

**Table 3.1 Foreign payments made and received for technological services<sup>1</sup>, 1963 to 2003**

Year	Payments		Receipts		Balance		Total
	R&D	Other	R&D	Other	R&D	Other	
	in millions of \$						
1963	29	21	7	2	-22	-19	-41
1965	28	28	26	3	-2	-25	-27
1967	35	42	17	3	-18	-39	-57
1969	39	62	20	2	-19	-60	-79
1971	52	58	25	6	-27	-52	-79
1973	61	90	31	5	-30	-85	-115
1975	75	119	45	9	-30	-110	-140
1977	104	154	57	10	-47	-144	-191
1979	138	213	73	21	-65	-192	-257
1981	189	310	158	30	-31	-280	-311
1983	194	390	431	28	237	-362	-125
1985	258	493	518	27	260	-486	-206
1987	309	476	739	33	430	-443	-13
1989	441	490	819	66	378	-424	-46
1990	455	533	923	65	468	-468	0
1991	559	504	988	75	429	-429	0
1992	492	537	1,019	87	527	-450	77
1993	564	561	1,134	140	570	-421	149
1994	621	630	1,466	161	845	-469	376
1995	728	655	1,555	206	827	-449	378
1996	760	637	1,662	242	902	-395	507
1997	912	698	1,720	184	838	-514	324
1998	1,045	694	2,499	296	1,454	-398	1,056
1999	1,490	523	2,642	320	1,152	-203	949
2000 <sup>r</sup>	1,375	523	3,543	339	2,168	-184	1,984
2001 <sup>r</sup>	1,310	315	2,851	390	1,541	75	1,616
2002 <sup>r</sup>	760	626	1,807	435	1,047	-191	856
2003 <sup>p</sup>	846	389	1,984	428	1,138	39	1,177

1. Effective 1997, data is only for firms engaged in R&D over \$1 million.



**Table 3.2 Foreign payments made and received for technological services (R&D and other), by selected industries<sup>1</sup>, 2003**

Selected industries	Payments	Receipts	Balance
		in millions of \$	
Mining and oil and gas extraction	38	11	-27
Petroleum and coal products	61	52	-9
Chemical products	101	63	-39
Computer and peripheral equipment	3	48	45
Communications equipment	17	116	99
All other manufacturing industries	502	940	437
<b>Total manufacturing</b>	<b>685</b>	<b>1,219</b>	<b>533</b>
Other industries	512	1,182	670
<b>Total</b>	<b>1,235</b>	<b>2,411</b>	<b>1,176</b>

1. Effective 1997, data is only for firms engaged in R&D over \$1 million.

#### 4. Energy R&D expenditures

- The energy R&D performing firms spent \$722 million, or 5.4% of all industrial R&D on energy research and development in 2003. In addition, these same companies performed \$686 million in non-energy areas for total intramural expenditures of \$1,408 million, or approximately 10.5% of total R&D for 2003. This is down slightly from the previous year.
- Table 4.3, sources of funds for energy R&D by area of technology, indicates that 81% of the energy R&D is funded by the performing companies themselves. Although the government funded only 5% of total energy R&D, certain technology areas received the majority of this funding.
- For the third year in a row, the area of technology with the largest amount of energy R&D is fossil fuels, which represented 18% of all intramural energy R&D expenditures in 2003.

<b>Table 4.1 Number of energy R&amp;D performers, by major industry group, 2003</b>	
<b>Major industry groups</b>	<b>Energy R&amp;D performers</b>
	number
Manufacturing	70
Services	64
Mining and oil and gas extraction	15
Other	11
<b>Total</b>	<b>160</b>

Major industry groups	Energy R&D performers			Non-energy R&D performers	Total
	Energy R&D expenditures	Other R&D expenditures	Total		
	in millions of \$				
Mining and oil and gas extraction	166	8	173	54	227
Manufacturing	387	661	1,048	6,944	7,992
Other	170	17	187	4,985	5,172
<b>Total</b>	<b>722</b>	<b>686</b>	<b>1,408</b>	<b>11,983</b>	<b>13,391</b>

Area of technology	Intramural R&D expenditures				Payments outside Canada	Total
	Self-funded	Government funded	Other sources	Sub-total		
	in millions of \$					
Renewable resources	64	2	2	68	1	69
Transportation and transmission	67	0	15	83	3	86
Conservation	108	4	7	118	0	118
Fossil fuels	120	0	7	127	23	150
Nuclear	45	9	3	58	0	58
Other	74	9	0	83	40	123
<b>Total</b>	<b>582</b>	<b>33</b>	<b>107</b>	<b>722</b>	<b>73</b>	<b>795</b>

## 5. Health R&D expenditures on therapeutic products

- According to table 5.1 below, brand name pharmaceutical and biotechnology or biopharmaceutical companies dominate the Health R&D expenditures related to discovery and for development of therapeutic products for human use in 2003.
- Brand name pharmaceutical companies show an average of 3.5% growth for 2004 preliminary and 2005 intentions as shown in table 5.2.
- For both years in our study, the therapeutic class “Anti-infectives for systemic use” dominates with 20.5% of these R&D expenditures in 2003 down from 23.6% in 2002. Most therapeutic classes showed growth in 2003

**Table 5.1 Number of health companies performing R&D expenditures related to therapeutic products, by type of organization, 2003**

Type of organization	Count
Brand name pharmaceutical company	32
Generic pharmaceutical company	9
Contract research organization	12
Biotechnology or biopharmaceutical company	31
Other company	14
<b>Total</b>	<b>98</b>

<b>Table 5.2 Health R&amp;D expenditures on therapeutic products, by type of organization, 2002 to 2005</b>				
<b>Type of organization</b>	<b>2002</b>	<b>2003</b>	<b>2004<sup>P</sup></b>	<b>2005<sup>i</sup></b>
		in millions of \$		
Brand name pharmaceutical company	301	362	378	389
Generic pharmaceutical company	16	18	18	19
Contract research organization	9	40	40	42
Biotechnology or biopharmaceutical company	0	125	119	120
Other company	260	85	73	90
<b>Total</b>	<b>586</b>	<b>630</b>	<b>627</b>	<b>660</b>

<b>Table 5.3 Health R&amp;D expenditures on therapeutic products, by therapeutic class, 2002 and 2003</b>		
<b>Therapeutic class</b>	<b>2002</b>	<b>2003</b>
	in millions of \$	
Alimentary tract and metabolism	33	44
Blood and blood forming organs	27	32
Cardiovascular system	33	40
Dermatological	9	11
Genito-urinary systems and sex hormones	9	14
Systemic hormonal preparation excluding sex hormones and insulin	10	10
Anti-infective for systemic use	138	129
Antineoplastic and immunomodulating agents	62	53
Musculo-skeletal systems	47	50
Nervous system	60	77
Antiparasitic products, insecticides and repellents	x	x
Respiratory system	52	71
Sensory organs	x	x
Various Others	102	96
<b>Total</b>	<b>586</b>	<b>630</b>

Source: Health R&D expenditures by therapeutic class, 2003

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# **Appendix I**

## **Survey methodology and reliability of the data**

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## Survey methodology

### The survey

Data on R&D in the business enterprise sector, covering commercially oriented enterprises (privately or publicly owned), industrial non-profit organizations and trade associations, have been collected since 1955. Until 1969, the survey was biennial. From 1970 to 1981, all known performers or funders of industrial R&D were surveyed for odd-numbered years and a sample, including the leading performers, were surveyed for even-numbered years. From 1982 to 1991, a full survey was conducted annually.

Because of reductions in the science and technology program, for the 1992 and 1994 reference years, only the top 100 R&D performers (accounting for 64% of all industrial R&D), were surveyed. However, as a result of a cost-sharing agreement with the province of Quebec, the 1992 and 1994 industrial R&D survey results also included small firms having R&D activities in the province of Quebec.

Prior to 1997, Statistics Canada surveyed all firms that performed or funded R&D in Canada. Virtually all of these firms also provided information to CRA in order to claim tax benefits under the Scientific Research and Experimental Development (SR&ED) program. In an effort to reduce respondent burden, Statistics Canada stopped surveying the small performers and funders (those with less than \$1 million of R&D in Canada) and instead, imputes their R&D data using CRA administrative data from the SR&ED program.

This initiative resulted in an understatement of the total value of intramural expenditure and of the total number of R&D personnel, for the most recent years reported. The understatement was a result of the different time frame for the collection of the survey and the administrative data. Beginning this year a new estimation system has been put in place to impute values for these outstanding data. The estimation system uses industry trends and Statistics Canada's extensive Business Register database, to ensure the company is active, before applying an estimate.

The 2003 survey collected data on four years. The four years were: 2002 for which the data are expected to be final; 2003, for which the data are expected to be close to final, 2004 for which the data are planned expenditures, and 2005 for which the data are a forecast of spending intentions.

Data from the surveyed firms in 2003 represent approximately 87% of the total expenditures. Estimates are not available for administrative data for 2004 and 2005. Therefore, based on the percentage increase or decrease by industry reported by the surveyed firms, forecasts are made for planned expenditures and spending intentions based on the administrative data.

Trends in R&D spending are important economic signals and the trends are not seriously affected by a small estimation of the outstanding CRA data. For this reason, the R&D data are published as soon as possible after the survey is conducted, and revised in subsequent publications.

## The survey (Continued)

The business enterprise sector is the only sector in which data are not collected on R&D in the social sciences and humanities.

In this survey, the reporting unit is generally the company or enterprise. This unit has been used because a company, which may have several establishments or even subsidiaries, will often have a centralized research unit. In the case of a company with decentralized research units, the reporting unit may be the division, if the accounting system enables divisions to supply the required data. This procedure creates a problem when classifying data by industry. A company can only be assigned to one industry although that company may have establishments in several industries. The assignment is based on the activity from which the firm derived the greatest portion of its income. Thus, comparisons between R&D data collected at the company level and other data collected at the establishment level, such as “census value added”, may be misleading. Since industrial R&D is highly concentrated, the use of the company/enterprise as the main reporting unit also means that classification cannot be very detailed, to avoid disclosing individual company data.

One of the problems in a survey of this type is to ensure that the quality of the data is satisfactory. It cannot be expected that all firms funding R&D will be surveyed, will respond and will report correctly. There are sources of information such as federal government grant and contract lists to aid in identifying firms and editing returns. The coverage, however, is probably not complete. This is especially true for the smaller companies in the service industries. In addition, R&D is a term subject to individual interpretation which can result in inconsistencies. Thus, the data, although reasonably accurate, cannot be regarded as precise.

Different interpretations of the definition of R&D also result in discrepancies between federal government reporting of funds to industry (the business enterprise sector) for R&D and industry's reporting of such funds. For example, a federal government department may regard a contract to industry for the building of a prototype (e.g., communications satellite) as R&D. The contractors and subcontractors, however, may only use a portion of the R&D contract and even that portion may not be reported because the contract is considered as part of the firm's “routine” contract work. Differences may also arise for contracts awarded to industry for services or equipment required for a government in-house project which are reported by the federal sponsor as industrial R&D contracts. Therefore, the totals for R&D grants and contracts from the federal government to industry shown in this publication do not agree with those reported in Federal Science Activities, 2004/2005, (Catalogue no. 88-204-XIE).

The 2003 survey was mailed out in June 2004. All companies believed to be performing or funding one million dollars or more in R&D were sent a questionnaire. The mailing list of companies was made up of firms which had reported R&D in the previous survey, of firms claiming an R&D income tax incentive for 2003, of firms reported by government respondents as R&D contractors or grantees for 2003 to 2004, of firms reported by other companies as funders or performers of R&D, and of firms indicated in some other way, such as newspaper or journal articles or provincial directories. These larger performers and funders received “long forms”, covering four years, 2002, 2003, 2004 and 2005.



## The survey response

The response for the 2003 “base year” survey is shown below.

Survey Group	Responded R&D	No R&D	Deleted <sup>1</sup>	Did not Respond <sup>2</sup>	Total
			number		
Long form	1,026 <sup>3</sup>	18	28	248	1,320
Administrative data <sup>4</sup>	9,634	...	...	...	9,634
<b>Total</b>	<b>10,660</b>	<b>18</b>	<b>28</b>	<b>248</b>	<b>10,954</b>

1. Inactive, out of business and unallocated.
2. Includes estimates made for 248 long form delinquents.
3. Includes 213 companies added from T661.
4. Data from Canada Revenue Agency.

### Note to users:

A new estimation system has been put in place for 2003. Data for outstanding administrative records have been estimated thereby reducing the previous understatement of R&D and in particular R&D employment counts. The new estimation system has projected data for more than 2,000 firms. The estimation of these records is also reflected in the 2004 planned expenditures and the 2005 spending intentions. These estimated records are not included in the counts, in the table above.

## Technical notes

### Statistics for even years

Data for the reference year 2003 are available for all tables with the exception of counts of companies. However, in the even years prior to 1982 and for 1992 and 1994, our estimation procedures did not permit the preparation of tables based on revenue size, employment size, sources of funds and country of control of companies.

Regional data on R&D expenditures and personnel are only available for 1977, 1979 and 1981 to 2003

### Terminology

In this publication (i.e. appendix II table 19) the following terminology is used:

**Performing company:** The organization which carried out the R&D and submitted the return. In the case of a consolidated return, performing company could include several companies. It also includes divisions of an enterprise which send separate returns or organizations such as industrial non-profit organizations.

**Related companies:** Includes parent, subsidiaries and other affiliated companies. In the case where a consolidated return is submitted, “related companies” would exclude companies included in the consolidation.

**R&D contracts for other companies:** R&D contract work performed by reporting company for other companies.

**Federal grants:** Federal R&D grants and the R&D portion of any other federal grants; it excludes funds or tax credits for R&D tax incentives.

**Federal contracts:** Federal R&D contracts and the R&D portion of any other federal contracts.

**Provincial sources:** Provincial R&D grants and contracts, and the R&D portion of any provincial grants and contracts; it excludes funds or tax credits for R&D tax incentives.

**Other Canadian sources:** Includes funds from universities and from levels of government other than federal and provincial.

**Intramural expenditures:** Expenditures for R&D work performed within the reporting company, including work financed by others.

**Current intramural expenditures:** Labour costs, fringe benefits and other current costs for R&D, including non-capital purchases of materials, supplies and equipment but excluding capital depreciation. Current intramural expenditures also include contracts for services required to carry out R&D (e.g. contracts awarded for drilling needed for heavy oil R&D).

**Capital expenditures:** Expenditures on fixed assets used in the R&D program, classified into land, buildings, and equipment.

**Technological payments:** Payments made for R&D and other technology.

## Terminology (Continue)

**Technological receipts:** Payments received for R&D and other technology.

**Other technology:** Technology acquired through patents (sale/purchase, licensing), “know-how” (unpatented), inventions, trademarks (including franchising), patterns, design, and R&D technical assistance.

**Revenues:** Revenues resulting from the sale of products and services (after deducting sales and excise taxes), and other revenues such as those generated from investment and rentals.

**Non-commercial firms:** R&D performers without a directly affiliated Canadian commercial base. Includes industrial non-profit organizations and trade associations, R&D establishments set up by consortia, and R&D establishments set up by non-residents without associated commercial establishments and funded principally from abroad.

**R&D personnel:** Calculated in full-time equivalent (FTE). R&D may be carried out by persons who work solely on R&D projects or by persons who devote only part of their time to R&D, and the balance to other activities such as testing, quality control and production engineering. To arrive at the total effort devoted to R&D in terms of person-years, it is necessary to estimate the full-time equivalent (FTE) of these persons working only part-time in R&D.

**FTE =** number of persons who work solely on R&D projects + estimate of time of persons working only part of their time on R&D.

### Example calculation:

If out of five scientists engaged in R&D work, one works solely on R&D projects and the remaining four devote only one quarter of their working time to R&D, then:  $FTE = 1 + 1/4 + 1/4 + 1/4 + 1/4 = 2$  scientists.

**Federal government funds for industrial R&D:** Federal support consists of grants and contracts for R&D to be performed by business enterprises. Taxes foregone as a result of income tax incentives for R&D are not considered direct government support and are not attributed to the federal government.

## Industrial classification

The natural classification to use within the business enterprise sector is the North American Industry Classification System (NAICS). There are, however, problems with its use. A major problem is caused by companies with establishments in more than one industry (e.g., companies which both refine petroleum and extract oil). Another is caused by the concentration of the R&D activity among a few companies. In order to prevent disclosure of individual respondents many industries must be grouped together to provide sufficient observations for publication.

A third problem is that the classification, chosen to represent general industrial activity, may not be entirely suitable for identifying companies chosen only for their involvement in R&D.

There are some restrictions on the application of the NAICS, for example, industrial non-profit organizations will be assigned to the industry they support.

The R&D activities of other sectors such as the federal government, provincial governments, higher education, and private non-profit organizations are covered in other reports.

## Definitions

### Research and development

Research and development (R&D) is systematic investigation carried out in the natural and engineering sciences by means of experiment or analysis to achieve a scientific or commercial advance.

Research is original investigation undertaken on a systematic basis to gain new knowledge.

Development is the application of research findings or other scientific knowledge for the creation of new or significantly improved products or processes. If successful, development will usually result in devices or processes which represent an improvement in the “state of the art” and are likely to be patentable.

### Example:

The investigation of electrical conduction in crystals was research. The application of this knowledge to the creation of a new amplifying device - the transistor - was development. The application of the device to the construction of new electrical circuits for television receivers was development. The formulation of new plastic cases for a television receiver is design, not development.

Research and development may be carried out either by a permanent R&D unit (e.g., R&D division) or by a unit generally engaged in any non-R&D activity such as engineering or production. In the first case, the R&D unit may spend part of its time on routine testing or trouble shooting or on some other activities which should not be included in R&D. In the second, only the R&D portion of such units' total activity should be considered.

Research and development should be considered to be “Scientific Research and Experimental Development” as defined in Section 37, Regulation 2900 of the Income Tax Act; this section specifically excludes the following:

- (i) market research, sales promotion,
- (ii) quality control or routine analysis and testing of materials, devices or products,
- (iii) research in the social sciences or the humanities,
- (iv) prospecting, exploring or drilling for or producing minerals, petroleum or natural gas,
- (v) the commercial production of a new or improved material, device or product or the commercial use of a new or improved process,
- (vi) style changes, or routine data collection,

**Note:**

Although the definition of “Scientific Research and Experimental Development” is considered to be the same as R&D, certain expenditures for scientific research cannot be claimed for income tax purposes (e.g., land, building). All expenditures attributable to R&D are included in this report.

**Interpretation of R&D**

Generally speaking, industrial R&D is intended to result in an invention which may subsequently become a technological innovation. An essential requirement is that the outcome of the work is uncertain, i.e., that the possibility of obtaining a given technical objective cannot be known in advance on the basis of current knowledge or experience. Hence much of the work done by scientists and engineers is not R&D, since they are primarily engaged in “routine” production, engineering, quality control or testing. Although they apply scientific or engineering principles their work is not directed towards the discovery of new knowledge or the development of new products and processes. However, work elements which are not considered R&D by them selves but which directly support R&D projects, should be included with R&D in these cases. Examples of such work elements are design and engineering, shop work, computer programming, and secretarial work.

If the primary objective is to make further technical improvements to the product or process, then the work comes within the definition of R&D. If however, the product, process or approach is substantially set and the primary objective is to develop markets, to do pre-production planning or to get a production or control system working smoothly, then the activity can no longer be considered as part of R&D even though it could be regarded as an important part of the total innovation process. Thus, the design, construction and testing of prototypes, models and pilot plants are part of R&D. But, when necessary modifications have been made and testing has been satisfactorily completed, the boundary of R&D has been reached. Hence, the costs of tooling (design and try-out), construction drawings and manufacturing blueprints, and production start-up are not included in development costs.

Pilot plants may be included in development only if the main purpose is to acquire experience and compile data. As soon as they begin operating as normal production units, their costs can no longer be attributed to R&D. Similarly, once the original prototype has been found satisfactory, the cost of other “prototypes” built to meet a special need or fill a very small order are not to be considered as part of R&D.

<b>Specific cases and their treatment</b>		
<b>Activity</b>	<b>Treatment</b>	<b>Remarks</b>
Economic research, market research, management studies	Exclude	All activities in the social sciences.
Quality control, routine testing, style changes, minor adaptation of a product to meet a customer's specific requirements	Exclude	Even if carried out by staff normally engaged in R&D.
Prospecting, exploratory drilling, development of mines, oil or gas wells	Exclude	Except for R&D projects concerned with new equipment or techniques in these activities, such as in-situ and tertiary recovery research.
Engineering	Exclude	Engineering unless it is in direct support of R&D.
Design and drawing	Exclude	Design and drawing unless it is in direct support of R&D.
Prototypes, pilot plants	Include	As long as the primary objective is to make further improvements.
Contracts for R&D	Include	All contracts for R&D. For contracts which include other work, report only the R&D costs.
Tooling up, trial production, trouble shooting	Exclude	Although R&D may be required as a result of these steps.
Patent and licence work	Exclude	All administrative and legal work connected with patents and licences.

## Reliability of the data

All the possible sources of error are examined below.

### Coverage

“Coverage errors are introduced whenever the sampling frame...does not adequately represent the target population at the time of the survey.”

Coverage is a minor source of error. Surveys are of all known and suspected, large R&D performers and funders (R&D  $\geq$  \$1,000,000).

Administrative data are used for the small R&D performers or funders. Companies have up to 18 months after their fiscal year end to claim a tax credit for their R&D expenditures; however, we estimate under reporting to be less than 8%.

### Response

“A response error occurs whenever a characteristic is misreported in a census or a survey.”

As a result of a reconciliation of federal and industrial accounts of government grants and contracts, we think that industrial R&D performance estimates may be slightly low. This is caused by the non-reporting of industrial R&D funded by contract. Such work is sometimes not distinguishable from non-R&D contract work.

The accuracy of the company's estimates of future expenditures has also been a problem in the past, particularly in the wells and petroleum products industries.

### Non-response

“Non-response occurs when information required for a survey unit is missing. This could happen because the unit cannot be contacted, because the unit is unable to provide the information requested, or because the unit refuses to cooperate in the survey.”

Non-response is a potential problem in four areas. One is the estimate of R&D expenditures two years past the base year. If no estimate is made, editors make one - based usually on the expenditure of the preceding year or a slight increase in expenditures.

The second involves the administrative data used for the smaller R&D performers. These represent 10% of all R&D performed by businesses. Certain information is not asked of them. However, the missing data are imputed from the replies of the larger performers in the same industry.

The third concerns companies inadvertently not included in the survey. A number of sources are used to create the mailing lists and it is unlikely that major performers would be overlooked.

Failure of surveyed companies to reply is the fourth type of non-response. We believe non-response error to be minor and may result in a minor under-estimation of R&D expenditures.

## **Coding**

“A coding operation in a survey or census is defined as the operation where data on questionnaires or source documents are transformed into a format which is suitable for input to the data capture operation. This often involves the assignment of codes for ‘write-in’ entries but may also be a fairly straightforward transcription operation.”

Uncorrected coding errors are unlikely because of the examination of numerous tables and listings prepared for data analysis before publication tables are created.

## **Data capture**

“The data capture operation in a census or survey consists of converting the data received on questionnaires (e.g., respondent answers) to a machine readable format.”

All data capture for science statistics is through manual intervention: key-edit or typed entry at a computer terminal.

Significant uncorrected data capture errors are unlikely because of the examination of numerous tables and listings prepared for data analysis before publication tables are created.

## **Edit and imputation**

“The edit procedure usually consists of: (i) checking each field of every record to ascertain whether it contains a valid code or entry; (ii) checking codes or entries in certain predetermined combinations of fields to ascertain whether codes or entries are consistent with one another... The imputation procedure consists of changing values in some of the fields in records which failed the edit rules with a view to ensuring that the resultant data records satisfy all edit rules”.

Although there are a number of edits, all cases of failed edit checks are corrected after consideration by editors. Automatic imputations are made only for the smaller R&D performers and funders.

## **Sampling**

“Sampling error occurs whenever survey results are based on a sample of units from a survey frame... Obviously there is no sampling error in complete enumeration surveys.”

Although a complete enumeration is carried out of known and suspected R&D performers and funders, records received from the administrative data do not provide as much information as do those completing the long form. Certain data are imputed for records from the administrative file based on the patterns of long form respondents in the same industry. Thus, as a result of the 2003 survey, the 2003 business enterprise sector R&D expenditures would be based on full enumeration but about 10% of the expenditures for 2004 and 2005 would have been imputed.



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## **Appendix II**

### **Tables 1 to 28**

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Table 1.

## GERD, by performing sector, 1963 to 2005

Year	Federal government	Provincial governments	Business enterprises <sup>1</sup>	Higher education	Private non-profit organizations	Total
in millions of \$						
1963	175	17	176	86	4	458
1964	195	18	229	109	4	555
1965	221	21	285	130	5	662
1966	241	24	313	167	5	750
1967	282	26	333	206	6	853
1968	309	27	339	229	6	910
1969	315	30	369	266	6	986
1970	327	30	408	295	9	1,069
1971	383	43	413	436	10	1,285
1972	414	50	462	434	12	1,372
1973	450	55	503	449	13	1,470
1974	508	68	613	485	15	1,689
1975	545	72	700	568	16	1,901
1976	593	82	755	624	17	2,071
1977	638	93	857	713	21	2,322
1978	711	98	1,006	769	25	2,609
1979	717	113	1,266	921	27	3,044
1980	779	140	1,571	1,055	30	3,575
1981	916	162	2,124	1,177	36	4,415
1982	1,103	194	2,489	1,373	39	5,198
1983	1,219	201	2,602	1,452	43	5,517
1984	1,389	206	3,022	1,604	52	6,273
1985	1,356	213	3,635	1,722	59	6,985
1986	1,407	217	4,022	1,839	61	7,546
1987	1,383	228	4,341	1,934	64	7,950
1988	1,429	242	4,623	2,669	82	9,045
1989	1,533	272	4,779	2,844	89	9,517
1990	1,654	302	5,169	3,033	102	10,260
1991 <sup>f</sup>	1,685	328	5,355	3,292	110	10,770
1992	1,716	293	5,742 <sup>e</sup>	3,519	68	11,338
1993	1,757	269	6,424	3,660	74	12,184
1994	1,753	260	7,567	3,675	86	13,341
1995	1,727	254	7,991	3,691	91	13,754
1996	1,792	242	7,996	3,697	89	13,816
1997 <sup>f</sup>	1,720	214	8,739	3,879	82	14,634
1998 <sup>f</sup>	1,743	216	9,682	4,370	77	16,088
1999 <sup>f</sup>	1,859	233	10,400	5,082	63	17,637
2000 <sup>f</sup>	2,080	255	12,450	5,793	57	20,635
2001 <sup>f</sup>	2,103	307	14,320	6,424	52	23,206
2002 <sup>f</sup>	2,190	315	13,367	7,455	55	23,382
2003 <sup>f</sup>	2,083	318	13,391	8,132	68	23,992
2004 <sup>p</sup>	2,257	357	13,630	8,945	70	25,259
2005 <sup>p</sup>	2,138	367	13,848	9,841	74	26,268

1. Excludes R&D in the social sciences and humanities.

Table 2.

## BERD compared to GERD and GDP, 1981 to 2005

Year	BERD <sup>1</sup>	BERD/GERD <sup>2</sup>	GDP <sup>3</sup>	BERD/GDP	GDP Implicit price index <sup>4</sup>	BERD in 1997 dollars
	in millions of \$	%	in millions of \$	%		in millions of \$
1981	2,124	48.12	360,471	0.59	60.1	3,535
1982	2,489	47.87	379,859	0.66	65.1	3,823
1983	2,602	47.17	411,386	0.63	68.7	3,788
1984	3,022	48.18	449,582	0.67	70.9	4,263
1985	3,633	52.01	485,714	0.75	73.2	4,963
1986	4,022	53.30	512,541	0.78	75.4	5,335
1987	4,340	54.59	558,949	0.78	78.8	5,508
1988	4,623	51.12	613,094	0.75	82.4	5,611
1989	4,779	50.22	657,728	0.73	86.1	5,551
1990	5,169	50.38	679,921	0.76	88.8	5,821
1991 <sup>f</sup>	5,355	49.73	685,367	0.78	91.5	5,852
1992	5,742 <sup>e</sup>	50.65	700,480	0.82	92.7	6,194
1993	6,424	52.72	727,184	0.88	94.0	6,834
1994	7,567	56.72	770,873	0.98	95.1	7,957
1995	7,991	58.10	810,426	0.99	97.2	8,221
1996	7,996	57.87	836,864	0.96	98.8	8,093
1997 <sup>f</sup>	8,739	59.72	882,733	0.99	100.0	8,739
1998 <sup>f</sup>	9,682	60.18	914,973	1.06	99.6	9,721
1999 <sup>f</sup>	10,400	58.97	982,441	1.06	101.3	10,266
2000 <sup>f</sup>	12,450	60.33	1,076,577	1.16	105.5	11,801
2001 <sup>f</sup>	14,320	61.71	1,108,048	1.29	106.7	13,421
2002 <sup>f</sup>	13,367	57.17	1,154,204	1.16	107.8	12,399
2003 <sup>p</sup>	13,391	55.81	1,216,191	1.10	111.3	12,031
2004 <sup>p</sup>	13,630	53.96	1,290,185	1.06	114.7	11,883
2005 <sup>i</sup>	13,848	52.72	..	..	..	..

1. Excludes R&D in the social sciences and humanities.

2. Source: Table 1 for GERD data.

3. Source: CANSIM Table 380-0017

4. Source: CANSIM Table 384-0036

Table 3.

## Total intramural R&amp;D expenditures, by industry, 2001 to 2005

Industries	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>p</sup>	2004 <sup>p</sup>	2005 <sup>i</sup>
	in millions of \$				
<b>Agriculture, forestry, fishing and hunting</b>					
Agriculture	70	80	64	62	62
Forestry and logging	15	16	21	21	20
Fishing, hunting and trapping	7	5	5	5	5
<b>Total agriculture, forestry, fishing and hunting</b>	<b>92</b>	<b>101</b>	<b>89</b>	<b>87</b>	<b>87</b>
<b>Mining and oil and gas extraction</b>					
Oil and gas extraction	164	182	182	205	211
Mining	50	41	45	55	54
<b>Total mining and oil and gas extraction</b>	<b>214</b>	<b>223</b>	<b>227</b>	<b>260</b>	<b>266</b>
<b>Utilities</b>					
Electric power	165	125	115	115	115
Other utilities	7	4	7	7	7
<b>Total utilities</b>	<b>171</b>	<b>129</b>	<b>121</b>	<b>122</b>	<b>122</b>
<b>Construction</b>	<b>51</b>	<b>44</b>	<b>40</b>	<b>40</b>	<b>40</b>
<b>Manufacturing</b>					
Food	71	81	91	91	90
Beverage and tobacco	22	27	42	26	30
Textile	48	42	45	44	44
Wood products	48	50	51	51	51
Paper	420	371	390	428	435
Printing	16	16	20	20	20
Petroleum and coal products	54	89	122	123	116
Pharmaceutical and medicine	889	1,163	1,166	1,219	1,219
Other chemicals	274	267	267	242	238
Plastic products	79	78	94	118	121
Rubber products	22	15	20	20	20
Non-metallic mineral products	20	14	20	20	20
Primary metal (ferrous)	52	36	30	32	31
Primary metal (non-ferrous)	162	191	231	244	243
Fabricated metal products	112	143	155	154	156
Machinery	441	433	436	430	450
Computer and peripheral equipment	202	204	187	175	180
Communications equipment	3,180	1,994	1,706	1,640	1,670
Semiconductor and other electronic components	872	802	729	786	813
Navigational, measuring, medical and control instruments	424	418	402	385	396
Other computer and electronic products	23	18	17	18	18
Electrical equipment, appliance and components	311	212	196	185	184
Motor vehicle and parts	407	423	469	464	469
Aerospace products and parts	949	896	914	916	949
All other transportation equipment	26	16	22	23	23
Furniture and related products	14	19	19	20	20
Other manufacturing industries	143	138	151	145	144
<b>Total manufacturing</b>	<b>9,283</b>	<b>8,155</b>	<b>7,992</b>	<b>8,019</b>	<b>8,149</b>
<b>Services</b>					
Wholesale trade	617	594	625	648	655
Retail trade	45	41	30	31	29
Transportation and warehousing	33	43	32	34	36
Information and cultural industries	571	730	910	899	913
Finance, insurance and real estate	169	200	225	233	232
Architectural, engineering and related services	548	490	462	504	498
Computer system design and related services	1,103	1,058	1,053	1,071	1,081
Management, scientific and technical consulting services	83	83	78	93	95
Scientific research and development	777	879	931	1,009	1,042
Health care and social assistance	341	385	382	372	393
All other services	221	210	193	207	210
<b>Total services</b>	<b>4,508</b>	<b>4,714</b>	<b>4,921</b>	<b>5,101</b>	<b>5,184</b>
<b>Total all industries</b>	<b>14,320</b>	<b>13,367</b>	<b>13,391</b>	<b>13,630</b>	<b>13,848</b>

Table 4.

## Current intramural R&amp;D expenditures, by industry, 2001 to 2005

Industries	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>p</sup>	2004 <sup>p</sup>	2005 <sup>i</sup>
	in millions of \$				
<b>Agriculture, forestry, fishing and hunting</b>					
Agriculture	61	76	60	57	57
Forestry and logging	15	16	20	21	20
Fishing, hunting and trapping	7	5	4	4	4
<b>Total agriculture, forestry, fishing and hunting</b>	<b>83</b>	<b>96</b>	<b>85</b>	<b>82</b>	<b>82</b>
<b>Mining and oil and gas extraction</b>					
Oil and gas extraction	129	113	118	130	131
Mining	45	40	42	51	53
<b>Total mining and oil and gas extraction</b>	<b>175</b>	<b>153</b>	<b>160</b>	<b>181</b>	<b>185</b>
<b>Utilities</b>					
Electric power	156	116	107	108	108
Other utilities	7	4	7	7	7
<b>Total utilities</b>	<b>163</b>	<b>120</b>	<b>114</b>	<b>114</b>	<b>114</b>
<b>Construction</b>	<b>47</b>	<b>43</b>	<b>39</b>	<b>39</b>	<b>39</b>
<b>Manufacturing</b>					
Food	69	79	88	88	87
Beverage and tobacco	21	26	41	25	29
Textile	46	41	43	42	42
Wood products	47	49	48	50	49
Paper	413	366	385	422	430
Printing	16	15	20	20	20
Petroleum and coal products	44	74	114	106	106
Pharmaceutical and medicine	797	1,033	1,063	1,114	1,156
Other chemicals	232	222	227	205	201
Plastic products	74	75	85	86	87
Rubber products	20	15	20	20	20
Non-metallic mineral products	19	13	20	20	20
Primary metal (ferrous)	46	35	27	29	28
Primary metal (non-ferrous)	154	171	196	216	214
Fabricated metal products	110	141	152	152	154
Machinery	421	416	421	417	437
Computer and peripheral equipment	185	185	170	158	163
Communications equipment	2,911	1,893	1,627	1,583	1,597
Semiconductor and other electronic components	688	692	671	716	743
Navigational, measuring, medical and control instruments	404	406	390	374	381
Other computer and electronic products	21	17	16	17	17
Electrical equipment, appliance and components	275	188	188	174	174
Motor vehicle and parts	361	388	438	425	430
Aerospace products and parts	930	877	889	891	899
All other transportation equipment	25	16	22	23	23
Furniture and related products	13	18	19	19	19
Other manufacturing industries	124	130	136	133	135
<b>Total manufacturing</b>	<b>8,467</b>	<b>7,579</b>	<b>7,516</b>	<b>7,524</b>	<b>7,661</b>
<b>Services</b>					
Wholesale trade	549	559	577	615	621
Retail trade	40	40	29	30	28
Transportation and warehousing	33	40	32	34	35
Information and cultural industries	467	644	803	801	813
Finance, insurance and real estate	153	193	219	228	226
Architectural, engineering and related services	441	417	400	430	429
Computer system design and related services	1,009	983	1,010	1,026	1,035
Management, scientific and technical consulting services	73	69	72	84	85
Scientific research and development	635	778	860	934	977
Health care and social assistance	284	346	334	329	352
All other services	202	198	181	193	196
<b>Total services</b>	<b>3,885</b>	<b>4,266</b>	<b>4,517</b>	<b>4,703</b>	<b>4,797</b>
<b>Total all industries</b>	<b>12,820</b>	<b>12,257</b>	<b>12,432</b>	<b>12,644</b>	<b>12,878</b>

Table 5.

## Capital R&amp;D expenditures, by industry, 2001 to 2005

Industries	2001 <sup>f</sup>	2002 <sup>f</sup>	2003 <sup>p</sup>	2004 <sup>p</sup>	2005 <sup>i</sup>
	in millions of \$				
<b>Agriculture, forestry, fishing and hunting</b>					
Agriculture	8	4	4	5	5
Forestry and logging	1	1	0	0	0
Fishing, hunting and trapping	0	1	0	0	0
<b>Total agriculture, forestry, fishing and hunting</b>	<b>9</b>	<b>5</b>	<b>4</b>	<b>5</b>	<b>5</b>
<b>Mining and oil and gas extraction</b>					
Oil and gas extraction	35	69	64	75	80
Mining	5	1	3	4	1
<b>Total mining and oil and gas extraction</b>	<b>40</b>	<b>70</b>	<b>67</b>	<b>79</b>	<b>81</b>
<b>Utilities</b>					
Electric power	8	9	7	8	8
Other utilities	0	0	0	0	0
<b>Total utilities</b>	<b>8</b>	<b>9</b>	<b>8</b>	<b>8</b>	<b>8</b>
<b>Construction</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>Manufacturing</b>					
Food	2	2	3	3	2
Beverage and tobacco	2	1	1	0	0
Textile	2	1	2	2	2
Wood products	1	2	2	2	2
Paper	7	5	5	6	6
Printing	0	0	0	0	0
Petroleum and coal products	11	15	7	17	10
Pharmaceutical and medicine	92	130	103	104	62
Other chemicals	42	45	40	37	37
Plastic products	5	3	9	33	34
Rubber products	2	0	0	0	0
Non-metallic mineral products	1	1	0	0	0
Primary metal (ferrous)	6	2	3	3	3
Primary metal (non-ferrous)	7	20	35	29	29
Fabricated metal products	3	2	2	3	2
Machinery	20	16	15	13	13
Computer and peripheral equipment	18	19	17	17	17
Communications equipment	269	101	79	57	73
Semiconductor and other electronic components	184	110	58	70	70
Navigational, measuring, medical and control instruments	20	12	11	12	15
Other computer and electronic products	2	1	1	1	1
Electrical equipment, appliance and components	36	24	9	10	10
Motor vehicle and parts	46	34	31	39	38
Aerospace products and parts	19	20	25	24	49
All other transportation equipment	0	0	0	1	0
Furniture and related products	0	1	1	1	1
Other manufacturing industries	18	8	15	12	9
<b>Total manufacturing</b>	<b>816</b>	<b>577</b>	<b>476</b>	<b>495</b>	<b>488</b>
<b>Services</b>					
Wholesale trade	68	35	48	33	34
Retail trade	4	2	1	1	1
Transportation and warehousing	1	3	1	1	1
Information and cultural industries	104	86	107	98	99
Finance, insurance and real estate	16	7	6	5	6
Architectural, engineering and related services	107	73	63	74	69
Computer system design and related services	94	75	43	46	46
Management, scientific and technical consulting services	9	14	6	9	10
Scientific research and development	143	100	71	75	65
Health care and social assistance	57	40	48	42	42
All other services	19	12	12	14	14
<b>Total services</b>	<b>623</b>	<b>447</b>	<b>404</b>	<b>398</b>	<b>387</b>
<b>Total all industries</b>	<b>1,501</b>	<b>1,109</b>	<b>960</b>	<b>986</b>	<b>970</b>

Table 6.

## Current intramural R&amp;D expenditures, by industry and by type of expenditure, 2003

Industries	Current expenditures		
	Wages and salaries	Other costs	Total
	in millions of \$		
<b>Agriculture, forestry, fishing and hunting</b>			
Agriculture	32	29	60
Forestry and logging	14	7	20
Fishing, hunting and trapping	3	2	4
<b>Total agriculture, forestry, fishing and hunting</b>	<b>48</b>	<b>37</b>	<b>85</b>
<b>Mining and oil and gas extraction</b>			
Oil and gas extraction	30	88	118
Mining	18	24	42
<b>Total mining and oil and gas extraction</b>	<b>48</b>	<b>113</b>	<b>160</b>
<b>Utilities</b>			
Electric power	68	39	107
Other utilities	5	1	7
<b>Total utilities</b>	<b>73</b>	<b>41</b>	<b>114</b>
<b>Construction</b>	<b>27</b>	<b>12</b>	<b>39</b>
<b>Manufacturing</b>			
Food	54	35	88
Beverage and tobacco	18	23	41
Textile	27	16	43
Wood products	28	20	48
Paper	96	290	385
Printing	17	3	20
Petroleum and coal products	26	89	114
Pharmaceutical and medicine	364	699	1,063
Other chemicals	129	98	227
Plastic products	54	31	85
Rubber products	12	8	20
Non-metallic mineral products	15	5	20
Primary metal (ferrous)	20	7	27
Primary metal (non-ferrous)	93	103	196
Fabricated metal products	111	41	152
Machinery	288	133	421
Computer and peripheral equipment	105	65	170
Communications equipment	946	681	1,627
Semiconductor and other electronic components	470	201	671
Navigational, measuring, medical and control instruments	268	122	390
Other computer and electronic products	11	5	16
Electrical equipment, appliance and components	110	78	188
Motor vehicle and parts	230	208	438
Aerospace products and parts	364	525	889
All other transportation equipment	14	8	22
Furniture and related products	15	4	19
Other manufacturing industries	89	47	136
<b>Total manufacturing</b>	<b>3,973</b>	<b>3,543</b>	<b>7,516</b>
<b>Services</b>			
Wholesale trade	334	243	577
Retail trade	26	3	29
Transportation and warehousing	16	15	32
Information and cultural industries	577	226	803
Finance, insurance and real estate	148	71	219
Architectural, engineering and related services	313	87	400
Computer system design and related services	793	217	1,010
Management, scientific and technical consulting services	53	19	72
Scientific research and development	460	399	860
Health care and social assistance	162	172	334
All other services	139	41	181
<b>Total services</b>	<b>3,023</b>	<b>1,494</b>	<b>4,517</b>
<b>Total all industries</b>	<b>7,192</b>	<b>5,239</b>	<b>12,432</b>

Table 7.

## Capital intramural R&amp;D expenditures, by industry and by type of expenditure, 2003

Industries	Capital expenditures			
	Land	Buildings	Equipment	Total
	in millions of \$			
<b>Agriculture, forestry, fishing and hunting</b>				
Agriculture	0	0	4	4
Forestry and logging	0	0	0	0
Fishing, hunting and trapping	0	0	0	0
<b>Total agriculture, forestry, fishing and hunting</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>4</b>
<b>Mining and oil and gas extraction</b>				
Oil and gas extraction	0	0	64	64
Mining	0	0	3	3
<b>Total mining and oil and gas extraction</b>	<b>0</b>	<b>0</b>	<b>67</b>	<b>67</b>
<b>Utilities</b>				
Electric power	0	1	6	7
Other utilities	0	0	0	0
<b>Total utilities</b>	<b>0</b>	<b>1</b>	<b>6</b>	<b>8</b>
<b>Construction</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>
<b>Manufacturing</b>				
Food	0	1	2	3
Beverage and tobacco	0	0	1	1
Textile	0	0	2	2
Wood products	0	0	2	2
Paper	0	0	5	5
Printing	0	0	0	0
Petroleum and coal products	0	0	7	7
Pharmaceutical and medicine	0	22	81	103
Other chemicals	0	2	38	40
Plastic products	0	0	9	9
Rubber products	0	0	0	0
Non-metallic mineral products	0	0	0	0
Primary metal (ferrous)	0	0	3	3
Primary metal (non-ferrous)	0	1	34	35
Fabricated metal products	0	0	2	2
Machinery	0	0	15	15
Computer and peripheral equipment	0	0	17	17
Communications equipment	0	0	79	79
Semiconductor and other electronic components	0	0	58	58
Navigational, measuring, medical and control instruments	0	0	11	11
Other computer and electronic products	0	0	1	1
Electrical equipment, appliance and components	0	0	9	9
Motor vehicle and parts	0	0	31	31
Aerospace products and parts	0	0	25	25
All other transportation equipment	0	0	0	0
Furniture and related products	0	0	1	1
Other manufacturing industries	0	7	9	15
<b>Total manufacturing</b>	<b>0</b>	<b>33</b>	<b>443</b>	<b>476</b>
<b>Services</b>				
Wholesale trade	0	14	34	48
Retail trade	0	0	1	1
Transportation and warehousing	0	0	1	1
Information and cultural industries	0	0	107	107
Finance, insurance and real estate	0	0	5	6
Architectural, engineering and related services	0	0	62	63
Computer system design and related services	0	0	43	43
Management, scientific and technical consulting services	0	0	6	6
Scientific research and development	0	6	65	71
Health care and social assistance	0	16	32	48
All other services	0	0	12	12
<b>Total services</b>	<b>0</b>	<b>37</b>	<b>367</b>	<b>404</b>
<b>Total all industries</b>	<b>0</b>	<b>70</b>	<b>889</b>	<b>960</b>



Table 8.

## Total intramural R&amp;D expenditures, by province, 2001 to 2003

Province	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>p</sup>
		in millions of \$	
Newfoundland and Labrador	21	18	19
Prince Edward Island	6	5	7
Nova Scotia	91	90	78
New Brunswick	45	44	43
Quebec	4,155	4,057	4,115
Ontario	7,944	7,048	7,066
Manitoba	173	138	126
Saskatchewan	87	113	83
Alberta	718	767	779
British Columbia	1,080	1,086	1,075
Yukon, Northwest Territories and Nunavut	1	0	1
<b>Total</b>	<b>14,320</b>	<b>13,367</b>	<b>13,391</b>

**Table 9.**

**Current intramural R&D expenditures, by province, 2001 to 2003**

Province	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>p</sup>
		in millions of \$	
Newfoundland and Labrador	20	18	18
Prince Edward Island	5	4	6
Nova Scotia	86	84	74
New Brunswick	42	42	42
Quebec	3,756	3,786	3,810
Ontario	7,090	6,494	6,622
Manitoba	163	132	121
Saskatchewan	79	94	78
Alberta	636	659	675
British Columbia	942	943	986
Yukon, Northwest Territories and Nunavut	1	0	1
<b>Total</b>	<b>12,820</b>	<b>12,257</b>	<b>12,432</b>

Table 10.

## Total intramural R&amp;D expenditures for Québec, by selected industry, 2001 to 2003

Selected industries	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>p</sup>
		in millions of \$	
<b>Agriculture, forestry, fishing and hunting</b>	<b>27</b>	<b>36</b>	<b>37</b>
<b>Mining and oil and gas extraction</b>	<b>x</b>	<b>x</b>	<b>x</b>
<b>Utilities</b>	<b>x</b>	<b>x</b>	<b>x</b>
<b>Construction</b>	<b>23</b>	<b>18</b>	<b>18</b>
<b>Manufacturing</b>			
Food, beverages and tobacco	29	43	51
Textile	36	28	31
Wood products	23	25	27
Paper	229	238	231
Printing	9	9	10
Pharmaceutical and medicine	348	422	449
Other chemicals	57	60	50
Rubber and plastic products	24	24	30
Non-metallic mineral products	6	7	10
Primary metals	105	104	137
Fabricated metal products	35	44	49
Machinery	116	119	118
Computer and peripheral equipment	33	31	21
Communications equipment	279	238	209
Semiconductor and other electronic components	155	118	85
Navigational, measuring, medical and control instruments	192	168	171
Other computer and electronic products	3	2	4
Electrical equipment, appliance and components	39	43	70
Motor vehicle and parts	24	21	23
Aerospace products and parts	634	558	528
All other transportation equipment	10	11	14
Furniture and related products	8	12	13
Other manufacturing industries	61	63	77
<b>Total manufacturing</b>	<b>2,453</b>	<b>2,387</b>	<b>2,408</b>
<b>Services</b>			
Wholesale trade	195	177	173
Retail trade	8	10	9
Transportation and warehousing	12	24	12
Information and cultural industries	189	178	232
Finance, insurance and real estate	15	17	14
Architectural, engineering and related services	293	246	252
Computer system design and related services	248	233	250
Management, scientific and technical consulting services	37	24	20
Scientific research and development	223	237	251
Health care and social assistance	243	278	267
All other services	79	84	64
<b>Total services</b>	<b>1,542</b>	<b>1,508</b>	<b>1,545</b>
<b>Total all industries</b>	<b>4,155</b>	<b>4,057</b>	<b>4,115</b>

Table 11.

## Total intramural R&amp;D expenditures for Ontario, by selected industry, 2001 to 2003

Selected industries	2001 <sup>f</sup>	2002 <sup>f</sup>	2003 <sup>p</sup>
	in millions of \$		
<b>Agriculture, forestry, fishing and hunting</b>	<b>25</b>	<b>25</b>	<b>25</b>
<b>Mining and oil and gas extraction</b>	<b>x</b>	<b>x</b>	<b>x</b>
<b>Utilities</b>	<b>x</b>	<b>x</b>	<b>x</b>
<b>Construction</b>	<b>20</b>	<b>17</b>	<b>14</b>
<b>Manufacturing</b>			
Food, beverages and tobacco	47	49	58
Textile	10	12	13
Wood products	8	8	7
Paper	98	79	113
Printing	6	5	9
Pharmaceutical and medicine	379	520	536
Other chemicals	186	178	194
Rubber and plastic products	70	64	81
Non-metallic mineral products	11	5	8
Primary metals	97	114	117
Fabricated metal products	63	85	87
Machinery	274	273	272
Computer and peripheral equipment	91	92	90
Communications equipment	x	1,646	1,399
Semiconductor and other electronic components	561	603	546
Navigational, measuring, medical and control instruments	168	193	183
Other computer and electronic products	18	15	12
Electrical equipment, appliance and components	216	124	85
Motor vehicle and parts	317	381	425
Aerospace products and parts	303	327	377
All other transportation equipment	5	2	3
Furniture and related products	5	6	5
Other manufacturing industries	x	82	91
<b>Total manufacturing</b>	<b>5,699</b>	<b>4,863</b>	<b>4,711</b>
<b>Services</b>			
Wholesale trade	340	277	289
Retail trade	29	19	15
Transportation and warehousing	6	7	6
Information and cultural industries	265	368	489
Finance, insurance and real estate	134	161	190
Architectural, engineering and related services	157	135	108
Computer system design and related services	708	633	605
Management, scientific and technical consulting services	22	28	25
Scientific research and development	359	390	443
Health care and social assistance	41	33	38
All other services	68	68	71
<b>Total services</b>	<b>2,129</b>	<b>2,118</b>	<b>2,279</b>
<b>Total all industries</b>	<b>7,944</b>	<b>7,048</b>	<b>7,066</b>

Table 12.

## Current intramural R&amp;D expenditures as a percent of performing company revenues, by industry, 2001 to 2003

Industries	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>p</sup>
	percent of company revenues		
<b>Agriculture, forestry, fishing and hunting</b>			
Agriculture	4.4	6.4	5.4
Forestry and logging	0.1	0.2	0.3
Fishing, hunting and trapping	12.1	14.8	13.7
<b>Total agriculture, forestry, fishing and hunting</b>	<b>1.7</b>	<b>2.3</b>	<b>2.0</b>
<b>Mining and oil and gas extraction</b>			
Oil and gas extraction	0.4	0.3	0.2
Mining	0.5	0.7	0.6
<b>Total mining and oil and gas extraction</b>	<b>0.4</b>	<b>0.3</b>	<b>0.3</b>
<b>Utilities</b>			
Electric power	0.5	0.4	0.6
Other utilities	0.4	0.2	0.3
<b>Total utilities</b>	<b>0.5</b>	<b>0.4</b>	<b>0.5</b>
<b>Construction</b>	<b>3.6</b>	<b>3.4</b>	<b>3.1</b>
<b>Manufacturing</b>			
Food	0.3	0.3	0.3
Beverage and tobacco	0.2	0.3	0.6
Textile	1.5	1.5	1.7
Wood products	0.4	0.8	0.8
Paper	1.4	1.2	1.4
Printing	0.7	1.5	1.3
Petroleum and coal products	0.1	0.2	0.2
Pharmaceutical and medicine	9.0	11.1	9.6
Other chemicals	1.0	0.9	1.0
Plastic products	1.3	1.4	1.8
Rubber products	0.4	1.1	0.8
Non-metallic mineral products	0.7	0.5	0.6
Primary metal (ferrous)	0.5	0.4	0.3
Primary metal (non-ferrous)	1.2	1.1	1.3
Fabricated metal products	0.3	2.2	2.4
Machinery	3.1	3.8	3.7
Computer and peripheral equipment	5.6	6.4	6.2
Communications equipment	34.2	26.6	26.8
Semiconductor and other electronic components	6.6	7.0	7.5
Navigational, measuring, medical and control instruments	9.0	9.6	10.9
Other computer and electronic products	5.7	4.5	6.1
Electrical equipment, appliance and components	2.6	2.1	2.7
Motor vehicle and parts	0.3	0.3	0.4
Aerospace products and parts	5.5	5.3	5.4
All other transportation equipment	1.3	1.1	1.2
Furniture and related products	0.8	1.2	1.2
Other manufacturing industries	3.3	3.6	3.2
<b>Total manufacturing</b>	<b>2.1</b>	<b>2.0</b>	<b>2.0</b>
<b>Services</b>			
Wholesale trade	2.6	2.3	2.5
Retail trade	3.4	2.8	2.6
Transportation and warehousing	0.2	0.2	0.4
Information and cultural industries	2.3	2.4	2.9
Finance, insurance and real estate	0.3	0.5	0.4
Architectural, engineering and related services	11.1	14.2	8.3
Computer system design and related services	12.5	11.7	10.0
Management, scientific and technical consulting services	10.5	9.5	10.0
Scientific research and development	57.8	26.7	27.3
Health care and social assistance	26.2	34.9	22.1
All other services	2.1	2.9	2.7
<b>Total services</b>	<b>3.0</b>	<b>3.3</b>	<b>3.2</b>
<b>Total all industries</b>	<b>2.1</b>	<b>2.1</b>	<b>2.1</b>

Table 13.

## Current intramural R&amp;D expenditures as a percent of performing company revenues, by industry and by country of control, 2003

Industries	Country of control		
	Canada	Foreign	Total
	percent of company revenues		
<b>Agriculture, forestry, fishing and hunting</b>			
Agriculture	3.9	27.0	5.4
Forestry and logging	0.3	0.0	0.3
Fishing, hunting and trapping	13.7	0.0	13.7
<b>Total agriculture, forestry, fishing and hunting</b>	<b>1.5</b>	<b>27.0</b>	<b>2.0</b>
<b>Mining and oil and gas extraction</b>			
Oil and gas extraction	0.2	0.3	0.2
Mining	0.7	0.5	0.6
<b>Total mining and oil and gas extraction</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>
<b>Utilities</b>			
Electric power	0.6	0.0	0.6
Other utilities	0.3	0.0	0.3
<b>Total utilities</b>	<b>0.5</b>	<b>0.0</b>	<b>0.5</b>
<b>Construction</b>	<b>3.5</b>	<b>0.0</b>	<b>3.1</b>
<b>Manufacturing</b>			
Food	0.4	0.2	0.3
Beverage and tobacco	0.8	0.1	0.6
Textile	1.5	2.3	1.7
Wood products	0.8	0.5	0.8
Paper	1.3	1.5	1.4
Printing	1.6	0.3	1.3
Petroleum and coal products	0.2	0.2	0.2
Pharmaceutical and medicine	16.8	8.2	9.6
Other chemicals	1.6	0.7	1.0
Plastic products	2.0	1.2	1.8
Rubber products	1.6	0.6	0.8
Non-metallic mineral products	2.3	0.2	0.6
Primary metal (ferrous)	0.3	0.3	0.3
Primary metal (non-ferrous)	1.4	1.1	1.3
Fabricated metal products	2.8	0.8	2.4
Machinery	4.0	2.9	3.7
Computer and peripheral equipment	8.6	5.4	6.2
Communications equipment	41.0	8.0	26.8
Semiconductor and other electronic components	21.2	3.1	7.5
Navigational, measuring, medical and control instruments	11.3	10.0	10.9
Other computer and electronic products	6.5	0.1	6.1
Electrical equipment, appliance and components	4.1	1.9	2.7
Motor vehicle and parts	1.5	0.3	0.4
Aerospace products and parts	2.6	14.8	5.4
All other transportation equipment	1.0	2.0	1.2
Furniture and related products	1.2	0.0	1.2
Other manufacturing industries	3.6	1.5	3.2
<b>Total manufacturing</b>	<b>3.3</b>	<b>1.3</b>	<b>2.0</b>
<b>Services</b>			
Wholesale trade	2.1	2.8	2.5
Retail trade	3.1	0.1	2.6
Transportation and warehousing	0.4	0.3	0.4
Information and cultural industries	2.4	20.9	2.9
Finance, insurance and real estate	0.4	6.1	0.4
Architectural, engineering and related services	5.8	19.6	8.3
Computer system design and related services	9.4	13.7	10.0
Management, scientific and technical consulting services	10.0	4.3	10.0
Scientific research and development	25.5	33.3	27.3
Health care and social assistance	17.0	106.9	22.1
All other services	2.6	4.0	2.7
<b>Total services</b>	<b>2.7</b>	<b>5.8</b>	<b>3.2</b>
<b>Total all industries</b>	<b>2.6</b>	<b>1.6</b>	<b>2.1</b>

Table 14.

Current intramural R&amp;D expenditures as a percent of performing company revenues, by country of control, 2001 to 2003

Country of control	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>p</sup>
	percent of company revenues		
Canada	2.5	2.6	2.6
United States	1.6	1.6	1.6
Other foreign	1.5	1.6	1.5
<b>Total</b>	<b>2.1</b>	<b>2.1</b>	<b>2.1</b>

TABLE 15.

Current intramural R&amp;D expenditures as a percent of performing company revenues, by employment size, 2001 to 2003

Employment size	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>p</sup>
	percent of company revenues		
1 to 49	5.2	5.7	5.8
50 to 99	2.1	8.6	6.8
100 to 199	5.6	5.7	5.3
200 to 499	3.3	3.8	3.9
500 to 999	2.9	3.2	4.3
1,000 to 1,999	2.2	2.2	2.0
2,000 to 4,999	1.0	1.1	2.0
Greater than 4,999	1.6	1.2	0.8
<b>Total</b>	<b>2.1</b>	<b>2.1</b>	<b>2.1</b>



Table 16.

## Total intramural R&amp;D expenditures, by country of control, 2001 to 2003

Country of control	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>p</sup>
		in millions of \$	
Canada	10,095	9,010	8,887
United States	2,956	3,031	3,129
Other foreign	1,269	1,325	1,375
<b>Total</b>	<b>14,320</b>	<b>13,367</b>	<b>13,391</b>

Table 17.

## Total intramural R&amp;D expenditures, by employment size, 2001 to 2003

Employment size	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>p</sup>
		in millions of \$	
Non-Commercial Enterprise	177	163	185
1 to 49	1,792	1,844	1,980
50 to 99	1,145	1,145	1,042
100 to 199	1,308	1,183	1,034
200 to 499	1,253	1,235	1,234
500 to 999	1,270	1,259	1,314
1,000 to 1,999	1,610	1,862	1,933
2,000 to 4,999	1,225	1,269	2,609
Greater than 4,999	4,540	3,406	2,062
<b>Total</b>	<b>14,320</b>	<b>13,367</b>	<b>13,391</b>

Table 18.

**Total intramural R&D expenditures of canadian-controlled firms as a percent of all intramural R&D expenditures, by industry, 2001 to 2003**

Industries	2001 <sup>r</sup>	2002 <sup>r</sup>	2003 <sup>p</sup>
		percent	
<b>Agriculture, forestry, fishing and hunting</b>			
Agriculture	64	x	68
Forestry and logging	100	100	100
Fishing, hunting and trapping	x	x	100
<b>Total agriculture, forestry, fishing and hunting</b>	<b>73</b>	<b>76</b>	<b>77</b>
<b>Mining and oil and gas extraction</b>			
Oil and gas extraction	70	72	67
Mining	71	61	75
<b>Total mining and oil and gas extraction</b>	<b>70</b>	<b>70</b>	<b>68</b>
<b>Utilities</b>			
Electric power	100	100	100
Other utilities	100	100	100
<b>Total utilities</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Construction</b>	<b>x</b>	<b>100</b>	<b>x</b>
<b>Manufacturing</b>			
Food	79	81	80
Beverage and tobacco	75	79	90
Textile	62	66	67
Wood products	x	100	x
Paper	76	71	60
Printing	x	x	x
Petroleum and coal products	x	19	23
Pharmaceutical and medicine	25	30	28
Other chemicals	41	42	49
Plastic products	88	89	88
Rubber products	46	51	44
Non-metallic mineral products	90	x	70
Primary metal (ferrous)	90	89	84
Primary metal (non-ferrous)	x	x	x
Fabricated metal products	92	96	94
Machinery	79	79	79
Computer and peripheral equipment	50	49	40
Communications equipment	90	88	87
Semiconductor and other electronic components	67	67	69
Navigational, measuring, medical and control instruments	76	72	73
Other computer and electronic products	100	x	x
Electrical equipment, appliance and components	43	60	58
Motor vehicle and parts	41	30	34
Aerospace products and parts	43	42	37
All other transportation equipment	46	71	68
Furniture and related products	100	100	x
Other manufacturing industries	90	89	94
<b>Total manufacturing</b>	<b>68</b>	<b>63</b>	<b>62</b>
<b>Services</b>			
Wholesale trade	50	38	38
Retail trade	x	x	x
Transportation and warehousing	x	x	x
Information and cultural industries	87	81	82
Finance, insurance and real estate	x	x	x
Architectural, engineering and related services	54	57	55
Computer system design and related services	80	81	83
Management, scientific and technical consulting services	x	x	x
Scientific research and development	79	77	74
Health care and social assistance	x	x	x
All other services	87	84	85
<b>Total services</b>	<b>74</b>	<b>73</b>	<b>73</b>
<b>Total all industries</b>	<b>70</b>	<b>67</b>	<b>66</b>

Table 19.

## Sources of funds for intramural R&amp;D, 1981 to 2003

Year	Business enterprises			Federal sources			Other canadian sources	Foreign sources	Total
	Canadian performing companies	Related companies	R&D contracts for other companies	Grants	Contracts	Provincial sources			
in millions of \$									
1981	1,543	123	70	132	58	37	3	158	2,124
1982	1,698	142	69	177	89	44	4	266	2,489
1983	1,608	158	76	175	106	46	3	431	2,602
1984	1,829	212	71	183	152	52	7	516	3,022
1985	2,323	241	97	215	168	60	12	518	3,633
1986	2,610	257	112	251	160	63	18	551	4,022
1987	2,714	255	125	287	155	60	9	734	4,340
1988	2,855	285	123	272	181	63	5	840	4,623
1989	2,981	325	164	239	177	69	6	819	4,779
1990	3,280	304	167	215	176	93	13	923	5,169
1991	3,388	275	162	204	212	114	11	988	5,355
1992	3,639	266	188	261	271	86	12	1,019	5,742
1993	4,073	347	242	266	250	105	7	1,134	6,424
1994	4,922	337	266	267	200	99	10	1,466	7,567
1995	5,383	286	259	259	152	87	10	1,555	7,991
1996	5,450	297	186	185	107	102	8	1,662	7,996
1997	6,124	268	156	253	103	77	8	1,750	8,739
1998	6,396	294	167	179	84	56	8	2,499	9,682
1999	6,968	201	214	241	68	58	8	2,642	10,400
2000	8,128	306	181	165	74	45	8	3,543	12,450
2001 <sup>r</sup>	10,417	349	178	345	116	51	14	2,851	14,320
2002 <sup>r</sup>	10,587	460	180	196	69	52	16	1,807	13,367
2003 <sup>p</sup>	10,437	433	180	216	56	69	17	1,984	13,391

Table 20.

## Sources of funds for intramural R&amp;D, by industry, 2003

Industries	Canadian performing companies	Federal government and other Canadian source	Foreign sources	Total
in millions of \$				
<b>Agriculture, forestry, fishing and hunting</b>				
Agriculture	49	x	x	64
Forestry and logging	7	x	x	21
Fishing, hunting and trapping	4	x	x	5
<b>Total agriculture, forestry, fishing and hunting</b>	<b>60</b>	<b>15</b>	<b>14</b>	<b>89</b>
<b>Mining and oil and gas extraction</b>				
Oil and gas extraction	139	x	x	182
Mining	44	x	x	45
<b>Total mining and oil and gas extraction</b>	<b>184</b>	<b>x</b>	<b>x</b>	<b>227</b>
<b>Utilities</b>				
Electric power	92	x	x	115
Other utilities	6	1	0	7
<b>Total utilities</b>	<b>98</b>	<b>x</b>	<b>x</b>	<b>121</b>
<b>Construction</b>	<b>39</b>	<b>x</b>	<b>x</b>	<b>40</b>
<b>Manufacturing</b>				
Food	89	2	0	91
Beverage and tobacco	42	0	0	42
Textile	44	x	x	45
Wood products	25	x	x	51
Paper	335	x	x	390
Printing	20	0	0	20
Petroleum and coal products	69	x	x	122
Pharmaceutical and medicine	728	90	348	1,166
Other chemicals	175	30	63	267
Plastic products	93	1	0	94
Rubber products	17	x	x	20
Non-metallic mineral products	19	x	x	20
Primary metal (ferrous)	30	0	0	30
Primary metal (non-ferrous)	212	x	x	231
Fabricated metal products	154	1	0	155
Machinery	403	26	7	436
Computer and peripheral equipment	132	x	x	187
Communications equipment	1,606	22	79	1,706
Semiconductor and other electronic components	428	x	x	729
Navigational, measuring, medical and control instruments	347	26	29	402
Other computer and electronic products	8	x	x	17
Electrical equipment, appliance and components	189	x	x	196
Motor vehicle and parts	444	12	14	469
Aerospace products and parts	749	90	75	914
All other transportation equipment	22	0	0	22
Furniture and related products	19	0	0	19
Other manufacturing industries	111	31	9	151
<b>Total manufacturing</b>	<b>6,510</b>	<b>483</b>	<b>999</b>	<b>7,992</b>
<b>Services</b>				
Wholesale trade	413	49	163	625
Retail trade	27	x	x	30
Transportation and warehousing	30	x	x	32
Information and cultural industries	772	71	68	910
Finance, insurance and real estate	206	19	0	225
Architectural, engineering and related services	371	65	27	462
Computer system design and related services	805	31	217	1,053
Management, scientific and technical consulting services	61	12	4	78
Scientific research and development	523	71	336	931
Health care and social assistance	177	76	129	382
All other services	162	19	12	193
<b>Total services</b>	<b>3,546</b>	<b>416</b>	<b>959</b>	<b>4,921</b>
<b>Total all industries</b>	<b>10,437</b>	<b>971</b>	<b>1,984</b>	<b>13,391</b>

Table 21.

Sources of funds for intramural R&D, by country of control of performer, 2003

Country of control	Canadian performing companies	Federal government	Provincial governments	Other canadian sources	Foreign sources	Total
in millions of \$						
Canada	7,547	169	58	451	662	8,887
United States	1,986	74	5	137	926	3,129
Other foreign	903	29	6	41	395	1,375
<b>Total</b>	<b>10,437</b>	<b>272</b>	<b>69</b>	<b>630</b>	<b>1,984</b>	<b>13,391</b>

Table 22.

## Sources of funds for intramural R&amp;D, by employment size, 2003

Employment size	Canadian performing companies	Federal government	Provincial governments	Other canadian sources	Foreign sources	Total
in millions of \$						
Non-Commercial Enterprise	7	32	31	102	13	185
1 to 49	1,697	39	12	72	161	1,980
50 to 99	787	21	5	61	167	1,042
100 to 199	697	18	4	49	266	1,034
200 to 499	941	20	7	118	147	1,234
500 to 999	825	40	5	70	373	1,314
1,000 to 1,999	1,369	50	5	137	372	1,933
2,000 to 4,999	2,358	16	0	5	230	2,609
Greater than 4,999	1,755	37	0	16	254	2,062
<b>Total</b>	<b>10,437</b>	<b>272</b>	<b>69</b>	<b>630</b>	<b>1,984</b>	<b>13,391</b>

Table 23.

## Number of persons engaged in R&amp;D, by industry and by occupational category, 2003

Industries	Professionals	Technicians	Other	Total
	person-years			
<b>Agriculture, forestry, fishing and hunting</b>				
Agriculture	263	277	216	756
Forestry and logging	156	59	26	241
Fishing, hunting and trapping	24	32	17	73
<b>Total agriculture, forestry, fishing and hunting</b>	<b>443</b>	<b>368</b>	<b>259</b>	<b>1,070</b>
<b>Mining and oil and gas extraction</b>				
Oil and gas extraction	203	147	40	390
Mining	151	93	27	271
<b>Total mining and oil and gas extraction</b>	<b>354</b>	<b>240</b>	<b>67</b>	<b>661</b>
<b>Utilities</b>				
Electric power	474	184	152	810
Other utilities	88	31	17	136
<b>Total utilities</b>	<b>562</b>	<b>215</b>	<b>169</b>	<b>946</b>
<b>Construction</b>	<b>362</b>	<b>286</b>	<b>106</b>	<b>754</b>
<b>Manufacturing</b>				
Food	612	412	221	1,245
Beverage and tobacco	207	89	41	337
Textile	200	266	190	656
Wood products	258	237	166	661
Paper	561	667	237	1,465
Printing	114	186	26	326
Petroleum and coal products	128	78	7	213
Pharmaceutical and medicine	2,890	1,543	1,114	5,547
Other chemicals	1,309	895	331	2,535
Plastic products	526	472	229	1,227
Rubber products	117	100	57	274
Non-metallic mineral products	156	136	69	361
Primary metal (ferrous)	191	84	48	323
Primary metal (non-ferrous)	579	355	148	1,082
Fabricated metal products	1,022	1,162	371	2,555
Machinery	2,653	2,019	908	5,580
Computer and peripheral equipment	912	376	307	1,595
Communications equipment	8,599	655	514	9,768
Semiconductor and other electronic components	4,053	747	328	5,128
Navigational, measuring, medical and control instruments	2,901	995	243	4,139
Other computer and electronic products	168	89	22	279
Electrical equipment, appliance and components	1,082	722	235	2,039
Motor vehicle and parts	2,384	1,061	688	4,133
Aerospace products and parts	2,588	1,395	1,243	5,226
All other transportation equipment	176	85	44	305
Furniture and related products	188	160	70	418
Other manufacturing industries	807	848	181	1,836
<b>Total manufacturing</b>	<b>35,381</b>	<b>15,834</b>	<b>8,038</b>	<b>59,253</b>
<b>Services</b>				
Wholesale trade	3,567	1,184	508	5,259
Retail trade	263	314	66	643
Transportation and warehousing	207	90	31	328
Information and cultural industries	5,694	2,382	2,337	10,413
Finance, insurance and real estate	1,016	802	157	1,975
Architectural, engineering and related services	3,852	888	424	5,164
Computer system design and related services	10,139	3,752	645	14,536
Management, scientific and technical consulting services	781	358	87	1,226
Scientific research and development	5,248	2,083	622	7,953
Health care and social assistance	1,346	1,326	431	3,103
All other services	1,581	1,105	323	3,009
<b>Total services</b>	<b>33,694</b>	<b>14,284</b>	<b>5,631</b>	<b>53,609</b>
<b>Total all industries</b>	<b>70,796</b>	<b>31,227</b>	<b>14,270</b>	<b>116,293</b>



Table 24.

## Professional personnel engaged in R&amp;D, by industry and by degree level, 2003

Industries	Bachelors	Masters	Doctorates	Total
	person-years			
<b>Agriculture, forestry, fishing and hunting</b>				
Agriculture	209	25	29	263
Forestry and logging	130	22	4	156
Fishing, hunting and trapping	24	0	0	24
<b>Total agriculture, forestry, fishing and hunting</b>	<b>363</b>	<b>47</b>	<b>33</b>	<b>443</b>
<b>Mining and oil and gas extraction</b>				
Oil and gas extraction	141	28	34	203
Mining	91	28	32	151
<b>Total mining and oil and gas extraction</b>	<b>232</b>	<b>56</b>	<b>66</b>	<b>354</b>
<b>Utilities</b>				
Electric power	187	158	129	474
Other utilities	88	0	0	88
<b>Total utilities</b>	<b>275</b>	<b>158</b>	<b>129</b>	<b>562</b>
<b>Construction</b>	<b>338</b>	<b>8</b>	<b>16</b>	<b>362</b>
<b>Manufacturing</b>				
Food	519	58	35	612
Beverage and tobacco	172	25	10	207
Textile	184	13	3	200
Wood products	188	37	33	258
Paper	308	127	126	561
Printing	103	6	5	114
Petroleum and coal products	73	14	41	128
Pharmaceutical and medicine	1,551	724	615	2,890
Other chemicals	966	170	173	1,309
Plastic products	474	34	18	526
Rubber products	105	6	6	117
Non-metallic mineral products	143	8	5	156
Primary metal (ferrous)	126	41	24	191
Primary metal (non-ferrous)	393	91	95	579
Fabricated metal products	919	79	24	1,022
Machinery	2,100	413	140	2,653
Computer and peripheral equipment	595	213	104	912
Communications equipment	6,405	1,706	488	8,599
Semiconductor and other electronic components	2,963	860	230	4,053
Navigational, measuring, medical and control instruments	2,304	428	169	2,901
Other computer and electronic products	123	28	17	168
Electrical equipment, appliance and components	827	185	70	1,082
Motor vehicle and parts	1,787	465	132	2,384
Aerospace products and parts	1,885	515	188	2,588
All other transportation equipment	138	28	10	176
Furniture and related products	187	0	1	188
Other manufacturing industries	668	73	66	807
<b>Total manufacturing</b>	<b>26,206</b>	<b>6,347</b>	<b>2,828</b>	<b>35,381</b>
<b>Services</b>				
Wholesale trade	2,836	447	284	3,567
Retail trade	239	17	7	263
Transportation and warehousing	163	24	20	207
Information and cultural industries	4,409	1,045	240	5,694
Finance, insurance and real estate	833	155	28	1,016
Architectural, engineering and related services	3,040	585	227	3,852
Computer system design and related services	8,416	1,300	423	10,139
Management, scientific and technical consulting services	703	50	28	781
Scientific research and development	3,614	909	725	5,248
Health care and social assistance	811	290	245	1,346
All other services	1,282	159	140	1,581
<b>Total services</b>	<b>26,346</b>	<b>4,981</b>	<b>2,367</b>	<b>33,694</b>
<b>Total all industries</b>	<b>53,760</b>	<b>11,597</b>	<b>5,439</b>	<b>70,796</b>

Table 25.

## Number of persons engaged in R&amp;D, by province and by occupational category, 2003

Province	Professionals	Other	Total
		person-years	
Newfoundland and Labrador	188	108	296
Prince Edward Island	66	44	110
Nova Scotia	616	346	962
New Brunswick	296	244	540
Québec	22,495	18,732	41,227
Ontario	36,898	19,615	56,513
Manitoba	662	549	1,211
Saskatchewan	465	479	944
Alberta	3,060	1,686	4,746
British Columbia	6,050	3,692	9,742
Yukon, Northwest Territories and Nunavut	0	2	2
<b>Total</b>	<b>70,796</b>	<b>45,497</b>	<b>116,293</b>



Table 27.

## Number of R&amp;D performers, by industry and by country of control, 2002

Industries	Country of control			Total
	Canada	U.S.	Other foreign	
	number			
<b>Agriculture, forestry, fishing and hunting</b>				
Agriculture	287	1	2	290
Forestry and logging	40	0	0	40
Fishing, hunting and trapping	32	0	1	33
<b>Total agriculture, forestry, fishing and hunting</b>	<b>359</b>	<b>1</b>	<b>3</b>	<b>363</b>
<b>Mining and oil and gas extraction</b>				
Oil and gas extraction	40	4	1	45
Mining	32	3	3	38
<b>Total mining and oil and gas extraction</b>	<b>72</b>	<b>7</b>	<b>4</b>	<b>83</b>
<b>Utilities</b>				
Electric power	13	0	0	13
Other utilities	41	0	0	41
<b>Total utilities</b>	<b>54</b>	<b>0</b>	<b>0</b>	<b>54</b>
<b>Construction</b>	<b>339</b>	<b>0</b>	<b>0</b>	<b>339</b>
<b>Manufacturing</b>				
Food	357	9	4	370
Beverage and tobacco	25	0	4	29
Textile	129	6	2	137
Wood products	189	0	0	189
Paper	83	7	3	93
Printing	102	1	0	103
Petroleum and coal products	20	2	3	25
Pharmaceutical and medicine	84	12	8	104
Other chemicals	289	20	13	322
Plastic products	294	3	5	302
Rubber products	44	4	1	49
Non-metallic mineral products	110	0	2	112
Primary metal (ferrous)	42	0	5	47
Primary metal (non-ferrous)	55	1	2	58
Fabricated metal products	682	4	4	690
Machinery	954	6	12	972
Computer and peripheral equipment	77	7	0	84
Communications equipment	122	9	1	132
Semiconductor and other electronic components	135	7	0	142
Navigational, measuring, medical and control instruments	233	7	11	251
Other computer and electronic products	33	1	0	34
Electrical equipment, appliance and components	194	9	10	213
Motor vehicle and parts	149	10	10	169
Aerospace products and parts	60	4	3	67
All other transportation equipment	61	3	2	66
Furniture and related products	161	0	0	161
Other manufacturing industries	388	7	3	398
<b>Total manufacturing</b>	<b>5,072</b>	<b>139</b>	<b>108</b>	<b>5,319</b>
<b>Services</b>				
Wholesale trade	891	20	26	937
Retail trade	226	1	2	229
Transportation and warehousing	81	2	0	83
Information and cultural industries	431	7	3	441
Finance, insurance and real estate	120	0	2	122
Architectural, engineering and related services	610	4	7	621
Computer system design and related services	1,771	18	6	1,795
Management, scientific and technical consulting services	390	1	1	392
Scientific research and development	573	11	6	590
Health care and social assistance	101	1	1	103
All other services	794	3	4	801
<b>Total services</b>	<b>5,988</b>	<b>68</b>	<b>58</b>	<b>6,114</b>
<b>Total all industries</b>	<b>11,884</b>	<b>215</b>	<b>173</b>	<b>12,272</b>

Table 28.

## Number of R&amp;D performers 2002, by NAICS 2002

NAICS description	NAICS	Firms	NAICS description	NAICS	Firms
<b>Agriculture, forestry, fishing and hunting</b>					
<b>Agriculture</b>			<b>Forestry and logging (continued)</b>		
Soybean Farming	111110	1	Logging (except Contract)	113311	7
Oilseed (except Soybean) Farming	111120	0	Contract Logging	113312	11
Dry Pea and Bean Farming	111130	1	Support Activities for Forestry	115310	17
Wheat Farming	111140	1	<b>Fishing, hunting and trapping</b>		
Corn Farming	111150	1	Animal Aquaculture	112510	25
Rice Farming	111160	0	Salt Water Fishing	114113	8
Other Grain Farming	111190	4	Inland Fishing	114114	0
Potato Farming	111211	16	Hunting and Trapping	114210	0
Other Vegetable (except Potato) and Melon Farming	111219	45	<b>Mining and oil and gas extraction</b>		
Orange Groves	111310	0	<b>Oil and gas Extraction</b>		
Citrus (except Orange) Groves	111320	0	Conventional Oil and Gas Extraction	211113	15
Non-Citrus Fruit and Tree Nut Farming	111330	21	Non-Conventional Oil Extraction	211114	2
Mushroom Production	111411	7	Oil and Gas Contract Drilling	213111	4
Other Food Crops Grown Under Cover	111419	17	Services to Oil and Gas Extraction	213118	24
Nursery and Tree Production	111421	18	<b>Mining</b>		
Floriculture Production	111422	40	Bituminous Coal Mining	212114	0
Tobacco Farming	111910	9	Subbituminous Coal Mining	212115	0
Cotton Farming	111920	0	Lignite Coal Mining	212116	0
Sugar-Cane Farming	111930	0	Iron Ore Mining	212210	2
Hay Farming	111940	3	Gold and Silver Ore Mining	212220	3
Fruit and Vegetable Combination Farming	111993	1	Lead-Zinc Ore Mining	212231	0
All Other Miscellaneous Crop Farming	111999	20	Nickel-Copper Ore Mining	212232	1
Beef Cattle Ranching and Farming, including Feedlots	112110	10	Copper-Zinc Ore Mining	212233	2
Dairy Cattle and Milk Production	112120	9	Uranium Ore Mining	212291	1
Hog and Pig Farming	112210	19	All Other Metal Ore Mining	212299	1
Chicken Egg Production	112310	1	Granite Mining and Quarrying	212314	2
Broiler and Other Meat-Type Chicken Production	112320	5	Limestone Mining and Quarrying	212315	4
Turkey Production	112330	0	Marble Mining and Quarrying	212316	0
Poultry Hatcheries	112340	1	Sandstone Mining and Quarrying	212317	0
Combination Poultry and Egg Production	112391	0	Sand and Gravel Mining and Quarrying	212323	1
All Other Poultry Production	112399	0	Shale, Clay and Refractory Mineral Mining and Quarrying	212326	0
Sheep Farming	112410	0	Diamond Mines	212392	0
Goat Farming	112420	1	Salt Mines	212393	0
Apiculture	112910	1	Asbestos Mining	212394	0
Horse and Other Equine Production	112920	0	Gypsum Mining	212395	0
Fur-Bearing Animal and Rabbit Production	112930	0	Potash Mining	212396	3
Animal Combination Farming	112991	11	Peat Extraction	212397	8
All Other Miscellaneous Animal Production	112999	2	All Other Non-Metallic Mineral Mining and Quarrying	212398	0
Support Activities for Crop Production	115110	15	Contract Drilling (except Oil and Gas)	213117	4
Support Activities for Animal Production	115210	10	Other Support Activities for Mining	213119	6
<b>Forestry and Logging</b>					
Timber Tract Operations	113110	3			
Forest Nurseries and Gathering of Forest Products	113210	2			

Table 28. (Continued)

## Number of R&amp;D performers 2002, by NAICS 2002

NAICS description	NAICS	Firms	NAICS description	NAICS	Firms
<b>Utilities</b>			<b>Construction (continued)</b>		
<b>Electric Power</b>			Flooring Contractors	238330	3
Hydro-Electric Power Generation	221111	10	Tile and Terrazzo Contractors	238340	2
Fossil-Fuel Electric Power Generation	221112	1	Finish Carpentry Contractors	238350	11
Nuclear Electric Power Generation	221113	1	Other Building Finishing Contractors	238390	6
Other Electric Power Generation	221119	0	Site Preparation Contractors	238910	21
Electric Bulk Power Transmission and Control	221121	1	All Other Specialty Trade Contractors	238990	12
Electric Power Distribution	221122	0	<b>Manufacturing</b>		
<b>Other Utilities</b>			<b>Food</b>		
Natural Gas Distribution	221210	1	Dog and Cat Food Manufacturing	311111	6
Water Supply and Irrigation Systems	221310	3	Other Animal Food Manufacturing	311119	30
Sewage Treatment Facilities	221320	2	Flour Milling	311211	6
Steam and Air-Conditioning Supply	221330	1	Rice Milling and Malt Manufacturing	311214	3
Waste Collection	562110	3	Wet Corn Milling	311221	1
Waste Treatment and Disposal	562210	8	Oilseed Processing	311224	3
Remediation Services	562910	15	Fat and Oil Refining and Blending	311225	1
Material Recovery Facilities	562920	2	Breakfast Cereal Manufacturing	311230	4
All Other Waste Management Services	562990	6	Sugar Manufacturing	311310	3
<b>Construction</b>			Chocolate and Confectionery Manufacturing from Cacao Beans	311320	3
Residential Building Construction	236110	30	Confectionery Manufacturing from Purchased Chocolate	311330	5
Industrial Building and Structure Construction	236210	13	Non-Chocolate Confectionery Manufacturing	311340	9
Commercial and Institutional Building Construction	236220	12	Frozen Food Manufacturing	311410	18
Water and Sewer Line and Related Structures Construction	237110	2	Fruit and Vegetable Canning, Pickling and Drying	311420	34
Oil and Gas Pipeline and Related Structures Construction	237120	3	Fluid Milk Manufacturing	311511	10
Power and Communication Line and Related Structures Construction	237130	3	Butter, Cheese, and Dry and Condensed Dairy Products Manufacturing	311515	32
Land Subdivision	237210	10	Ice Cream and Frozen Dessert Manufacturing	311520	5
Highway, Street and Bridge Construction	237310	25	Animal (except Poultry) Slaughtering	311611	15
Other Heavy and Civil Engineering Construction	237990	8	Rendering and Meat Processing from Carcasses	311614	31
Poured Concrete Foundation and Structure Contractors	238110	9	Poultry Processing	311615	16
Structural Steel and Precast Concrete Contractors	238120	5	Seafood Product Preparation and Packaging	311710	22
Framing Contractors	238130	2	Retail Bakeries	311811	6
Masonry Contractors	238140	5	Commercial Bakeries and Frozen Bakery Product Manufacturing	311814	29
Glass and Glazing Contractors	238150	5	Cookie and Cracker Manufacturing	311821	7
Roofing Contractors	238160	0	Flour Mixes and Dough Manufacturing from Purchased Flour	311822	7
Siding Contractors	238170	6	Dry Pasta Manufacturing	311823	3
Other Foundation, Structure and Building Exterior Contractors	238190	6	Tortilla Manufacturing	311830	1
Electrical Contractors	238210	57	Roasted Nut and Peanut Butter Manufacturing	311911	1
Plumbing, Heating and Air-Conditioning Contractors	238220	57	Other Snack Food Manufacturing	311919	6
Elevator and Escalator Installation Contractors	238291	2	Coffee and Tea Manufacturing	311920	6
All Other Building Equipment Contractors	238299	11	Flavouring Syrup and Concentrate Manufacturing	311930	1
Drywall and Insulation Contractors	238310	3	Seasoning and Dressing Manufacturing	311940	15
Painting and Wall Covering Contractors	238320	10	All Other Food Manufacturing	311990	31

Table 28. (Continued)

## Number of R&amp;D performers 2002, by NAICS 2002

NAICS description	NAICS	Firms	NAICS description	NAICS	Firms
<b>Beverages and tobacco</b>			<b>Paper (Continued)</b>		
Soft Drink and Ice Manufacturing	312110	3	Paper Bag and Coated and Treated Paper Manufacturing	322220	23
Breweries	312120	12	Stationery Product Manufacturing	322230	2
Wineries	312130	8	Sanitary Paper Product Manufacturing	322291	4
Distilleries	312140	3	All Other Converted Paper Product Manufacturing	322299	10
Tobacco Stemming and Redrying	312210	0			
Tobacco Product Manufacturing	312220	3	<b>Printing</b>		
			Commercial Screen Printing	323113	6
			Quick Printing	323114	0
<b>Textile</b>			Digital Printing	323115	5
Fibre, Yarn and Thread Mills	313110	9	Manifold Business Forms Printing	323116	6
Broad-Woven Fabric Mills	313210	23	Other Printing	323119	65
Narrow Fabric Mills and Schiffli Machine Embroidery	313220	10	Support Activities for Printing	323120	21
Nonwoven Fabric Mills	313230	5	<b>Petroleum and coal products</b>		
Knit Fabric Mills	313240	27			
Textile and Fabric Finishing	313310	21	Petroleum Refineries	324110	9
Fabric Coating	313320	4	Asphalt Paving Mixture and Block Manufacturing	324121	8
Carpet and Rug Mills	314110	6	Asphalt Shingle and Coating Material Manufacturing	324122	1
Curtain and Linen Mills	314120	5	Other Petroleum and Coal Products Manufacturing	324190	7
Textile Bag and Canvas Mills	314910	14			
All Other Textile Product Mills	314990	13	<b>Pharmaceutical and medicine</b>		
			Pharmaceutical and Medicine Manufacturing	325410	104
<b>Wood products</b>			<b>Other chemical</b>		
Sawmills (except Shingle and Shake Mills)	321111	45			
Shingle and Shake Mills	321112	5	Petrochemical Manufacturing	325110	1
Wood Preservation	321114	9	Industrial Gas Manufacturing	325120	2
Hardwood Veneer and Plywood Mills	321211	11	Synthetic Dye and Pigment Manufacturing	325130	6
Softwood Veneer and Plywood Mills	321212	5	Alkali and Chlorine Manufacturing	325181	1
Structural Wood Product Manufacturing	321215	8	All Other Basic Inorganic Chemical Manufacturing	325189	17
Particle Board and Fibreboard Mills	321216	6	Other Basic Organic Chemical Manufacturing	325190	14
Waferboard Mills	321217	1	Resin and Synthetic Rubber Manufacturing	325210	30
Wood Window and Door Manufacturing	321911	28	Artificial and Synthetic Fibres and Filaments Manufacturing	325220	7
Other Millwork	321919	38	Chemical Fertilizer (except Potash) Manufacturing	325313	3
Wood Container and Pallet Manufacturing	321920	8	Mixed Fertilizer Manufacturing	325314	5
Manufactured (Mobile) Home Manufacturing	321991	0	Pesticide and Other Agricultural Chemical Manufacturing	325320	7
Prefabricated Wood Building Manufacturing	321992	8	Paint and Coating Manufacturing	325510	49
All Other Miscellaneous Wood Product Manufacturing	321999	17	Adhesive Manufacturing	325520	22
			Soap and Cleaning Compound Manufacturing	325610	44
<b>Paper</b>			Toilet Preparation Manufacturing	325620	35
Mechanical Pulp Mills	322111	1	Printing Ink Manufacturing	325910	11
Chemical Pulp Mills	322112	9	Explosives Manufacturing	325920	1
Paper (except Newsprint) Mills	322121	12	Custom Compounding of Purchased Resins	325991	8
Newsprint Mills	322122	6	All Other Miscellaneous Chemical Product Manufacturing	325999	59
Paperboard Mills	322130	2			
Corrugated and Solid Fibre Box Manufacturing	322211	8			
Folding Paperboard Box Manufacturing	322212	11			
Other Paperboard Container Manufacturing	322219	5			





Table 28. (Continued)

## Number of R&amp;D performers 2002, by NAICS 2002

NAICS description	NAICS	Firms	NAICS description	NAICS	Firms
<b>Machinery (Continued)</b>			<b>Electrical equipment, appliance and component (Continued)</b>		
Other Metalworking Machinery Manufacturing	333519	167	Battery Manufacturing	335910	6
Turbine and Turbine Generator Set Unit Manufacturing	333611	15	Communication and Energy Wire and Cable Manufacturing	335920	13
Other Engine and Power Transmission Equipment Manufacturing	333619	9	Wiring Device Manufacturing	335930	12
Pump and Compressor Manufacturing	333910	25	All Other Electrical Equipment and Component Manufacturing	335990	30
Material Handling Equipment Manufacturing	333920	90			
All Other General-Purpose Machinery Manufacturing	333990	119	<b>Motor vehicle and parts</b>		
<b>Computer and peripheral equipment</b>			Automobile and Light-Duty Motor Vehicle Manufacturing	336110	7
			Heavy-Duty Truck Manufacturing	336120	12
Computer and Peripheral Equipment Manufacturing	334110	84	Motor Vehicle Body Manufacturing	336211	18
			Truck Trailer Manufacturing	336212	19
<b>Communications equipment</b>			Motor Home, Travel Trailer and Camper Manufacturing	336215	9
			Motor Vehicle Gasoline Engine and Engine Parts Manufacturing	336310	17
Telephone Apparatus Manufacturing	334210	29	Motor Vehicle Electrical and Electronic Equipment Manufacturing	336320	19
Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	334220	70	Motor Vehicle Steering and Suspension Components (except Spring) Manufacturing	336330	3
Other Communications Equipment Manufacturing	334290	33	Motor Vehicle Brake System Manufacturing	336340	8
			Motor Vehicle Transmission and Power Train Parts Manufacturing	336350	3
<b>Semiconductor and other electronic component</b>			Motor Vehicle Seating and Interior Trim Manufacturing	336360	11
			Motor Vehicle Metal Stamping	336370	17
Semiconductor and Other Electronic Component Manufacturing	334410	142	Other Motor Vehicle Parts Manufacturing	336390	26
<b>Navigational, measuring, medical and control instruments</b>			<b>Aerospace product and parts</b>		
Navigational and Guidance Instruments Manufacturing	334511	41	Aerospace Product and Parts Manufacturing	336410	67
Measuring, Medical and Controlling Devices Manufacturing	334512	210			
<b>Other computer and electronic product</b>			<b>All other transportation equipment</b>		
			Railroad Rolling Stock Manufacturing	336510	9
Audio and Video Equipment Manufacturing	334310	19	Ship Building and Repairing	336611	1
Manufacturing and Reproducing Magnetic and Optical Media	334610	15	Boat Building	336612	31
			Other Transportation Equipment Manufacturing	336990	25
<b>Electrical equipment, appliance and component</b>			<b>Furniture and related product</b>		
Electric Lamp Bulb and Parts Manufacturing	335110	2	Wood Kitchen Cabinet and Counter Top Manufacturing	337110	16
Lighting Fixture Manufacturing	335120	42	Upholstered Household Furniture Manufacturing	337121	9
Small Electrical Appliance Manufacturing	335210	13	Other Wood Household Furniture Manufacturing	337123	36
Major Kitchen Appliance Manufacturing	335223	12	Household Furniture (except Wood and Upholstered) Manufacturing	337126	10
Other Major Appliance Manufacturing	335229	6	Institutional Furniture Manufacturing	337127	14
Power, Distribution and Specialty Transformers Manufacturing	335311	19	Wood Office Furniture, including Custom Architectural Woodwork, Manufacturing	337213	25
Motor and Generator Manufacturing	335312	11	Office Furniture (except Wood) Manufacturing	337214	18
Switchgear and Switchboard, and Relay and Industrial Control Apparatus Manufacturing	335315	47			



Table 28. (Continued)

## Number of R&amp;D performers 2002, by NAICS 2002

NAICS description	NAICS	Firms	NAICS description	NAICS	Firms
<b>Wholesale trade (Continued)</b>			<b>Retail trade</b>		
Plumbing, Heating and Air-Conditioning Equipment and Supplies Wholesaler-Distributors	416120	27	New Car Dealers	441110	0
Metal Service Centres	416210	11	Used Car Dealers	441120	0
General-Line Building Supplies Wholesaler-Distributors	416310	6	Recreational Vehicle Dealers	441210	2
Lumber, Plywood and Millwork Wholesaler-Distributors	416320	13	Motorcycle, Boat and Other Motor Vehicle Dealers	441220	9
Hardware Wholesaler-Distributors	416330	14	Automotive Parts and Accessories Stores	441310	4
Paint, Glass and Wallpaper Wholesaler-Distributors	416340	4	Tire Dealers	441320	1
Other Specialty-Line Building Supplies Wholesaler-Distributors	416390	12	Furniture Stores	442110	2
Farm, Lawn and Garden Machinery and Equipment Wholesaler-Distributors	417110	27	Floor Covering Stores	442210	0
Construction and Forestry Machinery, Equipment and Supplies Wholesaler-Distributors	417210	10	Window Treatment Stores	442291	1
Mining and Oil and Gas Well Machinery, Equipment and Supplies Wholesaler-Distributors	417220	13	Print and Picture Frame Stores	442292	2
Industrial Machinery, Equipment and Supplies Wholesaler-Distributors	417230	87	All Other Home Furnishings Stores	442298	2
Computer, Computer Peripheral and Pre-Packaged Software Wholesaler-Distributors	417310	74	Appliance, Television and Other Electronics Stores	443110	20
Electronic Components, Navigational and Communications Equipment and Supplies Wholesaler-Distributors	417320	55	Computer and Software Stores	443120	74
Office and Store Machinery and Equipment Wholesaler-Distributors	417910	20	Camera and Photographic Supplies Stores	443130	1
Service Establishment Machinery, Equipment and Supplies Wholesaler-Distributors	417920	15	Home Centres	444110	1
Professional Machinery, Equipment and Supplies Wholesaler-Distributors	417930	47	Paint and Wallpaper Stores	444120	2
All Other Machinery, Equipment and Supplies Wholesaler-Distributors	417990	22	Hardware Stores	444130	3
Recyclable Metal Wholesaler-Distributors	418110	8	Other Building Material Dealers	444190	8
Recyclable Paper and Paperboard Wholesaler-Distributors	418120	2	Outdoor Power Equipment Stores	444210	1
Other Recyclable Material Wholesaler-Distributors	418190	23	Nursery and Garden Centres	444220	6
Stationery and Office Supplies Wholesaler-Distributors	418210	4	Supermarkets and Other Grocery (except Convenience) Stores	445110	0
Other Paper and Disposable Plastic Product Wholesaler-Distributors	418220	3	Convenience Stores	445120	0
Agricultural Feed Wholesaler-Distributors	418310	8	Meat Markets	445210	2
Seed Wholesaler-Distributors	418320	13	Fish and Seafood Markets	445220	1
Agricultural Chemical and Other Farm Supplies Wholesaler-Distributors	418390	13	Fruit and Vegetable Markets	445230	1
Chemical (except Agricultural) and Allied Product Wholesaler-Distributors	418410	33	Baked Goods Stores	445291	5
Log and Wood Chip Wholesaler-Distributors	418910	3	Confectionery and Nut Stores	445292	2
Mineral, Ore and Precious Metal Wholesaler-Distributors	418920	2	All Other Specialty Food Stores	445299	5
Second-Hand Goods (except Machinery and Automotive) Wholesaler-Distributors	418930	0	Beer, Wine and Liquor Stores	445310	0
All Other Wholesaler-Distributors	418990	58	Pharmacies and Drug Stores	446110	3
Farm Product Agents and Brokers	419110	1	Cosmetics, Beauty Supplies and Perfume Stores	446120	3
Petroleum Product Agents and Brokers	419120	1	Optical Goods Stores	446130	1
Food, Beverage and Tobacco Agents and Brokers	419130	4	Food (Health) Supplement Stores	446191	1
Personal and Household Goods Agents and Brokers	419140	4	All Other Health and Personal Care Stores	446199	2
Motor Vehicle and Parts Agents and Brokers	419150	1	Gasoline Stations with Convenience Stores	447110	0
Building Material and Supplies Agents and Brokers	419160	4	Other Gasoline Stations	447190	2
Machinery, Equipment and Supplies Agents and Brokers	419170	18	Men's Clothing Stores	448110	1
Other Wholesale Agents and Brokers	419190	23	Women's Clothing Stores	448120	2
			Children's and Infants' Clothing Stores	448130	0

**Table 28.** (Continued)

**Number of R&D performers 2002, by NAICS 2002**

NAICS description	NAICS	Firms	NAICS description	NAICS	Firms
<b>Retail trade (Continued)</b>			<b>Transport and warehousing (Continued)</b>		
Family Clothing Stores	448140	1	Bulk Liquids Trucking, Local	484221	0
Clothing Accessories Stores	448150	0	Dry Bulk Materials Trucking, Local	484222	2
Fur Stores	448191	0	Forest Products Trucking, Local	484223	1
All Other Clothing Stores	448199	0	Other Specialized Freight (except Used Goods) Trucking, Local	484229	0
Shoe Stores	448210	3	Bulk Liquids Trucking, Long Distance	484231	0
Jewellery Stores	448310	1	Dry Bulk Materials Trucking, Long Distance	484232	3
Luggage and Leather Goods Stores	448320	0	Forest Products Trucking, Long Distance	484233	1
Sporting Goods Stores	451110	5	Other Specialized Freight (except Used Goods) Trucking, Long Distance	484239	3
Hobby, Toy and Game Stores	451120	1	Urban Transit Systems	485110	0
Sewing, Needlework and Piece Goods Stores	451130	1	Interurban and Rural Bus Transportation	485210	0
Musical Instrument and Supplies Stores	451140	1	Taxi Service	485310	0
Book Stores and News Dealers	451210	1	Limousine Service	485320	0
Pre-Recorded Tape, Compact Disc and Record Stores	451220	0	School and Employee Bus Transportation	485410	0
Department Stores	452110	0	Charter Bus Industry	485510	0
Warehouse Clubs and Superstores	452910	0	Other Transit and Ground Passenger Transportation	485990	0
Home and Auto Supplies Stores	452991	2	Pipeline Transportation of Crude Oil	486110	0
All Other Miscellaneous General Merchandise Stores	452999	3	Pipeline Transportation of Natural Gas	486210	1
Florists	453110	0	Pipeline Transportation of Refined Petroleum Products	486910	0
Office Supplies and Stationery Stores	453210	1	All Other Pipeline Transportation	486990	0
Gift, Novelty and Souvenir Stores	453220	3	Scenic and Sightseeing Transportation, Land	487110	0
Used Merchandise Stores	453310	0	Scenic and Sightseeing Transportation, Water	487210	1
Pet and Pet Supplies Stores	453910	0	Scenic and Sightseeing Transportation, Other	487990	2
Art Dealers	453920	0	Air Traffic Control	488111	0
Mobile Home Dealers	453930	0	Other Airport Operations	488119	0
Beer and Wine-Making Supplies Stores	453992	2	Other Support Activities for Air Transportation	488190	7
All Other Miscellaneous Store Retailers (except Beer and Wine-Making Supplies Stores)	453999	10	Support Activities for Rail Transportation	488210	1
Electronic Shopping and Mail-Order Houses	454110	15	Port and Harbour Operations	488310	0
Vending Machine Operators	454210	3	Marine Cargo Handling	488320	1
Fuel Dealers	454310	1	Marine Salvage Services	488331	1
Other Direct Selling Establishments	454390	5	Ship Piloting Services	488332	0
			Other Navigational Services to Shipping	488339	0
			Other Support Activities for Water Transportation	488390	2
			Motor Vehicle Towing	488410	1
			Other Support Activities for Road Transportation	488490	2
<b>Transport and warehousing</b>			Marine Shipping Agencies	488511	1
Scheduled Air Transportation	481110	1	Other Freight Transportation Arrangement	488519	8
Non-Scheduled Chartered Air Transportation	481214	4	Other Support Activities for Transportation	488990	4
Non-Scheduled Specialty Flying Services	481215	3	Postal Service	491110	0
Short-Haul Freight Rail Transportation	482112	1	Couriers	492110	0
Mainline Freight Rail Transportation	482113	2	Local Messengers and Local Delivery	492210	0
Passenger Rail Transportation	482114	0	General Warehousing and Storage	493110	6
Deep Sea, Coastal and Great Lakes Water Transportation (except by Ferries)	483115	2	Refrigerated Warehousing and Storage	493120	4
Deep Sea, Coastal and Great Lakes Water Transportation by Ferries	483116	0	Farm Product Warehousing and Storage	493130	3
Inland Water Transportation (except by Ferries)	483213	0	Other Warehousing and Storage	493190	3
Inland Water Transportation by Ferries	483214	0			
General Freight Trucking, Local	484110	3			
General Freight Trucking, Long Distance, Truck-Load	484121	7			
General Freight Trucking, Long Distance, Less Than Truck-Load	484122	1			
Used Household and Office Goods Moving	484210	1			

Table 28. (Continued)

## Number of R&amp;D performers 2002, by NAICS 2002

NAICS description	NAICS	Firms	NAICS description	NAICS	Firms
<b>Information and cultural industries</b>			<b>Finance, insurance and real estate (Continued)</b>		
Newspaper Publishers	511110	6	Other Financial Transactions Processing and Clearing House Activities	522329	4
Periodical Publishers	511120	2	Other Activities Related to Credit Intermediation	522390	0
Book Publishers	511130	5	Investment Banking and Securities Dealing	523110	4
Directory and Mailing List Publishers	511140	5	Securities Brokerage	523120	2
Other Publishers	511190	3	Commodity Contracts Dealing	523130	0
Software Publishers	511210	258	Commodity Contracts Brokerage	523140	1
Motion Picture and Video Production	512110	18	Securities and Commodity Exchanges	523210	1
Motion Picture and Video Distribution	512120	1	Miscellaneous Intermediation	523910	1
Motion Picture and Video Exhibition	512130	1	Portfolio Management	523920	27
Post-Production and Other Motion Picture and Video Industries	512190	5	Investment Advice	523930	1
Record Production	512210	1	All Other Financial Investment Activities	523990	6
Integrated Record Production/Distribution	512220	0	Direct Individual Life, Health and Medical Insurance Carriers	524111	1
Music Publishers	512230	0	Direct Group Life, Health and Medical Insurance Carriers	524112	0
Sound Recording Studios	512240	3	Direct General Property and Casualty Insurance Carriers	524121	0
Other Sound Recording Industries	512290	0	Direct, Private, Automobile Insurance Carriers	524122	1
Radio Broadcasting	515110	0	Direct, Public, Automobile Insurance Carriers	524123	0
Television Broadcasting	515120	0	Direct Property Insurance Carriers	524124	0
Pay and Specialty Television	515210	1	Direct Liability Insurance Carriers	524125	0
Internet Publishing and Broadcasting	516110	1	Other Direct Insurance (except Life, Health and Medical) Carriers	524129	1
Wired Telecommunications Carriers	517110	16	Life Reinsurance Carriers	524131	0
Wireless Telecommunications Carriers (except Satellite)	517210	10	Accident and Sickness Reinsurance Carriers	524132	0
Telecommunications Resellers	517310	10	Automobile Reinsurance Carriers	524133	0
Satellite Telecommunications	517410	5	Property Reinsurance Carriers	524134	0
Cable and Other Program Distribution	517510	3	Liability Reinsurance Carriers	524135	0
Other Telecommunications	517910	2	General and Other Reinsurance Carriers	524139	0
Internet Service Providers	518111	34	Insurance Agencies and Brokerages	524210	2
Web Search Portals	518112	1	Claims Adjusters	524291	1
Data Processing, Hosting, and Related Services	518210	35	All Other Insurance Related Activities	524299	3
News Syndicates	519110	3	Trustees Pension Funds	526111	0
Libraries	519121	2	Non-Trustees Pension Funds	526112	0
Archives	519122	2	Equity Funds - Canadian	526911	0
All Other Information Services	519190	8	Equity Funds - Foreign	526912	0
			Mortgage Funds	526913	0
			Money Market Funds	526914	0
			Bond and Income / Dividend Funds - Canadian	526915	0
			Bond and Income / Dividend Funds - Foreign	526916	0
			Balanced Funds / Asset Allocation Funds	526917	0
			Other Open-Ended Funds	526919	0
			Mortgage Investment Funds	526920	0
			Segregated (except Pension) Funds	526930	0
			Securitization Vehicles	526981	0
			All Other Miscellaneous Funds and Financial Vehicles	526989	0
			Lessors of Residential Buildings and Dwellings (except Social Housing Projects)	531111	0
			Lessors of Social Housing Projects	531112	0
			Lessors of Non-Residential Buildings (except Mini-Warehouses)	531120	7
			Self-Storage Mini-Warehouses	531130	0
<b>Finance, insurance and real estate</b>					
Monetary Authorities - Central Bank	521110	0			
Personal and Commercial Banking Industry	522111	4			
Corporate and Institutional Banking Industry	522112	0			
Local Credit Unions	522130	0			
Other Depository Credit Intermediation	522190	0			
Credit Card Issuing	522210	0			
Sales Financing	522220	3			
Consumer Lending	522291	0			
All Other Non-Depository Credit Intermediation	522299	7			
Mortgage and Non-mortgage Loan Brokers	522310	1			
Central Credit Unions	522321	0			

Table 28. (Continued)

## Number of R&amp;D performers 2002, by NAICS 2002

NAICS description	NAICS	Firms	NAICS description	NAICS	Firms
<b>Finance, insurance and real estate</b> (Continued)			<b>Scientific research and development</b>		
Lessors of Other Real Estate Property	531190	1	Research and Development in the Physical, Engineering and Life Sciences	541710	561
Offices of Real Estate Agents and Brokers	531210	7	Research and Development in the Social Sciences and Humanities	541720	29
Real Estate Property Managers	531310	1			
Offices of Real Estate Appraisers	531320	2	<b>Health care and social assistance</b>		
Other Activities Related to Real Estate	531390	0			
Passenger Car Rental	532111	1	Offices of Physicians	621110	13
Passenger Car Leasing	532112	0	Offices of Dentists	621210	3
Truck, Utility Trailer and RV (Recreational Vehicle) Rental and Leasing	532120	0	Offices of Chiropractors	621310	4
Consumer Electronics and Appliance Rental	532210	0	Offices of Optometrists	621320	2
Formal Wear and Costume Rental	532220	0	Offices of Mental Health Practitioners (except Physicians)	621330	5
Video Tape and Disc Rental	532230	1	Offices of Physical, Occupational, and Speech Therapists and Audiologists	621340	3
Other Consumer Goods Rental	532290	2	Offices of All Other Health Practitioners	621390	5
General Rental Centres	532310	2	Family Planning Centres	621410	1
Construction, Transportation, Mining, and Forestry Machinery and Equipment Rental and Leasing	532410	8	Out-Patient Mental Health and Substance Abuse Centres	621420	0
Office Machinery and Equipment Rental and Leasing	532420	0	Community Health Centres	621494	0
Other Commercial and Industrial Machinery and Equipment Rental and Leasing	532490	10	All Other Out-Patient Care Centres	621499	1
Lessors of Non-Financial Intangible Assets (Except Copyrighted Works)	533110	9	Medical and Diagnostic Laboratories	621510	58
			Home Health Care Services	621610	1
			Ambulance (except Air Ambulance) Services	621911	0
			Air Ambulance Services	621912	0
			All Other Ambulatory Health Care Services	621990	1
			General (except Paediatric) Hospitals	622111	0
			Paediatric Hospitals	622112	0
			Psychiatric and Substance Abuse Hospitals	622210	0
			Specialty (except Psychiatric and Substance Abuse) Hospitals	622310	2
			Nursing Care Facilities	623110	0
			Residential Developmental Handicap Facilities	623210	0
			Residential Substance Abuse Facilities	623221	0
			Homes for the Psychiatrically Disabled	623222	0
			Community Care Facilities for the Elderly	623310	0
			Transition Homes for Women	623991	0
			Homes for Emotionally Disturbed Children	623992	0
			Homes for the Physically Handicapped or Disabled	623993	0
			All Other Residential Care Facilities	623999	1
			Child and Youth Services	624110	0
			Services for the Elderly and Persons with Disabilities	624120	0
			Other Individual and Family Services	624190	1
			Community Food Services	624210	0
			Community Housing Services	624220	0
			Emergency and Other Relief Services	624230	0
			Vocational Rehabilitation Services	624310	0
			Child Day-Care Services	624410	2
<b>Architectural, engineering and related</b>					
Architectural Services	541310	10			
Landscape Architectural Services	541320	0			
Engineering Services	541330	491			
Drafting Services	541340	8			
Building Inspection Services	541350	5			
Geophysical Surveying and Mapping Services	541360	15			
Surveying and Mapping (except Geophysical) Services	541370	23			
Testing Laboratories	541380	69			
<b>Computer system design and related</b>					
Computer Systems Design and Related Services	541510	1,795			
<b>Management, scientific and technical consulting</b>					
Administrative Management and General Management Consulting Services	541611	127			
Human Resource and Executive Search Consulting Services	541612	9			
Other Management Consulting Services	541619	50			
Environmental Consulting Services	541620	45			
Other Scientific and Technical Consulting Services	541690	161			

Table 28. (Continued)

## Number of R&amp;D performers 2002, by NAICS 2002

NAICS description	NAICS	Firms	NAICS description	NAICS	Firms
<b>All other services</b>			<b>All other services (Continued)</b>		
Offices of Lawyers	541110	2	Landscaping Services	561730	12
Offices of Notaries	541120	0	Carpet and Upholstery Cleaning Services	561740	1
Other Legal Services	541190	3	Duct and Chimney Cleaning Services	561791	2
Offices of Accountants	541212	6	All Other Services to Buildings and Dwellings	561799	6
Tax Preparation Services	541213	1	Packaging and Labelling Services	561910	14
Bookkeeping, Payroll and Related Services	541215	8	Convention and Trade Show Organizers	561920	3
Interior Design Services	541410	1	All Other Support Services	561990	56
Industrial Design Services	541420	43	Elementary and Secondary Schools	611110	1
Graphic Design Services	541430	34	Community Colleges and C.E.G.E.P.s	611210	6
Other Specialized Design Services	541490	7	Universities	611310	0
Advertising Agencies	541810	23	Business and Secretarial Schools	611410	0
Public Relations Services	541820	0	Computer Training	611420	7
Media Buying Agencies	541830	1	Professional and Management Development Training	611430	6
Media Representatives	541840	6	Technical and Trade Schools	611510	3
Display Advertising	541850	7	Fine Arts Schools	611610	0
Direct Mail Advertising	541860	2	Athletic Instruction	611620	3
Advertising Material Distribution Services	541870	0	Language Schools	611630	0
Specialty Advertising Distributors	541891	1	All Other Schools and Instruction	611690	8
All Other Services Related to Advertising	541899	5	Educational Support Services	611710	2
Marketing Research and Public Opinion Polling	541910	16	Theatre (except Musical) Companies	711111	1
Photographic Services	541920	7	Musical Theatre and Opera Companies	711112	0
Translation and Interpretation Services	541930	1	Dance Companies	711120	1
Veterinary Services	541940	6	Musical Groups and Artists	711130	0
All Other Professional, Scientific and Technical Services	541990	27	Other Performing Arts Companies	711190	0
Holding Companies	551113	96	Sports Teams and Clubs	711211	0
Head Offices	551114	0	Horse Race Tracks	711213	1
Office Administrative Services	561110	43	Other Spectator Sports	711218	0
Facilities Support Services	561210	0	Live Theatres and Other Performing Arts Presenters with Facilities	711311	1
Employment Placement Agencies	561310	7	Sports Stadiums and Other Presenters with Facilities	711319	0
Temporary Help Services	561320	1	Performing Arts Promoters (Presenters) without Facilities	711321	2
Professional Employer Organization	561330	0	Festivals without Facilities	711322	0
Document Preparation Services	561410	6	Sports Presenters and Other Presenters without Facilities	711329	1
Telephone Call Centres	561420	8	Agents and Managers for Artists, Athletes, Entertainers and Other Public Figures	711410	1
Business Service Centres	561430	2	Independent Artists, Writers and Performers	711510	8
Collection Agencies	561440	1	Non-Commercial Art Museums and Galleries	712111	0
Credit Bureaus	561450	1	Museums (except Art Museums and Galleries)	712119	1
Other Business Support Services	561490	2	Historic and Heritage Sites	712120	1
Travel Agencies	561510	1	Zoos and Botanical Gardens	712130	2
Tour Operators	561520	2	Other Heritage Institutions	712190	1
Other Travel Arrangement and Reservation Services	561590	1	Amusement and Theme Parks	713110	0
Investigation Services	561611	4	Amusement Arcades	713120	0
Security Guard and Patrol Services	561612	0	Casinos (except Casino Hotels)	713210	0
Armoured Car Services	561613	1	Lotteries	713291	1
Security Systems Services (except Locksmiths)	561621	23	All Other Gambling Industries	713299	1
Locksmiths	561622	1	Golf Courses and Country Clubs	713910	1
Exterminating and Pest Control Services	561710	4	Skiing Facilities	713920	3
Window Cleaning Services	561721	1	Marinas	713930	1
Janitorial Services (except Window Cleaning)	561722	6	Fitness and Recreational Sports Centres	713940	1

Table 28. (Continued)

## Number of R&amp;D performers 2002, by NAICS 2002

NAICS description	NAICS	Firms	NAICS description	NAICS	Firms
<b>All other services (Continued)</b>			<b>All other services (Continued)</b>		
Bowling Centres	713950	0	Photo Finishing Laboratories (except One-Hour)	812921	2
All Other Amusement and Recreation Industries	713990	2	One-Hour Photo Finishing	812922	0
Hotels	721111	0	Parking Lots and Garages	812930	1
Motor Hotels	721112	1	All Other Personal Services	812990	1
Resorts	721113	0	Religious Organizations	813110	0
Motels	721114	0	Grant-Making and Giving Services	813210	1
Casino Hotels	721120	0	Social Advocacy Organizations	813310	2
Bed and Breakfast	721191	0	Civic and Social Organizations	813410	3
Housekeeping Cottages and Cabins	721192	0	Business Associations	813910	3
All Other Traveller Accommodation	721198	1	Professional Organizations	813920	5
RV (Recreational Vehicle) Parks and Campgrounds	721211	0	Labour Organizations	813930	0
Hunting and Fishing Camps	721212	0	Political Organizations	813940	0
Recreational (except Hunting and Fishing) and Vacation Camps	721213	0	Other Membership Organizations	813990	1
Rooming and Boarding Houses	721310	0	Private Households	814110	1
Full-Service Restaurants	722110	2	Defence Services	911110	0
Limited-Service Eating Places	722210	8	Federal Courts of Law	911210	0
Food Service Contractors	722310	0	Federal Correctional Services	911220	0
Caterers	722320	2	Federal Police Services	911230	0
Mobile Food Services	722330	0	Federal Regulatory Services	911240	0
Drinking Places (Alcoholic Beverages)	722410	1	Other Federal Protective Services	911290	0
General Automotive Repair	811111	15	Federal Labour and Employment Services	911310	0
Automotive Exhaust System Repair	811112	0	Immigration Services	911320	0
Other Automotive Mechanical and Electrical Repair and Maintenance	811119	7	Other Federal Labour, Employment and Immigration Services	911390	0
Automotive Body, Paint and Interior Repair and Maintenance	811121	13	Foreign Affairs	911410	0
Automotive Glass Replacement Shops	811122	1	International Assistance	911420	0
Car Washes	811192	2	Other Federal Government Public Administration	911910	2
All Other Automotive Repair and Maintenance	811199	0	Provincial Courts of Law	912110	0
Electronic and Precision Equipment Repair and Maintenance	811210	31	Provincial Correctional Services	912120	0
Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance	811310	89	Provincial Police Services	912130	0
Home and Garden Equipment Repair and Maintenance	811411	3	Provincial Fire-Fighting Services	912140	0
Appliance Repair and Maintenance	811412	5	Provincial Regulatory Services	912150	0
Reupholstery and Furniture Repair	811420	3	Other Provincial Protective Services	912190	0
Footwear and Leather Goods Repair	811430	0	Provincial Labour and Employment Services	912210	0
Other Personal and Household Goods Repair and Maintenance	811490	8	Other Provincial and Territorial Public Administration	912910	0
Barber Shops	812114	0	Municipal Courts of Law	913110	0
Beauty Salons	812115	2	Municipal Correctional Services	913120	0
Unisex Hair Salons	812116	1	Municipal Police Services	913130	0
Other Personal Care Services	812190	1	Municipal Fire-Fighting Services	913140	0
Funeral Homes	812210	1	Municipal Regulatory Services	913150	0
Cemeteries and Crematoria	812220	0	Other Municipal Protective Services	913190	0
Coin-Operated Laundries and Dry Cleaners	812310	0	Other Local, Municipal and Regional Public Administration	913910	0
Dry Cleaning and Laundry Services (except Coin-Operated)	812320	3	Aboriginal Public Administration	914110	0
Linen and Uniform Supply	812330	0	International and Other Extra-Territorial Public Administration	919110	0
Pet Care (except Veterinary) Services	812910	0	<b>Total all R&amp;D performers</b>		<b>12,272</b>



**Catalogued publications****Statistical Publications**

- 88-001-XIE** Science Statistics (monthly)
- 88-202-XIE** Industrial Research and Development Intentions (with 2003 preliminary estimates and 2002 actual expenditures) (annual)
- 88-204-XIE** Federal Scientific Activities (annual)

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- No. 1 Distribution of federal expenditures on science and technology by province and territories, 2002-2003 (January 2005)
- No. 2 Research and development (R&D) personnel in Canada, 1993 to 2002 (May 2005)
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- No. 5 Estimates of total spending on research and development in the health field in Canada, 1988 to 2004 (July 2005)
- No. 6 Estimation of research and development expenditures in the higher education sector, 2003-04 (December 2005)
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- No. 4 Research and development (R&D) expenditures of private non-profit (PNP) organizations, 2002 (April 2004)
- No. 5 The provincial research organizations, 2001 (May 2004)
- No. 6 Scientific and technological (S&T) activities of provincial governments, 1994-95 to 2002-03 (June 2004)
- No. 7 Biotechnology scientific activities in selected federal government departments and agencies, 2002-2003 (July 2004)

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- No. 8 Estimates of total spending on research and development in the health field in Canada, 1988 to 2003 (July 2004)
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- No. 11 Federal government expenditures on scientific activities, 2004-2005 (November 2004)
- No. 12 Total spending on research and development in Canada, 1990 to 2004, and provinces, 1990 to 2002 (December 2004)

**Working papers – 2005**

- ST-05-01 Federal government expenditures and personnel in the natural and social sciences 1995-96 to 2004-05, (January 2005)
- ST-05-02 Provincial distribution of federal expenditures and personnel on science and technology, 1996-97 to 2002-2003 (January 2005)
- ST-05-03 Industrial R&D statistics by region, 1994 to 2002 (January 2005)
- ST-05-04 Knowledge sharing succeeds: how selected service industries rated the importance of using knowledge management practices to their success (February 2005)
- ST-05-05 Characteristics of firms that grow from small to medium size: Industrial and geographic distribution of small high-growth firms (February 2005)
- ST-05-06 Summary: Joint Statistics Canada – University of Windsor Workshop on Intellectual Property Commercialization Indicators, Windsor (March 2005)
- ST-05-07 Summary: Meeting on Commercialization Measurement, Indicators, Gaps and Frameworks, Ottawa (March 2005)
- ST-05-08 Estimates of research and development, personnel in Canada, 1979 to 2002 (May 2005)
- ST-05-09 Overview of the Biotechnology Use and Development Survey – 2003, (April 2005)
- ST-05-10 Access to Financing Capital by Canadian Innovative Biotechnology Firms, (April 2005)
- ST-05-11 Scientific and technological (S&T) activities of provincial governments and provincial research organizations, 1995-96 to 2003-04 (September 2005)
- ST-05-12 Innovation in the Information and Communications Technology (ICT) services sector industries: Results from the Survey of Innovation 2003 (October 2005)
- ST-05-13 Innovation in Selected Professional, Scientific and Technical Services: Results from the Survey of Innovation 2003 (October 2005)
- ST-05-14 Innovation in selected transportation industries: Results from the survey of innovation 2003 (November 2005)
- ST-05-15 Innovation in selected industries serving the mining and forestry sectors: Results from the survey of innovation 2003 (November 2005)

**Working papers – 2005** (continued)

- ST-05-16 Functional foods and nutraceuticals: The development of value-added food by Canadian firms (September 2005)
- ST-05-17 Industrial R&D Statistics by Region, 1994 to 2003 (November 2005)
- ST-05-18 Survey of intellectual property commercialization in the higher education sector, 2003 (November 2005)
- ST-05-19 Estimation of Research and Development Expenditures in the Higher Education Sector, 2003-2004 (December 2005)
- ST-05-20 Estimates of Canadian Research and Development Expenditures (GERD), Canada, 1994 to 2005, and by Province 1994 to 2003 (December 2005)

**Working papers – 2004**

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