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Industrial Research and Development: Intentions

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Symbols

The following standard symbols are used in Statistics Canada publications:

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

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Appendix

Highlights

Spending on industrial research and development 2008 (Intentions)

- Companies that perform industrial research and development anticipate spending $16.3[E] billion on industrial R&D in 2008, up slightly from the $16.2 billion spending intentions for 2007.
- The six leading industries performing R&D in 2008 are expected to remain unchanged from 2007. Together, information and cultural industries ($1.7[E] billion), communications equipment ($1.6[E] billion), scientific research and development services ($1.4 billion), computer system design and related services ($1.1[E] billion), pharmaceutical and medicine ($1.1 billion), and aerospace products and parts ($0.9 billion) will represent almost half (48.2%) of all industrial R&D expected to be performed in 2008.

Analysis

Industrial research and development (R&D) declined by 3% between 2006 and 2007, when measured in constant 2002 dollars. This represented a continuation of the trend which has seen small declines in 2005 and 2006. Current intramural R&D expenditures peaked in real terms in 2004, while both total R&D expenditures and capital expenditures for R&D peaked in 2001 (table 1).

The number of R&D performing firms is increasing rapidly also, particularly since the turn of the millennium, therefore the average R&D expenditure by performing firm is lower in 2005 versus 2000, at $751 thousand per firm versus $1.1 million per firm, in 2002 constant dollars ($14,330 million / 19,087 firms in 2005 and $12,674 million / 10,849 firms in 2000). It appears that industrial R&D is gaining importance as a business strategy amongst firms operating in Canada (tables 1 and 19-2).

The business expenditures on R&D (BERD) ratio, a ratio of total intramural business R&D expenditures divided by Gross Domestic Product (GDP), enables countries to be compared without reference to exchange rates and other comparative valuations of currency, such as purchasing power parity (PPP) dollars. The measure can also be used across time, without concern for calculations of constant value versus current value dollars (table 2).

Canada's BERD ratio in 2006 was almost the same as ten years earlier, 1.06% versus 0.99%. This compares with the OECD average of 1.56%. Of the twenty selected members, only four reported lower BERD as a percentage of GDP in 2006. Between 2003 and 2006, Canada's BERD ratio declined, as its GDP continued to rise while business R&D expenditures remained stable (table 2).

The countries with the highest BERD ratios in 2006 were the same as those with the highest ratios in 2003, and even in 1995. In 2006, Sweden reported a BERD ratio of 2.79%, followed by Japan and Korea at 2.62% and 2.49% respectively. The United States reported a BERD ratio of 1.84%, unchanged from 2003 (table 2).

After reaching a high of 1.29% in 2001, Canada's BERD ratio fell to 1.05% in 2007. The proportion of R&D undertaken by the business sector as a proportion of all performing sectors also reached its highpoint in 2001 at 61.7%, falling to 55.8% by 2007. Canada's share of total R&D performed by business is, and has been consistently, lower than the OECD average (table 3).

In the late 1980s, industrial research and development performance was concentrated in a few firms – 25 firms accounted for almost half of Canada's industrial R&D expenditures. This concentration in a few firms has in recent years showed signs of weakening. In 2008, the top 25 R&D performers accounted for one-third of all business R&D; the top 100 performers accounted for just over half, at 54%. This shift largely took place between 2000 and 2002, the same time as the bursting of the tech bubble. The net effect is a wider and shallower distribution of R&D expenditures across the pool of performers (table 4).

Information and cultural industries, comprised of the publishing industries including software publishing, the Internet publishing and broadcasting industries, the telecommunications industries and the Internet service providers, accounted for just over one-tenth of industrial R&D spending (table 5-1).

Of the seven top industrial groups, two were related to computer and electronic product manufacturing: communications equipment industries (such as telephone apparatus manufacturing, radio and television broadcasting and wireless communications and other communications manufacturing) which accounted for 10% of R&D expenditures; and semiconductor and other electronic components at 6%. Computer system design and related services accounted for 7% of spending further indicating the importance of information communication technologies to Canadian industrial R&D expenditures (table 5-1).

Scientific research and development services (8%), pharmaceutical and medicine (7%) and aerospace products and parts (6%) round out the most important industrial groups to R&D expenditures (table 5-1).

Manufacturing firms accounted for just over one-half of all industrial R&D expenditures 52.8%. Services industries accounted for the vast majority of the remainder at 41.2%. Resource industries, utilities and construction combined accounted for the remainder of 6.0% (table 5-1).

Within the manufacturing sector, computers and information and communication technology (ICT) related industries represent 16.4% of all industrial R&D, while all chemicals manufacturing accounted for 9.4% and transportation industries accounted for just over 9.3% (table 5-1).

Information and cultural services is the largest of all of the service sector industry groups in terms of R&D expenditures at 11% of total R&D expenditures, but all professional services (NAICS 54 includes four of the industry categories from architecture, engineering and related services through to scientific research and development) account for 18% of total R&D expenditures (table 5-1).

The scientific R&D services industry accounts for 8.3% of all industrial R&D expenditures and is composed of a variety of types of companies. Some are the R&D equivalent of accounting, legal and other business service firms. These firms are contract research firms that conduct research for a fee and provide some form of analytical outcome as a product. Other firms in this industry are “venture firms” which are heavily engaged in R&D activities on their own account, but which do not yet have significant sales to cover these and other operating costs. Many of these firms are biotechnology firms. There are, however, firms engaged in research on communications technologies, instruments or energy. In terms of R&D expenditure, biotechnology and ICT-related R&D dominate this industry (table 5-1).

Of the industries in the remaining sectors, oil and gas extraction has historically been the most significant R&D performing industry (table 5-1).

Provincial performance of R&D tends to mirror the general economic activity within the province. Ontario has higher than average concentration of R&D in the manufacturing sector, while Alberta dominates R&D by oil and gas extraction firms (table 5-3).

Manufacturing and service sector R&D accounts for about 95% or more of all industrial R&D in all regions and provinces except Saskatchewan and Alberta where they account for just over half (table 5-3).

Atlantic Canada and Quebec report very similar distributions of R&D by sector, with manufacturing accounting for about 55% and services for 40. In Atlantic Canada, important industries for R&D include: information and cultural services, computer systems design, scientific R&D services and pharmaceuticals and medicine which all reported $20 million or more in industrial R&D expenditures. Quebec’s most significant industries included information and cultural services, computer systems design and related services, scientific R&D services and pharmaceuticals, but also aerospace and health care and social assistance services. Each of these industries and industry groups reported more than $250 million in R&D expenditures (table 5-3).

Ontario and Manitoba show similarities at the sector level as well, with manufacturing accounting for about 61% and services close to 36%. In Ontario the following industries reported more than $500 million in R&D expenditures: communications equipment, information and cultural services, semiconductors and other electronic components, computer systems design and related services (all ICTs), pharmaceuticals and medicine and lastly motor vehicle manufacturing. Very little detail was available for Manitoba but scientific R&D services and wholesale trade are among the important R&D performing industries (table 5-3).

As noted above, Alberta and Saskatchewan show similar low levels of R&D in manufacturing and services. For Saskatchewan, machinery, architectural, engineering and related services and wholesale trade each accounted for $10 million or more in industrial R&D expenditures. In Alberta, energy is the central focus of much of the industrial R&D performed. In addition to $440 million in R&D undertaken by the mining and oil and gas extraction sector, the next largest contributor was petroleum and coal products manufacturing. In the service sector firms: computer systems design and related services, architectural, engineering and related services, wholesale trade and information and cultural industries, were the largest performers of R&D (table 5-3).

British Columbia stands alone in reporting a majority of R&D being performed by firms in the service sector (62.9%). Information and cultural industries firms reported the highest levels of R&D performance, followed by scientific R&D services and then computer systems design and related services. In the manufacturing sector paper products reported the highest levels of industrial R&D (table 5-3).

Intramural R&D expenditures by country of control remained virtually unchanged over the period 2004 to 2006. Two-thirds of the R&D performed was undertaken by Canadian-controlled enterprises, 22% by U.S. controlled enterprises and the remaining 12% by firms of other countries' control (table 5-4).

Canadian-controlled firms performed two-thirds of industrial R&D, but there were major differences between industries. Enterprises in resource industries such as Forestry and logging and Fishing, hunting and trapping performing R&D were 100% Canadian controlled (table 5-5).

The proportion of R&D performed by Canadian-controlled firms continues to be higher for the service sector than for manufacturing. In energy, the share performed by Canadian-controlled firms has held steady at around 53%, while the figure for the mining sector has been volatile, perhaps due to changes in ownership in the sector (table 5-5).

The firms with the largest R&D budgets together performed the vast majority of industrial R&D. Those with annual R&D budgets of $1 million or more performed 82.7% of all industrial R&D in 2006. What is interesting is that this was a slight decline from 85.9% in 2002 (table 5-6).

Funding for industrial R&D activities can come from a variety of sources, both private and public. The share of funding from public sources of funds, be they federal grants or contracts, provincial sources or other Canadian sources has dropped steadily over the period 1981 to 2006, such that by 2006 almost all (98%) industrial R&D was funded by private sources. This is a drop from the figures reported in the 1980s when the public sources accounted for between 10% and 13% (table 6-1).

Private sources range from the performing company, companies related to the performing company, other unrelated companies and foreign firms, related or not. The performing company has always been the primary source of funding for R&D activities, and this source has been at an all time high since 2002, during which time it has accounted for almost 80% of all industrial R&D funding. The share of funding from companies related to the performing companies has dropped over the years from a high of 7%, in 1989, to the current figure of 3%. R&D contracts in 1993 and 1994 accounted for 4% of all funding, but by 2006 this had dropped to 1%. Foreign funding reached its peak at 28% in 2000. The most recent figure, from 2006, indicates that foreign sources of funds accounted for 15% of all industrial R&D funding (table 6-1).

Sources of funds varies significantly by the amount of R&D expenditures. As the firms' total expenditures on R&D increase, the amount of funds obtained from outside the firm also steadily increases. The largest shift in funding occurs amongst R&D performing firms with the largest R&D budgets ($1 million or more per year); these firms obtain one-quarter of their funding outside the performing firm, compared with over 90% of such funding coming from inside the firm for all other categories (table 6-3).

Funds for R&D performance for Canadian-controlled firms are much more likely to come from within the firm than for their foreign-controlled counterparts. Canadian-controlled firms obtained less than 5% of their funding from outside Canada, while U.S.-controlled firms obtained 37% of funding from outside Canada and other foreign-controlled firms obtained 35% from outside (table 6-4).

Expenditures on R&D can be broken down into two main groups: current and capital. Current expenditures include wages and salaries and "other" current expenditures. These other current expenditures typically include items which are consumed within the year, for example lab supplies like test strips for measurement devices. Note that the purchase of the device itself would likely be a capital expenditure, as capital expenditure are for items that last for years and therefore must be capitalized over their useful life (table 7-1).

Current intramural expenditures on R&D accounted for 94% of total intramural R&D expenditures, while capital accounted for 6%. The figures for manufacturing and services were identical, at 95%. Petroleum and coal product manufacturing was significantly different from the other reporting industries in that only 79% of its total R&D expenditures were for current intramural expenditures (table 7-1).

Overall, 59% of current intramural R&D expenditures were for wages and salaries, but there were differences between the manufacturing and services sectors and between industries. Manufacturing firms reported 56% of all current intramural R&D expenditure were allocated to wages and salaries, while for firms in the service sector the figure was 66%. Firms in mining and petroleum and coal products reported the lowest figures of 25% and 21% respectively. Amongst industries in the manufacturing sector, those in which not much R&D was performed, printing, other computer and electronics products and furniture and related product, reported the highest proportion of expenditures composed of wages and salaries. In the service sector three industries in professional services, architectural, engineering and related services, computer system design and related services and management, scientific and technical consulting services, reported the highest share of expenditures composed of wages and salaries (table 7-2).

The distribution of current intramural research and development expenditures largely mirrored the distribution of total intramural research and development expenditures, with the exceptions of Saskatchewan and Alberta. These two provinces reported current expenditures at 72% and 81% of total R&D expenditures respectively (tables 5-2 and 7-3).

R&D expenditures as a proportion of firm revenues declined slightly between 2002 and 2006, from 1.9% to 1.7%. This decline was reported across almost all revenue size categories. Firms with the lowest revenues report the highest ratio of R&D to revenues, at 38.1% for firms with revenues of $1 million or less, compared with 1.0% for firms with revenues of $400 million or more (table 7-4).

Canadian-controlled firms have consistently reported higher R&D expenditures to revenues than foreign-controlled firms in the interval 2002 to 2006. The overall R&D intensity measure declined slightly, but the decline was a result of a decline reported by the foreign-controlled firms. The R&D intensity of the Canadian-controlled firms remained stable (table 7-5).

In 2006, in most industries, Canadian-controlled firms reported higher R&D intensities, measured as a proportion of firm revenues, than foreign-controlled firms (table 7-6).

While the average R&D intensity was 1.7% in 2006, some industries reported much higher levels. Amongst all the industries, scientific R&D services firms reported the highest R&D intensity at 37.1%, followed by firms in health care and social assistance at 24.9% and communications equipment at 16.6% (table 7-6).

As with virtually all business statistics, the population of R&D performing firms consists of two groups – the largest firms which are few in number, but which account for the majority of economic activity and the large pool of smaller firms which account for much less activity. Amongst R&D performing firms, firms with revenues less than $50 million account for 94% of the population and 34% of total R&D performed. By contrast, the 258 largest firms, with revenues of $400 million or more, performed 44% of all industrial R&D and reported spending an average of $26.9 million in 2005 (table 8).

Capital intramural R&D expenditures held fairly steady in current value dollar terms from 2004 to 2007, but reported intentions may indicate a drop in 2008. This drop appears to be at least in part due to a drop in capital R&D expenditures by firms in the service sector (table 10).

Approximately six in 10 of all R&D personnel were professionals and the remaining four in 10 were technicians and other personnel. The share of professionals was higher in Alberta, British Columbia and northern Canada and lowest in Newfoundland and Labrador, Prince Edward Island, Manitoba and Saskatchewan (table 12-2).

The distribution of R&D personnel by occupational category also varies by industry. The share of professionals was higher in service sector than in manufacturing (table 12-3).

Industries with particularly high proportions of professionals fell into two groups: those associated with ICTs (both manufacturing and services ICT industries) and professional services (NAICS 54). Industries with particularly low proportions of professionals tended to fall within industries with lower R&D intensities: agriculture, textiles, printing and furniture and related products. In the service sector, firms in health care and social assistance reported the lowest proportion of professionals (table 12-3).

The share of R&D personnel which is composed of professionals fell slightly between 2002 and 2006, from 62% to 59%. This was matched by a proportionate increase in the share of technicians from 27% to 30%. The other R&D personnel remained close to 12% of the total (table 12-4).

The largest changes in the number of R&D personnel by occupational category occurred between 2003 and 2004 for professionals and technicians, and between 2002 and 2003 for the other R&D personnel (table 12-4).

Professional R&D personnel can be divided by highest degree obtained. In 2006, three-quarters of all professional R&D personnel engaged in industrial R&D had a bachelor's degree, 17% had a master's and 7% held a doctorate (table 13).

Firms can perform R&D in-house or they can pay someone else to undertake the work. Of the seven industries with the highest intramural R&D expenditures, four (pharmaceutical and medicine, communications equipment, information and cultural industries and scientific research and development services) are also the highest in terms of extramural payments for R&D services. Computer systems design and related services report a high level of extramural payments, but not as high as wholesale trade. Aerospace products and parts by contrast, reported very low levels of extramural payments for research and development, and no data were available for semiconductors and other electronic components (table 14-1).

Over $1 billion of industrial R&D was related to biotechnology in 2004 through 2006. The vast majority of this research was undertaken by firms in the service sector, followed by those in manufacturing and lastly by firms in the agriculture sector. The amount of funds expended on biotechnology R&D fell between 2004 and 2006 (table 15-1).

R&D expenditure on pollution reduction have held steady between 2004 and 2006, with the largest share of such research performed by the manufacturing sector. Pollution-related research increased in Mining and oil and gas extraction industries as well as Utilities between 2004 and 2006 (table 15-2).

R&D related to the development of software increased steadily between 2004 and 2006. As a proportion of total intramural R&D expenditures, software has increased from 23% in 2004 to 26% in 2006. Software is a larger share of total intramural R&D spending in the service sector (37%) than in the manufacturing sector (20%) (tables 5-1 and 15-3).

For Canadian technological balance of payments (TBP), the estimates are taken only from firms performing or funding at least $1.5 million of research and development (R&D) starting with 2006, for earlier years, the TBP represented firms performing or funding at least $1 million of R&D. The statistics which appear in tables 16-1 and 16-2 are taken from 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 (table 16-1).

Technological services are composed of R&D and "other" technological services. These services are typically performed intramurally, but they can also be purchased from a source within or outside of Canada. Similarly, Canadian firms can perform technological services for firms outside of Canada. In 2006, Canadian firms obtained receipts of $2.9 billion and made payments of $1.5 billion, for a net balance of payment for technological services of $1.3 billion. The mining and oil and gas extraction sector was almost neutral in terms of payments and receipts, while the manufacturing sector reported almost $150 million more in receipts than payments. It was, however, "other industries" which accounted for the vast majority of the positive balance (table 16-1).

In 2006, R&D activities accounted for over 85% of technological services receipts and almost 80% of payments. This contrasts with 1997, when R&D accounted for 90% of all technological services receipts but only just over 57% of all payments (table 16-2).

Throughout the period 1997 to 2006, the balance for technological services was always positive, as was the balance for R&D activities. The balance for "other" technological services was strongly negative in 1997, but small and positive from 2003 onward (table 16-2).

Over 60% of all intramural R&D related to energy was related to fossil fuel energy, this was followed by R&D related to conservation (table 17).

R&D expenditures on therapeutic health products reported a significant shift in the type of performing organization. In 2005, brand name pharmaceutical firms accounted for the largest share of such R&D, accounting for 56% of the total. Projected data for 2008 indicate that biotech firms account for half. This is most likely to be a result of reclassification of existing therapeutic health R&D performers rather than major changes in the levels of R&D being performed by the largest firms in each category (table 18-1).

Biotechnology or biopharmaceutical companies (50%) and brand name pharmaceutical companies (27%) dominate therapeutic health product R&D in Canada. There has been a noticeable shift from brand name pharmaceutical companies to biotechnology or biopharmaceutical companies since 2005 (table 18-1).

Three-quarters of a billion dollars ($744 million) were dedicated to research and development on therapeutic products in 2006. Excluding the category, “various others” ($120 million), the therapeutic class of the most importance ranked on R&D expenditure continued to be anti-infective for systemic use ($113 million). This area of research encompasses therapeutics capable of killing or inhibiting the growth or spread of infectious agents through the body, thus including treatments such as vaccines, antibacterials and antivirals (table 18-2).

Other important therapeutic classes for health product R&D are: antineoplastic and immunomodulating agents ($81 million); nervous system therapeutics ($76 million); and, blood and blood forming organs ($70 million) (table 18-2).

In 2005, there were 19,087 R&D performers in Canada. Of these, the vast majority of firms (96%) were Canadian-controlled. Of the remaining foreign-controlled firms, more than half were U.S.-controlled firms. R&D performers in forestry and logging and management, scientific and technical consulting services were 100% Canadian-controlled. At the other end of the spectrum, of the R&D performing firms in oil and gas extraction, petroleum and coal products and pharmaceutical and medicine were the least likely to be Canadian-controlled. In the service sector, firms in information and cultural services were the least likely to be Canadian-controlled; even so, almost 95% of these firms were Canadian-controlled (table 19-1).

No sector accounted for the majority of R&D performing firms, but the service sector came closest with 47% of all R&D performers (table 19-1).

The number of R&D performers has increased dramatically, by 75.9% from 2000 to 2005. This occurred while the total number of firms in Canada declined slightly (table 21). The greatest change in absolute numbers took place in Ontario, where performers almost doubled from 3,812 to 7,484 (table 19-2).

Quebec continued to report the highest number of R&D performing firms at 7,739 in 2005. Together the share of “central Canada”, Quebec and Ontario, grew from 77% to 80% between 2000 and 2005. The shares of the other regions fell accordingly, with the exception of the North which reported a large percentage change from a very small base (table 19-2).

R&D can be viewed as a business strategy. Business strategies attempt to position a firm in the most advantageous way relative to its competition in the market. The decision to perform R&D therefore represents a wager of sorts, that the expenditures incurred to perform the activity will generate some knowledge that will enable the firm to strengthen, or at least maintain, its position relative to the competition. Propensity data provides a snapshot of all of the firms which were performing R&D in a given period as a proportion of all firms in operation at that time. It is therefore interesting to note that the propensity to perform R&D has increased rapidly from 2000 to 2005, and that this occurred across all business sectors. This may represent a response to an increasingly competitive, global marketplace whose pressures cannot be avoided in protected local markets (table 19-3).

Overall, R&D performers represent a very small proportion of all business in Canada, only 2%. This varies by sector, with only 0.5% of all construction firms performing R&D versus over 15% of firms in the manufacturing sector. Propensities varied significantly by industries within each sector as well (table 19-3).

In some industries, R&D is almost a “price of admission”, with half or more of all firms in communications equipment and pharmaceutical and medicine reporting that they performed R&D in 2005. Other industries which reported high propensities to perform R&D include some expected industries like computer and peripheral equipment, semiconductors and other electronic components, navigational, measuring, medical and control instruments, aerospace products and parts and scientific R&D services, which are generally viewed as R&D intensive. The data also include some surprises however. Approximately one third of all firms in petroleum and coal products and primary metals (ferrous) and primary metals (non-ferrous) reported performing R&D in 2005. Other fairly high propensity industries include paper, other chemicals, plastic products, rubber products, machinery and motor vehicles and parts which all reported more than 20% of all firms engaged in R&D in 2005. Even industries such as food, textiles, non-metallic mineral products and fabricated metal products, each reported more than 10% of all firms engaged in R&D in 2005 (table 19-3).

In addition to scientific R&D services and computer systems design and related services, industries of interest in the service sector also include information and cultural industries and architectural, engineering and related services, which both reported more than 5% of all firms engaging in R&D (table 19-3).

Statistical tables

Table 1
Industrial research and development expenditures in current and constant dollars

	Current dollars			Goss domestic product implicit price index (2002)	2002 constant dollars		
	Current intramural expenditures	Capital expenditures	Total intramural expenditures		Current intramural expenditures	Capital expenditures	Total intramural expenditures
	millions of dollars			index = 2002	millions of dollars		
2008 p	15,349 E	968 E	**16,316** E	..	..	..	**..**
2007 p	15,159	1,000	**16,159**	116.4	13,023	859	**13,882**
2006 p	15,028	1,109	**16,137**	112.8	13,323	983	**14,306**
2005 r	14,696	1,095	**15,791**	110.2	13,336	994	**14,330**
2004 r	14,220	1,078	**15,299**	106.6	13,340	1,011	**14,351**
2003 r	13,140	983	**14,123**	103.3	12,720	952	**13,672**
2002 r	12,489	1,052	**13,540**	100	12,489	1,052	**13,541**
2001	12,767	1,499	**14,266**	98.9	12,909	1,516	**14,425**
2000	11,201	1,194	**12,395**	97.8	11,453	1,221	**12,674**
1999	9,361	1,039	**10,399**	93.9	9,969	1,106	**11,075**
1998	8,727	955	**9,682**	92.3	9,455	1,034	**10,489**
1997	7,874	865	**8,739**	92.8	8,485	932	**9,417**
1996	7,159	838	**7,997**	91.6	7,816	914	**8,730**
1995	7,286	705	**7,991**	90.2	8,077	781	**8,858**
1994	6,938	629	**7,567**	88.2	7,866	713	**8,579**
1993	5,878	546	**6,424**	87.2	6,741	626	**7,367**
1992	5,286	457	**5,742**	85.9	6,153	532	**6,685**
1991	4,812	543	**5,355**	84.8	5,674	640	**6,314**
1990	4,541	628	**5,169**	82.4	5,511	763	**6,274**
1989	4,155	624	**4,779**	79.8	5,207	782	**5,989**
1988	3,980	643	**4,623**	76.4	5,210	842	**6,052**
1987	3,691	649	**4,340**	73.1	5,049	888	**5,937**
1986	3,447	575	**4,022**	69.9	4,932	822	**5,754**
1985	3,054	579	**3,633**	67.8	4,504	854	**5,358**

Note(s): Components may not add to totals due to rounding.
Source(s): CANSIM tables 358-0024 and 380-0056.

Table 2
International comparison of business enterprise expenditures on research and development as a percentage of gross domestic product, by selected OECD countries

	2006 p	2005 r	2004 r	2003 r	1995
	percent				
Sweden	2.79	2.81	2.67	2.86	2.43
Japan	2.62	2.54	2.38	2.40	1.90
Korea	2.49	2.29	2.18	2.00	1.75
Finland	2.46	2.47	2.42	2.42	1.43
United States	1.84	1.83	1.79	1.84	1.77
Germany	1.77	1.72	1.73	1.76	1.45
Austria	1.66	1.64	1.51	..	..
Denmark	1.62	1.67	1.69	1.78	1.04
Iceland	..	1.43	..	1.46	0.49
France	1.34	1.33	1.36	1.36	1.39
Luxembourg	1.25	1.36	1.43	1.47	..
Belgium	1.24	1.25	1.29	1.31	1.19
Australia	1.15	1.04	0.96	0.92	0.84
United Kingdom	1.10	1.08	1.07	1.13	1.26
Canada	**1.06**	**1.12**	**1.16**	**1.16**	**0.99**
Czech Republic	1.02	0.91	0.79	0.76	0.62
Netherlands	0.96	1.02	1.03	1.01	1.03
Ireland	0.89	0.82	0.81	0.79	0.88
Norway	0.82	0.82	0.87	0.98	0.96
Switzerland	..	..	2.14	..	..
Total OECD	**1.56**	**1.53**	**1.49**	**1.51**	**1.38**

Note(s): Countries are presented in descending order of Business expenditures on research and development as a percentage of GDP based on their information for the most recent year reported on the table.
Source(s): OECD, Main Science and Technology Indicators. Volume 2008/1 (updated December 2008).

Table 3
Business expenditures on research and development compared to gross domestic expenditures on research and development and gross domestic product

	Business expenditures on research and development	Gross domestic expenditures on research and development	Gross domestic product	Business expenditures on research and development / Gross domestic expenditures on research and development	Business expenditures on research and development / Gross domestic product
	millions of dollars			percent	
2008 p	16,316 E	..	..	..	..
2007 p	16,159	28,984	1,535,646	55.75	1.05
2006 p	16,137	28,067	1,450,490	57.49	1.11
2005 r	15,791	27,699	1,372,626	57.01	1.15
2004 r	15,299	26,480	1,290,906	57.78	1.19
2003	14,039	24,635	1,213,175	56.99	1.16
2002	13,541	23,532	1,152,905	57.54	1.17
2001	14,266	23,132	1,108,048	61.67	1.29
2000	12,395	20,581	1,076,577	60.23	1.15
1999	10,399	17,638	982,441	58.96	1.06
1998	9,682	16,088	914,973	60.18	1.06
1997	8,739	14,635	882,733	59.71	0.99
1996	7,997	13,817	836,864	57.88	0.96
1995	7,991	13,754	810,426	58.10	0.99
1994	7,567	13,341	770,873	56.72	0.98
1993	6,424	12,184	727,184	52.72	0.88
1992	5,742	11,338	700,480	50.64	0.82
1991	5,355	10,767	685,367	49.74	0.78
1990	5,169	10,260	679,921	50.38	0.76
1989	4,779	9,517	657,728	50.22	0.73
1988	4,623	9,045	613,094	51.11	0.75
1987	4,341	7,950	558,949	54.60	0.78
1986	4,022	7,546	512,541	53.30	0.78
1985	3,635	6,985	485,714	52.04	0.75
1984	3,022	6,273	449,582	48.17	0.67
1983	2,602	5,517	411,386	47.16	0.63
1982	2,489	5,198	379,859	47.88	0.66

Source(s): CANSIM tables 358-0001 and 380-0017.

Table 4
Concentration of total intramural research and development expenditures by companies size

	Top 25	Top 50	Top 75	Top 100	Total intramural expenditures
	percent				millions of dollars
2008 p	33	44	50	54	**16,316** E
2007 p	33	43	49	53	**16,159**
2006 p	32	42	49	53	**16,137**
2005 r	33	44	50	54	**15,791**
2004 r	34	44	50	54	**15,299**
2003 r	34	45	50	54	**14,123**
2002 r	34	44	50	54	**13,540**
2001	41	49	55	59	**14,266**
2000	46	54	60	64	**12,395**
1999	44	54	59	63	**10,399**
1998	46	55	60	64	**9,682**
1997	44	53	59	63	**8,739**
1996	41	50	56	61	**7,997**
1995	39	48	54	58	**7,991**
1994	39	49	54	58	**7,567**
1993	43	54	60	64	**6,424**
1992	45	55	60	64	**5,742**
1991	47	57	63	67	**5,355**
1990	47	58	64	68	**5,169**
1989	48	59	64	68	**4,779**
1988	49	59	64	68	**4,623**
1987	49	58	64	67	**4,340**
1986	47	57	63	67	**4,022**
1985	48	58	64	68	**3,633**

Table 5-1
Total intramural research and development expenditures — By industry

	2004 r	2005 r	2006 p	2007 p	2008 p
	millions of dollars				
Total	**15,299**	**15,791**	**16,137**	**16,159**	**16,316** E
Agriculture, forestry, fishing and hunting	**102**	**109**	**115**	**114** E	**102** E
Agriculture	78	80	91	89 E	80 E
Forestry and logging	19	19	20 E	F	F
Fishing, hunting and trapping	5	10	4	F	F
Mining and oil and gas extraction	**371**	**433**	**578**	**489**	**500**
Oil and gas extraction	314	386	515	x	x
Mining	58	47	63	F	F
Utilities	**243**	**271**	**318**	**x**	**x**
Electric power	230	258	301	299	310
Other utilities	13	13	17	F	F
Construction	**56**	**69**	**69**	**F**	**F**
Manufacturing	**8,343**	**8,435**	**8,563**	**8,426**	**8,607**
Food	136	136	141	140 E	142 E
Beverage and tobacco	x	19	17	19	F
Textile	57	55	x	48 E	49 E
Wood products	80	100	122	105 E	91
Paper	420	343	374	311	314 E
Printing	35	39	x	F	F
Petroleum and coal products	190	214	202	239	239
Pharmaceutical and medicine	1,190	1,177	1,077	1,081	1,090
Other chemicals	220	199	189	208 E	198 E
Plastic products	124	129	135	F	F
Rubber products	26	31	x	25	25
Non-metallic mineral products	44	73	75	81 E	67 E
Primary metal (ferrous)	47	x	x	x	x
Primary metal (non-ferrous)	225	250	272	236	244
Fabricated metal products	202	214	238	F	F
Machinery	498	551	592	527 E	624 E
Computer and peripheral equipment	165	156	141	139 E	116 E
Communications equipment	1,510	1,410	1,506	1,556 E	1,631 E
Semiconductor and other electronic components	811	840	826	893	905
Navigational, measuring, medical and control instruments	370	473	441	410	428
Other computer and electronic products	22	28	x	19 E	17 E
Electrical equipment, appliance and components	148	142	160	160 E	158 E
Motor vehicle and parts	657	638	608	568	590
Aerospace products and parts	x	857	x	x	928
All other transportation equipment	45	x	63	x	x
Furniture and related products	31	31	x	x	x
Other manufacturing industries	182	x	216	227 E	215 E
Services	**6,183**	**6,473**	**6,494**	**6,743**	**6,720**
Wholesale trade	794	828	814	859	823 E
Retail trade	31	40	x	F	F
Transportation and warehousing	52	57	x	64	61
Information and cultural industries	1,390	1,585	1,669	1,800 E	1,744 E
Finance, insurance and real estate	331	412	428	377	F
Architectural, engineering and related services	515	445	418	419	441
Computer system design and related services	1,168	1,137	1,179	1,197 E	1,127 E
Management, scientific and technical consulting services	69	71	56	F	F
Scientific research and development services	1,225	1,215	1,152	1,218	1,350
Health care and social assistance	364	400	378	421	421 E
All other services	244	283	293	295 E	273 E

Note(s): Components may not add to totals due to rounding.

Table 5-2
Total intramural research and development expenditures — By province

	2004 [r]	2005 [r]	2006 [p]
	millions of dollars		
Total	**15,299**	**15,791**	**16,137**
Newfoundland and Labrador	30	86	99
Prince Edward Island	7	11	13
Nova Scotia	94	102	106
New Brunswick	82	96	102
Quebec	4,340	4,199	4,598
Ontario	7,871	8,250	8,033
Manitoba	183	199	184
Saskatchewan	113	152	167
Alberta	1,131	1,193	1,236
British Columbia [1]	1,447	1,503	1,600

1. Includes Yukon, Northwest Territories and Nunavut.
Note(s): Components may not add to totals due to rounding.

Table 5-3
Total intramural research and development expenditures — By province, by industry, 2006

	Atlantic Canada	Quebec	Ontario	Manitoba	Saskat-chewan	Alberta	British Columbia [1]	Total
	millions of dollars							
Total	**320**	**4,598**	**8,033**	**184**	**167**	**1,236**	**1,600**	**16,137**
Agriculture, forestry, fishing, hunting	**x**	**44**	**41**	**x**	**x**	**x**	**17**	**115**
Agriculture	x	33	40	x	x	x	7	**91**
Forestry and logging	0 s	11	x	0	0	x	7	**20** E
Fishing, hunting and trapping	x	0 s	x	0	0	x	3	**4**
Mining and oil and gas extraction	**x**	**x**	**13**	**x**	**x**	**440**	**49**	**578**
Oil and gas extraction	0	x	x	x	x	x	x	**515**
Mining	x	x	x	x	x	x	x	**63**
Utilities	**x**	**x**	**24**	**x**	**x**	**x**	**x**	**318**
Electric power	x	x	x	x	x	x	x	**301**
Other utilities	x	5	x	0	x	x	2	**17**
Construction	**x**	**29**	**30**	**x**	**x**	**x**	**x**	**69**
Manufacturing	**177**	**2,459**	**4,941**	**113**	**48**	**305**	**520**	**8,563**
Food	10	54	62	x	x	2	8	**141**
Beverage and tobacco	x	8	8	0	0	0	x	**17**
Textile	x	33	19	0 s	x	x	x	**x**
Wood products	x	48	10	x	x	13	40	**122**
Paper	7	195	86	x	x	x	73	**374**
Printing	0	22	15	x	0	x	1	**x**
Petroleum and coal products	x	2	x	x	x	124	x	**202**
Pharmaceutical and medicine	20	429	536	x	x	23	35	**1,077**
Other chemicals	3	35	119	x	x	17	4	**188**
Plastic products	x	34	86	4	x	3	7	**135**
Rubber products	x	6	25	x	0	x	0	**x**
Non-metallic mineral products	2	18	45	x	0	1	x	**75**
Primary metal (ferrous)	0	x	19	x	x	x	0 s	**x**
Primary metal (non-ferrous)	x	141	63	x	0	x	x	**272**
Fabricated metal products	6	71	137	6	2	9	7	**238**
Machinery	5	147	367	11	13	18	30	**592**
Computer and peripheral equipment	x	x	57	x	0	x	x	**141**
Communications equipment	x	111	1,302	0 s	x	x	25	**1,506**
Semiconductor and other electronic components	x	68	653	1	x	5	x	**826**
Navigational, measuring, medical and control instruments	4	144	244	9	1	11	28	**441**
Other computer and electronic products	x	6	x	0	0	x	4	**x**
Electrical equipment, appliance and components	3	42	73	x	x	3	37	**160**
Motor vehicle and parts	1	33	556	x	x	1	3	**608**
Aerospace products and parts	x	649	296	x	0	x	1	**x**
All other transportation equipment	2	35	23	1	0	0 s	2	**63**
Furniture and related products	0 s	15	19	0 s	x	x	1	**x**
Other manufacturing industries	x	91	85	1	1	x	18	**216**
Services	**126**	**1,921**	**2,983**	**66**	**37**	**355**	**1,006**	**6,494**
Wholesale trade	13	237	401	14	10	45	92	**814**
Retail trade	x	14	22	2	x	1	4	**x**
Transportation and warehousing	x	31	8	x	x	x	x	**x**
Information and cultural industries	41	315	870	3	2	43	395	**1,669**
Finance, insurance, and real estate	x	79	316	11	x	10	x	**428**
Architectural, engineering and related services	7	196	110	3	11	50	40	**418**
Computer system design and related services	29	291	662	8	4	83	102	**1,179**
Management, scientific and technical consulting	1	12	23	x	x	8	10	**56**
Scientific research and development services	21	377	440	19	2	41	253	**1,152**
Health care and social assistance	0 s	275	22	x	x	x	78	**378**
All other services	9	93	108	4	2	57	20	**293**

1. Includes Yukon, Northwest Territories and Nunavut.
Note(s): Components may not add to totals due to rounding.

Table 5-4
Total intramural research and development expenditures — By country of control

	2004 [r]	2005 [r]	2006 [p]
	millions of dollars		
Total	**15,299**	**15,791**	**16,137**
Canada	10,229	10,507	10,678
United States	3,397	3,507	3,536
Other foreign	1,672	1,777	1,924

Note(s): Components may not add to totals due to rounding.

Table 5-5
Total intramural research and development expenditures — Of Canadian-controlled companies compared to all intramural research and development expenditures, by industry

	2004 r	2005 r	2006 p
	percent		
Total	**67**	**67**	**66**
Agriculture, forestry, fishing and hunting	**x**	**74**	**68**
Agriculture	x	x	60
Forestry and logging	100	100	100
Fishing, hunting and trapping	x	x	100
Mining and oil and gas extraction	**57**	**59**	**52**
Oil and gas extraction	56	56	53
Mining	67	84	41
Utilities	**x**	**x**	**x**
Electric power	x	x	x
Other utilities	100	x	x
Construction	**x**	**x**	**x**
Manufacturing	**63**	**62**	**63**
Food	82	83	83
Beverage and tobacco	x	57	38
Textile	68	73	70
Wood products	98	97	x
Paper	76	85	91
Printing	94	92	92
Petroleum and coal products	40	x	x
Pharmaceutical and medicine	31	29	27
Other chemicals	54	45	50
Plastic products	83	86	80
Rubber products	x	51	45
Non-metallic mineral products	x	62	42
Primary metal (ferrous)	79	65	80
Primary metal (non-ferrous)	85	87	93
Fabricated metal products	94	95	95
Machinery	83	85	83
Computer and peripheral equipment	36	32	27
Communications equipment	88	88	88
Semiconductor and other electronic components	x	x	x
Navigational, measuring, medical and control instruments	83	67	67
Other computer and electronic products	100	x	x
Electrical equipment, appliance and components	54	56	59
Motor vehicle and parts	39	36	33
Aerospace products and parts	30	x	x
All other transportation equipment	42	x	x
Furniture and related products	x	x	x
Other manufacturing industries	94	96	94
Services	**71**	**71**	**70**
Wholesale trade	34	37	40
Retail trade	x	x	x
Transportation and warehousing	x	x	x
Information and cultural industries	75	83	65
Finance, insurance and real estate	97	96	96
Architectural, engineering and related services	x	x	65
Computer system design and related services	80	68	78
Management, scientific and technical consulting services	x	100	95
Scientific research and development services	73	75	79
Health care and social assistance	x	x	x
All other services	87	83	x

Note(s): Components may not add to totals due to rounding.

Table 5-6
Total intramural research and development expenditures — By expenditures size[1]

	2002 r	2003 r	2004 r	2005 r	2006 p
	millions of dollars				
Total	**13,540**	**14,123**	**15,299**	**15,791**	**16,137**
Less than $50,000	116	134	155	167	176
$50,000 to 99,999	200	241	283	306	324
$100,000 to 199,999	351	421	481	514	527
$200,000 to 399,999	459	580	654	670	714
$400,000 to 999,999	786	863	957	997	1,057
$1,000,000 or greater	11,627	11,884	12,769	13,137	13,339

1. Research and development program size is based on current intramural expenditures.
Note(s): Components may not add to totals due to rounding.

Table 6-1
Total intramural research and development — By sources of funds

	Business enterprises			Federal sources		Provincial sources	Other Canadian sources	Foreign sources	Total
	Canadian performing companies	Related companies	Research and development contracts for other companies	Grants	Contracts				
	millions of dollars								
2006 p	12,651	465	171	218	42	111	26	2,452	**16,137**
2005 r	12,269	414	131	287	35	88	24	2,542	**15,791**
2004 r	12,035	350	149	228	43	59	18	2,417	**15,299**
2003 r	11,122	379	153	256	44	70	17	2,083	**14,123**
2002 r	10,752	425	170	231	69	53	17	1,822	**13,540**
2001 r	10,437	301	177	345	112	51	14	2,828	**14,266**
2000 r	8,129	269	181	165	74	45	8	3,524	**12,395**
1999	6,968	201	213	241	68	57	8	2,642	**10,399**
1998	6,396	294	167	179	84	56	8	2,499	**9,682**
1997	6,124	268	156	253	103	77	8	1,750	**8,739**
1996	5,450	297	186	185	107	102	8	1,662	**7,997**
1995	5,383	286	259	259	152	87	10	1,555	**7,991**
1994	4,922	337	266	267	200	99	10	1,466	**7,567**
1993	4,073	347	242	266	250	105	7	1,134	**6,424**
1992	3,639	266	188	261	271	86	12	1,019	**5,742**
1991	3,388	275	162	204	212	114	11	988	**5,355**
1990	3,280	304	167	215	176	93	13	923	**5,169**
1989	2,981	325	164	239	177	69	6	819	**4,779**
1988	2,855	285	123	272	181	63	5	840	**4,623**
1987	2,714	255	125	287	155	60	9	734	**4,340**
1986	2,610	257	112	251	160	63	18	551	**4,022**
1985	2,323	241	97	215	168	60	12	518	**3,633**
1984	1,829	212	71	183	152	52	7	516	**3,022**
1983	1,608	158	76	175	106	46	3	431	**2,602**
1982	1,698	142	69	177	89	44	4	266	**2,489**
1981	1,543	123	70	132	58	37	3	158	**2,124**

Note(s): Components may not add to totals due to rounding.

Table 6-2
Total intramural research and development — By sources of funds and by industry, 2006

	Canadian performing companies	Federal government and other Canadian sources	Foreign sources	Total
	millions of dollars			
Total	**12,651**	**1,035**	**2,452**	**16,137**
Agriculture, forestry, fishing and hunting	**75**	**x**	**x**	**115**
Agriculture	x	x	x	**91**
Forestry and logging	x	x	x	**20** E
Fishing, hunting and trapping	x	x	x	**4**
Mining and oil and gas extraction	**456**	**x**	**x**	**578**
Oil and gas extraction	x	x	x	**515**
Mining	x	x	x	**63**
Utilities	**290**	**x**	**x**	**318**
Electric power	274	x	x	**301**
Other utilities	16	1	x	**17**
Construction	**65**	**4**	**0**	**69**
Manufacturing	**7,021**	**534**	**1,008**	**8,563**
Food	138	x	x	**141**
Beverage and tobacco	x	x	0	**17**
Textile	x	x	x	**x**
Wood products	x	x	0	**122**
Paper	x	x	x	**374**
Printing	x	x	0	**x**
Petroleum and coal products	x	x	x	**202**
Pharmaceutical and medicine	542	170	365	**1,077**
Other chemicals	143	16	30	**189**
Plastic products	135	0 s	0	**135**
Rubber products	x	x	0	**x**
Non-metallic mineral products	74	x	x	**75**
Primary metal (ferrous)	x	x	0	**x**
Primary metal (non-ferrous)	245	x	x	**272**
Fabricated metal products	237	x	x	**238**
Machinery	568	12	12	**592**
Computer and peripheral equipment	92	0 s	49	**141**
Communications equipment	1,377	x	x	**1,506**
Semiconductor and other electronic components	x	7	x	**826**
Navigational, measuring, medical and control instruments	318	40	83	**441**
Other computer and electronic products	12	x	x	**x**
Electrical equipment, appliance and components	146	x	x	**160**
Motor vehicle and parts	581	x	x	**608**
Aerospace products and parts	803	x	x	**x**
All other transportation equipment	x	x	x	**63**
Furniture and related products	36	0 s	0	**x**
Other manufacturing industries	x	x	x	**216**
Services	**4,744**	**365**	**1,385**	**6,494**
Wholesale trade	577	33	204	**814**
Retail trade	43	0 s	0	**x**
Transportation and warehousing	62	x	x	**x**
Information and cultural industries	1,196	12	461	**1,669**
Finance, insurance and real estate	428	0 s	0	**428**
Architectural, engineering and related services	365	34	19	**418**
Computer system design and related services	895	61	224	**1,179**
Management, scientific and technical consulting services	47	7	2	**56**
Scientific research and development services	708	103	342	**1,152**
Health care and social assistance	172	x	x	**378**
All other services	253	x	x	**293**

Note(s): Components may not add to totals due to rounding.

Table 6-3
Total intramural research and development — By sources of funds and by size of expenditures[1], 2006

	Performing company	Federal government	Provincial government	Other Canadian sources	Foreign sources	Total
	percent					
Total	**78**	**2**	**1**	**4**	**15**	**100**
Less than $50,000	98	1	0	1	0	**100**
$50,000 to 99,999	98	1	0	1	0	**100**
$100,000 to 199,999	97	1	0	1	1	**100**
$200,000 to 399,999	96	1	0	2	1	**100**
$400,000 to 999,999	94	1	1	3	2	**100**
$1,000,000 or greater	75	2	1	5	18	**100**

1. Research and development size is based on current intramural expenditures.
Note(s): Components may not add to totals due to rounding.

Table 6-4
Total intramural research and development — By sources of funds and by country of control of performer, 2006

	Canadian performing companies	Federal government	Provincial government	Other Canadian sources	Foreign sources	Total
	millions of dollars					
Total	**12,651**	**261**	**111**	**662**	**2,452**	**16,137**
Canada	9,594	151	56	399	477	**10,678**
United States	1,896	x	x	x	1,303	**3,536**
Other foreign	1,161	x	x	x	672	**1,924**

Note(s): Components may not add to totals due to rounding.

Table 7-1
Current intramural research and development expenditures — By industry

	2004 r	2005 r	2006 p	2007 p	2008 p
	millions of dollars				
Total	**14,220**	**14,696**	**15,028**	**15,159**	**15,349** E
Agriculture, forestry, fishing and hunting	**98**	**x**	**111**	**x**	**x**
Agriculture	x	x	x	87 E	78 E
Forestry and logging	x	19	x	x	x
Fishing, hunting and trapping	5	x	4	F	F
Mining and oil and gas extraction	**x**	**x**	**x**	**x**	**x**
Oil and gas extraction	x	280	x	x	x
Mining	53	x	61	F	F
Utilities	**x**	**x**	**x**	**x**	**x**
Electric power	x	x	x	x	x
Other utilities	12	12	16	F	F
Construction	**55**	**69**	**68**	**F**	**F**
Manufacturing	**7,939**	**7,965**	**8,130**	**8,047**	**8,200**
Food	128	131	137	138 E	139 E
Beverage and tobacco	18	18	17	19	F
Textile	55	53	53	48 E	48 E
Wood products	71	99	121	104 E	90
Paper	411	337	372	308	311 E
Printing	35	39	38	F	F
Petroleum and coal products	174	174	184	205	189
Pharmaceutical and medicine	1,133	1,121	1,035	1,050	1,018
Other chemicals	206	190	183	202 E	192 E
Plastic products	121	125	129	F	F
Rubber products	26	31	32	25	24
Non-metallic mineral products	43	72	74	80 E	65 E
Primary metal (ferrous)	45	34	33	23	26
Primary metal (non-ferrous)	189	169	186	189	221
Fabricated metal products	196	211	234	F	F
Machinery	486	543	575	517 E	607 E
Computer and peripheral equipment	160	150	138	136 E	113 E
Communications equipment	1,437	1,335	1,406	1,460 E	1,524 E
Semiconductor and other electronic components	761	792	781	835	851
Navigational, measuring, medical and control instruments	363	463	431	400	418
Other computer and electronic products	21	27	15	18 E	17 E
Electrical equipment, appliance and components	144	138	154	155 E	153 E
Motor vehicle and parts	616	616	581	544	570
Aerospace products and parts	858	818	916	886	922
All other transportation equipment	44	58	61	75 E	F
Furniture and related products	30	31	35	F	F
Other manufacturing industries	167	189	209	215 E	206 E
Services	**5,725**	**6,074**	**6,083**	**6,330**	**6,372**
Wholesale trade	748	798	775	814	782 E
Retail trade	30	39	43	F	F
Transportation and warehousing	50	56	55	63	60
Information and cultural industries	1,258	1,452	1,485	1,607 E	1,595 E
Finance, insurance and real estate	318	395	417	362	F
Architectural, engineering and related services	451	408	403	395	418
Computer system design and related services	1,117	1,089	1,121	1,155 E	F
Management, scientific and technical consulting services	66	69	53	F	F
Scientific research and development services	1,124	1,133	1,086	1,154	1,285
Health care and social assistance	332	375	365	408	408 E
All other services	230	260	280	281 E	262 E

Note(s): Components may not add to totals due to rounding.

Table 7-2
Current intramural research and development expenditures — By industry and by type of expenditures, 2006

	Wages and salaries	Other costs	Total
	millions of dollars		
Total	**8,885**	**6,143**	**15,028**
Agriculture, forestry, fishing and hunting	**67**	**44**	**111**
Agriculture	50	x	**x**
Forestry and logging	14 [E]	x	**x**
Fishing, hunting and trapping	3	1	**4**
Mining and oil and gas extraction	**x**	**379**	**x**
Oil and gas extraction	x	333	**x**
Mining	15	46	**61**
Utilities	**x**	**84**	**x**
Electric power	x	79	**x**
Other utilities	11	5	**16**
Construction	**54**	**15**	**68**
Manufacturing	**4,575**	**3,555**	**8,130**
Food	95	42	**137**
Beverage and tobacco	8	9	**17**
Textile	35	18	**53**
Wood products	55	66	**121**
Paper	100	272	**372**
Printing	33	6	**38**
Petroleum and coal products	38	146	**184**
Pharmaceutical and medicine	402	634	**1,035**
Other chemicals	110	74	**183**
Plastic products	87	42	**129**
Rubber products	17	15	**32**
Non-metallic mineral products	42	32	**74**
Primary metal (ferrous)	18	15	**33**
Primary metal (non-ferrous)	116	69	**186**
Fabricated metal products	185	49	**234**
Machinery	414	161	**575**
Computer and peripheral equipment	105	33	**138**
Communications equipment	806	600	**1,406**
Semiconductor and other electronic components	530	250	**781**
Navigational, measuring, medical and control instruments	306	125	**431**
Other computer and electronic products	13	2	**15**
Electrical equipment, appliance and components	105	49	**154**
Motor vehicle and parts	344	237	**581**
Aerospace products and parts	404	512	**916**
All other transportation equipment	40	21	**61**
Furniture and related products	30	5	**35**
Other manufacturing industries	138	72	**209**
Services	**4,017**	**2,065**	**6,083**
Wholesale trade	454	322	**775**
Retail trade	30	13	**43**
Transportation and warehousing	39	16	**55**
Information and cultural industries	896	589	**1,485**
Finance, insurance and real estate	246	171	**417**
Architectural, engineering and related services	338	64	**403**
Computer system design and related services	958	163	**1,121**
Management, scientific and technical consulting services	47	6	**53**
Scientific research and development services	626	460	**1,086**
Health care and social assistance	177	188	**365**
All other services	206	75	**280**

Note(s): Components may not add to totals due to rounding.

Table 7-3
Current intramural research and development expenditures — By province

	2004 r	2005 r	2006 p
	millions of dollars		
Total	**14,220**	**14,696**	**15,028**
Newfoundland and Labrador	x	x	x
Prince Edward Island	x	x	x
Nova Scotia	91	x	103
New Brunswick	77	x	x
Quebec	4,034	3,973	4,387
Ontario	7,467	7,814	7,600
Manitoba	173	193	177
Saskatchewan	93	124	120
Alberta	907	944	995
British Columbia [1]	1,341	1,413	1,465

1. Includes Yukon, Northwest Territories and Nunavut.
Note(s): Components may not add to totals due to rounding.

Table 7-4
Current intramural research and development expenditures — As a percentage of performing company revenues, by company revenue size

	2002	2003 r	2004 r	2005 r	2006 p
	percent				
Total	**1.9**	**1.8**	**1.8**	**1.7**	**1.7**
Less than $1,000,000	45.9	45.4	48.5	38.7	38.1
$1,000,000 to 9,999,999	9.4	8.8	7.5	7.7	7.2
$10,000,000 to 49,999,999	4.2	3.5	3.6	3.2	3.6
$50,000,000 to 99,999,999	3.0	2.7	2.7	3.1	2.8
$100,000,000 to 399,999,999	2.5	2.6	2.9	2.7	2.5
$400,000,000 or greater	1.1	1.1	1.0	1.0	1.0

Table 7-5
Current intramural research and development expenditures — Of company revenues, by country of control

	2002	2003 r	2004 r	2005 r	2006 p
	percent				
Total	**1.9**	**1.8**	**1.8**	**1.7**	**1.7**
Canada	2.0	1.9	1.9	1.9	2.0
Foreign	1.7	1.6	1.6	1.4	1.4

Table 7-6
Current intramural research and development expenditures — Of performing company revenues, by industry and by country of control, 2006

	Canada	Foreign	Total
	percent		
Total all industries	**2.0**	**1.4**	**1.7**
Agriculture, forestry, fishing and hunting	**2.0**	**9.6**	**2.7**
Agriculture	1.6	9.6	**2.4**
Forestry and logging	4.4	0.0	**4.4**
Fishing, hunting and trapping	5.8	0.0	**5.8**
Mining and oil and gas extraction	**0.7**	**0.5**	**0.6**
Oil and gas extraction	0.9	0.5	**0.6**
Mining	0.4	1.6	**0.7**
Utilities	**x**	**x**	**x**
Electric power	x	x	**x**
Other utilities	x	x	**x**
Construction	**x**	**x**	**x**
Manufacturing	**2.3**	**1.2**	**1.7**
Food	0.4	0.2	**0.3**
Beverage and tobacco	0.5	0.2	**0.3**
Textile	2.1	1.7	**2.0**
Wood products	x	x	**x**
Paper	1.6	0.6	**1.3**
Printing	1.1	0.9	**1.1**
Petroleum and coal products	x	x	**x**
Pharmaceutical and medicine	6.7	7.1	**7.0**
Other chemicals	1.0	0.5	**0.7**
Plastic products	1.3	0.8	**1.2**
Rubber products	1.6	0.5	**0.7**
Non-metallic mineral products	1.5	0.6	**0.8**
Primary metal (ferrous)	0.4	0.3	**0.4**
Primary metal (non-ferrous)	0.7	0.7	**0.7**
Fabricated metal products	1.5	0.5	**1.4**
Machinery	3.6	2.6	**3.4**
Computer and peripheral equipment	5.3	5.1	**5.2**
Communications equipment	24.0	5.3	**16.6**
Semiconductor and other electronic components	x	x	**x**
Navigational, measuring, medical and control instruments	10.0	8.5	**9.5**
Other computer and electronic products	x	x	**x**
Electrical equipment, appliance and components	3.2	0.8	**1.5**
Motor vehicle and parts	1.1	0.5	**0.6**
Aerospace products and parts	x	x	**x**
All other transportation equipment	x	x	**x**
Furniture and related products	x	x	**x**
Other manufacturing industries	3.3	1.0	**2.8**
Services	**2.1**	**3.4**	**2.4**
Wholesale trade	0.9	1.4	**1.1**
Retail trade	x	x	**x**
Transportation and warehousing	x	x	**x**
Information and cultural industries	3.7	21.2	**5.2**
Finance, insurance and real estate	0.5	0.2	**0.5**
Architectural, engineering and related services	4.3	6.8	**4.9**
Computer system design and related services	10.8	20.1	**11.9**
Management, scientific and technical consulting services	x	x	**10.2**
Scientific research and development services	38.8	31.8	**37.1**
Health care and social assistance	x	x	**x**
All other services	x	x	**x**

Table 7-7
Current intramural research and development expenditures — Of performing company revenues, by country of control

	2004 [r]	2005 [r]	2006 [p]
	percent		
Total	**1.8**	**1.7**	**1.7**
Canada	1.9	1.9	2.0
United States	1.7	1.6	1.6
Other foreign	1.4	1.2	1.2

Table 8
Average total intramural research and development expenditures, by performing company revenue size, 2005

	Firms	Expenditures	Average expenditures
	number	millions of dollars	
Total	**19,087**	**15,791**	**0.8**
Non-commercial firms	19	186	9.8
Less than $1,000,000 dollars	7,303	1,060	0.1
$1,000,000 to 9,999,999 dollars	8,153	2,397	0.3
$10,000,000 to 49,999,999 dollars	2,463	1,775	0.7
$50,000,000 to 99,999,999 dollars	459	1,038	2.3
$100,000,000 to 399,999,999 dollars	432	2,386	5.5
$400,000,000 dollars or greater	258	6,949	26.9

Table 9
Intramural research and development expenditures, by province, 2006

	Current expenditures	Capital expenditures	Total expenditures
	millions of dollars		
Total	**15,028**	**1,109**	**16,137**
Newfoundland and Labrador	x	x	**99**
Prince Edward Island	x	x	**13**
Nova Scotia	103	3	**106**
New Brunswick	x	x	**102**
Quebec	4,387	211	**4,598**
Ontario	7,600	432	**8,033**
Manitoba	177	6	**184**
Saskatchewan	120	46	**167**
Alberta	995	241	**1,236**
British Columbia [1]	1,466	134	**1,600**

1. Includes Yukon, Northwest Territories and Nunavut

Note(s): Components may not add to totals due to rounding.

Table 10
Capital intramural research and development expenditures, by industry

	2004 r	2005 r	2006 p	2007 p	2008 p
	millions of dollars				
Total	**1,078**	**1,095**	**1,109**	**1,000**	**968** E
Agriculture, forestry, fishing and hunting	**4**	**x**	**4**	**x**	**x**
Agriculture	x	x	x	2 E	2 E
Forestry and logging	x	0 s	x	x	x
Fishing, hunting and trapping	0 s	x	0 s	F	F
Mining and oil and gas extraction	**x**	**x**	**x**	**x**	**x**
Oil and gas extraction	x	105	x	x	x
Mining	5	x	2	F	F
Utilities	**x**	**x**	**x**	**x**	**x**
Electric power	x	x	x	x	x
Other utilities	2	1	1	F	F
Construction	**1**	**1**	**1**	**F**	**F**
Manufacturing	**404**	**470**	**433**	**379**	**407**
Food	8	5	4	3 E	2 E
Beverage and tobacco	x	0 s	0 s	0 s	F
Textile	2	2	x	1 E	1
Wood products	8	2	1	1 E	1
Paper	10	6	3	3	3 E
Printing	0 s	0 s	x	F	F
Petroleum and coal products	15	40	18	34	51
Pharmaceutical and medicine	57	55	42	31	72
Other chemicals	14	8	5	6 E	6 E
Plastic products	2	4	6	F	F
Rubber products	1	0 s	x	0 s	0 s
Non-metallic mineral products	0 s	1	2	2 E	1 E
Primary metal (ferrous)	2	x	x	x	x
Primary metal (non-ferrous)	36	81	86	47	22
Fabricated metal products	6	3	4	F	F
Machinery	12	8	17	10 E	17 E
Computer and peripheral equipment	6	6	3	3 E	3 E
Communications equipment	73	75	100	96 E	108 E
Semiconductor and other electronic components	50	48	46	58	54
Navigational, measuring, medical and control instruments	7	10	10	9	11
Other computer and electronic products	1	1	x	0 E	1 E
Electrical equipment, appliance and components	5	4	6	5 E	5 E
Motor vehicle and parts	41	22	27	24	20
Aerospace products and parts	x	39	x	x	6
All other transportation equipment	1	x	2	x	x
Furniture and related products	0 s	0 s	x	x	x
Other manufacturing industries	15	x	7	11 E	9 E
Services	**458**	**399**	**412**	**413**	**348**
Wholesale trade	47	31	39	45	41 E
Retail trade	1	1	x	F	F
Transportation and warehousing	2	1	x	1	1
Information and cultural industries	132	133	185	192 E	148 E
Finance, insurance and real estate	13	17	12	15	F
Architectural, engineering and related services	63	37	15	25	23
Computer system design and related services	51	48	58	42 E	F
Management, scientific and technical consulting services	2	2	2	F	F
Scientific research and development services	101	82	67	64	65
Health care and social assistance	32	24	13	12	13 E
All other services	14	23	12	14 E	12 E

Note(s): Components may not add to totals due to rounding.

Table 11
Total research and development personnel, by selected industries

	2002 r	2003 r	2004 r	2005 r	2006 p
	number				
Total research and development personnel	**118,370**	**127,058**	**138,113**	**140,610**	**148,813**
	percent				
Computer system design and related services	13	13	13	12	12
Information and cultural industries	7	8	8	9	9
Communications equipment	10	8	7	7	7
Scientific research and development	6	7	7	7	7
Pharmaceutical and medicine	4	4	4	4	4
Semiconductor and other electronic components	5	4	4	4	4
Aerospace products and parts	4	4	3	3	3
Other industries	51	52	54	54	53

Note(s): Components may not add to totals due to rounding. Personnel counts are reported as full-time equivalent.

Table 12-1
Personnel engaged in research and development — By industry group and by region, 2006

	Atlantic Canada	Quebec	Ontario	Manitoba	Saskat-chewan	Alberta	British Columbia [1]	Total
	number							
Total	**3,474**	**49,067**	**70,463**	**2,198**	**1,210**	**7,606**	**14,795**	**148,813**
Agriculture, forestry, fishing and hunting	59	713	581	32	41	45	244	**1,715**
Mining and oil and gas extraction	26	112	87	x	x	861	27	**1,142**
Utilities	x	681	305	x	x	111	50	**1,185**
Construction	x	618	506	x	x	81	63	**1,301**
Manufacturing	1,568	23,255	41,001	936	542	1,874	4,651	**73,827**
Services	1,790	23,688	27,983	1,194	594	4,634	9,760	**69,643**

1. Includes Yukon, Northwest Territories and Nunavut.
Note(s): Components may not add to totals due to rounding. Personnel counts are reported as full-time equivalent.

Table 12-2
Personnel engaged in research and development — By province and by occupationnal category, 2006

	Professionals	Other personnel[2]	Total
	number		
Total	**87,577**	**61,236**	**148,813**
Newfoundland and Labrador	314	407	**721**
Prince Edward Island	98	102	**200**
Nova Scotia	820	527	**1,347**
New Brunswick	651	555	**1,206**
Quebec	26,509	22,558	**49,067**
Ontario	42,750	27,713	**70,463**
Manitoba	1,076	1,122	**2,198**
Saskatchewan	575	635	**1,210**
Alberta	4,777	2,829	**7,606**
British Columbia [1]	10,007	4,788	**14,795**

1. Includes Yukon, Northwest Territories and Nunavut.
2. Includes technicians and other.
Note(s): Components may not add to totals due to rounding. Personnel counts are reported as full-time equivalent.

Table 12-3
Personnel engaged in research and development — By industry and by occupational category, 2006

	Professionals	Technicians	Other	Total
	number			
Total	**87,577**	**44,284**	**16,952**	**148,813**
Agriculture, forestry, fishing and hunting	**585**	**661**	**469**	**1,715**
Agriculture	434	557	419	**1,410**
Forestry and logging	120	76	31	**227**
Fishing, hunting and trapping	31	28	19	**78**
Mining and oil and gas extraction	**617**	**380**	**145**	**1,142**
Oil and gas extraction	452	272	109	**833**
Mining	165	108	36	**309**
Utilities	**681**	**328**	**176**	**1,185**
Electric power	537	223	139	**899**
Other utilities	144	105	37	**286**
Construction	**545**	**567**	**189**	**1,301**
Manufacturing	**41,080**	**22,391**	**10,356**	**73,827**
Food	842	879	407	**2,128**
Beverage and tobacco	107	108	65	**280**
Textile	222	358	177	**757**
Wood products	446	456	295	**1,197**
Paper	658	576	442	**1,676**
Printing	259	445	72	**776**
Petroleum and coal products	195	117	12	**324**
Pharmaceutical and medicine	3,440	1,395	1,055	**5,890**
Other chemicals	1,066	839	236	**2,141**
Plastic products	816	934	400	**2,150**
Rubber products	133	127	38	**298**
Non-metallic mineral products	441	348	111	**900**
Primary metal (ferrous)	134	90	41	**265**
Primary metal (non-ferrous)	696	557	214	**1,467**
Fabricated metal products	1,530	1,972	670	**4,172**
Machinery	3,871	3,723	1,073	**8,667**
Computer and peripheral equipment	1,094	322	89	**1,505**
Communications equipment	8,104	1,037	810	**9,951**
Semiconductor and other electronic components	5,213	937	300	**6,450**
Navigational, measuring, medical and control instruments	3,555	1,393	337	**5,285**
Other computer and electronic products	168	69	39	**276**
Electrical equipment, appliance and components	1,380	768	258	**2,406**
Motor vehicle and parts	2,253	1,934	1,018	**5,205**
Aerospace products and parts	2,637	1,115	1,446	**5,198**
All other transportation equipment	292	245	213	**750**
Furniture and related products	248	351	137	**736**
Other manufacturing industries	1,280	1,296	401	**2,977**
Services	**44,069**	**19,957**	**5,617**	**69,643**
Wholesale trade	4,700	2,181	995	**7,876**
Retail trade	380	323	86	**789**
Transportation and warehousing	348	245	145	**738**
Information and cultural industries	9,241	3,458	560	**13,259**
Finance, insurance and real estate	1,665	1,237	190	**3,092**
Architectural, engineering and related services	4,368	1,435	392	**6,195**
Computer system design and related services	12,147	4,902	861	**17,910**
Management, scientific and technical consulting services	752	353	52	**1,157**
Scientific research and development services	6,919	2,919	888	**10,726**
Health care and social assistance	1,224	1,348	1,065	**3,637**
All other services	2,325	1,556	383	**4,264**

Note(s): Components may not add to totals due to rounding. Personnel counts are reported as full-time equivalent.

Table 12-4
Personnel engaged in research and development — By occupational category

	2002 r	2003 r	2004 r	2005 r	2006 p
	number				
Total	**118,370**	**127,058**	**138,113**	**140,610**	**148,813**
Professionals	73,202	76,458	81,295	83,689	87,577
Technicians	31,586	34,567	39,828	39,796	44,284
Other	13,582	16,033	16,990	17,125	16,952

Note(s): Components may not add to totals due to rounding. Personnel counts are reported as full-time equivalent.

Table 13
Professional personnel engaged in research and development, by degree level

	Bachelors	Masters	Doctorates	Total
	number			
2006 p	66,845	14,867	5,865	**87,577**
2005 r	63,446	14,396	5,847	**83,689**
2004 r	61,434	14,087	5,774	**81,295**
2003 r	58,298	12,531	5,629	**76,458**
2002 r	58,888	9,692	4,622	**73,202**
2001 r	60,276	8,618	4,223	**73,117**

Note(s): Data are estimated for all performers not surveyed directly, i.e. performers for whom data were obtained through the Canada Revenue Agency's SR&ED program (see Survey Methodology). Components may not add to totals due to rounding. Personnel counts are reported as full-time equivalent.

Table 14-1
Total extramural payments for research and development, by industry — By year

	2004	2005	2006 p	2007 p	2008 p
	millions of dollars				
Total	**4,131**	**3,978**	**3,870**	**3,979**	**3,884**
Agriculture, forestry, fishing and hunting	**14**	**13**	**14**	**F**	**F**
Agriculture	11	11	11	F	F
Forestry and logging	2	1	2	F	F
Fishing, hunting and trapping	1	1	1	F	F
Mining and oil and gas extraction	**124**	**75**	**91**	**95**	**89**
Oil and gas extraction	92	57	76	79	73
Mining	32	18	15	16	16
Utilities	**48**	**46**	**76**	**83**	**77**
Electric power	44	43	69	77	72
Other utilities	4	3	7	F	F
Construction	**13**	**11**	**12**	**F**	**F**
Manufacturing	**1,669**	**1,812**	**1,935**	**1,881**	**1,786**
Food	22	21	29	35	25
Beverage and tobacco	x	7	x	9	3
Textile	5	6	x	x	4
Wood products	14	17	16	16	15
Paper	45	46	32	29	28
Printing	x	x	x	x	F
Petroleum and coal products	45	42	69	65	67
Pharmaceutical and medicine	310	462	474	510	506
Other chemicals	47	38 E	52	51	52
Plastic products	15	12	12	F	F
Rubber products	x	x	x	x	2
Non-metallic mineral products	5	x	7	8	7
Primary metal (ferrous)	6 E	5	9	x	5
Primary metal (non-ferrous)	47	56	70	58	49
Fabricated metal products	22	23	23	F	F
Machinery	58	53	56	60 E	54 E
Computer and peripheral equipment	36	9	15	16	12
Communications equipment	141	142	208	231	x
Semiconductor and other electronic components	x	x	x	x	x
Navigational, measuring, medical and control instruments	31	33	30	39	40
Other computer and electronic products	x	x	2	x	F
Electrical equipment, appliance and components	15	12	14	14	14
Motor vehicle and parts	512	497 E	459 E	315	252
Aerospace products and parts	F	15 E	21 E	17	16
All other transportation equipment	x	x	x	x	3
Furniture and related products	x	x	x	x	F
Other manufacturing industries	16	20	23	22 E	20 E
Services	**2,262**	**2,020**	**1,739**	**1,897**	**1,908**
Wholesale trade	210	229	236	252	219
Retail trade	9	29	7	F	F
Transportation and warehousing	10	15	15	11	11
Information and cultural industries	1,060	865	705	767	742
Finance, insurance and real estate	133	92	86	88	71
Architectural, engineering and related services	55	39	44	43 E	38
Computer system design and related services	133	124	134	153	148
Management, scientific and technical consulting services	19	16	16	F	F
Scientific research and development services	404	412	376	417	519
Health care and social assistance	96	114	72	83	78
All other services	133	85	48	58 E	55 E

Note(s): Components may not add to totals due to rounding.

Table 14-2
Total extramural payments for research and development, by industry — By country of control, 2006

	Canadian	Foreign	Total
	millions of dollars		
Total	**2,666**	**1,204**	**3,870**
Agriculture, forestry, fishing and hunting	**x**	**x**	**13**
Agriculture	x	x	**11**
Forestry and logging	2	0	**2**
Fishing, hunting and trapping	1	0	**1**
Mining and oil and gas extraction	**x**	**x**	**92**
Oil and gas extraction	x	x	**76**
Mining	15	0 [s]	**15**
Utilities	**72**	**4**	**76**
Electric power	x	x	**69**
Other utilities	x	x	**7**
Construction	**12**	**0**	**12**
Manufacturing	**1,131**	**805**	**1,936**
Food	10	19	**29**
Beverage and tobacco	x	0 [s]	**x**
Textile	x	0 [s]	**x**
Wood products	16	0	**16**
Paper	32	0 [s]	**32**
Printing	x	0	**x**
Petroleum and coal products	x	x	**69**
Pharmaceutical and medicine	460	14	**474**
Other chemicals	52	0 [s]	**52**
Plastic products	12	0	**12**
Rubber products	x	0	**x**
Non-metallic mineral products	7	0	**7**
Primary metal (ferrous)	x	x	**9**
Primary metal (non-ferrous)	67	3	**70**
Fabricated metal products	22	2	**23**
Machinery	53	4	**56**
Computer and peripheral equipment	9	6	**15**
Communications equipment	193	15	**208**
Semiconductor and other electronic components	x	x	**x**
Navigational, measuring, medical and control instruments	23	7	**30**
Other computer and electronic products	2	0	**2**
Electrical equipment, appliance and components	12	2	**14**
Motor vehicle and parts	x	x	**459** [E]
Aerospace products and parts	18 [E]	3 [E]	**21** [E]
All other transportation equipment	x	0 [s]	**x**
Furniture and related products	x	0	**x**
Other manufacturing industries	19	4	**23**
Services	**1,384**	**357**	**1,741**
Wholesale trade	213	23	**236**
Retail trade	7	0	**7**
Transportation and warehousing	14	1	**15**
Information and cultural industries	x	x	**705**
Finance, insurance and real estate	86	0	**86**
Architectural, engineering and related services	x	x	**44**
Computer system design and related services	x	x	**134**
Management, scientific and technical consulting services	16	0	**16**
Scientific research and development services	187	189	**376**
Health care and social assistance	x	x	**72**
All other services	44	4	**48**

Note(s): Components may not add to totals due to rounding.

Table 15-1
Research and development by area of specialization — Biotechnology

	2004	2005	2006 [p]
	millions of dollars		
Total	**1,290**	**1,284**	**1,147**
Agriculture, forestry, fishing and hunting	24	25	31
Mining and oil and gas extraction	x	x	x
Utilities	1	1	x
Construction	x	x	x
Manufacturing	275	330	322
Services	985	918	793

Note(s): Data is based on total intramural research and development expenditures.

Table 15-2
Research and development by area of specialization — Pollution abatement and control

	2004	2005	2006 [p]
	millions of dollars		
Total	**323**	**307**	**322**
Agriculture, forestry, fishing and hunting	2	1	2
Mining and oil and gas extraction	8	21	34
Utilities	13	19	24
Construction	2	5	1
Manufacturing	189	168	175
Services	109	93	86

Note(s): Data is based on total intramural research and development expenditures.

Table 15-3
Research and development by area of specialization — Software

	2004	2005	2006 [p]
	millions of dollars		
Total	**3,518**	**4,003**	**4,130**
Agriculture, forestry, fishing and hunting	x	0 [s]	0 [s]
Mining and oil and gas extraction	x	2	3
Utilities	x	33	38
Construction	4	5	6
Manufacturing	1,567	1,673	1,710
Services	1,920	2,290	2,372

Note(s): Data is based on total intramural research and development expenditures.

Table 16-1
Foreign receipts and payments for technological services — By selected industries, 2006

	Receipts	Payments	Balance
	millions of dollars		
Total	**2,852**	**1,540**	**1,312**
Mining and oil and gas extraction	**x**	**x**	**2**
Manufacturing	**x**	**x**	**147**
Petroleum and coal products	x	x	-19
Chemical products	x	x	-31
Computer and peripheral equipment	49	7	41
Communications equipment	130	39	90
All other manufacturing industries	957	892	65
Other industries	**1,617**	**455**	**1,162**

Note(s): Data are only for firms engaged in research and development over $1.5 million.

Table 16-2
Foreign receipts and payments for technological services — By research and development and other

	Receipts		Total	Payments		Total	Balance		Total
	Research and development	Other		Research and development	Other		Research and development	Other	
	millions of dollars								
2006 p	2,452	400	**2,852**	1,204	336	**1,540**	1,248	64	**1,312**
2005 r	2,542	456	**2,998**	1,169	312	**1,481**	1,373	145	**1,518**
2004 r	2,417	412	**2,829**	1,152	358	**1,510**	1,265	54	**1,319**
2003 r	2,082	425	**2,507**	1,174	402	**1,576**	908	24	**932**
2002 r	1,822	435	**2,257**	1,101	626	**1,727**	721	-191	**530**
2001	2,828	390	**3,218**	1,309	315	**1,624**	1,519	75	**1,594**
2000	3,524	339	**3,863**	1,374	523	**1,897**	2,150	-184	**1,967**
1999	2,642	320	**2,962**	1,490	523	**2,013**	1,152	-202	**950**
1998	2,499	296	**2,795**	1,045	694	**1,739**	1,453	-398	**1,056**
1997	1,750	184	**1,934**	912	698	**1,610**	837	-514	**323**

Note(s): Data are only for firms engaged in research and development over $1.5 million.

Table 17
Energy research and development expenditures, by area of technology and by source of funds, 2006

	Intramural research and development expenditures			Payments outside Canada	Total
	Self-funded	Government funded and other sources	Total		
	millions of dollars				
Total	**968**	**192**	**1,161**	**x**	**x**
Renewable resources	x	15	**x**	x	**59**
Transportation and transmission	72	x	**x**	x	**82**
Conservation	140	33	**173**	x	**173**
Fossil fuels	596	x	**x**	x	**730**
Nuclear	x	x	**x**	x	**66**
Other	60	x	**x**	x	**x**

Note(s): Components may not add to totals due to rounding.

Table 18-1
Research and development expenditures on therapeutic health products — By type of organization

	2005 r	2006 p	2007 p	2008 p
	millions of dollars			
Total	**788**	**744**	**818**	**824**
Brand name pharmaceutical company	440	209	228	219
Generic pharmaceutical company	x	72	41	x
Contract research organization	69	22	22	x
Biotechnology or biopharmaceutical company	174	318	395	408
Other	x	124	132	136

Note(s): Components may not add to totals due to rounding.

Table 18-2
Research and development expenditures on therapeutic health products — By therapeutic class

	2005 r	2006 p
	millions of dollars	
Total	**788**	**744**
Alimentary tract and metabolism	79	49
Blood and blood forming organs	37	70
Cardiovascular system	90	50
Dermatological	19	28
Genito-urinary systems and sex hormones	17	17
Systemic hormonal preparation excluding sex hormones and insulin	12	x
Anti-infective for systemic use	123	113
Antineoplastic and immunomodulating agents	85	81
Musculo-skeletal systems	81	56
Nervous system	91	76
Antiparasitic products, insecticides and repellents	x	x
Respiratory system	50	28
Sensory organs	x	x
Various others	94	120

Note(s): Components may not add to totals due to rounding.

Table 19-1
Research and development performers — By industry and by country of control, 2005

	Canada	Foreign	Total
	number		
Total	**18,400**	**687**	**19,087**
Agriculture, forestry, fishing and hunting	**721**	**6**	**727**
Agriculture	609	5	**614**
Forestry and logging	68	0	**68**
Fishing, hunting and trapping	44	1	**45**
Mining and oil and gas extraction	**135**	**21**	**156**
Oil and gas extraction	82	16	**98**
Mining	53	5	**58**
Utilities	**112**	**4**	**116**
Electric power	19	2	**21**
Other utilities	93	2	**95**
Construction	**564**	**1**	**565**
Manufacturing	**8,161**	**415**	**8,576**
Food	624	19	**643**
Beverage and tobacco	50	5	**55**
Textile	169	10	**179**
Wood products	294	5	**299**
Paper	119	18	**137**
Printing	255	5	**260**
Petroleum and coal products	35	11	**46**
Pharmaceutical and medicine	105	26	**131**
Other chemicals	411	40	**451**
Plastic products	499	20	**519**
Rubber products	62	7	**69**
Non-metallic mineral products	201	12	**213**
Primary metal (ferrous)	65	12	**77**
Primary metal (non-ferrous)	80	10	**90**
Fabricated metal products	1,235	29	**1,264**
Machinery	1,441	41	**1,482**
Computer and peripheral equipment	81	9	**90**
Communications equipment	151	17	**168**
Semiconductor and other electronic components	159	10	**169**
Navigational, measuring, medical and control instruments	298	21	**319**
Other computer and electronic products	47	1	**48**
Electrical equipment, appliance and components	276	26	**302**
Motor vehicle and parts	257	35	**292**
Aerospace products and parts	63	10	**73**
All other transportation equipment	105	3	**108**
Furniture and related products	297	1	**298**
Other manufacturing industries	782	12	**794**
Services	**8,707**	**240**	**8,947**
Wholesale trade	1,477	72	**1,549**
Retail trade	378	1	**379**
Transportation and warehousing	132	2	**134**
Information and cultural industries	622	35	**657**
Finance, insurance and real estate	252	8	**260**
Architectural, engineering and related services	863	16	**879**
Computer system design and related services	2,297	51	**2,348**
Management, scientific and technical consulting services	459	0	**459**
Scientific research and development services	813	32	**845**
Health care and social assistance	143	3	**146**
All other services	1,271	20	**1,291**

Table 19-2
Research and development performers — By province, 2000 to 2005

	2000	2001	2002	2003	2004 [r]	2005	Absolute change from 2005 to 2000	Change from 2000 to 2005
	number							percent
Canada - total	**10,849**	**12,087**	**13,363**	**15,729**	**17,949**	**19,087**	**8,238**	**75.9**
Total - Multi-province	11,210	12,435	13,699	16,051	18,273	19,435	8,225	73.4
Newfoundland and Labrador	86	66	82	104	118	132	46	53.5
Prince Edward Island	27	26	28	34	37	50	23	85.2
Nova Scotia	228	214	218	227	241	247	19	8.3
New Brunswick	161	167	173	200	212	208	47	29.2
Quebec	4,594	5,101	5,664	6,446	7,215	7,739	3,145	68.5
Ontario	3,812	4,396	4,928	5,937	6,938	7,484	3,672	96.3
Manitoba	269	276	320	368	401	403	134	49.8
Saskatchewan	163	167	176	190	211	224	61	37.4
Alberta	808	854	833	999	1,170	1,167	359	44.4
British Columbia [1]	1,062	1,168	1,276	1,545	1,730	1,781	719	67.7

1. Includes Yukon, Northwest Territories and Nunavut.

Table 19-3

Research and development performers — As a percentage of enterprises with one or more employees, 2000 to 2005

	2000	2001	2002	2003 r	2004 r	2005
	percent					
Total	**1.1**	**1.2**	**1.4**	**1.6**	**1.9**	**2.0**
Agriculture, forestry, fishing and hunting	**0.4**	**0.5**	**0.7**	**0.9**	**1.2**	**1.3**
Agriculture	0.5	0.6	0.7	1.0	1.3	1.5
Forestry and logging	0.2	0.3	0.4	0.5	0.7	0.7
Fishing, hunting and trapping	0.7	0.6	0.6	0.8	0.8	0.7
Mining and oil and gas extraction	**1.5**	**1.6**	**1.5**	**1.9**	**2.0**	**2.0**
Oil and gas extraction	0.9	1.1	1.0	1.3	1.5	1.6
Mining	3.1	3.3	3.3	4.3	4.5	4.0
Utilities	**1.9**	**2.1**	**1.9**	**2.3**	**3.0**	**3.6**
Electric power	2.0	2.7	3.2	2.8	3.5	4.8
Other utilities	1.8	2.0	1.7	2.3	2.9	3.4
Construction	**0.2**	**0.3**	**0.3**	**0.4**	**0.5**	**0.5**
Manufacturing	**8.0**	**8.9**	**10.2**	**12.4**	**14.7**	**15.9**
Food	4.4	5.1	6.9	9.0	11.0	11.9
Beverage and tobacco	4.4	5.3	5.4	5.9	7.6	9.5
Textile	7.3	7.2	8.5	10.3	11.2	11.5
Wood products	3.6	4.2	5.1	6.6	7.8	8.0
Paper	16.1	16.4	15.9	20.0	22.8	22.2
Printing	1.5	1.8	2.4	3.6	5.0	5.6
Petroleum and coal products	11.9	14.9	15.7	21.1	35.9	35.1
Pharmaceutical and medicine	32.5	37.6	40.2	43.5	50.0	48.9
Other chemicals	21.2	21.2	21.9	24.5	27.7	29.8
Plastic products	13.7	16.5	17.9	22.7	26.7	28.1
Rubber products	17.5	18.7	16.8	17.9	20.8	24.0
Non-metallic mineral products	5.9	6.4	6.7	8.5	10.0	11.5
Primary metal (ferrous)	15.9	15.6	16.8	23.1	23.9	25.4
Primary metal (non-ferrous)	16.0	16.7	19.6	25.2	26.5	30.6
Fabricated metal products	6.2	7.6	9.1	11.6	14.5	15.9
Machinery	16.0	17.5	20.4	23.5	27.5	29.1
Computer and peripheral equipment	28.2	27.4	31.5	31.4	32.6	34.5
Communications equipment	39.5	40.5	48.1	52.5	57.6	56.6
Semiconductor and other electronic components	26.7	27.8	31.2	33.5	38.9	38.1
Navigational, measuring, medical and control instruments	28.2	29.4	31.5	35.5	37.6	41.6
Other computer and electronic products	14.7	17.9	17.6	21.8	26.2	26.2
Electrical equipment, appliance and components	16.8	18.2	20.1	21.6	25.1	27.8
Motor vehicle and parts	12.6	14.0	14.6	17.8	20.6	22.5
Aerospace products and parts	22.1	26.0	26.3	34.4	40.1	33.5
All other transportation equipment	8.5	8.9	10.4	14.2	16.0	17.5
Furniture and related products	2.2	3.0	4.0	5.2	6.4	7.0
Other manufacturing industries	3.6	3.9	4.9	6.5	8.1	9.5
Services	**0.7**	**0.8**	**0.9**	**1.0**	**1.2**	**1.2**
Wholesale trade	1.5	1.7	1.9	2.2	2.8	3.0
Retail trade	0.2	0.2	0.2	0.3	0.3	0.4
Transportation and warehousing	0.1	0.2	0.2	0.3	0.3	0.3
Information and cultural industries	3.2	3.7	4.1	4.8	5.2	5.8
Finance, insurance and real estate	0.2	0.2	0.2	0.3	0.4	0.4
Architectural, engineering and related services	3.7	3.8	3.9	4.6	5.3	5.0
Computer system design and related services	7.6	8.5	9.0	10.1	10.9	10.9
Management, scientific and technical consulting services	1.2	1.4	1.6	1.6	1.6	1.7
Scientific research and development services	24.7	26.9	27.2	31.6	38.3	36.8
Health care and social assistance	0.1	0.1	0.1	0.2	0.2	0.2
All other services	0.2	0.3	0.3	0.3	0.4	0.4

Note(s): Components may not add to totals due to rounding.

Table 19-4

Research and development performers — By the North American industry classification system (NAICS) 2002, in 2005

	NAICS Code	Performers
		number
Total, all industries		**19,087**
Agriculture, Forestry, Fishing and Hunting		**727**
Agriculture		**614**
Soybean Farming	111110	1
Oilseed (except Soybean) Farming	111120	0
Dry Pea and Bean Farming	111130	3
Wheat Farming	111140	5
Corn Farming	111150	3
Rice Farming	111160	0
Other Grain Farming	111190	14
Potato Farming	111211	20
Other Vegetable (except Potato) and Melon Farming	111219	51
Orange Groves	111310	0
Citrus (except Orange) Groves	111320	0
Non-Citrus Fruit and Tree Nut Farming	111330	47
Mushroom Production	111411	11
Other Food Crops Grown Under Cover	111419	34
Nursery and Tree Production	111421	35
Floriculture Production	111422	97
Tobacco Farming	111910	14
Cotton Farming	111920	0
Sugar-Cane Farming	111930	0
Hay Farming	111940	3
Fruit and Vegetable Combination Farming	111993	9
All Other Miscellaneous Crop Farming	111999	34
Beef Cattle Ranching and Farming, including Feedlots	112110	8
Dairy Cattle and Milk Production	112120	55
Hog and Pig Farming	112210	48
Chicken Egg Production	112310	2
Broiler and Other Meat-Type Chicken Production	112320	10
Turkey Production	112330	2
Poultry Hatcheries	112340	2
Combination Poultry and Egg Production	112391	3
All Other Poultry Production	112399	2
Sheep Farming	112410	3
Goat Farming	112420	2
Apiculture	112910	7
Horse and Other Equine Production	112920	1
Fur-Bearing Animal and Rabbit Production	112930	1
Livestock Combination Farming	112991	30
All Other Miscellaneous Animal Production	112999	4
Support Activities for Crop Production	115110	36
Support Activities for Animal Production	115210	17
Forestry and Logging		**68**
Timber Tract Operations	113110	2
Forest Nurseries and Gathering of Forest Products	113210	7
Logging (except Contract)	113311	11
Contract Logging	113312	18
Support Activities for Forestry	115310	30
Fishing, Hunting and Trapping		**45**
Animal Aquaculture	112510	30
Salt Water Fishing	114113	14
Inland Fishing	114114	1
Hunting and Trapping	114210	0
Mining and Oil and Gas Extraction		**156**
Oil and Gas Extraction		**98**
Conventional Oil and Gas Extraction	211113	30
Non-Conventional Oil Extraction	211114	4
Oil and Gas Contract Drilling	213111	11
Services to Oil and Gas Extraction	213118	53
Mining		**58**
Bituminous Coal Mining	212114	0
Subbituminous Coal Mining	212115	0
Lignite Coal Mining	212116	0
Iron Ore Mining	212210	3
Gold and Silver Ore Mining	212220	6

Table 19-4 – continued

Research and development performers — By the North American industry classification system (NAICS) 2002, in 2005

	NAICS Code	Performers
		number
Lead-Zinc Ore Mining	212231	0
Nickel-Copper Ore Mining	212232	1
Copper-Zinc Ore Mining	212233	1
Uranium Ore Mining	212291	1
All Other Metal Ore Mining	212299	0
Granite Mining and Quarrying	212314	4
Limestone Mining and Quarrying	212315	3
Marble Mining and Quarrying	212316	2
Sandstone Mining and Quarrying	212317	0
Sand and Gravel Mining and Quarrying	212323	9
Shale, Clay and Refractory Mineral Mining and Quarrying	212326	1
Diamond Mines	212392	1
Salt Mines	212393	1
Asbestos Mining	212394	0
Gypsum Mining	212395	0
Potash Mining	212396	2
Peat Extraction	212397	6
All Other Non-Metallic Mineral Mining and Quarrying	212398	3
Contract Drilling (except Oil and Gas)	213117	5
Other Support Activities for Mining	213119	9
Utilities		**116**
Electric Power		**21**
Hydro-Electric Power Generation	221111	9
Fossil-Fuel Electric Power Generation	221112	7
Nuclear Electric Power Generation	221113	0
Other Electric Power Generation	221119	1
Electric Bulk Power Transmission and Control	221121	1
Electric Power Distribution	221122	3
Other Utilities		**95**
Natural Gas Distribution	221210	6
Water Supply and Irrigation Systems	221310	19
Sewage Treatment Facilities	221320	1
Steam and Air-Conditioning Supply	221330	0
Waste Collection	562110	13
Waste Treatment and Disposal	562210	24
Remediation Services	562910	20
Material Recovery Facilities	562920	5
All Other Waste Management Services	562990	7
Construction		**565**
Residential Building Construction	236110	60
Industrial Building and Structure Construction	236210	16
Commercial and Institutional Building Construction	236220	21
Water and Sewer Line and Related Structures Construction	237110	14
Oil and Gas Pipeline and Related Structures Construction	237120	8
Power and Communication Line and Related Structures Construction	237130	8
Land Subdivision	237210	9
Highway, Street and Bridge Construction	237310	28
Other Heavy and Civil Engineering Construction	237990	14
Poured Concrete Foundation and Structure Contractors	238110	10
Structural Steel and Precast Concrete Contractors	238120	9
Framing Contractors	238130	4
Masonry Contractors	238140	10
Glass and Glazing Contractors	238150	11
Roofing Contractors	238160	3
Siding Contractors	238170	7
Other Foundation, Structure and Building Exterior Contractors	238190	6
Electrical Contractors	238210	72
Plumbing, Heating and Air-Conditioning Contractors	238220	87
Elevator and Escalator Installation Contractors	238291	6
All Other Building Equipment Contractors	238299	27
Drywall and Insulation Contractors	238310	5
Painting and Wall Covering Contractors	238320	16
Flooring Contractors	238330	16
Tile and Terrazzo Contractors	238340	2
Finish Carpentry Contractors	238350	31
Other Building Finishing Contractors	238390	11
Site Preparation Contractors	238910	31

Table 19-4 – continued

Research and development performers — By the North American industry classification system (NAICS) 2002, in 2005

	NAICS Code	Performers
		number
All Other Specialty Trade Contractors	238990	23
Manufacturing		**8,576**
Food		**643**
Dog and Cat Food Manufacturing	311111	5
Other Animal Food Manufacturing	311119	47
Flour Milling	311211	8
Rice Milling and Malt Manufacturing	311214	3
Wet Corn Milling	311221	1
Oilseed Processing	311224	7
Fat and Oil Refining and Blending	311225	2
Breakfast Cereal Manufacturing	311230	5
Sugar Manufacturing	311310	5
Chocolate and Confectionery Manufacturing from Cacao Beans	311320	3
Confectionery Manufacturing from Purchased Chocolate	311330	10
Non-Chocolate Confectionery Manufacturing	311340	14
Frozen Food Manufacturing	311410	20
Fruit and Vegetable Canning, Pickling and Drying	311420	54
Fluid Milk Manufacturing	311511	14
Butter, Cheese, and Dry and Condensed Dairy Products Manufacturing	311515	60
Ice Cream and Frozen Dessert Manufacturing	311520	9
Animal (except Poultry) Slaughtering	311611	12
Rendering and Meat Processing from Carcasses	311614	39
Poultry Processing	311615	29
Seafood Product Preparation and Packaging	311710	41
Retail Bakeries	311811	20
Commercial Bakeries and Frozen Bakery Product Manufacturing	311814	83
Cookie and Cracker Manufacturing	311821	11
Flour Mixes and Dough Manufacturing from Purchased Flour	311822	12
Dry Pasta Manufacturing	311823	9
Tortilla Manufacturing	311830	0
Roasted Nut and Peanut Butter Manufacturing	311911	1
Other Snack Food Manufacturing	311919	11
Coffee and Tea Manufacturing	311920	18
Flavouring Syrup and Concentrate Manufacturing	311930	6
Seasoning and Dressing Manufacturing	311940	17
All Other Food Manufacturing	311990	67
Beverages and Tobacco		**55**
Soft Drink and Ice Manufacturing	312110	6
Breweries	312120	21
Wineries	312130	21
Distilleries	312140	4
Tobacco Stemming and Redrying	312210	0
Tobacco Product Manufacturing	312220	3
Textile		**179**
Fibre, Yarn and Thread Mills	313110	12
Broad-Woven Fabric Mills	313210	21
Narrow Fabric Mills and Schiffli Machine Embroidery	313220	8
Nonwoven Fabric Mills	313230	8
Knit Fabric Mills	313240	29
Textile and Fabric Finishing	313310	32
Fabric Coating	313320	6
Carpet and Rug Mills	314110	10
Curtain and Linen Mills	314120	15
Textile Bag and Canvas Mills	314910	16
All Other Textile Product Mills	314990	22
Wood Products		**299**
Sawmills (except Shingle and Shake Mills)	321111	59
Shingle and Shake Mills	321112	5
Wood Preservation	321114	8
Hardwood Veneer and Plywood Mills	321211	11
Softwood Veneer and Plywood Mills	321212	4
Structural Wood Product Manufacturing	321215	19
Particle Board and Fibreboard Mills	321216	8
Waferboard Mills	321217	3
Wood Window and Door Manufacturing	321911	45
Other Millwork	321919	69
Wood Container and Pallet Manufacturing	321920	21
Manufactured (Mobile) Home Manufacturing	321991	1

Table 19-4 – continued

Research and development performers — By the North American industry classification system (NAICS) 2002, in 2005

	NAICS Code	Performers
		number
Prefabricated Wood Building Manufacturing	321992	14
All Other Miscellaneous Wood Product Manufacturing	321999	32
Paper		**137**
Mechanical Pulp Mills	322111	2
Chemical Pulp Mills	322112	7
Paper (except Newsprint) Mills	322121	15
Newsprint Mills	322122	8
Paperboard Mills	322130	6
Corrugated and Solid Fibre Box Manufacturing	322211	19
Folding Paperboard Box Manufacturing	322212	14
Other Paperboard Container Manufacturing	322219	10
Paper Bag and Coated and Treated Paper Manufacturing	322220	29
Stationery Product Manufacturing	322230	5
Sanitary Paper Product Manufacturing	322291	6
All Other Converted Paper Product Manufacturing	322299	16
Printing		**260**
Commercial Screen Printing	323113	27
Quick Printing	323114	3
Digital Printing	323115	5
Manifold Business Forms Printing	323116	14
Other Printing	323119	167
Support Activities for Printing	323120	44
Petroleum and Coal Products		**46**
Petroleum Refineries	324110	12
Asphalt Paving Mixture and Block Manufacturing	324121	7
Asphalt Shingle and Coating Material Manufacturing	324122	5
Other Petroleum and Coal Products Manufacturing	324190	22
Pharmaceutical and Medicine		**131**
Pharmaceutical and Medicine Manufacturing	325410	131
Other Chemical		**451**
Petrochemical Manufacturing	325110	3
Industrial Gas Manufacturing	325120	3
Synthetic Dye and Pigment Manufacturing	325130	11
Alkali and Chlorine Manufacturing	325181	0
All Other Basic Inorganic Chemical Manufacturing	325189	18
Other Basic Organic Chemical Manufacturing	325190	18
Resin and Synthetic Rubber Manufacturing	325210	31
Artificial and Synthetic Fibres and Filaments Manufacturing	325220	8
Chemical Fertilizer (except Potash) Manufacturing	325313	11
Mixed Fertilizer Manufacturing	325314	19
Pesticide and Other Agricultural Chemical Manufacturing	325320	6
Paint and Coating Manufacturing	325510	73
Adhesive Manufacturing	325520	23
Soap and Cleaning Compound Manufacturing	325610	66
Toilet Preparation Manufacturing	325620	52
Printing Ink Manufacturing	325910	17
Explosives Manufacturing	325920	2
Custom Compounding of Purchased Resins	325991	9
All Other Miscellaneous Chemical Product Manufacturing	325999	81
Plastic Product		**519**
Unsupported Plastic Bag Manufacturing	326111	34
Unsupported Plastic Film and Sheet Manufacturing	326114	34
Unsupported Plastic Profile Shape Manufacturing	326121	30
Plastic Pipe and Pipe Fitting Manufacturing	326122	16
Laminated Plastic Plate, Sheet and Shape Manufacturing	326130	9
Polystyrene Foam Product Manufacturing	326140	17
Urethane and Other Foam Product (except Polystyrene) Manufacturing	326150	16
Plastic Bottle Manufacturing	326160	10
Plastic Plumbing Fixture Manufacturing	326191	14
Motor Vehicle Plastic Parts Manufacturing	326193	57
All Other Plastic Product Manufacturing	326198	282
Rubber Product		**69**
Tire Manufacturing	326210	6
Rubber and Plastic Hose and Belting Manufacturing	326220	15
Other Rubber Product Manufacturing	326290	48
Non-Metallic Mineral Products		**213**
Pottery, Ceramics and Plumbing Fixture Manufacturing	327110	4
Clay Building Material and Refractory Manufacturing	327120	11

Table 19-4 – continued

Research and development performers — By the North American industry classification system (NAICS) 2002, in 2005

	NAICS Code	Performers
		number
Glass Manufacturing	327214	18
Glass Product Manufacturing from Purchased Glass	327215	30
Cement Manufacturing	327310	4
Ready-Mix Concrete Manufacturing	327320	13
Concrete Pipe, Brick and Block Manufacturing	327330	22
Other Concrete Product Manufacturing	327390	40
Lime Manufacturing	327410	3
Gypsum Product Manufacturing	327420	10
Abrasive Product Manufacturing	327910	11
All Other Non-Metallic Mineral Product Manufacturing	327990	47
Primary Metal (Ferrous)		**77**
Iron and Steel Mills and Ferro-Alloy Manufacturing	331110	15
Iron and Steel Pipes and Tubes Manufacturing from Purchased Steel	331210	17
Cold-Rolled Steel Shape Manufacturing	331221	4
Steel Wire Drawing	331222	7
Iron Foundries	331511	25
Steel Foundries	331514	9
Primary Metal (Non-Ferrous)		**90**
Primary Production of Alumina and Aluminum	331313	8
Aluminum Rolling, Drawing, Extruding and Alloying	331317	20
Non-Ferrous Metal (except Aluminum) Smelting and Refining	331410	11
Copper Rolling, Drawing, Extruding and Alloying	331420	4
Non-Ferrous Metal (except Copper and Aluminum) Rolling, Drawing, Extruding and Alloying	331490	11
Non-Ferrous Die-Casting Foundries	331523	19
Non-Ferrous Foundries (except Die-Casting)	331529	17
Fabricated Metal Product		**1,265**
Forging	332113	31
Stamping	332118	54
Cutlery and Hand Tool Manufacturing	332210	56
Prefabricated Metal Building and Component Manufacturing	332311	23
Concrete Reinforcing Bar Manufacturing	332314	1
Other Plate Work and Fabricated Structural Product Manufacturing	332319	85
Metal Window and Door Manufacturing	332321	82
Other Ornamental and Architectural Metal Products Manufacturing	332329	87
Power Boiler and Heat Exchanger Manufacturing	332410	15
Metal Tank (Heavy Gauge) Manufacturing	332420	34
Metal Can Manufacturing	332431	3
Other Metal Container Manufacturing	332439	15
Hardware Manufacturing	332510	36
Spring (Heavy Gauge) Manufacturing	332611	9
Other Fabricated Wire Product Manufacturing	332619	37
Machine Shops	332710	418
Turned Product and Screw, Nut and Bolt Manufacturing	332720	34
Coating, Engraving, Heat Treating and Allied Activities	332810	121
Metal Valve Manufacturing	332910	28
Ball and Roller Bearing Manufacturing	332991	6
All Other Miscellaneous Fabricated Metal Product Manufacturing	332999	90
Machinery		**1,481**
Agricultural Implement Manufacturing	333110	121
Construction Machinery Manufacturing	333120	41
Mining and Oil and Gas Field Machinery Manufacturing	333130	58
Sawmill and Woodworking Machinery Manufacturing	333210	37
Rubber and Plastics Industry Machinery Manufacturing	333220	30
Paper Industry Machinery Manufacturing	333291	15
All Other Industrial Machinery Manufacturing	333299	115
Commercial and Service Industry Machinery Manufacturing	333310	121
Industrial and Commercial Fan and Blower and Air Purification Equipment Manufacturing	333413	41
Heating Equipment and Commercial Refrigeration Equipment Manufacturing	333416	80
Industrial Mould Manufacturing	333511	149
Other Metalworking Machinery Manufacturing	333519	283
Turbine and Turbine Generator Set Unit Manufacturing	333611	19
Other Engine and Power Transmission Equipment Manufacturing	333619	22
Pump and Compressor Manufacturing	333910	37
Material Handling Equipment Manufacturing	333920	124
All Other General-Purpose Machinery Manufacturing	333990	188

Table 19-4 – continued

Research and development performers — By the North American industry classification system (NAICS) 2002, in 2005

	NAICS Code	Performers
		number
Computer and Peripheral Equipment		**90**
Computer and Peripheral Equipment Manufacturing	334110	90
Communications Equipment		**168**
Telephone Apparatus Manufacturing	334210	38
Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	334220	79
Other Communications Equipment Manufacturing	334290	51
Semiconductor and Other Electronic Component		**169**
Semiconductor and Other Electronic Component Manufacturing	334410	169
Navigational, Measuring, Medical and Control Instruments		**319**
Navigational and Guidance Instruments Manufacturing	334511	42
Measuring, Medical and Controlling Devices Manufacturing	334512	277
Other Computer and Electronic Product		**48**
Audio and Video Equipment Manufacturing	334310	33
Manufacturing and Reproducing Magnetic and Optical Media	334610	15
Electrical Equipment, Appliance and Component		**302**
Electric Lamp Bulb and Parts Manufacturing	335110	3
Lighting Fixture Manufacturing	335120	54
Small Electrical Appliance Manufacturing	335210	21
Major Kitchen Appliance Manufacturing	335223	11
Other Major Appliance Manufacturing	335229	8
Power, Distribution and Specialty Transformers Manufacturing	335311	26
Motor and Generator Manufacturing	335312	13
Switchgear and Switchboard, and Relay and Industrial Control Apparatus Manufacturing	335315	59
Battery Manufacturing	335910	7
Communication and Energy Wire and Cable Manufacturing	335920	24
Wiring Device Manufacturing	335930	24
All Other Electrical Equipment and Component Manufacturing	335990	52
Motor Vehicle and Parts		**292**
Automobile and Light-Duty Motor Vehicle Manufacturing	336110	10
Heavy-Duty Truck Manufacturing	336120	14
Motor Vehicle Body Manufacturing	336211	36
Truck Trailer Manufacturing	336212	31
Motor Home, Travel Trailer and Camper Manufacturing	336215	10
Motor Vehicle Gasoline Engine and Engine Parts Manufacturing	336310	22
Motor Vehicle Electrical and Electronic Equipment Manufacturing	336320	29
Motor Vehicle Steering and Suspension Components (except Spring) Manufacturing	336330	8
Motor Vehicle Brake System Manufacturing	336340	11
Motor Vehicle Transmission and Power Train Parts Manufacturing	336350	14
Motor Vehicle Seating and Interior Trim Manufacturing	336360	19
Motor Vehicle Metal Stamping	336370	26
Other Motor Vehicle Parts Manufacturing	336390	62
Aerospace Product and Parts		**73**
Aerospace Product and Parts Manufacturing	336410	73
All Other Transportation Equipment		**108**
Railroad Rolling Stock Manufacturing	336510	7
Ship Building and Repairing	336611	6
Boat Building	336612	49
Other Transportation Equipment Manufacturing	336990	46
Furniture and Related Product		**298**
Wood Kitchen Cabinet and Counter Top Manufacturing	337110	40
Upholstered Household Furniture Manufacturing	337121	22
Other Wood Household Furniture Manufacturing	337123	72
Household Furniture (except Wood and Upholstered) Manufacturing	337126	15
Institutional Furniture Manufacturing	337127	29
Wood Office Furniture, including Custom Architectural Woodwork, Manufacturing	337213	21
Office Furniture (except Wood) Manufacturing	337214	24
Showcase, Partition, Shelving and Locker Manufacturing	337215	58
Mattress Manufacturing	337910	12
Blind and Shade Manufacturing	337920	5
Other Manufacturing Industries		**794**
Hosiery and Sock Mills	315110	8
Other Clothing Knitting Mills	315190	20
Cut and Sew Clothing Contracting	315210	25

Table 19-4 – continued

Research and development performers — By the North American industry classification system (NAICS) 2002, in 2005

	NAICS Code	Performers
		number
Men's and Boys' Cut and Sew Underwear and Nightwear Manufacturing	315221	2
Men's and Boys' Cut and Sew Suit, Coat and Overcoat Manufacturing	315222	8
Men's and Boys' Cut and Sew Shirt Manufacturing	315226	4
Men's and Boys' Cut and Sew Trouser, Slack and Jean Manufacturing	315227	4
Other Men's and Boys' Cut and Sew Clothing Manufacturing	315229	15
Women's and Girls' Cut and Sew Lingerie, Loungewear and Nightwear Manufacturing	315231	13
Women's and Girls' Cut and Sew Blouse and Shirt Manufacturing	315232	5
Women's and Girls' Cut and Sew Dress Manufacturing	315233	14
Women's and Girls' Cut and Sew Suit, Coat, Tailored Jacket and Skirt Manufacturing	315234	11
Other Women's and Girls' Cut and Sew Clothing Manufacturing	315239	30
Infants' Cut and Sew Clothing Manufacturing	315291	3
Fur and Leather Clothing Manufacturing	315292	25
All Other Cut and Sew Clothing Manufacturing	315299	2
Clothing Accessories and Other Clothing Manufacturing	315990	23
Leather and Hide Tanning and Finishing	316110	7
Footwear Manufacturing	316210	16
Other Leather and Allied Product Manufacturing	316990	16
Medical Equipment and Supplies Manufacturing	339110	161
Jewellery and Silverware Manufacturing	339910	29
Sporting and Athletic Goods Manufacturing	339920	81
Doll, Toy and Game Manufacturing	339930	25
Office Supplies (except Paper) Manufacturing	339940	15
Sign Manufacturing	339950	36
All Other Miscellaneous Manufacturing	339990	196
Services		**8,947**
Wholesale Trade		**1,549**
Live Animal Wholesaler-Distributors	411110	8
Oilseed and Grain Wholesaler-Distributors	411120	10
Nursery Stock and Plant Wholesaler-Distributors	411130	15
Other Farm Product Wholesaler-Distributors	411190	5
Petroleum Product Wholesaler-Distributors	412110	6
General-Line Food Wholesaler-Distributors	413110	18
Dairy and Milk Products Wholesaler-Distributors	413120	4
Poultry and Egg Wholesaler-Distributors	413130	2
Fish and Seafood Product Wholesaler-Distributors	413140	8
Fresh Fruit and Vegetable Wholesaler-Distributors	413150	22
Red Meat and Meat Product Wholesaler-Distributors	413160	22
Other Specialty-Line Food Wholesaler-Distributors	413190	73
Non-Alcoholic Beverage Wholesaler-Distributors	413210	5
Alcoholic Beverage Wholesaler-Distributors	413220	0
Cigarette and Tobacco Product Wholesaler-Distributors	413310	0
Clothing and Clothing Accessories Wholesaler-Distributors	414110	41
Footwear Wholesaler-Distributors	414120	3
Piece Goods, Notions and Other Dry Goods Wholesaler-Distributors	414130	22
Home Entertainment Equipment Wholesaler-Distributors	414210	6
Household Appliance Wholesaler-Distributors	414220	8
China, Glassware, Crockery and Pottery Wholesaler-Distributors	414310	2
Floor Covering Wholesaler-Distributors	414320	4
Linen, Drapery and Other Textile Furnishings Wholesaler-Distributors	414330	2
Other Home Furnishings Wholesaler-Distributors	414390	17
Jewellery and Watch Wholesaler-Distributors	414410	2
Book, Periodical and Newspaper Wholesaler-Distributors	414420	3
Photographic Equipment and Supplies Wholesaler-Distributors	414430	2
Sound Recording Wholesalers	414440	0
Video Cassette Wholesalers	414450	0
Toy and Hobby Goods Wholesaler-Distributors	414460	7
Amusement and Sporting Goods Wholesaler-Distributors	414470	11
Pharmaceuticals and Pharmacy Supplies Wholesaler-Distributors	414510	50

Table 19-4 – continued

Research and development performers — By the North American industry classification system (NAICS) 2002, in 2005

	NAICS Code	Performers
		number
Toiletries, Cosmetics and Sundries Wholesaler-Distributors	414520	33
New and Used Automobile and Light-Duty Truck Wholesaler-Distributors	415110	1
Truck, Truck Tractor and Bus Wholesaler-Distributors	415120	6
Recreational and Other Motor Vehicles Wholesaler-Distributors	415190	2
Tire Wholesaler-Distributors	415210	1
Other New Motor Vehicle Parts and Accessories Wholesaler-Distributors	415290	30
Used Motor Vehicle Parts and Accessories Wholesaler-Distributors	415310	4
Electrical Wiring and Construction Supplies Wholesaler-Distributors	416110	32
Plumbing, Heating and Air-Conditioning Equipment and Supplies Wholesaler-Distributors	416120	54
Metal Service Centres	416210	24
General-Line Building Supplies Wholesaler-Distributors	416310	9
Lumber, Plywood and Millwork Wholesaler-Distributors	416320	20
Hardware Wholesaler-Distributors	416330	22
Paint, Glass and Wallpaper Wholesaler-Distributors	416340	8
Other Specialty-Line Building Supplies Wholesaler-Distributors	416390	24
Farm, Lawn and Garden Machinery and Equipment Wholesaler-Distributors	417110	29
Construction and Forestry Machinery, Equipment and Supplies Wholesaler-Distributors	417210	18
Mining and Oil and Gas Well Machinery, Equipment and Supplies Wholesaler-Distributors	417220	12
Industrial Machinery, Equipment and Supplies Wholesaler-Distributors	417230	141
Computer, Computer Peripheral and Pre-Packaged Software Wholesaler-Distributors	417310	126
Electronic Components, Navigational and Communications Equipment and Supplies Wholesaler-Distributors	417320	78
Office and Store Machinery and Equipment Wholesaler-Distributors	417910	25
Service Establishment Machinery, Equipment and Supplies Wholesaler-Distributors	417920	17
Professional Machinery, Equipment and Supplies Wholesaler-Distributors	417930	72
All Other Machinery, Equipment and Supplies Wholesaler-Distributors	417990	37
Recyclable Metal Wholesaler-Distributors	418110	18
Recyclable Paper and Paperboard Wholesaler-Distributors	418120	3
Other Recyclable Material Wholesaler-Distributors	418190	31
Stationery and Office Supplies Wholesaler-Distributors	418210	1
Other Paper and Disposable Plastic Product Wholesaler-Distributors	418220	8
Agricultural Feed Wholesaler-Distributors	418310	18
Seed Wholesaler-Distributors	418320	15
Agricultural Chemical and Other Farm Supplies Wholesaler-Distributors	418390	19
Chemical (except Agricultural) and Allied Product Wholesaler-Distributors	418410	47
Log and Wood Chip Wholesaler-Distributors	418910	2
Mineral, Ore and Precious Metal Wholesaler-Distributors	418920	0
Second-Hand Goods (except Machinery and Automotive) Wholesaler-Distributors	418930	2
All Other Wholesaler-Distributors	418990	99
Farm Product Agents and Brokers	419110	0
Petroleum Product Agents and Brokers	419120	25
Food, Beverage and Tobacco Agents and Brokers	419130	3
Personal and Household Goods Agents and Brokers	419140	10
Motor Vehicle and Parts Agents and Brokers	419150	0
Building Material and Supplies Agents and Brokers	419160	5
Machinery, Equipment and Supplies Agents and Brokers	419170	16
Other Wholesale Agents and Brokers	419190	24
Retail Trade		**379**
New Car Dealers	441110	0
Used Car Dealers	441120	7
Recreational Vehicle Dealers	441210	0
Motorcycle, Boat and Other Motor Vehicle Dealers	441220	12
Automotive Parts and Accessories Stores	441310	12
Tire Dealers	441320	1
Furniture Stores	442110	3

Table 19-4 – continued

Research and development performers — By the North American industry classification system (NAICS) 2002, in 2005

	NAICS Code	Performers
		number
Floor Covering Stores	442210	2
Window Treatment Stores	442291	3
Print and Picture Frame Stores	442292	1
All Other Home Furnishings Stores	442298	5
Appliance, Television and Other Electronics Stores	443110	26
Computer and Software Stores	443120	69
Camera and Photographic Supplies Stores	443130	2
Home Centres	444110	4
Paint and Wallpaper Stores	444120	5
Hardware Stores	444130	3
Other Building Material Dealers	444190	12
Outdoor Power Equipment Stores	444210	1
Nursery and Garden Centres	444220	12
Supermarkets and Other Grocery (except Convenience) Stores	445110	3
Convenience Stores	445120	2
Meat Markets	445210	14
Fish and Seafood Markets	445220	2
Fruit and Vegetable Markets	445230	0
Baked Goods Stores	445291	17
Confectionery and Nut Stores	445292	3
All Other Specialty Food Stores	445299	9
Beer, Wine and Liquor Stores	445310	0
Pharmacies and Drug Stores	446110	10
Cosmetics, Beauty Supplies and Perfume Stores	446120	9
Optical Goods Stores	446130	3
Food (Health) Supplement Stores	446191	7
All Other Health and Personal Care Stores	446199	9
Gasoline Stations with Convenience Stores	447110	0
Other Gasoline Stations	447190	2
Men's Clothing Stores	448110	2
Women's Clothing Stores	448120	5
Children's and Infants' Clothing Stores	448130	1
Family Clothing Stores	448140	3
Clothing Accessories Stores	448150	0
Fur Stores	448191	2
All Other Clothing Stores	448199	8
Shoe Stores	448210	3
Jewellery Stores	448310	5
Luggage and Leather Goods Stores	448320	1
Sporting Goods Stores	451110	10
Hobby, Toy and Game Stores	451120	2
Sewing, Needlework and Piece Goods Stores	451130	0
Musical Instrument and Supplies Stores	451140	1
Book Stores and News Dealers	451210	2
Pre-Recorded Tape, Compact Disc and Record Stores	451220	1
Department Stores	452110	1
Warehouse Clubs and Superstores	452910	0
Home and Auto Supplies Stores	452991	0
All Other Miscellaneous General Merchandise Stores	452999	6
Florists	453110	1
Office Supplies and Stationery Stores	453210	0
Gift, Novelty and Souvenir Stores	453220	4
Used Merchandise Stores	453310	1
Pet and Pet Supplies Stores	453910	5
Art Dealers	453920	0
Manufactured (Mobile) Home Dealers	453930	0
Beer and Wine-Making Supplies Stores	453992	3
All Other Miscellaneous Store Retailers (except Beer and Wine-Making Supplies Stores)	453999	15
Electronic Shopping and Mail-Order Houses	454110	16
Vending Machine Operators	454210	1
Fuel Dealers	454310	1
Other Direct Selling Establishments	454390	9
Transportation and Warehousing		**134**
Scheduled Air Transportation	481110	3
Non-Scheduled Chartered Air Transportation	481214	4
Non-Scheduled Specialty Flying Services	481215	3
Short-Haul Freight Rail Transportation	482112	3
Mainline Freight Rail Transportation	482113	3

Table 19-4 – continued

Research and development performers — By the North American industry classification system (NAICS) 2002, in 2005

	NAICS Code	Performers
		number
Passenger Rail Transportation	482114	0
Deep Sea, Coastal and Great Lakes Water Transportation (except by Ferries)	483115	1
Deep Sea, Coastal and Great Lakes Water Transportation by Ferries	483116	0
Inland Water Transportation (except by Ferries)	483213	0
Inland Water Transportation by Ferries	483214	0
General Freight Trucking, Local	484110	9
General Freight Trucking, Long Distance, Truck-Load	484121	10
General Freight Trucking, Long Distance, Less Than Truck-Load	484122	0
Used Household and Office Goods Moving	484210	2
Bulk Liquids Trucking, Local	484221	1
Dry Bulk Materials Trucking, Local	484222	7
Forest Products Trucking, Local	484223	4
Other Specialized Freight (except Used Goods) Trucking, Local	484229	0
Bulk Liquids Trucking, Long Distance	484231	0
Dry Bulk Materials Trucking, Long Distance	484232	3
Forest Products Trucking, Long Distance	484233	0
Other Specialized Freight (except Used Goods) Trucking, Long Distance	484239	3
Urban Transit Systems	485110	0
Interurban and Rural Bus Transportation	485210	0
Taxi Service	485310	0
Limousine Service	485320	0
School and Employee Bus Transportation	485410	0
Charter Bus Industry	485510	1
Other Transit and Ground Passenger Transportation	485990	0
Pipeline Transportation of Crude Oil	486110	0
Pipeline Transportation of Natural Gas	486210	1
Pipeline Transportation of Refined Petroleum Products	486910	0
All Other Pipeline Transportation	486990	0
Scenic and Sightseeing Transportation, Land	487110	0
Scenic and Sightseeing Transportation, Water	487210	2
Scenic and Sightseeing Transportation, Other	487990	1
Air Traffic Control	488111	0
Other Airport Operations	488119	2
Other Support Activities for Air Transportation	488190	15
Support Activities for Rail Transportation	488210	7
Port and Harbour Operations	488310	0
Marine Cargo Handling	488320	2
Marine Salvage Services	488331	1
Ship Piloting Services	488332	0
Other Navigational Services to Shipping	488339	0
Other Support Activities for Water Transportation	488390	4
Motor Vehicle Towing	488410	2
Other Support Activities for Road Transportation	488490	6
Marine Shipping Agencies	488511	0
Other Freight Transportation Arrangement	488519	10
Other Support Activities for Transportation	488990	2
Postal Service	491110	0
Couriers	492110	3
Local Messengers and Local Delivery	492210	0
General Warehousing and Storage	493110	8
Refrigerated Warehousing and Storage	493120	5
Farm Product Warehousing and Storage	493130	3
Other Warehousing and Storage	493190	3
Information and Cultural Industries		**657**
Newspaper Publishers	511110	5
Periodical Publishers	511120	5
Book Publishers	511130	8
Database and Directory Publishers	511140	6
Other Publishers	511190	1
Software Publishers	511210	361
Motion Picture and Video Production	512110	27
Motion Picture and Video Distribution	512120	3
Motion Picture and Video Exhibition	512130	1
Post-Production and Other Motion Picture and Video Industries	512190	15
Record Production	512210	0
Integrated Record Production/Distribution	512220	2
Music Publishers	512230	0

Table 19-4 – continued

Research and development performers — By the North American industry classification system (NAICS) 2002, in 2005

	NAICS Code	Performers
		number
Sound Recording Studios	512240	3
Other Sound Recording Industries	512290	0
Radio Broadcasting	515110	6
Television Broadcasting	515120	1
Pay and Specialty Television	515210	1
Internet Publishing and Broadcasting	516110	12
Wired Telecommunications Carriers	517110	22
Wireless Telecommunications Carriers (except Satellite)	517210	13
Telecommunications Resellers	517310	16
Satellite Telecommunications	517410	12
Cable and Other Program Distribution	517510	6
Other Telecommunications	517910	25
Internet Service Providers	518111	19
Web Search Portals	518112	5
Data Processing, Hosting, and Related Services	518210	58
News Syndicates	519110	1
Libraries	519121	0
Archives	519122	1
All Other Information Services	519190	22
Finance, Insurance and Real Estate		**260**
Monetary Authorities - Central Bank	521110	0
Personal and Commercial Banking Industry	522111	9
Corporate and Institutional Banking Industry	522112	0
Local Credit Unions	522130	3
Other Depository Credit Intermediation	522190	0
Credit Card Issuing	522210	0
Sales Financing	522220	2
Consumer Lending	522291	0
All Other Non-Depository Credit Intermediation	522299	11
Mortgage and Non-mortgage Loan Brokers	522310	1
Central Credit Unions	522321	1
Other Financial Transactions Processing and Clearing House Activities	522329	8
Other Activities Related to Credit Intermediation	522390	1
Investment Banking and Securities Dealing	523110	2
Securities Brokerage	523120	5
Commodity Contracts Dealing	523130	2
Commodity Contracts Brokerage	523140	0
Securities and Commodity Exchanges	523210	1
Miscellaneous Intermediation	523910	8
Portfolio Management	523920	44
Investment Advice	523930	6
All Other Financial Investment Activities	523990	5
Direct Individual Life, Health and Medical Insurance Carriers	524111	8
Direct Group Life, Health and Medical Insurance Carriers	524112	2
Direct General Property and Casualty Insurance Carriers	524121	8
Direct, Private, Automobile Insurance Carriers	524122	0
Direct, Public, Automobile Insurance Carriers	524123	0
Direct Property Insurance Carriers	524124	0
Direct Liability Insurance Carriers	524125	0
Other Direct Insurance (except Life, Health and Medical) Carriers	524129	1
Life Reinsurance Carriers	524131	1
Accident and Sickness Reinsurance Carriers	524132	0
Automobile Reinsurance Carriers	524133	0
Property Reinsurance Carriers	524134	1
Liability Reinsurance Carriers	524135	0
General and Other Reinsurance Carriers	524139	0
Insurance Agencies and Brokerages	524210	10
Claims Adjusters	524291	4
All Other Insurance Related Activities	524299	3
Trusteed Pension Funds	526111	0
Non-Trusteed Pension Funds	526112	0
Equity Funds - Canadian	526911	0
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

Table 19-4 – continued

Research and development performers — By the North American industry classification system (NAICS) 2002, in 2005

	NAICS Code	Performers
		number
Other Open-Ended Funds	526919	0
Mortgage Investment Funds	526920	2
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	1
Lessors of Social Housing Projects	531112	0
Lessors of Non-Residential Buildings (except Mini-Warehouses)	531120	17
Self-Storage Mini-Warehouses	531130	0
Lessors of Other Real Estate Property	531190	2
Offices of Real Estate Agents and Brokers	531210	5
Real Estate Property Managers	531310	6
Offices of Real Estate Appraisers	531320	2
Other Activities Related to Real Estate	531390	3
Passenger Car Rental	532111	1
Passenger Car Leasing	532112	1
Truck, Utility Trailer and RV (Recreational Vehicle) Rental and Leasing	532120	1
Consumer Electronics and Appliance Rental	532210	0
Formal Wear and Costume Rental	532220	0
Video Tape and Disc Rental	532230	2
Other Consumer Goods Rental	532290	6
General Rental Centres	532310	1
Construction, Transportation, Mining, and Forestry Machinery and Equipment Rental and Leasing	532410	23
Office Machinery and Equipment Rental and Leasing	532420	2
Other Commercial and Industrial Machinery and Equipment Rental and Leasing	532490	16
Lessors of Non-Financial Intangible Assets (Except Copyrighted Works)	533110	22
Architectural, Engineering and Related Services		**879**
Architectural Services	541310	19
Landscape Architectural Services	541320	2
Engineering Services	541330	672
Drafting Services	541340	13
Building Inspection Services	541350	3
Geophysical Surveying and Mapping Services	541360	33
Surveying and Mapping (except Geophysical) Services	541370	34
Testing Laboratories	541380	103
Computer System Design and Related		**2,348**
Computer Systems Design and Related Services	541510	2,348
Management, Scientific and Technical Consulting		**459**
Administrative Management and General Management Consulting Services	541611	183
Human Resource and Executive Search Consulting Services	541612	13
Other Management Consulting Services	541619	72
Environmental Consulting Services	541620	63
Other Scientific and Technical Consulting Services	541690	128
Scientific Research and Development		**845**
Scientific Research and Development Services	5417	845
Health Care and Social Assistance		**146**
Offices of Physicians	621110	26
Offices of Dentists	621210	7
Offices of Chiropractors	621310	3
Offices of Optometrists	621320	3
Offices of Mental Health Practitioners (except Physicians)	621330	7
Offices of Physical, Occupational, and Speech Therapists and Audiologists	621340	4
Offices of All Other Health Practitioners	621390	8
Family Planning Centres	621410	5
Out-Patient Mental Health and Substance Abuse Centres	621420	1
Community Health Centres	621494	2
All Other Out-Patient Care Centres	621499	3
Medical and Diagnostic Laboratories	621510	62
Home Health Care Services	621610	0
Ambulance (except Air Ambulance) Services	621911	1
Air Ambulance Services	621912	0
All Other Ambulatory Health Care Services	621990	3

Table 19-4 – continued

Research and development performers — By the North American industry classification system (NAICS) 2002, in 2005

	NAICS Code	Performers
		number
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	0
Child and Youth Services	624110	0
Services for the Elderly and Persons with Disabilities	624120	2
Other Individual and Family Services	624190	3
Community Food Services	624210	0
Community Housing Services	624220	0
Emergency and Other Relief Services	624230	1
Vocational Rehabilitation Services	624310	2
Child Day-Care Services	624410	1
All Other Services		**1,291**
Offices of Lawyers	541110	3
Offices of Notaries	541120	0
Other Legal Services	541190	10
Offices of Accountants	541212	9
Tax Preparation Services	541213	0
Bookkeeping, Payroll and Related Services	541215	9
Interior Design Services	541410	3
Industrial Design Services	541420	75
Graphic Design Services	541430	34
Other Specialized Design Services	541490	13
Advertising Agencies	541810	38
Public Relations Services	541820	0
Media Buying Agencies	541830	0
Media Representatives	541840	7
Display Advertising	541850	13
Direct Mail Advertising	541860	4
Advertising Material Distribution Services	541870	2
Specialty Advertising Distributors	541891	1
All Other Services Related to Advertising	541899	15
Marketing Research and Public Opinion Polling	541910	20
Photographic Services	541920	9
Translation and Interpretation Services	541930	2
Veterinary Services	541940	6
All Other Professional, Scientific and Technical Services	541990	54
Holding Companies	551113	170
Head Offices	551114	0
Office Administrative Services	561110	66
Facilities Support Services	561210	0
Employment Placement Agencies	561310	7
Temporary Help Services	561320	12
Employee Leasing Services	561330	1
Document Preparation Services	561410	9
Telephone Call Centres	561420	9
Business Service Centres	561430	10
Collection Agencies	561440	2
Credit Bureaus	561450	3
Other Business Support Services	561490	6
Travel Agencies	561510	9
Tour Operators	561520	6
Other Travel Arrangement and Reservation Services	561590	4
Investigation Services	561611	3
Security Guard and Patrol Services	561612	2
Armoured Car Services	561613	0
Security Systems Services (except Locksmiths)	561621	32
Locksmiths	561622	3
Exterminating and Pest Control Services	561710	3
Window Cleaning Services	561721	0
Janitorial Services (except Window Cleaning)	561722	11

Table 19-4 – continued

Research and development performers — By the North American industry classification system (NAICS) 2002, in 2005

	NAICS Code	Performers
		number
Landscaping Services	561730	13
Carpet and Upholstery Cleaning Services	561740	3
Duct and Chimney Cleaning Services	561791	2
All Other Services to Buildings and Dwellings	561799	2
Packaging and Labelling Services	561910	24
Convention and Trade Show Organizers	561920	3
All Other Support Services	561990	69
Elementary and Secondary Schools	611110	0
Community Colleges and C.E.G.E.P.s	611210	2
Universities	611310	0
Business and Secretarial Schools	611410	1
Computer Training	611420	13
Professional and Management Development Training	611430	9
Technical and Trade Schools	611510	3
Fine Arts Schools	611610	0
Athletic Instruction	611620	4
Language Schools	611630	2
All Other Schools and Instruction	611690	14
Educational Support Services	611710	4
Theatre (except Musical) Companies	711111	0
Musical Theatre and Opera Companies	711112	0
Dance Companies	711120	0
Musical Groups and Artists	711130	0
Other Performing Arts Companies	711190	1
Sports Teams and Clubs	711211	0
Horse Race Tracks	711213	0
Other Spectator Sports	711218	1
Live Theatres and Other Performing Arts Presenters with Facilities	711311	1
Sports Stadiums and Other Presenters with Facilities	711319	1
Performing Arts Promoters (Presenters) without Facilities	711321	1
Festivals without Facilities	711322	0
Sports Presenters and Other Presenters without Facilities	711329	1
Agents and Managers for Artists, Athletes, Entertainers and Other Public Figures	711410	0
Independent Artists, Writers and Performers	711510	8
Non-Commercial Art Museums and Galleries	712111	0
Museums (except Art Museums and Galleries)	712119	0
Historic and Heritage Sites	712120	0
Zoos and Botanical Gardens	712130	1
Other Heritage Institutions	712190	1
Amusement and Theme Parks	713110	2
Amusement Arcades	713120	0
Casinos (except Casino Hotels)	713210	0
Lotteries	713291	0
All Other Gambling Industries	713299	0
Golf Courses and Country Clubs	713910	0
Skiing Facilities	713920	3
Marinas	713930	1
Fitness and Recreational Sports Centres	713940	2
Bowling Centres	713950	0
All Other Amusement and Recreation Industries	713990	4
Hotels	721111	0
Motor Hotels	721112	0
Resorts	721113	0
Motels	721114	0
Casino Hotels	721120	0
Bed and Breakfast	721191	0
Housekeeping Cottages and Cabins	721192	1
All Other Traveller Accommodation	721198	0
RV (Recreational Vehicle) Parks and Campgrounds	721211	2
Hunting and Fishing Camps	721212	0
Recreational (except Hunting and Fishing) and Vacation Camps	721213	0
Rooming and Boarding Houses	721310	1
Full-Service Restaurants	722110	13
Limited-Service Eating Places	722210	13
Food Service Contractors	722310	4
Caterers	722320	4
Mobile Food Services	722330	0
Drinking Places (Alcoholic Beverages)	722410	3

Table 19-4 – continued

Research and development performers — By the North American industry classification system (NAICS) 2002, in 2005

	NAICS Code	Performers
		number
General Automotive Repair	811111	30
Automotive Exhaust System Repair	811112	2
Other Automotive Mechanical and Electrical Repair and Maintenance	811119	13
Automotive Body, Paint and Interior Repair and Maintenance	811121	20
Automotive Glass Replacement Shops	811122	2
Car Washes	811192	2
All Other Automotive Repair and Maintenance	811199	1
Electronic and Precision Equipment Repair and Maintenance	811210	41
Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance	811310	168
Home and Garden Equipment Repair and Maintenance	811411	9
Appliance Repair and Maintenance	811412	6
Reupholstery and Furniture Repair	811420	7
Footwear and Leather Goods Repair	811430	0
Other Personal and Household Goods Repair and Maintenance	811490	11
Barber Shops	812114	0
Beauty Salons	812115	3
Unisex Hair Salons	812116	1
Other Personal Care Services	812190	5
Funeral Homes	812210	0
Cemeteries and Crematoria	812220	0
Coin-Operated Laundries and Dry Cleaners	812310	0
Dry Cleaning and Laundry Services (except Coin-Operated)	812320	4
Linen and Uniform Supply	812330	2
Pet Care (except Veterinary) Services	812910	1
Photo Finishing Laboratories (except One-Hour)	812921	5
One-Hour Photo Finishing	812922	0
Parking Lots and Garages	812930	0
All Other Personal Services	812990	1
Religious Organizations	813110	0
Grant-Making and Giving Services	813210	0
Social Advocacy Organizations	813310	4
Civic and Social Organizations	813410	3
Business Associations	813910	9
Professional Organizations	813920	4
Labour Organizations	813930	0
Political Organizations	813940	0
Other Membership Organizations	813990	0
Private Households	814110	1
Defence Services	911110	1
Federal Courts of Law	911210	0
Federal Correctional Services	911220	0
Federal Police Services	911230	0
Federal Regulatory Services	911240	0
Other Federal Protective Services	911290	0
Federal Labour and Employment Services	911310	0
Immigration Services	911320	0
Other Federal Labour, Employment and Immigration Services	911390	0
Foreign Affairs	911410	0
International Assistance	911420	1
Other Federal Government Public Administration	911910	1
Provincial Courts of Law	912110	0
Provincial Correctional Services	912120	0
Provincial Police Services	912130	0
Provincial Fire-Fighting Services	912140	0
Provincial Regulatory Services	912150	0
Other Provincial Protective Services	912190	0
Provincial Labour and Employment Services	912210	0
Other Provincial and Territorial Public Administration	912910	1
Municipal Courts of Law	913110	0
Municipal Correctional Services	913120	0
Municipal Police Services	913130	0
Municipal Fire-Fighting Services	913140	0
Municipal Regulatory Services	913150	0
Other Municipal Protective Services	913190	0
Other Local, Municipal and Regional Public Administration	913910	0
Aboriginal Public Administration	914110	0
International and Other Extra-Territorial Public Administration	919110	0

Table 20

Enterprises with one or more employee, by industry, with percentage change from 2000 to 2005 and percentage distribution, 2005

	2000	2001	2002	2003	2004 [r]	2005	Change from 2000 to 2005	2005 distribution
	number						percent	
Total	**967,853**	**970,261**	**966,766**	**962,987**	**952,985**	**959,856**	**-0.8**	**100**
Agriculture, forestry, fishing and hunting	**63,623**	**62,661**	**60,777**	**58,896**	**57,048**	**56,254**	**-11.6**	**5.9**
Agriculture	45,465	44,883	43,498	42,150	40,870	40,393	-11.2	4.2
Forestry and logging	11,730	11,300	10,906	10,399	9,971	9,722	-17.1	1.0
Fishing, hunting and trapping	6,428	6,478	6,373	6,347	6,207	6,139	-4.5	0.6
Mining and oil and gas extraction	**6,710**	**7,005**	**7,045**	**7,059**	**7,315**	**7,639**	**13.8**	**0.8**
Oil and gas extraction	4,924	5,282	5,487	5,639	5,911	6,190	25.7	0.6
Mining	1,786	1,723	1,558	1,420	1,404	1,449	-18.9	0.2
Utilities	**3,334**	**3,244**	**3,227**	**3,215**	**3,162**	**3,248**	**-2.6**	**0.3**
Electric power	503	445	436	430	433	435	-13.5	0.0
Other utilities	2,831	2,799	2,791	2,785	2,729	2,813	-0.6	0.3
Construction	**107,374**	**108,433**	**108,627**	**110,070**	**110,213**	**113,733**	**5.9**	**11.8**
Manufacturing	**60,859**	**59,249**	**57,708**	**56,331**	**54,669**	**53,885**	**-11.5**	**5.6**
Food	6,645	6,287	6,021	5,815	5,575	5,404	-18.7	0.6
Beverage and tobacco	620	584	577	573	580	578	-6.8	0.1
Textile	2,009	1,884	1,774	1,712	1,625	1,563	-22.2	0.2
Wood products	4,385	4,270	4,168	3,907	3,702	3,745	-14.6	0.4
Paper	709	695	679	670	635	617	-13.0	0.1
Printing	5,356	5,149	5,012	4,851	4,697	4,655	-13.1	0.5
Petroleum and coal products	227	202	191	161	128	131	-42.3	0.0
Pharmaceutical and medicine	295	266	266	262	262	268	-9.2	0.0
Other chemicals	1,645	1,612	1,555	1,573	1,520	1,511	-8.1	0.2
Plastic products	1,988	1,943	1,908	1,888	1,857	1,846	-7.1	0.2
Rubber products	342	332	327	319	303	288	-15.8	0.0
Non-metallic mineral products	2,123	2,045	1,987	1,946	1,916	1,854	-12.7	0.2
Primary metal (ferrous)	334	326	333	290	284	303	-9.3	0.0
Primary metal (non-ferrous)	318	323	317	298	294	294	-7.5	0.0
Fabricated metal products	8,513	8,472	8,361	8,224	8,000	7,947	-6.6	0.8
Machinery	5,535	5,370	5,274	5,172	5,071	5,091	-8.0	0.5
Computer and peripheral equipment	330	321	279	258	258	261	-20.9	0.0
Communications equipment	306	304	287	282	290	297	-2.9	0.0
Semiconductor and other electronic components	544	518	490	483	473	443	-18.6	0.0
Navigational, measuring, medical and control instruments	944	916	854	825	808	766	-18.9	0.1
Other computer and electronic products	245	235	210	211	191	183	-25.3	0.0
Electrical equipment, appliance and components	1,254	1,195	1,150	1,100	1,078	1,085	-13.5	0.1
Motor vehicle and parts	1,394	1,342	1,345	1,325	1,301	1,298	-6.9	0.1
Aerospace products and parts	317	292	285	224	212	218	-31.2	0.0
All other transportation equipment	750	740	694	656	636	617	-17.7	0.1
Furniture and related products	4,327	4,363	4,380	4,382	4,349	4,269	-1.3	0.4
Other manufacturing industries	9,404	9,263	8,984	8,924	8,624	8,353	-11.2	0.9
Services	**725,953**	**729,669**	**729,382**	**727,416**	**720,578**	**725,097**	**-0.1**	**75.5**
Wholesale trade	55,053	54,684	54,451	53,663	51,951	51,789	-5.9	5.4
Retail trade	112,156	110,670	109,648	108,105	107,511	106,531	-5.0	11.1
Transportation and warehousing	43,073	42,913	42,689	42,601	42,481	43,157	0.2	4.5
Information and cultural industries	11,935	11,947	11,600	11,451	11,224	11,263	-5.6	1.2
Finance, insurance and real estate	65,520	65,616	65,746	64,889	64,095	69,398	5.9	7.2
Architectural, engineering and related services	17,746	17,682	17,435	17,271	17,228	17,675	-0.4	1.8
Computer system design and related services	19,365	20,665	20,754	20,822	20,709	21,610	11.6	2.3
Management, scientific and technical consulting services	23,351	25,336	26,471	27,036	27,019	27,483	17.7	2.9
Scientific research and development services	2,016	2,196	2,241	2,276	2,267	2,298	14.0	0.2
Health care and social assistance	75,782	76,675	77,074	78,127	77,765	77,959	2.9	8.1
All other services	299,956	301,285	301,273	301,175	298,328	295,934	-1.3	30.8

Note(s): Components may not add to totals due to rounding.
Source(s): Statistics Canada, Business Register, enterprises with one or more employees, December 2000-2005.

Table 21
Research and development in Canadian Industry, 2006 survey response

	Responded research and development	No research and development	Deleted [1]	Did not respond [2]	Total
	number				
Total	**16,831**	**9**	**9**	**347**	**17,399**
Long form	816 [3]	9	9	347	**1,181**
Administrative data [4]	16,218	…	…	…	**16,218**

1. Inactive, out of business and unallocated.
2. Includes estimates made for 347 long form delinquents.
3. Includes 164 companies added from T661 and 39 which were captured and changed to short form.
4. Data from Canada Revenue Agency, does not include records projected.

Survey methodology

The 2006 survey

The 2006 survey collected data on four years. The four years were: 2005 for which the data are expected to be final; 2006, for which the data are expected to be close to final, 2007 for which the data are planned expenditures, and 2008 for which the data are a forecast of spending intentions.

Data from the surveyed firms in 2006 represent approximately 80% of the total expenditures. Estimates are not available for administrative data for 2007 and 2008. 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.

The 2006 survey was mailed out in September 2007. All companies believed to be performing or funding one and a half 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 2006, of firms reported by government respondents as R&D contractors or grantees for 2006 to 2007, 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, 2005, 2006, 2007 and 2008.

Recent changes to survey methodology

To further relieve respondent burden, the 2006 survey threshold was raised from one million dollars to one and one half million dollars, thereby reducing the number of surveyed firms by 481. These firms continue to be included in our tabulations as their R&D data is imputed using CRA administrative data from the SR&ED program.

To improve data quality for two of the survey’s classification variables - Revenues in Canada and Number of Employees in Canada - administrative sources were used to replace missing or inconsistent data.

Revenue figures for the SR&ED tax filers were adjusted to reflect corporate income tax data for the corresponding filer. These tax data are from T2 corporate income tax data mapped to the Statistics Canada Chart of Accounts (COA) classification, by firm, from Tax Data Division. The variable COA4 comprises (Total) Revenue for firms. COA4 values were used to improve data quality for missing total revenues data from reference year 1997 through the current year. Inconsistent reported total revenue data were also examined by subject matter experts with reference to COA4 data. Within the publication, the revisions have impacted the revenue size groups. It is believed the revisions have substantially improved the quality of the revenue variable.

Canada Revenue Agency (CRA) Payroll Deductions total employment data (PD7) was used to improve the quality of missing or inconsistent total employment data for survey years 2001 through the current survey year. Payroll Deduction data are monthly data, therefore an annual average is calculated from CRA monthly Payroll Deduction data for all business enterprises that reported having one or more employees in at least one of the twelve months of the tax year.

The survey's history

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, only the top 100 R&D performers (accounting for 64% of all industrial R&D) were surveyed for the 1992 and 1994 reference years. 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. In the 2006 survey year this threshold was raised to $1.5 million thereby further reducing respondent burden.

When first implemented, this initiative resulted in an understatement of the total value of intramural expenditure and of the total number of R&D personnel. Under the current tax regulations, firms must file their application to the SR&ED program within 18 months of expenditure. Once claims are submitted, they are processed and forwarded to Statistics Canada. As a result, data may not arrive for up to two years after the incurrence of expenditures. To remedy the situation, an estimation system was subsequently put into place to impute values for outstanding administrative data. This estimation system confirms the company is active using Statistics Canada's extensive Business Register, and then applies an estimate based on industry trends.

Recent developments in R&D spending are important economic signals, desired promptly by a variety of users. Because the small estimation of outstanding CRA data does not seriously influence overall trends, the R&D data are published as soon as possible after the survey is conducted, and revised in subsequent publications.

Data quality

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. In addition, complete coverage cannot be assured. This is especially true for the smaller companies in the service industries. The term, R&D, in spite of survey guidelines, can be misinterpreted.

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, 2007/2008, (Catalogue no. 88-204-X).

Other notes

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 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.

The survey response

The response for the 2006 “base year” survey is shown below.

For 2006 the response rate was 66 %. Survey questionnaires were mailed to 1,017 firms: 670 were returned; 613 were data captured as long forms, 39 were data captured and changed to short forms, 9 indicated no research and development activity; 6 were out of business; 3 were included with another respondent; and 347 were estimated.

An additional 164 firms were added to the survey universe from the 2006 Scientific Research & Experimental Development tax file.

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 themselves 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.

Text table 1
Specific cases and their treatment

Activity	Treatment	Remarks
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 licenses

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."[1]

Coverage is a minor source of error. Surveys are of all known and suspected, large R&D performers and funders i.e., those believed to have R&D expenditures of at least $1,500,000.

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. Underreporting due to this time lag is estimated to be less than 8%, and is largely corrected by imputing estimates based on industry trends for all known performers who have not yet submitted their claim.

Response

"A response error occurs whenever a characteristic is misreported in a census or a survey."[2]

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.

1. "A compendium of methods of error evaluation in censuses and surveys", Statistics Canada, Statistical Services Field, November 1978, Catalogue No. 13-564E.
2. "A compendium of methods of error evaluation in censuses and surveys", Statistics Canada, Statistical Services Field, November 1978, Catalogue No. 13-564E.

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."[3]

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 20% 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."[4]

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.[5]

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."[6]

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.

3. "A compendium of methods of error evaluation in censuses and surveys", Statistics Canada, Statistical Services Field, November 1978, Catalogue No. 13-564E.
4. "A compendium of methods of error evaluation in censuses and surveys", Statistics Canada, Statistical Services Field, November 1978, Catalogue No. 13-564E.
5. "A compendium of methods of error evaluation in censuses and surveys", Statistics Canada, Statistical Services Field, November 1978, Catalogue No. 13-564E.
6. "A compendium of methods of error evaluation in censuses and surveys", Statistics Canada, Statistical Services Field, November 1978, Catalogue No. 13-564E.

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."[7]

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 2006 survey, the 2006 business enterprise sector R&D expenditures would be based on full enumeration but about 18% of the expenditures for 2007 and 2008 would have been imputed.

Technical notes

Statistics for even years

Data for the reference year 2006 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, the 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 research and development (R&D) expenditures and personnel are only available for 1977, 1979 and 1981 to 2006.

Terminology

The following terminology is used within the publication:

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, subsidiary 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 the 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.

7. "A compendium of methods of error evaluation in censuses and surveys", Statistics Canada, Statistical Services Field, November 1978, Catalogue No. 13-564E.

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.

Country of control: In most cases of foreign control, the country of control is the country of residence of the ultimate foreign controlling parent corporation, family, trust, estate or related group. Each subsidiary within the global enterprise is assigned the same country of control as its parent. A company whose voting rights are equally owned by Canadian-controlled and foreign- controlled corporations is Canadian-controlled. If two foreign-controlled corporations jointly own an equal amount of the voting rights of a Canadian resident company, the country of control is assigned according to an order of precedence based on their aggregate level of foreign control in Canada. For example, United States takes precedence over all other foreign countries because it has the highest level of aggregate foreign control in Canada.

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 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.

Appendix I

North American industry classification system 2002 by Industry group

Agriculture, forestry, fishing and hunting	
Agriculture	111110, 111120, 111130, 111140, 111150, 111160, 111190, 111211, 111219, 111310, 111320, 111330, 111411, 111419, 111421, 111422, 111910, 111920, 111930, 111940, 111993, 111999, 112110, 112120, 112210, 112310, 112320, 112330, 112340, 112391, 112399, 112410, 112420, 112910, 112920, 112930, 112991, 112999, 115110, 115210
Forestry and logging	113110, 113210, 113311, 113312, 115310
Fishing, hunting and trapping	114113, 114114, 114210, 112510
Mining and oil and gas extraction	
Oil and gas extraction	211113, 211114, 213111, 213118
Mining	212114-212116, 212210, 212220, 212231-212233, 212291, 212299, 212314-212317, 212323, 212326, 212392-212398, 213117, 213119
Utilities	
Electric power	221111-221113, 221119, 221121, 221122
Other utilities	221210, 221310, 221320, 221330, 562110, 562210, 562910, 562920, 562990
Construction	236110, 236210, 236220, 237110, 237120, 237130, 237210, 237310, 237990, 238110, 238120, 238130, 238140, 238150, 238160, 236110, 236210, 236220, 237110, 237120, 237130, 237210, 237310, 237990, 238110, 238120, 238130, 238140, 238150, 238160, 238170, 238190, 238210, 238220, 238291, 238299, 238310, 238320, 238330, 238340, 238350, 238390, 238910, 238990
Manufacturing	
Food	311111, 311119, 311211, 311214, 311221, 311224, 311225, 311230, 311310, 311320, 311330, 311340, 311410, 311420, 311511, 311515, 311520, 311611, 311614, 311615, 311710, 311811, 311814, 311821-311823, 311830, 311911, 311919, 311920, 311930, 311940, 311990
Beverage and tobacco	312110, 312120, 312130, 312140, 312210, 312220
Textile	313110, 313210, 313220, 313230, 313240, 313310, 313320, 314110, 314120, 314910, 314990
Wood products	321111, 321112, 321114, 321211, 321212, 321215-321217, 321911, 321919, 321920, 321991, 321992, 321999
Paper	322111, 322112, 322121, 322122, 322130, 322211, 322212, 322219, 322220, 322230, 322291, 322299
Printing	323113-323116, 323119, 323120
Petroleum and coal products	324110, 324121, 324122, 324190
Pharmaceutical and medicine	325410
Other chemical	325110, 325120, 325130, 325181, 325189, 325190, 325210, 325220, 325313-325314, 325320, 325510, 325520, 325610, 325620, 325910, 325920, 325991, 325999
Plastic products	326111, 326114, 326121, 326122, 326130, 326140, 326150, 326160, 326191, 326193, 326198

Rubber products	326210, 326220, 326290
Non-metallic mineral products	327110, 327120, 327214, 327215, 327310, 327320, 327330, 327390, 327410, 327420, 327910, 327990
Primary metal (ferrous)	331110, 331210, 331221-331222, 331511, 331514
Primary metal (non-ferrous)	331313, 331317, 331410, 331420, 331490, 331523, 331529
Fabricated metal products	332113, 332118, 332210, 332311, 332314, 332319, 332321, 332329, 332410, 332420, 332431, 332439, 332510, 332611, 332619, 332710, 332720, 332810, 332910, 332991, 332999
Machinery	333110, 333120, 333130, 333210, 333220, 333291, 333299, 333310, 333413, 333416, 333511, 333519, 333611, 333619, 333910, 333920, 333990
Computer and peripheral equipment	334110
Communications equipment	334210, 334220, 334290
Semiconductor and other electronic components	334410
Navigational, measuring, medical and control instruments	334511, 334512
Other computer and electronic products	334310, 334610
Electrical equipment, appliance and components	335110, 335120, 335210, 335223, 335229, 335311, 335312, 335315, 335910, 335920, 335930, 335990
Motor Vehicle and parts	336110, 336120, 336211, 336212, 336215, 336310, 336320, 336330, 336340, 336350, 336360, 336370, 336390
Aerospace products and parts	336410
All other transportation equipment	336510, 336611, 336612, 336990
Furniture and related products	337110, 337121, 337123, 337126, 337127, 337213-337215, 337910, 337920
Other manufacturing industries	315110, 315190, 315210, 315221-315222, 315226, 315227, 315229, 315231-315234, 315239, 315291, 315292, 315299, 315990, 316110, 316210, 316990, 339110, 339910, 339920, 339930, 339940, 339950, 339990
Services	
Wholesale trade	411110, 411120, 411130, 411190, 412110, 413110, 413120, 413130, 413140, 413150, 413160, 413190, 413210, 413220, 413310, 414110, 414120, 414130, 414210, 414220, 414310, 414320, 414330, 414390, 414410, 414420, 414430, 414440, 414450, 414460, 414470, 414510, 414520, 415110, 415120, 415190, 415210, 415290, 415310, 416110, 416120, 416210, 416310, 416320, 416330, 416340, 416390, 417110, 417210, 417220, 417230, 417310, 417320, 417910, 417920, 417930, 417990, 418110, 418120, 418190, 418210, 418220, 418310, 418320, 418390, 418410, 418910, 418920, 418930, 418990, 419110, 419120, 419130, 419140, 419150, 419160, 419170, 419190
Retail trade	441110, 441120, 441210, 441220, 441310, 441320, 442110, 442210, 442291, 442292, 442298, 443110, 443120, 443130, 444110, 444120, 444130, 444190, 444210, 444220, 445110, 445120, 445210, 445220, 445230, 445291, 445292, 445299, 445310, 446110, 446120, 446130, 446191, 446199, 447110, 447190, 448110, 448120, 448130, 448140, 448150, 448191, 448199, 448210, 448310, 448320, 451110, 451120, 451130, 451140, 451210, 451220, 452110, 452910, 452991, 452999, 453110, 453210, 453220, 453310, 453910, 453920, 453930, 453992, 453999, 454110, 454210, 454310, 454390

Transportation and warehousing	481110, 481214, 481215, 482112-482114, 483115, 483116, 483213, 483214, 484110, 484121, 484122, 484210, 484221-484223, 484229, 484231-484233, 484239, 485110, 485210, 485310, 485320, 485410, 485510, 485990, 486110, 486210, 486910, 486990, 487110, 487210, 487990, 488111, 488119, 488190, 488210, 488310, 488320, 488331, 488332, 488339, 488390, 488410, 488490, 488511, 488519, 488990, 491110, 492110, 492210, 493110, 493120, 493130, 493190
Information and cultural industries	511110, 511120, 511130, 511140, 511190, 511210, 512110, 512120, 512130, 512190, 512210, 512220, 512230, 512240, 512290, 515110, 515120, 515210, 516110, 517110, 517210, 517310, 517410, 517510, 517910, 518111, 518112, 518210, 519110, 519121, 519122, 519190
Finance, insurance and real estate	521110, 522111, 522112, 522130, 522190, 522210, 522220, 522291, 522299, 522310, 522321, 522329, 522390, 523110, 523120, 523130, 523140, 523210, 523910, 523920, 523930, 523990, 524111, 524112, 524121-524125, 524129, 524131-524135, 524139, 524210, 524291, 524299, 526111, 526112, 526911-529917, 526919, 526920, 526930, 526981, 526989, 531111, 531112, 531120, 531130, 531190, 531210, 531310, 531320, 531390, 532111, 532112, 532120, 532210, 532220, 532230, 532290, 532310, 532410, 532420, 532490, 533110
Architectural, engineering and related services	541310, 541320, 541330, 541340, 541350, 541360, 541370, 541380
Computer system design and related services	541510
Management, scientific and technical consulting services	541611, 541612, 541619, 541620, 541690
Scientific research and development services	541710, 541720
Health care and social assistance	621110, 621210, 621310, 621320, 621330, 621340, 621390, 621410, 621420, 621494, 621499, 621510, 621610, 621911, 621912, 621990, 622111, 622112, 622210, 622310, 623110, 623210, 623221, 623222, 623310, 623991-623993, 623999, 624110, 624120, 624190, 624210, 624220, 624230, 624310, 624410

All other services	541110, 541120, 541190, 541212, 541213, 541215, 541410, 541420, 541430, 541490, 541810, 541820, 541830, 541840, 541850, 541860, 541870, 541891, 541899, 541910, 541920, 541930, 541940, 541990, 551113, 551114, 561110, 561210, 561310, 561320, 561330, 561410, 561420, 561430, 561440, 561450, 561490, 561510, 561520, 561590, 561611-561613, 561621, 561622, 561710, 561721, 561722, 561730, 561740, 561791, 561799, 561910, 561920, 561990, 611110, 611210, 611310, 611410, 611420, 611430, 611510, 611610, 611620, 611630, 611690, 611710, 711111, 711112, 711120, 711130, 711190, 711211, 711213, 711218, 711311, 711319, 711321, 711322, 711329, 711410, 711510, 712111, 712119, 712120, 712130, 712190, 713110, 713120, 713210, 713291, 713299, 713910, 713920, 713930, 713940, 713950, 713990, 721111-721114, 721120, 721191, 721192, 721198, 721211-721213, 721310, 722110, 722210, 722310, 722320, 722330, 722410, 811111, 811112, 811119, 811121, 811122, 811192, 811199, 811210, 811310, 811411, 811412, 811420, 811430, 811490, 812114-812116, 812190, 812210, 812220, 812310, 812320, 812330, 812910, 812921, 812922, 812930, 812990, 813110, 813210, 813310, 813410, 813910, 813920, 813930, 813940, 813990, 814110, 911110, 911210, 911220, 911230, 911240, 911290, 911310, 911320, 911390, 911410, 911420, 911910, 912110, 912120, 912130, 912140, 912150, 912190, 912210, 912910, 913110, 913120, 913130, 913140, 913150, 913190, 913910, 914110, 919110