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## Nature of Research and Development, 2000 to 2004

### Highlights

- ▶ In the 2000-2004 period, close to two-thirds of current intramural R&D expenditures by Canadian firms was allocated to developing and improving products. Basic and applied research and the development and improvement of processes ranked second and third with 17% and 16% of total spending, while developing and improving technical services accounted for a very modest portion of expenditures at 4%. However, it should also be noted that the portion of expenditures allocated to developing and improving products fell slightly but steadily from 68% in 2000 to 63% in 2004 (Table 3).
- ▶ The portion of current intramural R&D expenditures targeting radical change (defined as the sum of expenditures devoted to basic research and to developing new products, processes and technical services) remained unchanged in 2004 compared with 2000 at 58% of total spending. However, for 2004, this percentage was 68% for firms controlled by countries other than Canada and the United States (Tables 4 and 5).
- ▶ Between 2000 and 2004, the percentage of current intramural R&D expenditures allocated to basic and applied research was substantially higher among firms controlled by countries other than Canada and the United States. In contrast, while the portion of expenditures linked to product development and improvement fell from 69% in 2000 to 62% in 2004 among Canadian-controlled firms, this percentage rose slightly among firms controlled by American interests (Table 6).
- ▶ In 2004, product development and improvement activity was the main beneficiary of current intramural R&D spending by firms in the majority of industrial sectors, with only one exception, the mining and oil and gas extraction sector. Over 42% of total expenditures by the mining and oil and gas extraction sector was allocated to the development and improvement of processes (Tables 7 to 9).

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- ▶ Since 2000, the portion of current intramural R&D expenditures of the manufacturing sector allocated to developing and improving processes has increased by 4% to 16% of total spending, while that allocated to product development and improvement has fallen steadily from 73% in 2000 to 68% in 2004 (Tables 7 to 9).
- ▶ The choice of type of activity varied based on the size of the company; firms with fewer than 100 employees tended to allocate a larger portion of current intramural R&D expenditures to basic and applied research than larger companies (over 2,000 employees), which focused more on developing and improving processes (Tables 10 and 11).
- ▶ In almost all provinces and territories, over 50% of R&D expenditures by companies was allocated mainly to product development and improvement. The only exceptions were Alberta, Nova Scotia and Saskatchewan where the other three types of activities monopolize the majority of spending (Tables 12 and 13).
- ▶ There were, however, differences in the choice of activity between the various provinces. While basic and applied research activities represented 32% of total spending in Saskatchewan, the rate was only 19% in Nova Scotia where more spending was allocated to developing and improving processes (27%). Companies in Alberta allocated over 51% of their R&D expenditures to basic and applied research activities and to developing and improving processes, at 25% and 26% respectively, while the national average for these two activities was 16% respectively (Tables 12 and 13). Lastly, New Brunswick had the largest percentage of expenditures allocated to developing and improving processes at 33% in 2004.

#### Note to users:

The statistics in this bulletin are derived from the 2004 survey of industrial R&D activities in Canada, which covers firms spending a million dollars or more on the performance or funding of R&D in Canada, and from the administrative data of the Canada Revenue Agency (CRA) for firms which spend less than a million dollars on the performance or funding of R&D in Canada. CRA data are supplemented with estimates data, to allow for the timing difference between CRA filing and the survey. This is explained in the note on Methodology on page 14. The 2004 survey, conducted in 2005, collected data on actual R&D spending for 2004, on preliminary figures for 2005, and on spending intentions for 2006.

This bulletin uses data from companies on the nature of R&D activities. The companies that were involved in the 2004 survey and those for which the data was obtained from the Canada Revenue Agency (CRA) were asked to respond to the following question:

Please estimate, in terms of the percentage of the current R&D expenditures, the approximate distribution of your R&D effort in 2005.

- ✓ Basic research (no specific practical application in view)
- ✓ Applied research (with a specific practical application in view)
- ✓ New product development
- ✓ Existing product improvement
- ✓ New process development
- ✓ Existing process improvement
- ✓ New technical services development
- ✓ Existing technical services improvement

R&D statistics are provided for 46 industries falling under 6 sub-groups: Agriculture, forestry, fishing and hunting; Mining and oil and gas extraction; Utilities; Construction; Manufacturing; and, Services industries. The industry breakdown is in accordance with the *North American Industry Classification System Canada 2002* (NAICS) (Catalogue no. 12-501-XPE) and is necessary to preserve the confidentiality of the respondents. In a small number of cases, adjustments to the NAICS classification was necessary in order to adhere to the international guidelines for science and technological surveys as defined in the Organisation for Economic Co-operation and Development (OECD) *Frascati Manual: Proposed Standard Practice for Surveys on Research and Experimental Development, 2002*.

**Table 1 Distribution of current intramural R&D expenditures by type of activity, 2000 to 2004**

	2000	2001	2002	2003	2004
	in millions of dollars				
Basic research	468	530	439	491	539
Applied research	1,345	1,491	1,684	1,634	1,690
New product development	5,179	5,953	5,806	5,588	5,775
Existing product improvement	2,435	2,674	2,332	2,376	2,766
New process development	655	714	761	872	1,110
Existing process improvement	762	936	995	1,133	1,035
New technical services development	206	317	309	458	379
Existing technical services improvement	151	157	134	187	222
<b>Total *</b>	<b>11,201</b>	<b>12,771</b>	<b>12,461</b>	<b>12,739</b>	<b>13,514</b>

\*Due to rounding, components may not add to the totals.

**Table 2 Distribution of current intramural R&D expenditures by type of activity, 2000 to 2004**

	2000	2001	2002	2003	2004
	percentage				
Basic research	4	4	4	4	4
Applied research	12	12	14	13	13
New product development	46	47	47	44	43
Existing product improvement	22	21	19	19	20
New process development	6	6	6	7	8
Existing process improvement	7	7	8	9	8
New technical services development	2	2	2	4	3
Existing technical services improvement	1	1	1	1	2
<b>Total *</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

\*Due to rounding, components may not add to the totals.

**Table 3 Distribution of current intramural R&D expenditures by type of activity, 2000 to 2004**

	Basic and applied research	Development and improvement of product	Development and improvement of process	Development and improvement of technical research	Total *
	in millions of dollars				
<b>2004</b>	2,229	8,540	2,144	601	<b>13,514</b>
	% of expenditure				
	17	63	16	4	<b>100</b>
	in millions of dollars				
<b>2003</b>	2,125	7,964	2,005	645	<b>12,739</b>
	% of expenditure				
	17	62	16	5	<b>100</b>
	in millions of dollars				
<b>2002</b>	2,123	8,138	1,756	443	<b>12,461</b>
	% of expenditure				
	17	65	14	4	<b>100</b>
	in millions of dollars				
<b>2001</b>	2,021	8,627	1,650	474	<b>12,771</b>
	% of expenditure				
	16	67	13	4	<b>100</b>
	in millions of dollars				
<b>2000</b>	1,813	7,614	1,417	357	<b>11,201</b>
	% of expenditure				
	16	68	13	3	<b>100</b>

\* Due to rounding, components may not add to the totals.

**Table 4 Distribution of current intramural R&D expenditures by type of change, 2000 to 2004**

	Radical change <sup>1</sup>		Gradual change <sup>2</sup>		Total *
	in millions of dollars	% of expenditure	in millions of dollars	% of expenditure	
<b>2004</b>	7,802	58	5,712	42	<b>13,514</b>
<b>2003</b>	7,409	58	5,331	42	<b>12,739</b>
<b>2002</b>	7,315	59	5,146	41	<b>12,461</b>
<b>2001</b>	7,513	59	5,258	41	<b>12,771</b>
<b>2000</b>	6,508	58	4,694	42	<b>11,201</b>

\* Due to rounding, components may not add to the totals.

1. Radical change is the sum of current intramural R&D expenditures devoted to basic research and to developing new products, new processes and new technical services.

2. Gradual change is the sum of current intramural R&D expenditures devoted to applied research and to improving existing products, existing processes and existing technical services.

**Table 5 Distribution of current intramural R&D expenditures by type of change and country of control, 2004**

Country of control	Radical change <sup>1</sup>		Gradual change <sup>2</sup>		Total *
	in millions of dollars	% of expenditure	in millions of dollars	% of expenditure	
Canada	5,044	57	3,818	43	<b>8,862</b>
United States	1,749	55	1,413	45	<b>3,162</b>
Other countries	1,009	68	482	32	<b>1,491</b>
<b>Total *</b>	<b>7,802</b>	<b>58</b>	<b>5,712</b>	<b>42</b>	<b>13,514</b>

\* Due to rounding, components may not add to the totals.

1. Radical change is the sum of current intramural R&D expenditures devoted to basic research and to developing new products, new processes and new technical services.

2. Gradual change is the sum of current intramural R&D expenditures devoted to applied research and to improving existing products, existing processes and existing technical services.

**Table 6 Distribution of current intramural R&D expenditures by type of activity and by country of control, 2000 to 2004**

Country of control	Basic and applied research		Development and improvement of product		Development and improvement of process		Development and improvement of technical research		Total *	
	in millions of dollars	% of expenditure	in millions of dollars	% of expenditure	in millions of dollars	% of expenditure	in millions of dollars	% of expenditure	in millions of dollars	% of expenditure
<b>2004</b>										
Canada	1,365	15	5,527	62	1,475	17	495	6	<b>8,862</b>	<b>100</b>
United States	509	16	2,115	67	447	14	91	3	<b>3,162</b>	<b>100</b>
Other countries	355	24	899	60	222	15	15	1	<b>1,491</b>	<b>100</b>
<b>Total *</b>	<b>2,229</b>	<b>16</b>	<b>8,540</b>	<b>63</b>	<b>2,144</b>	<b>16</b>	<b>601</b>	<b>4</b>	<b>13,514</b>	<b>100</b>
<b>2003</b>										
Canada	1,340	16	5,248	61	1,424	17	554	6	<b>8,565</b>	<b>100</b>
United States	458	16	1,991	68	389	13	80	3	<b>2,918</b>	<b>100</b>
Other countries	328	26	724	58	193	15	11	1	<b>1,256</b>	<b>100</b>
<b>Total *</b>	<b>2,125</b>	<b>17</b>	<b>7,964</b>	<b>63</b>	<b>2,005</b>	<b>16</b>	<b>645</b>	<b>5</b>	<b>12,739</b>	<b>100</b>
<b>2002</b>										
Canada	1,308	15	5,498	65	1,276	15	367	4	<b>8,449</b>	<b>100</b>
United States	544	20	1,822	66	319	12	69	3	<b>2,754</b>	<b>100</b>
Other countries	271	22	818	65	162	13	8	1	<b>1,258</b>	<b>100</b>
<b>Total *</b>	<b>2,123</b>	<b>17</b>	<b>8,138</b>	<b>65</b>	<b>1,756</b>	<b>14</b>	<b>443</b>	<b>4</b>	<b>12,461</b>	<b>100</b>
<b>2001</b>										
Canada	1,319	15	6,120	68	1,230	14	377	4	<b>9,046</b>	<b>100</b>
United States	476	18	1,732	67	294	11	86	3	<b>2,587</b>	<b>100</b>
Other countries	226	20	775	68	126	11	11	1	<b>1,138</b>	<b>100</b>
<b>Total *</b>	<b>2,021</b>	<b>16</b>	<b>8,627</b>	<b>68</b>	<b>1,650</b>	<b>13</b>	<b>474</b>	<b>4</b>	<b>12,771</b>	<b>100</b>
<b>2000</b>										
Canada	1,145	14	5,548	69	1,028	13	280	4	<b>8,001</b>	<b>100</b>
United States	408	19	1,385	65	258	12	69	3	<b>2,119</b>	<b>100</b>
Other countries	261	24	681	63	131	12	8	1	<b>1,081</b>	<b>100</b>
<b>Total *</b>	<b>1,813</b>	<b>16</b>	<b>7,614</b>	<b>68</b>	<b>1,417</b>	<b>13</b>	<b>357</b>	<b>3</b>	<b>11,201</b>	<b>100</b>

\* Due to rounding, components may not add to the totals.

**Table 7 Distribution of current intramural R&D expenditures by type of activity and industry sector, 2000 to 2004**

Industry sector	Basic and applied research	Development and improvement of product	Development and improvement of process	Development and improvement of technical research	Total *
in millions of dollars					
<b>2004</b>					
Agriculture, forestry, fishing and hunting	10	43	25	6	<b>84</b>
Mining and oil and gas extraction	38	42	104	61	<b>245</b>
Utilities	X	X	X	X	<b>X</b>
Construction	X	X	X	X	<b>X</b>
Manufacturing	942	5,207	1,219	243	<b>7,611</b>
Services	1,193	3,180	747	280	<b>5,400</b>
<b>Total all industries *</b>	<b>2,229</b>	<b>8,540</b>	<b>2,144</b>	<b>601</b>	<b>13,514</b>
<b>2003</b>					
Agriculture, forestry, fishing and hunting	11	37	29	5	<b>82</b>
Mining and oil and gas extraction	33	65	55	46	<b>199</b>
Utilities	X	X	X	X	<b>X</b>
Construction	X	X	X	X	<b>X</b>
Manufacturing	939	5,073	1,304	236	<b>7,552</b>
Services	1,116	2,721	558	346	<b>4,742</b>
<b>Total all industries *</b>	<b>2,125</b>	<b>7,964</b>	<b>2,005</b>	<b>645</b>	<b>12,739</b>
<b>2002</b>					
Agriculture, forestry, fishing and hunting	16	40	43	3	<b>102</b>
Mining and oil and gas extraction	33	76	40	33	<b>182</b>
Utilities	X	X	X	X	<b>X</b>
Construction	X	X	X	X	<b>X</b>
Manufacturing	1,017	5,259	1,213	210	<b>7,699</b>
Services	1,035	2,659	438	179	<b>4,310</b>
<b>Total all industries *</b>	<b>2,123</b>	<b>8,138</b>	<b>1,756</b>	<b>443</b>	<b>12,461</b>
<b>2001</b>					
Agriculture, forestry, fishing and hunting	15	35	30	3	<b>83</b>
Mining and oil and gas extraction	34	65	43	35	<b>177</b>
Utilities	X	X	X	X	<b>X</b>
Construction	X	X	X	X	<b>X</b>
Manufacturing	1,034	5,969	1,156	262	<b>8,421</b>
Services	910	2,419	395	156	<b>3,880</b>
<b>Total all industries *</b>	<b>2,021</b>	<b>8,627</b>	<b>1,650</b>	<b>474</b>	<b>12,771</b>
<b>2000</b>					
Agriculture, forestry, fishing and hunting	12	34	19	4	<b>70</b>
Mining and oil and gas extraction	49	21	60	23	<b>153</b>
Utilities	X	X	X	X	<b>X</b>
Construction	X	X	X	X	<b>X</b>
Manufacturing	973	5,601	935	209	<b>7,717</b>
Services	751	1,868	342	92	<b>3,054</b>
<b>Total all industries *</b>	<b>1,813</b>	<b>7,614</b>	<b>1,417</b>	<b>357</b>	<b>11,201</b>

\* Due to rounding, components may not add to the totals.

**Table 8 Distribution of current intramural R&D expenditures by type of activity and by industry, 2004**

Industry	Basic and applied research	Development and improvement of product	Development and improvement of process	Development and improvement of technical research	Total*
in millions of dollars					
Agriculture	7	35	14	5	61
Forestry and logging	1	7	10	0	19
Fishing, hunting and trapping	2	2	1	1	5
<b>Total agriculture, forestry, fishing and hunting *</b>	<b>10</b>	<b>43</b>	<b>25</b>	<b>6</b>	<b>84</b>
Oil and gas extraction	24	27	70	59	180
Mining	13	15	34	2	65
<b>Total mining and oil and gas extraction *</b>	<b>38</b>	<b>42</b>	<b>104</b>	<b>61</b>	<b>245</b>
Electric power	X	X	X	X	X
Other utilities	X	X	X	X	X
<b>Total utilities</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>Construction</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
Food	7	65	34	9	115
Beverage and tobacco	6	10	9	0	25
Textile	2	35	12	3	52
Wood products	23	16	9	4	52
Paper	25	237	193	5	459
Printing	2	15	5	3	25
Petroleum and coal products	13	24	84	3	124
Pharmaceutical and medicine	360	662	98	7	1,127
Other chemicals	35	101	46	7	188
Plastic products	9	74	18	7	108
Rubber products	2	16	3	1	22
Non-metallic mineral products	3	25	17	4	50
Primary metal (ferrous)	1	22	10	1	35
Primary metal (non-ferrous)	19	47	114	4	185
Fabricated metal products	14	103	33	21	171
Machinery	46	307	61	20	434
Computer and peripheral equipment	47	102	8	1	158
Communications equipment	101	1,234	55	40	1,431
Semiconductor and other electronic components	33	686	26	4	748
Navig., measuring, medical and control instruments	30	291	26	10	357
Other computer and electronic products	X	14	2	X	20
Electrical equipment, appliance and components	13	92	25	3	133
Motor vehicle and parts	24	346	126	15	510
Aerospace products and parts	71	560	170	61	863
All other transportation equipment	X	25	4	X	44
Furniture and related products	4	14	5	3	26
Other manufacturing industries	35	84	25	6	150
<b>Total manufacturing *</b>	<b>942</b>	<b>5,207</b>	<b>1,219</b>	<b>243</b>	<b>7,611</b>
Wholesale trade	172	444	54	14	685
Retail trade	2	17	X	X	23
Transportation and warehousing	6	14	X	X	35
Information and cultural industries	172	559	315	183	1,229
Finance, insurance and real estate	17	214	49	17	296
Architectural, engineering and related services	82	299	44	13	439
Computer system design and related services	183	780	90	25	1,078
Management, scientific and technical consulting	22	32	5	2	62
Scientific research and development services	373	584	79	4	1,041
Health care and social assistance	125	124	67	2	318
All other services	38	113	37	5	194
<b>Total services *</b>	<b>1,193</b>	<b>3,180</b>	<b>747</b>	<b>280</b>	<b>5,400</b>
<b>Total all industries *</b>	<b>2,229</b>	<b>8,540</b>	<b>2,144</b>	<b>601</b>	<b>13,514</b>

\* Due to rounding, components may not add to the totals.

**Table 9 Distribution of current intramural R&D expenditures by type of change and by industry sector, 2000 to 2004**

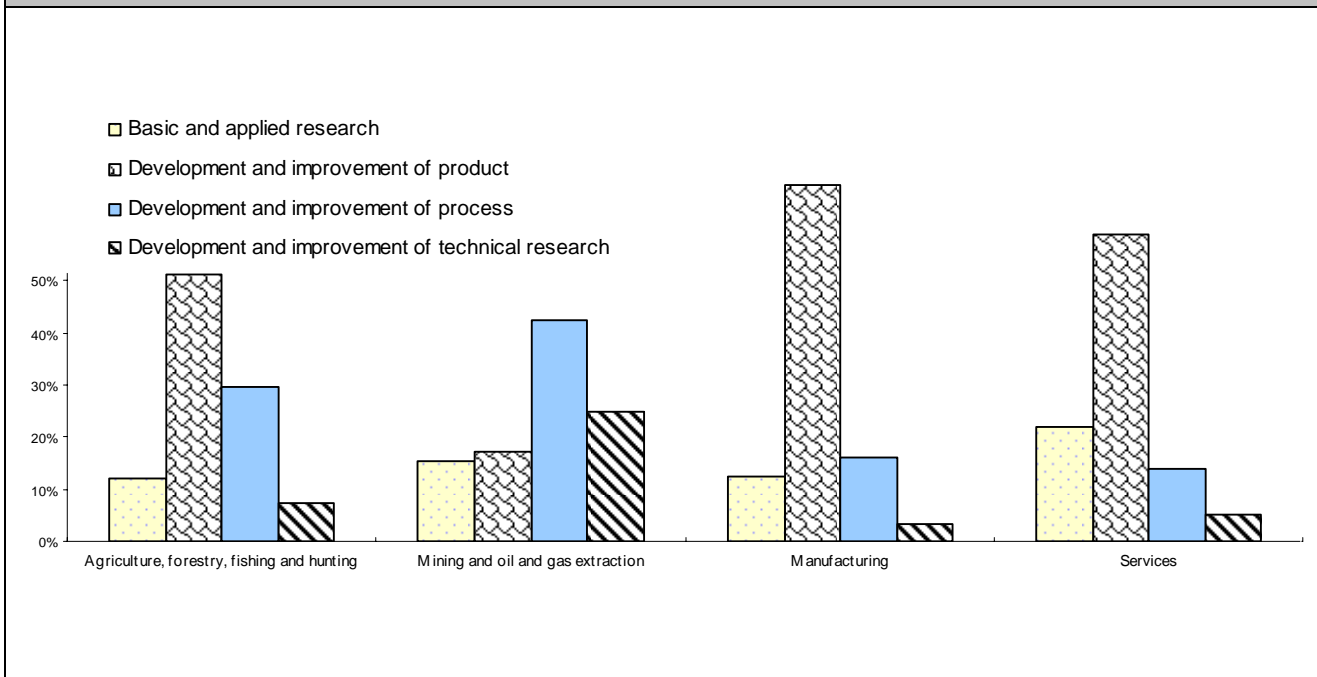
Industry sector	Radical change <sup>1</sup>		Gradual change <sup>2</sup>		Total *
	in millions of dollars	% of expenditure	in millions of dollars	% of expenditure	
<b>2004</b>					
Agriculture, forestry, fishing and hunting	46	55	38	45	<b>84</b>
Mining and oil and gas extraction	130	53	115	47	<b>245</b>
Utilities	X	X	X	X	<b>X</b>
Construction	X	X	X	X	<b>X</b>
Manufacturing	4,403	58	3,208	42	<b>7,611</b>
Services	3,142	58	2,258	42	<b>5,400</b>
<b>Total all industries *</b>	<b>7,802</b>	<b>58</b>	<b>5,712</b>	<b>42</b>	<b>13,514</b>
<b>2003</b>					
Agriculture, forestry, fishing and hunting	46	57	35	43	<b>82</b>
Mining and oil and gas extraction	98	49	101	51	<b>199</b>
Utilities	X	X	X	X	<b>X</b>
Construction	X	X	X	X	<b>X</b>
Manufacturing	4,346	58	3,206	42	<b>7,552</b>
Services	2,828	60	1,915	40	<b>4,742</b>
<b>Total all industries *</b>	<b>7,409</b>	<b>58</b>	<b>5,331</b>	<b>42</b>	<b>12,739</b>
<b>2002</b>					
Agriculture, forestry, fishing and hunting	61	60	41	40	<b>102</b>
Mining and oil and gas extraction	96	53	86	47	<b>182</b>
Utilities	X	X	X	X	<b>X</b>
Construction	X	X	X	X	<b>X</b>
Manufacturing	4,404	57	3,295	43	<b>7,699</b>
Services	2,622	61	1,688	39	<b>4,310</b>
<b>Total all industries *</b>	<b>7,315</b>	<b>59</b>	<b>5,146</b>	<b>41</b>	<b>12,461</b>
<b>2001</b>					
Agriculture, forestry, fishing and hunting	45	54	38	46	<b>83</b>
Mining and oil and gas extraction	93	53	84	47	<b>177</b>
Utilities	X	X	X	X	<b>X</b>
Construction	X	X	X	X	<b>X</b>
Manufacturing	4,715	56	3,706	44	<b>8,421</b>
Services	2,550	66	1,329	34	<b>3,880</b>
<b>Total all industries *</b>	<b>7,513</b>	<b>59</b>	<b>5,258</b>	<b>41</b>	<b>12,771</b>
<b>2000</b>					
Agriculture, forestry, fishing and hunting	38	54	32	46	<b>70</b>
Mining and oil and gas extraction	81	53	72	47	<b>153</b>
Utilities	X	X	X	X	<b>X</b>
Construction	X	X	X	X	<b>X</b>
Manufacturing	4,324	56	3,394	44	<b>7,717</b>
Services	1,984	65	1,069	35	<b>3,054</b>
<b>Total all industries *</b>	<b>6,508</b>	<b>58</b>	<b>4,694</b>	<b>42</b>	<b>11,201</b>

\* Due to rounding, components may not add to the totals.

1. Radical change is the sum of current intramural R&D expenditures devoted to basic research and to developing new products, new processes and new technical services.
2. Gradual change is the sum of current intramural R&D expenditures devoted to applied research and to improving existing products, existing processes and existing technical services.

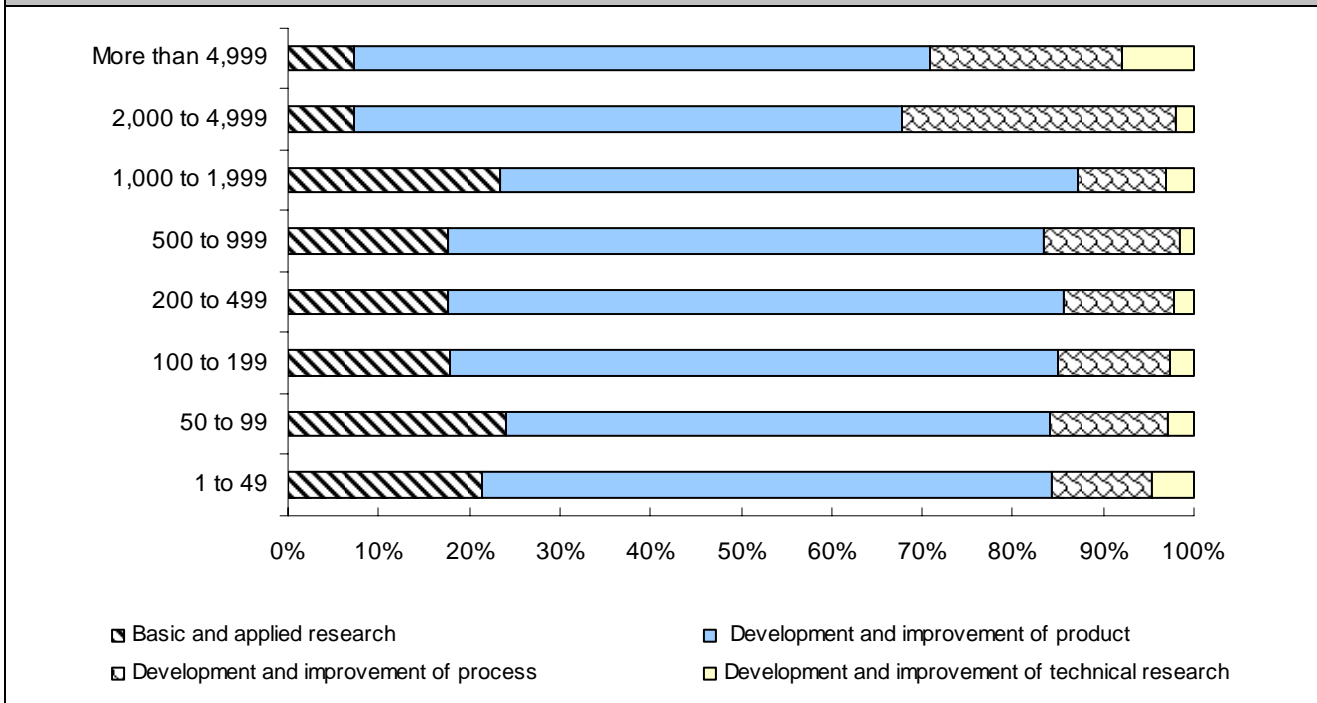


**Graph 1 Distribution of current intramural R&D expenditures by type of activity and by industrial sector, 2004**



Source: Tables 7 and 8

**Graph 2 Distribution of current intramural R&D expenditures by number of employees, 2004**



Source: Table 10

**Table 10 Distribution of current intramural R&D expenditures by type of activity and by number of employees, 2000 to 2004**

Number of employees	Basic and applied research	Development and improvement of product	Development and improvement of process	Development and improvement of technical research	Total *
in millions of dollars					
<b>2004</b>					
Non-commercial enterprises	77	27	41	27	172
1 to 49	457	1,343	236	101	2,137
50 to 99	265	661	143	31	1,100
100 to 199	188	706	130	28	1,053
200 to 499	198	760	135	25	1,118
500 to 999	218	811	185	20	1,234
1,000 to 1,999	488	1,334	202	65	2,090
2,000 to 4,999	81	676	337	23	1,118
More than 4,999	256	2,223	734	280	3,492
<b>Total *</b>	<b>2,229</b>	<b>8,540</b>	<b>2,144</b>	<b>601</b>	<b>13,514</b>
<b>2003</b>					
Non-commercial enterprises	76	37	43	27	183
1 to 49	428	1,188	272	122	2,009
50 to 99	223	612	137	39	1,011
100 to 199	190	623	133	25	970
200 to 499	233	738	176	25	1,172
500 to 999	223	858	180	15	1,275
1,000 to 1,999	425	1,095	168	41	1,729
2,000 to 4,999	68	775	326	23	1,192
More than 4,999	259	2,038	571	329	3,197
<b>Total *</b>	<b>2,125</b>	<b>7,964</b>	<b>2,005</b>	<b>645</b>	<b>12,739</b>
<b>2002</b>					
Non-commercial enterprises	76	14	36	23	149
1 to 49	410	1,030	282	107	1,829
50 to 99	230	708	141	31	1,110
100 to 199	224	681	134	28	1,066
200 to 499	198	752	176	26	1,153
500 to 999	236	786	166	9	1,197
1,000 to 1,999	433	1,112	124	31	1,701
2,000 to 4,999	93	761	237	19	1,109
More than 4,999	222	2,295	460	170	3,147
<b>Total *</b>	<b>2,123</b>	<b>8,138</b>	<b>1,756</b>	<b>443</b>	<b>12,461</b>
<b>2001</b>					
Non-commercial enterprises	78	19	34	29	159
1 to 49	383	899	239	93	1,614
50 to 99	226	588	131	34	979
100 to 199	216	695	152	21	1,083
200 to 499	143	816	132	21	1,111
500 to 999	238	695	151	39	1,124
1,000 to 1,999	310	1,019	94	15	1,438
2,000 to 4,999	69	766	209	20	1,063
More than 4,999	358	3,129	509	204	4,200
<b>Total *</b>	<b>2,021</b>	<b>8,627</b>	<b>1,650</b>	<b>474</b>	<b>12,771</b>
<b>2000</b>					
Non-commercial enterprises	54	21	36	27	138
1 to 49	322	717	203	70	1,312
50 to 99	143	405	106	25	679
100 to 199	176	663	122	20	981
200 to 499	192	623	85	14	914
500 to 999	275	627	149	8	1,059
1,000 to 1,999	179	958	134	10	1,281
2,000 to 4,999	131	611	145	29	916
More than 4,999	340	2,989	438	154	3,921
<b>Total *</b>	<b>1,813</b>	<b>7,614</b>	<b>1,417</b>	<b>357</b>	<b>11,201</b>

\* Due to rounding, components may not add to the totals.

**Table 11 Distribution of current intramural R&D expenditures by type of change and by number of employees, 2000 to 2004**

Number of employees	Radical change <sup>1</sup>		Gradual change <sup>2</sup>		Total *
	in millions of dollars	% of expenditure	in millions of dollars	% of expenditure	
<b>2004</b>					
Non-commercial enterprises	79	46	93	54	172
1 to 49	1,323	62	814	38	2,137
50 to 99	584	53	516	47	1,100
100 to 199	681	65	372	35	1,053
200 to 499	647	58	471	42	1,118
500 to 999	766	62	468	38	1,234
1,000 to 1,999	1,302	62	787	38	2,090
2,000 to 4,999	583	52	535	48	1,118
More than 4,999	1,837	53	1,655	47	3,492
<b>Total *</b>	<b>7,802</b>	<b>58</b>	<b>5,712</b>	<b>42</b>	<b>13,514</b>
<b>2003</b>					
Non-commercial enterprises	90	49	92	51	183
1 to 49	1,314	65	696	35	2,009
50 to 99	591	58	420	42	1,011
100 to 199	605	62	366	38	970
200 to 499	692	59	480	41	1,172
500 to 999	847	66	428	34	1,275
1,000 to 1,999	1,080	62	649	38	1,729
2,000 to 4,999	590	49	602	51	1,192
More than 4,999	1,599	50	1,598	50	3,197
<b>Total *</b>	<b>7,409</b>	<b>58</b>	<b>5,331</b>	<b>42</b>	<b>12,739</b>
<b>2002</b>					
Non-commercial enterprises	66	44	84	56	149
1 to 49	1,209	66	621	34	1,829
50 to 99	712	64	398	36	1,110
100 to 199	624	59	442	41	1,066
200 to 499	758	66	395	34	1,153
500 to 999	644	54	553	46	1,197
1,000 to 1,999	1,058	62	643	38	1,701
2,000 to 4,999	619	56	489	44	1,109
More than 4,999	1,626	52	1,521	48	3,147
<b>Total *</b>	<b>7,315</b>	<b>59</b>	<b>5,146</b>	<b>41</b>	<b>12,461</b>
<b>2001</b>					
Non-commercial enterprises	74	47	85	53	159
1 to 49	1,055	65	559	35	1,614
50 to 99	652	67	327	33	979
100 to 199	709	65	375	35	1,083
200 to 499	779	70	332	30	1,111
500 to 999	696	62	427	38	1,124
1,000 to 1,999	914	64	524	36	1,438
2,000 to 4,999	688	65	375	35	1,063
More than 4,999	1,946	46	2,253	54	4,200
<b>Total *</b>	<b>7,513</b>	<b>59</b>	<b>5,258</b>	<b>41</b>	<b>12,771</b>
<b>2000</b>					
Non-commercial enterprises	53	38	85	62	138
1 to 49	829	63	483	37	1,312
50 to 99	433	64	246	36	679
100 to 199	712	73	269	27	981
200 to 499	593	65	321	35	914
500 to 999	693	66	365	34	1,059
1,000 to 1,999	830	65	451	35	1,281
2,000 to 4,999	563	61	353	39	916
More than 4,999	1,801	46	2,120	54	3,921
<b>Total *</b>	<b>6,508</b>	<b>58</b>	<b>4,694</b>	<b>42</b>	<b>11,201</b>

\* Due to rounding, components may not add to the totals.

1. Radical change is the sum of current intramural R&D expenditures devoted to basic research and to developing new products, new processes and new technical services.
2. Gradual change is the sum of current intramural R&D expenditures devoted to applied research and to improving existing products, existing processes and existing technical services.

**Table 12 Distribution of current intramural R&D expenditures by type of activity and by province and territory, 2004**

Provinces and territories	Basic and applied research	Development and improvement of product	Development and improvement of process	Development and improvement of technical research	Total *
in millions of dollars					
Newfoundland and Labrador	4	11	1	1	17
Prince Edward Island	2	4	1	0	7
Nova Scotia	15	38	21	5	79
New-Brunswick	7	36	22	2	67
<b>Sub-total Atlantic Provinces</b>	<b>27</b>	<b>89</b>	<b>45</b>	<b>8</b>	<b>169</b>
Quebec	726	2,353	788	198	4,065
Ontario	940	4,953	979	299	7,170
Manitoba	31	77	25	5	138
Saskatchewan	23	31	16	3	73
Alberta	180	281	187	74	722
British Columbia	303	756	102	14	1,175
<b>Canada * <sup>1</sup></b>	<b>2,229</b>	<b>8,540</b>	<b>2,144</b>	<b>601</b>	<b>13,514</b>

\* Due to rounding, components may not add to the totals.

1. Canada totals include the Yukon, Northwest Territories and Nunavut.

**Table 13 Distribution of current intramural R&D expenditures by type of activity and by province and territory, 2004**

Provinces and territories	Basic and applied research	Development and improvement of product	Development and improvement of process	Development and improvement of technical research	Total *
percentage					
Newfoundland and Labrador	24	65	6	6	100
Prince Edward Island	29	57	14	0	100
Nova Scotia	19	48	27	6	100
New-Brunswick	10	54	33	3	100
<b>Sub-total Atlantic Provinces</b>	<b>16</b>	<b>53</b>	<b>27</b>	<b>5</b>	<b>100</b>
Quebec	18	58	19	5	100
Ontario	13	69	14	4	100
Manitoba	22	56	18	4	100
Saskatchewan	32	42	22	4	100
Alberta	25	39	26	10	100
British Columbia	26	64	9	1	100
<b>Canada * <sup>1</sup></b>	<b>16</b>	<b>63</b>	<b>16</b>	<b>4</b>	<b>100</b>

\* Due to rounding, components may not add to the totals.

1. Canada totals include the Yukon, Northwest Territories and Nunavut.

**Table 14 Distribution of current intramural R&D expenditures by type of change and by province and territory, 2004**

Provinces and territories	Radical change <sup>1</sup>		Gradual change <sup>2</sup>	
	in millions of dollars	% of expenditure	in millions of dollars	% of expenditure
Newfoundland and Labrador	9	54	8	46
Prince Edward Island	4	53	3	47
Nova Scotia	46	58	33	42
New-Brunswick	46	69	21	31
<b>Sub-total Atlantic Provinces</b>	<b>104</b>	<b>62</b>	<b>65</b>	<b>38</b>
Quebec	2,423	60	1,642	40
Ontario	4,190	58	2,980	42
Manitoba	79	57	59	43
Saskatchewan	37	50	36	50
Alberta	333	46	389	54
British Columbia	634	54	541	46
<b>Canada * <sup>3</sup></b>	<b>7,802</b>	<b>58</b>	<b>5,712</b>	<b>42</b>

\* Due to rounding, components may not add to the totals.

1. Radical change is the sum of current intramural R&D expenditures devoted to basic research and to developing new products, new processes and new technical services.
2. Gradual change is the sum of current intramural R&D expenditures devoted to applied research and to improving existing products, existing processes and existing technical services.
3. Canada totals include the Yukon, Northwest Territories and Nunavut.

**Table 15 Distribution of current intramural R&D expenditures by type of activity and by revenue size of the executing firm, 2004**

Revenue size	Basic and applied research	Development and improvement of product	Development and improvement of process	Development and improvement of technical research	Total *
	in millions of dollars				
Non-commercial enterprises	77	27	41	27	<b>172</b>
Less than \$1,000,000	282	708	82	23	<b>1,095</b>
\$1,000,000 to \$9,999,999	344	1,142	270	88	<b>1,844</b>
\$10,000,000 to \$49,999,999	324	1,005	243	57	<b>1,630</b>
\$50,000,000 to \$99,999,999	104	561	95	16	<b>775</b>
\$100,000,000 to \$399,999,999	464	1,692	207	33	<b>2,396</b>
More than \$399,999,999	633	3,405	1,206	357	<b>5,602</b>
<b>Total *</b>	<b>2,229</b>	<b>8,540</b>	<b>2,144</b>	<b>601</b>	<b>13,514</b>

\* Due to rounding, components may not add to the totals.

**Table 16 Distribution of current intramural R&D expenditures by type of change and by revenue size of the executing firm, 2004**

Revenue size	Radical change <sup>1</sup>		Gradual change <sup>2</sup>	
	in millions of dollars	% of expenditure	in millions of dollars	% of expenditure
Non-commercial enterprises	79	46	93	54
Less than \$1,000,000	730	67	365	33
\$1,000,000 to \$9,999,999	1,073	58	771	42
\$10,000,000 to \$49,999,999	915	56	715	44
\$50,000,000 to \$99,999,999	475	61	300	39
\$100,000,000 to \$399,999,999	1,561	65	834	35
More than \$399,999,999	2,968	53	2,634	47
<b>Total *</b>	<b>7,802</b>	<b>58</b>	<b>5,712</b>	<b>42</b>

\* Due to rounding, components may not add to the totals.

1. Radical change is the sum of current intramural R&D expenditures devoted to basic research and to developing new products, new processes and new technical services.
2. Gradual change is the sum of current intramural R&D expenditures devoted to applied research and to improving existing products, existing processes and existing technical services.

## Methodology

The Annual survey "Research and Development in Canadian Industry, 2004" was mailed out in June 2005, to all companies known to be performing or funding \$1 million or more in R&D. The data collected from this survey are augmented by tax data for those companies falling below the \$1 million threshold.

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, imputed their R&D data using CRA administrative data from the SR&ED program.

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

The 2004 survey collected data on four years. The four years were: 2003 for which the data are expected to be final; 2004, for which the data are expected to be close to final, 2005 for which the data are planned expenditures, and 2006 for which the data are a forecast of spending intentions.

Data from the surveyed firms in 2004 represent approximately 86% of the total expenditures. Estimates are not available for administrative data for 2005 and 2006. Therefore, based on the percentage increase or decrease by industry reported by the surveyed firms, forecasts are made for planned expenditures and spending intentions based on the administrative data.

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

## 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
0 <sup>s</sup>	value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
<sup>p</sup>	preliminary
<sup>r</sup>	revised
X	suppressed to meet the confidentiality requirements of the Statistics Act
E	use with caution
F	too unreliable to be published

## Other symbols

i intentions

**Note:** Due to rounding, components may not add to totals.

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<http://www.statcan.ca:8096/bsolc/english/bsolc?catno=88-001-X>

Current publications of the Science and Technologies Surveys section include:

***Industrial Research and Development, 2005 Intentions*** (with 2004 preliminary estimates and 2003 actual expenditures) Catalogue No. 88-202-XIE, annual. It presents statistics on research and development (R&D) activities performed and funded by Canadian business enterprises. The report covers current and capital expenditures on R&D, R&D as a percent of performing company revenues, R&D expenditures by province, the company's country of control, personnel engaged in R&D and payments for technological services.

<http://www.statcan.ca:8096/bsolc/english/bsolc?catno=88-202-X>

***Federal Science Activities, 2004-2005***, Catalogue No. 88-204-XIE, annual. It presents statistics on the federal government's activities in science and technology (S&T). It covers expenditures and full-time equivalent by type of science, performing sectors, provinces, federal departments and agencies.

<http://www.statcan.ca:8096/bsolc/english/bsolc?catno=88-204-X>

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## Note of appreciation

Canada owes the success of its statistical system to a long-standing cooperation involving Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued cooperation and goodwill.

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