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Science Statistics

Scientific and technological activities of provincial governments and provincial research organizations, 2005/2006 to 2009/2010



October 2011 Edition



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Statistics Canada
Business Special Surveys and Technology Statistics Division

Science Statistics

Scientific and technological activities of provincial governments and provincial research organizations, 2005/2006 to 2009/2010

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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
- 0^s 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
- * significantly different from reference category ($p < 0.05$)

Additional symbols used in this publication:

- A excellent (0 to 4.9% coefficient of variation)
- B very good (5.0% to 9.9% coefficient of variation)
- C good (10.0% to 14.9% coefficient of variation)
- D acceptable (15.0% to 24.9% coefficient of variation)

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Highlights

Scientific and technological activities of provincial governments and provincial research organizations, 2005/2006 to 2009/2010

This bulletin reports on scientific and technological (S&T) activities involving the generation, dissemination and application of new scientific and technological knowledge for the provincial governments of New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia.

Within this bulletin, the main S&T activity is research and development (R&D). Although not provided by the provincial government of Quebec, spending on related scientific activities (RSA) are available for all other participating provinces. RSA includes activities such as technical surveys, special services or studies to form provincial standards and statistical surveys.

Note to readers

For New Brunswick, the spending intentions for 2009/2010 were collected in reference year 2008/2009.

Similarly for British Columbia, the spending intentions for 2008/2009 were collected in reference year 2007/2008.

Saskatchewan collected data as a limited pilot from seven ministries for reference year 2007/2008. For 2008/2009 the survey included 15 ministries. This difference in survey coverage contributes to the year-over-year change in expenditures and personnel.

Since 1994/1995, the provincial government of Quebec has conducted and processed its own survey of R&D activities, and shared the results with Statistics Canada. R&D expenditures are included in R&D totals reported by Statistics Canada, but are excluded from Statistics Canada's total provincial government S&T expenditures, in order to permit accurate intra-provincial comparisons.

Statistics Canada obtained permission from respondents to the Scientific Activities of Provincial Research Organizations Survey to publish their information by name to support analysis.

- In 2009/2010, total expenditures on scientific activities (S&T) by the six participating provincial governments was \$1.9 billion, down 11.2% from the previous year.
- Overall, the top four S&T expenditure objectives for 2009/2010 were: protection and improvement of human health (\$356.2 million); basic research (\$281.3 million); control and care of the environment (\$255.9 million); and social structures and relationships (\$230.4 million) (Table 5).
- Of the six participating provincial governments, Manitoba alone experienced an increase in provincial government S&T expenditure (\$103.9 million) in 2009/2010, up \$3.7 million from the previous year (Table 3-1).
- In 2009/2010, all participating provinces except Saskatchewan decreased their intramural (in-house) S&T expenditures from the previous year. However, intramural S&T expenditures still predominated in all participating provinces with the exception of Ontario, where the largest portion of S&T expenditures was directed to the higher education sector (42%) (Table 3-2).
- The total research and development (R&D) expenditures of the provincial governments of New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia was \$1.7 billion in 2009/2010. Of the seven participating provincial governments, Quebec (\$584.8 million) led for total R&D expenditures in 2009/2010 followed by Ontario (\$429.0 million) and Alberta (\$413.1 million) (Table 3-2).

- The provincial government of Alberta led the provinces for intramural (in-house) R&D expenditures (\$137.8 million), followed by Quebec (\$87.5 million) and Saskatchewan (\$65.8 million) (Table 3-2).
- In 2009/2010, the total expenditures of provincial research organizations (PROs) on scientific activities were \$92.7 million, a decrease of 7% from the previous year. The 34% (\$12.5 million) increase in S&T expenditures recorded by the Saskatchewan Research Council largely masked the decrease of 78% (-\$13.8 million) reported by the Aurora Research Institute due to the completion of a large three-year R&D contract in 2009/2010 (Table 14).

Analysis

For the purpose of this analysis, the participating provincial governments and provincial research organizations (PROs) are treated separately.

Total S&T spending in the participating provincial governments in 2009/2010 was \$1,899 million. Of the six participating provincial governments, only Manitoba reported an increase in total S&T spending in 2009/2010, while Saskatchewan alone reported an increase in S&T intramural expenditures (Table 3-2).

Scientific and technological (S&T) spending

The provinces allocate their S&T expenditures by socio-economic objectives. These objectives are:

1. Exploration and exploitation of the earth
2. Infrastructure and general planning of land use
3. Control and care of the environment
4. Protection and improvement of human health
5. Production, distribution and rational utilization of energy
6. Agriculture production and technology
7. Fishing
8. Forestry
9. Industrial production and technology
10. Social structures and relationships
11. Exploration and exploitation of space
12. Basic research
13. Other civil research

Examples of socio-economic objectives that are provided to survey respondents are listed in the 'Data quality, concepts and methodology' section at the end of this bulletin.

In 2009/2010, total expenditures on S&T by the six provincial governments varied by socio-economic objectives. The top four objectives of the combined participating provinces were: protection and improvement of human health (\$356.2 million); basic research (\$281.3 million); control and care of the environment (\$255.9 million); and social structures and relationships (\$230.4 million) (Table 5).

The provincial governments of Ontario (\$200.8 million) and Alberta (\$114.9 million) concentrated the majority of their S&T spending on 'protection and improvement of human health'. 'Infrastructure and general planning for land use' including transportation and telecommunication systems was the primary focus of S&T spending in 2009/2010 for the provincial governments of Saskatchewan (\$63.2 million), Manitoba (\$23.8 million) and New Brunswick (\$23.1 million). British Columbia (\$57.5 million) indicated 'basic research' as its primary objective (Table 5).

Provincial government S&T spending continued to be concentrated in the natural sciences and engineering. Four-fifths of total S&T spending went to these disciplines, comprised of scientific activities related to natural, physical, medical, health and agricultural sciences, engineering and engineering technology.

Total S&T spending in the natural sciences and engineering for all six participating provinces in 2009/2010 amounted to \$1,544 million. Ontario accounted for \$617.3 million, while Alberta totalled \$540.1 million. Together these two provinces represented 75% of total S&T expenditures in the natural sciences and engineering for 2009/2010 (Table 3-5).

The remaining 19% of S&T spending was directed towards activities in the social sciences (such as economics, geography, law, political science, psychology and urban and rural planning) and in the humanities (including history, communications and media studies).

S&T spending in the social sciences and humanities for all six participating provinces in 2009/2010 totalled \$355.3 million. Ontario accounted for \$160.3 million, almost half of the reported total spending. However, only New Brunswick reported increased S&T spending in the social science and humanities in 2009/2010 (Table 3-9).

Research and development (R&D) spending

Total research and development (R&D) expenditures for the seven participating provinces (New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia) declined by 3.8% from 2008/2009 to \$1.7 billion in 2009/2010. The leading provinces for total R&D expenditures in 2009/2010 continued to be Quebec (\$584.8 million), Ontario (\$429.0 million) and Alberta (\$413.1 million) (Table 3-1).

Intramural (in-house) R&D expenditures for the seven provincial governments totalled \$387 million in 2009/2010, up 7.8% from 2008/2009. Extramural R&D expenditures of \$1.3 billion in 2009/2010 were down 6.8% from 2008/2009. Extramural R&D spending was directed mainly to the higher education sector (\$943.6 million, or 71%) followed by business enterprises (\$174.8 million, or 13%) (Table 3-2).

The provinces that led intramural (in-house) R&D spending in 2009/2010 were Alberta (\$137.8 million), followed by Quebec (\$87.5 million) and Saskatchewan (\$65.8 million) (Table 3-2).

Provincial government research and development expenditures in the natural sciences and engineering are available for New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia. At \$136.5 million in 2009/2010, Alberta led all participating provinces in intramural R&D spending in the natural sciences and engineering (Table 3-5).

For 2009/2010 in the natural sciences and engineering, Quebec funded the highest amount of R&D to the business enterprise sector, at \$66.5 million (Table 3-5).

Quebec reported \$254.0 million in funding for natural sciences and engineering R&D expenditures in the higher education sector in 2009/2010, followed by Ontario at \$245.6 million and Alberta at \$181.1 million (Table 3-5).

The total provincial government's research and development expenditures in the social sciences and humanities were \$279.4 million in 2009/2010. Quebec accounted for more than half, or \$167.6 million (and led intramural R&D spending in the social science and humanities with \$22.1 million) (Table 3-9).

Ontario followed with \$62.5 million. Together Quebec and Ontario accounted for more than 80% of total R&D in the social sciences and humanities. For both provinces, the majority of R&D funding went to higher education sector, at \$129.7 million and \$42.2 million respectively.

In 2009/2010, total extramural R&D spending in the social sciences and humanities was \$241.3 million, down 18.3% from 2008/2009. Spending was directed mainly to the higher education sector (74% or \$177.4 million) followed by hospitals and health organizations (12% or \$29.6 million) (Table 3-9).

Science and technology expenditures in the social sciences and humanities were reported at \$355.3 for the six participating provinces in 2009/2010. Ontario led with \$160.3 million, followed by Alberta (\$63.9 million) and British Columbia (\$43.8 million). The majority of funds went to the higher education sector in Ontario and Manitoba. In British Columbia, the highest-funded sector was hospitals and health organizations. New Brunswick, Saskatchewan and Alberta reported the largest funding to the other sector category (Table 3-9).

Research and development (R&D) personnel

Research and development (R&D) personnel in New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia totalled 2,627 in 2009/2010, down 2.7% from 2008/2009. Over 50% full-time equivalents were found in the scientific and professional category (Table 12-2).

In 2009/2010, Alberta reported 811 full-time equivalents (FTEs) to R&D activities, of which the highest amount were found in the scientific and professional category at 313 FTEs. Quebec followed with 785 FTEs working on R&D activities. At 469, Quebec reported more full-time equivalent scientists and professionals engaged in research and development than any other province. Ontario reported 497 full-time equivalents, with 285 scientists and professionals (Table 12-2).

Provincial research organizations (PRO) scientific and technological (S&T) spending

In 2009/2010 total expenditures of the seven provincial research organizations on scientific and technologic activities totalled \$92.7 million, a decrease of 7% from the previous year.

Fifty-three percent of total PRO S&T expenditures occurred in Saskatchewan, whose Saskatchewan Research Council accounted for \$49.2 million of the \$92.7 million total. On the other hand the Centre de recherche industrielle du Québec reported spending \$25.2 million. Together these two leading PRO's accounted for over 80% of the S&T expenditures in 2009/2010 (Table 14).

The Saskatchewan Research Council reported an increase of 34% (\$12.5M) in S&T expenditures, largely masking the 78% decrease (-\$13.8M) reported by the Aurora Research Institute which completed a large three-year R&D contract (Table 14).

The provincial research organizations located in New Brunswick, Quebec, Saskatchewan, Yukon, and the Northwest Territories spent \$35.5 million on R&D. Similar to S&T, this is a 7% decrease from the previous year.

Again similar to S&T, the Saskatchewan Research Council accounted for the majority (57%) of the total R&D expenditures in 2009/2010 at \$20.3 million, and the Centre de recherche industrielle du Québec, was second with reported spending of \$11.1 million (Table 14).

Related products

Selected publications from Statistics Canada

88-202-X	Industrial Research and Development: Intentions
88-204-X	Federal Scientific Activities
88-221-X	Gross Domestic Expenditures on Research and Development in Canada (GERD), and the Provinces
88-522-X	Science and Technology Activities and Impacts: A Framework for a Statistical Information
88F0006X	Business Special Surveys and Technology Statistics Division Working Papers
88F0017M	Science, Innovation and Electronic Information Division Research Papers

Selected CANSIM tables from Statistics Canada

358-0001	Gross domestic expenditures on research and development, by science type and by funder and performer sector, annual
358-0024	Business enterprise research and development (BERD) characteristics, by industry group based on the North American Industry Classification System (NAICS), annual
358-0026	Intellectual property management, by federal departments and agencies indicators, annual
358-0142	Federal expenditures on science and technology and its components in current dollars and 2002 constant dollars, annual
358-0143	Federal expenditures on science and technology and its components, by type of science and performing sector, annual
358-0144	Federal expenditures on science and technology and its components, by activity and performing sector, annual
358-0145	Federal intramural expenditures on science and technology and its components, by type of science for the National Capital Region, annual
358-0146	Federal personnel engaged in science and technology activities, by type of science and personnel category, annual
358-0147	Federal personnel engaged in science and technology and its components, by type of science and personnel category, annual
358-0148	Federal personnel engaged in science and technology and its components, by type of science, personnel category, Canada, provinces and territories, annual

358-0149	Federal expenditures on science and technology and its components, by type of science, performing sector, Canada, provinces and territories, annual
358-0150	Federal extramural expenditures on science and technology and its components, by type of science, performing sector, type of payment, Canada, provinces and territories, annual
358-0151	Federal expenditures on science and technology and its components, by socio-economic objectives, annual

Selected surveys from Statistics Canada

4201	Research and Development in Canadian Industry
4204	Research and Development of Canadian Private Non-Profit Organizations
4208	Provincial Research Organizations
4209	Provincial Government Activities in the Natural Sciences
4210	Provincial Government Activities in the Social Sciences
4212	Federal Science Expenditures and Personnel, Activities in the Social Sciences and Natural Sciences
5109	Higher Education Research and Development Estimates

Selected summary tables from Statistics Canada

- *Domestic spending on research and development (GERD), performing sector, by province*
- *Domestic spending on research and development (GERD)*
- *Research and development performed by the business enterprise sector*
- *Domestic spending on research and development (GERD), funding sector, by province*

Statistical tables

Table 1
Provincial indicators, 2008

	Population ¹	Provincial Gross Domestic Product ²	Gross Domestic Expenditures on Research and Development ³	Gross Domestic Expenditures on Research and Development over Provincial Gross Domestic Product ³	Gross Domestic Expenditures on Research and Development over Capita
	thousands	millions of dollars		ratio	dollars
Canada ⁴	33,103	1,599,608	29,894	1.87	903
Newfoundland and Labrador	507	31,671	278	0.88	548
Prince Edward Island	139	4,650	64	1.38	462
Nova Scotia	936	34,041	515	1.51	550
New Brunswick	746	27,376	300	1.10	402
Quebec ⁵	7,717	302,748	7,895	2.61	1,023
Ontario ⁵	12,852	584,460	13,874	2.37	1,080
Manitoba	1,199	51,048	567	1.11	473
Saskatchewan	1,008	65,425	528	0.81	524
Alberta	3,545	291,577	2,877	0.99	812
British Columbia	4,346	197,728	2,804	1.42	645

1. CANSIM table 051-0005

2. CANSIM table 384-0002

3. Gross domestic expenditures on research and development in Canada and the provinces, national estimates 2000 to 2010, provincial estimates 2004 to 2008.

4. Includes the Yukon, Northwest Territories and Nunavut.

5. Quebec and Ontario Gross Domestic Expenditures on Research and Development figures now include federal government expenditures in the National Capital Region.

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

Source(s): CANSIM tables 051-0005 and 384-0002.

Table 2
Provincial distribution of gross expenditures on research and development by performing and funding sectors, 2008

	Newfoundland and Labrador	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskat- chewan	Alberta	British Columbia	Total Canada ¹
	millions of dollars										
Performing Sector											
Total	278	64	515	300	7,895	13,874	567	528	2,877	2,804	29,894
Federal government	19	14	77	36	413	1,668	85	64	126	93	2,599
Provincial governments ²	5	0	0	13	95	62	10	17	151	33	402
Business enterprise	108	13	94	101	4,595	7,564	160	132	1,479	1,541	15,792
Higher Education	146	37	343	150	2,792	4,580	312	314	1,122	1,136	10,932
Private non-profit organizations	..	..	..	..	..	..	..	..	..	..	169
Funding Sector											
Total	278	64	515	300	7,895	13,874	567	528	2,877	2,804	29,894
Federal government	56	25	172	74	1,303	2,793	161	151	397	489	5,676
Provincial governments ²	13	2	9	17	396	475	28	55	367	170	1,564
Business enterprise	116	14	110	104	4,152	6,814	160	151	1,539	1,283	14,471
Higher Education	77	22	179	91	1,289	2,199	149	146	447	461	5,360
Private non-profit organizations	6	1	25	10	239	425	53	20	76	94	1,015
Foreign	10	1	20	5	516	1,168	15	5	51	307	2,108

1. Includes the Yukon Territory, Northwest Territories and Nunavut.

2. Includes provincial research organizations.

Note(s): Quebec and Ontario figures now include federal government expenditures on research and development performed in the National Capital Region. The private non-profit (PNP) sector appears in both the performing and funding sector for the gross domestic expenditure on research and development (GERD) for Canada. Commencing with reference year 2000 the data for the PNP sector performing research and development are not distributed by provinces or territories. The national totals of research and development by performing sector include the PNP sector. The data for the PNP sector funding research and development continue to be distributed by provinces and territories. Components may not add to total due to rounding.

Table 3-1
Total expenditures of provincial governments on scientific activities — By activity

	2005/2006 ^r	2006/2007 ^r	2007/2008 ^r	2008/2009 ^r	2009/2010
	thousands of dollars				
Participating provinces					
Total science and technology	1,627,227	1,736,829	2,207,007	2,139,124	1,898,958
New Brunswick	..	..	63,158	62,516	60,179 ^E
Ontario	832,032	879,992	963,420	866,553	777,552
Manitoba	85,635	94,542	92,609	100,228	103,897
Saskatchewan ¹	..	..	62,751 ^E	178,176	152,146
Alberta	381,769	455,926	592,173	622,652	603,951
British Columbia	327,791	306,369	432,896	308,999 ^E	201,233
Total research and development	1,534,733	1,510,771	1,908,296	1,781,388	1,712,709
New Brunswick	..	..	27,181	28,246	29,017 ^E
Quebec ²	451,806	469,457	516,445	512,038	584,832
Ontario	555,643	548,865	595,272	514,167	428,964
Manitoba	27,372	29,902	30,578	36,040	39,830
Saskatchewan ¹	..	..	47,578 ^E	66,795	106,979
Alberta	274,501	318,022	374,913	407,340	413,148
British Columbia	225,411	144,525	316,329	216,762 ^E	109,939
Total related scientific activities	544,300	695,515	815,156	869,774	771,081
New Brunswick	..	..	35,977	34,270	31,162 ^E
Ontario	276,389	331,127	368,148	352,386	348,588
Manitoba	58,263	64,640	62,031	64,188	64,067
Saskatchewan ¹	..	..	15,173 ^E	111,381	45,167
Alberta	107,268	137,904	217,260	215,312	190,803
British Columbia	102,380	161,844	116,567	92,237 ^E	91,294

1. Saskatchewan conducted a limited pilot of seven ministries in 2007/2008. The difference in expenditures contributes to the differences between the 2007/2008 pilot survey and 2008/2009 data results including fifteen ministries. A large one time capital expenditure increased related scientific activities expenditures in 2008/2009. Research and development expenditures increased in 2009/2010 due to actual data being received for a ministry which previously provided estimates.
 2. Since 1994/1995, the Quebec provincial government collects only research and development activities. These research and development expenditures are not included in the science and technology totals.
- Note(s):** Components may not add to total due to rounding.

Table 3-2
Total expenditures of provincial governments on scientific activities — By activity, and by sector of performance, 2009/2010

	Intramural	Business enterprise	Higher education	Hospitals and health organizations	Provincial research organizations	Other	Total
thousands of dollars							
Participating provinces							
Total science and technology	732,101	248,487	614,903	135,948	7,949	159,570	1,898,958
New Brunswick ^E	34,395	13,216	1,732	191	2,074	8,571	60,179
Ontario	225,300	73,404	324,147	88,948	...	65,753	777,552
Manitoba	46,702	29,204	19,327	4,662	1,035	2,967	103,897
Saskatchewan	90,267	8,789	24,742	1,154	4,840	22,354	152,146
Alberta	236,679	106,974	189,367	24,913	...	46,018	603,951
British Columbia	98,758	16,900	55,588	16,080	...	13,907	201,233
Total research and development	386,950	174,829	943,555	114,333	13,426	79,615	1,712,709
New Brunswick ^E	11,308	8,958	116	41	1,277	7,317	29,017
Quebec ¹	87,545	66,602	383,688	26,548	7,676	12,772	584,832
Ontario	51,128	15,946	287,814	55,238	...	18,838	428,964
Manitoba	8,408	6,124	18,266	4,662	1,035	1,335	39,830
Saskatchewan	65,814	4,506	22,159	400	3,438	10,662	106,979
Alberta	137,829	59,292	182,214	11,444	...	22,369	413,148
British Columbia	24,918	13,401	49,298	16,000	...	6,322	109,939
Total related scientific activities	432,696	140,260	55,036	48,163	2,199	92,727	771,081
New Brunswick ^E	23,087	4,258	1,616	150	797	1,254	31,162
Ontario	174,172	57,458	36,333	33,710	...	46,915	348,588
Manitoba	38,294	23,080	1,061	0	0	1,632	64,067
Saskatchewan	24,453	4,283	2,583	754	1,402	11,692	45,167
Alberta	98,850	47,682	7,153	13,469	...	23,649	190,803
British Columbia	73,840	3,499	6,290	80	...	7,585	91,294

1. Since 1994/1995, the Quebec provincial government collects only research and development activities. These research and development expenditures are not included in the science and technology totals.

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

Table 3-3
Total expenditures of provincial governments on scientific activities — In the natural sciences and engineering, by activity

	2005/2006 ^r	2006/2007 ^r	2007/2008 ^r	2008/2009 ^r	2009/2010
	thousands of dollars				
Participating provinces					
Total science and technology	1,298,411	1,390,096	1,772,764	1,657,341	1,543,652
New Brunswick	..	..	40,138	37,566	34,929 ^E
Ontario	684,520	699,765	798,627	682,284	617,253
Manitoba	57,197	66,222	65,988	66,087	75,589
Saskatchewan ¹	..	..	41,367 ^E	123,559	118,386
Alberta	356,834	424,710	508,739	553,266	540,052
British Columbia	199,860	199,399	317,905	194,579 ^E	157,443
Total research and development	1,251,216	1,236,006	1,583,981	1,449,320	1,433,330
New Brunswick	..	..	19,041	17,892	15,622 ^E
Quebec ²	334,401	353,739	388,172	390,717	417,232
Ontario	490,848	464,544	531,956	445,357	366,463
Manitoba	22,951	26,315	26,321	25,901	29,645
Saskatchewan ¹	..	..	34,831 ^E	52,077	104,386
Alberta	266,386	307,283	360,136	392,339	407,383
British Columbia	136,630	84,125	223,524	125,037 ^E	92,599
Total related scientific activities	381,596	507,829	576,995	598,738	527,554
New Brunswick	..	..	21,097	19,674	19,307 ^E
Ontario	193,672	235,221	266,671	236,927	250,790
Manitoba	34,246	39,907	39,667	40,186	45,944
Saskatchewan ¹	..	..	6,536 ^E	71,482	14,000
Alberta	90,448	117,427	148,603	160,927	132,669
British Columbia	63,230	115,274	94,381	69,542 ^E	64,844

1. Saskatchewan conducted a limited pilot of seven ministries in 2007/2008. The difference in expenditures contributes to the differences between the 2007/2008 pilot survey and 2008/2009 data results including fifteen ministries. A large one time capital expenditure increased related scientific activities expenditures in 2008/2009. Research and development expenditures increased in 2009/2010 due to actual data being received for a ministry which previously provided estimates.
2. Since 1994/1995, the Quebec provincial government collects only research and development activities. These research and development expenditures are not included in the science and technology totals.

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

Table 3-4
Total expenditures of provincial governments on scientific activities — In the natural sciences and engineering, by activity, 2009/2010

	New Brunswick ^E	Quebec ¹	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total participating provinces
thousands of dollars								
Total science and technology	34,929	..	617,253	75,589	118,386	540,052	157,443	1,543,652
Total research and development	15,622	417,232	366,463	29,645	104,386	407,383	92,599	1,433,330
Current expenditures								
In-house	7,365	42,666	36,682	4,692	62,056	50,950	23,038	227,449
Contracts	6,494	11,913	57,624	216	26,077	157,475	11,251	271,050
Grants	1,750	19,239	172,942	22,023	14,095	175,641	57,522	463,212
Research fellowships	0	324,886	90,333	1,819	0	19	0	417,057
Administration of extramural research and development programs	13	14,645	8,404	895	2,158	20,558	788	47,461
Sub-total	15,622	413,348	365,985	29,645	104,386	404,643	92,599	1,426,228
Capital expenditures	0	3,884	478	0	0	2,740	0	7,102
Total related scientific activities	19,307	..	250,790	45,944	14,000	132,669	64,844	527,554
Current expenditures								
Education support	1,697	..	16,297	269	521	506	1,867	21,157
Technical surveys	8,214	..	91,191	15,109	2,672	54,943	33,735	205,864
Information services	3,047	..	28,684	23	2,664	18,696	22,872	75,986
Special services and studies	4,484	..	59,607	30,325	3,514	49,832	4,740	152,502
Museum services	50	..	42,206	0	4,393	2,418	996	50,063
Administration of extramural related scientific activities programs	116	..	5,878	218	236	5,655	634	12,737
Sub-total	17,608	..	243,863	45,944	14,000	132,050	64,844	518,309
Capital expenditures	1,699	..	6,927	0	0	619	0	9,245

1. Since 1994/1995, the Quebec provincial government collects only research and development activities. These research and development expenditures are not included in the science and technology totals.

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

Table 3-5
Total expenditures of provincial governments on scientific activities — In natural sciences and engineering, by activity and sector of performance, 2009/2010

	Intramural	Business enterprise	Higher education	Hospitals and health organizations	Provincial research organizations	Other	Total
thousands of dollars							
Participating provinces							
Total science and technology	580,782	224,385	545,714	78,064	7,093	107,614	1,543,652
New Brunswick ^E	21,249	9,654	1,520	191	1,277	1,038	34,929
Ontario	166,511	64,047	272,170	58,159	...	56,366	617,253
Manitoba	30,336	24,578	14,681	4,471	1,035	488	75,589
Saskatchewan	75,062	5,634	21,957	400	4,781	10,552	118,386
Alberta	206,345	103,894	183,970	14,843	...	31,000	540,052
British Columbia	81,279	16,578	51,416	0	...	8,170	157,443
Total research and development	348,893	168,455	766,110	84,749	9,731	55,392	1,433,330
New Brunswick ^E	7,378	6,658	116	41	1,277	152	15,622
Quebec ¹	65,439	66,450	253,972	24,742	3,981	2,648	417,232
Ontario	45,564	14,998	245,636	46,537	...	13,728	366,463
Manitoba	5,768	3,908	14,172	4,471	1,035	291	29,645
Saskatchewan	64,396	4,308	21,909	400	3,438	9,935	104,386
Alberta	136,522	58,827	181,107	8,558	...	22,369	407,383
British Columbia	23,826	13,306	49,198	0	...	6,269	92,599
Total related scientific activities	297,328	122,380	33,576	18,057	1,343	54,870	527,554
New Brunswick ^E	13,871	2,996	1,404	150	0	886	19,307
Ontario	120,947	49,049	26,534	11,622	...	42,638	250,790
Manitoba	24,568	20,670	509	0	0	197	45,944
Saskatchewan	10,666	1,326	48	0	1,343	617	14,000
Alberta	69,823	45,067	2,863	6,285	...	8,631	132,669
British Columbia	57,453	3,272	2,218	0	...	1,901	64,844

1. Since 1994/1995, the Quebec provincial government collects only research and development activities. These research and development expenditures are not included in the science and technology totals.

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

Table 3-6
Total expenditures of provincial governments on scientific activities — In natural sciences and engineering, by objective, 2009/2010

	New Brunswick ^E	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total participating provinces
thousands of dollars							
Total	34,929	617,253	75,589	118,386	540,052	157,443	1,543,652
Exploration and exploitation of the earth	1,778	29,171	6,506	935	13,227	8,668	60,285
Infrastructure and general planning of land use	23,090	21,524	23,847	63,162	32,174	41,940	205,737
Control and care of the environment	3,874	127,416	10,600	11,205	83,743	15,065	251,903
Protection and improvement of human health	3,417	142,562	8,187	451	100,318	403	255,338
Production, distribution and rational utilization of energy	0	21,467	2,015	5,501	83,529	21	112,533
Agriculture production and technology	0	61,585	7,202	18,237	55,310	6,183	148,517
Fishing	0	2,210	1,872	0	0	0	4,082
Forestry	2,510	25,771	4	1,679	36,589	26,694	93,247
Industrial production and technology	165	52,865	7,650	904	33,198	0	94,782
Social structures and relationships	0	41,496	433	4,430	5,954	0	52,313
Exploration and exploitation of space	0	1,667	0	0	0	0	1,667
Basic research	95	80,042	7,273	11,702	91,560	54,254	244,926
Other civil research	0	9,477	0	180	4,450	4,215	18,322

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

Table 3-7
Total expenditures of provincial governments on scientific activities — In the social sciences and humanities, by activity

	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010
	thousands of dollars				
Participating provinces					
Total science and technology	328,816	346,733	434,243	481,783	355,306
New Brunswick	..	..	23,020	24,950	25,250 ^E
Ontario	147,512	180,227	164,793	184,269	160,299
Manitoba	28,438	28,320	26,621	34,141	28,308
Saskatchewan ¹	..	..	21,384 ^E	54,617	33,760
Alberta	24,935	31,216	83,434	69,386	63,899
British Columbia	127,931	106,970	114,991	114,420 ^E	43,790
Total research and development	283,517	274,765	324,315	332,068	279,380
New Brunswick	..	..	8,140	10,354	13,395 ^E
Quebec ²	117,405	115,718	128,273	121,321	167,601
Ontario	64,795	84,321	63,316	68,810	62,501
Manitoba	4,421	3,587	4,257	10,139	10,185
Saskatchewan ¹	..	..	12,747 ^E	14,718	2,593
Alberta	8,115	10,739	14,777	15,001	5,765
British Columbia	88,781	60,400	92,805	91,725 ^E	17,340
Total related scientific activities	162,704	187,686	238,201	271,036	243,527
New Brunswick	..	..	14,880	14,596	11,855 ^E
Ontario	82,717	95,906	101,477	115,459	97,798
Manitoba	24,017	24,733	22,364	24,002	18,123
Saskatchewan ¹	..	..	8,637 ^E	39,899	31,167
Alberta	16,820	20,477	68,657	54,385	58,134
British Columbia	39,150	46,570	22,186	22,695 ^E	26,450

1. Saskatchewan conducted a limited pilot of seven ministries in 2007/2008. The difference in expenditures contributes to the differences between the 2007/2008 pilot survey and 2008/2009 data results including fifteen ministries. A large one time capital expenditure increased related scientific activities expenditures in 2008/2009. Research and development expenditures increased in 2009/2010 due to actual data being received for a ministry which previously provided estimates.
2. Since 1994/1995, the Quebec provincial government collects only research and development activities. These research and development expenditures are not included in the science and technology totals.

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

Table 3-8
Total expenditures of provincial governments on scientific activities — In the social sciences and humanities, by activity, 2009/2010

	New Brunswick ^E	Quebec ¹	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total participating provinces
thousands of dollars								
Total science and technology	25,250	..	160,299	28,308	33,760	63,899	43,790	355,306
Total research and development	13,395	167,601	62,501	10,185	2,593	5,765	17,340	279,380
Current expenditures								
In-house	2,168	14,753	3,774	2,302	1,357	466	1,092	25,912
Contracts	3,709	4,020	3,654	2,026	875	516	205	15,005
Grants	7,165	122,117	42,091	5,017	200	3,982	16,043	196,615
Research fellowships	0	20,362	11,192	502	100	0	0	32,156
Administration of extramural research and development programs	353	6,035	1,778	338	61	778	0	9,343
Sub-total	13,395	167,288	62,489	10,185	2,593	5,742	17,340	279,032
Capital expenditures	0	313	12	0	0	23	0	348
Total related scientific activities	11,855	..	97,798	18,123	31,167	58,134	26,450	243,527
Current expenditures	11,718	..	91,971	17,949	30,481	54,807	26,361	233,287
Administration of extramural related scientific activities programs	137	..	1,218	174	626	3,292	89	5,536
Sub-total	11,855	..	93,189	18,123	31,107	58,099	26,450	238,823
Capital expenditures	0	..	4,609	0	60	35	0	4,704

1. Since 1994/1995, the Quebec provincial government collects only research and development activities. These research and development expenditures are not included in the science and technology totals.

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

Table 3-9
Total expenditures of provincial governments on scientific activities — In the social sciences and humanities, by activity and by sector of performance, 2009/2010

	Intramural	Business enterprise	Higher education	Hospitals and health organizations	Provincial research organizations	Other	Total
thousands of dollars							
Participating provinces							
Total science and technology	151,319	24,102	69,189	57,884	856	51,956	355,306
New Brunswick ^E	13,146	3,562	212	0	797	7,533	25,250
Ontario	58,789	9,357	51,977	30,789	...	9,387	160,299
Manitoba	16,366	4,626	4,646	191	0	2,479	28,308
Saskatchewan	15,205	3,155	2,785	754	59	11,802	33,760
Alberta	30,334	3,080	5,397	10,070	...	15,018	63,899
British Columbia	17,479	322	4,172	16,080	...	5,737	43,790
Total research and development	38,057	6,375	177,446	29,585	3,695	24,222	279,380
New Brunswick ^E	3,930	2,300	0	0	0	7,165	13,395
Quebec ¹	22,106	153	129,717	1,807	3,695	10,123	167,601
Ontario	5,564	948	42,178	8,701	...	5,110	62,501
Manitoba	2,640	2,216	4,094	191	0	1,044	10,185
Saskatchewan	1,418	198	250	0	0	727	2,593
Alberta	1,307	465	1,107	2,886	...	0	5,765
British Columbia	1,092	95	100	16,000	...	53	17,340
Total related scientific activities	135,368	17,880	21,460	30,106	856	37,857	243,527
New Brunswick ^E	9,216	1,262	212	0	797	368	11,855
Ontario	53,225	8,409	9,799	22,088	...	4,277	97,798
Manitoba	13,726	2,410	552	0	0	1,435	18,123
Saskatchewan	13,787	2,957	2,535	754	59	11,075	31,167
Alberta	29,027	2,615	4,290	7,184	...	15,018	58,134
British Columbia	16,387	227	4,072	80	...	5,684	26,450

1. Since 1994/1995, the Quebec provincial government collects only research and development activities. These research and development expenditures are not included in the science and technology totals.

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

Table 3-10
Total expenditures of provincial governments on scientific activities — In the social sciences and humanities, by objective, 2009/2010

	New Brunswick ^E	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total participating provinces
thousands of dollars							
Total	25,250	160,299	28,308	33,760	63,899	43,790	355,306
Exploration and exploitation of the earth	0	0	0	0	0	0	0
Infrastructure and general planning of land use	0	3,039	0	35	17	0	3,091
Control and care of the environment	0	0	48	0	3,956	0	4,004
Protection and improvement of human health	856	58,253	2,325	4,907	14,596	19,945	100,882
Production, distribution and rational utilization of energy	1,320	50	0	0	0	0	1,370
Agriculture production and technology	0	954	325	0	0	0	1,279
Fishing	0	88	0	0	0	0	88
Forestry	0	175	0	0	0	850	1,025
Industrial production and technology	0	271	1,059	0	0	552	1,882
Social structures and relationships	21,274	47,882	21,942	28,586	43,790	14,645	178,119
Exploration and exploitation of space	0	0	0	0	0	0	0
Basic research	1,800	28,546	1,858	177	750	3,201	36,332
Other civil research	0	21,041	751	55	790	4,597	27,234

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

Table 4-1
Total expenditures of provincial governments on research and development — In the natural sciences and engineering, by objective, 2009/2010

	New Brunswick ^E	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total participating provinces
thousands of dollars							
Total	15,622	366,463	29,645	104,386	407,383	92,599	1,016,098
Exploration and exploitation of the earth	1,212	1,641	668	260	2,996	8,668	15,445
Infrastructure and general planning of land use	12,309	10,918	1,834	62,868	16,028	438	104,395
Control and care of the environment	139	40,955	4,510	7,520	25,647	7,191	85,962
Protection and improvement of human health	1,664	120,266	8,187	4	91,666	53	221,840
Production, distribution and rational utilization of energy	0	16,132	1,421	4,245	80,091	0	101,889
Agriculture production and technology	0	44,768	3,488	17,314	42,987	417	108,974
Fishing	0	158	0	0	0	0	158
Forestry	58	11,139	4	381	21,456	24,211	57,249
Industrial production and technology	165	38,785	2,247	0	33,198	0	74,395
Social structures and relationships	0	1,240	433	0	0	0	1,673
Exploration and exploitation of space	0	1,667	0	0	0	0	1,667
Basic research	75	78,407	6,853	11,614	90,964	47,406	235,319
Other civil research	0	387	0	180	2,350	4,215	7,132

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

Table 4-2
Total expenditures of provincial governments on research and development — In the social sciences and humanities, by objective, 2009/2010

	New Brunswick ^E	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total participating provinces
thousands of dollars							
Total	13,395	62,501	10,185	2,593	5,765	17,340	108,738
Exploration and exploitation of the earth	0	0	0	0	0	0	0
Infrastructure and general planning of land use	0	279	0	0	0	0	279
Control and care of the environment	0	0	0	0	0	0	0
Protection and improvement of human health	0	25,213	2,325	1,071	4,807	16,225	49,659
Production, distribution and rational utilization of energy	1,320	0	0	0	0	0	10
Agriculture production and technology	0	0	25	0	0	0	25
Fishing	0	73	0	0	0	0	73
Forestry	0	160	0	0	0	0	160
Industrial production and technology	0	0	39	0	0	0	39
Social structures and relationships	11,954	8,222	5,411	1,420	714	1,115	27,017
Exploration and exploitation of space	0	0	0	0	0	0	0
Basic research	121	26,915	1,851	102	244	0	29,303
Other civil research	0	1,639	534	0	0	0	2,173

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

Table 5
Total expenditures on scientific activities, by objective, and by province, 2009/2010

	New Brunswick ^E	Ontario	Manitoba	Saskat- chewan	Alberta	British Columbia	Total participating provinces
thousands of dollars							
Total	60,179	777,552	103,897	152,146	603,951	201,233	1,898,958
Exploration and exploitation of the earth	1,778	29,171	6,506	935	13,227	8,668	60,285
Infrastructure and general planning of land use	23,090	24,563	23,847	63,197	32,191	41,940	208,828
Control and care of the environment	3,874	127,416	10,648	11,205	87,699	15,065	255,907
Protection and improvement of human health	4,273	200,815	10,512	5,358	114,914	20,348	356,220
Production, distribution and rational utilization of energy	1,320	21,517	2,015	5,501	83,529	21	113,903
Agriculture production and technology	0	62,539	7,527	18,237	55,310	6,183	149,796
Fishing	0	2,298	1,872	0	0	0	4,170
Forestry	2,510	25,946	4	1,679	36,589	27,544	94,272
Industrial production and technology	165	53,136	8,709	904	33,198	552	96,664
Social structures and relationships	21,274	89,378	22,375	33,016	49,744	14,645	230,432
Exploration and exploitation of space	0	1,667	0	0	0	0	1,667
Basic research	1,895	108,588	9,131	11,879	92,310	57,455	281,258
Other civil research	0	30,518	751	235	5,240	8,812	45,556

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

Table 6
Total expenditures on research and development, by objective and by province, 2009/2010

	New Brunswick ^E	Ontario	Manitoba	Saskat- chewan	Alberta	British Columbia	Total participating provinces
thousands of dollars							
Total	29,017	428,964	39,830	106,979	413,148	109,939	1,127,877
Exploration and exploitation of the earth	1,212	1,641	668	260	2,996	8,668	15,445
Infrastructure and general planning of land use	12,309	11,197	1,834	62,868	16,028	438	104,674
Control and care of the environment	139	40,955	4,510	7,520	25,647	7,191	85,962
Protection and improvement of human health	1,664	145,479	10,512	1,075	96,473	16,278	271,481
Production, distribution and rational utilization of energy	1,320	16,132	1,421	4,245	80,091	0	103,209
Agriculture production and technology	0	44,768	3,513	17,314	42,987	417	108,999
Fishing	0	231	0	0	0	0	231
Forestry	58	11,299	4	381	21,456	24,211	57,409
Industrial production and technology	165	38,785	2,286	0	33,198	0	74,434
Social structures and relationships	11,954	9,462	5,844	1,420	714	1,115	30,509
Exploration and exploitation of space	0	1,667	0	0	0	0	1,667
Basic research	196	105,322	8,704	11,716	91,208	47,406	264,552
Other civil research	0	2,026	534	180	2,350	4,215	9,305

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

**Table 7-1
Intramural expenditures of provincial governments on scientific activities — In the natural sciences and engineering**

	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010
thousands of dollars					
Total participating provinces	462,480	512,906	574,959	583,274	580,782
New Brunswick	..	..	21,142	22,368	21,249 ^E
Ontario	162,694	196,258	193,926	187,336	166,511
Manitoba	36,425	29,019	29,497	29,537	30,336
Saskatchewan ¹	..	..	9,807 ^E	12,868	75,062
Alberta	190,588	203,564	215,319	235,949	206,345
British Columbia	72,773	84,065	105,268	95,216 ^E	81,279

1. Saskatchewan conducted a limited pilot of seven ministries in 2007/2008. The difference in expenditures contributes to the differences between the 2007/2008 pilot survey and 2008/2009 data results including fifteen ministries. A large one time capital expenditure increased related scientific activities expenditures in 2008/2009. Research and development expenditures increased in 2009/2010 due to actual data being received for a ministry which previously provided estimates.

**Table 7-2
Intramural expenditures of provincial governments on scientific activities — In the social sciences and humanities**

	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010
thousands of dollars					
Total participating provinces	93,567	101,899	132,576	163,473	151,319
New Brunswick	..	..	10,991	14,186	13,146 ^E
Ontario	42,872	48,391	54,145	62,290	58,789
Manitoba	22,998	24,689	21,557	26,620	16,366
Saskatchewan ¹	..	..	4,797 ^E	12,857	15,205
Alberta	6,418	8,275	27,321	31,181	30,334
British Columbia	21,279	20,544	13,765	16,339 ^E	17,479

1. Saskatchewan conducted a limited pilot of seven ministries in 2007/2008. The difference in expenditures contributes to the differences between the 2007/2008 pilot survey and 2008/2009 data results including fifteen ministries. A large one time capital expenditure increased related scientific activities expenditures in 2008/2009. Research and development expenditures increased in 2009/2010 due to actual data being received for a ministry which previously provided estimates.

**Table 8
Intramural expenditures of provincial governments on research and development - in the natural sciences and engineering**

	2005/2006 ^f	2006/2007	2007/2008 ^f	2008/2009	2009/2010
thousands of dollars					
Total participating provinces	247,787	264,212	308,544	322,069	348,893
New Brunswick	..	..	8,058	8,548	7,378 ^E
Quebec	66,386	54,455	71,206	66,357	65,439
Ontario	40,639	65,672	51,899	55,995	45,564
Manitoba	3,511	4,915	4,506	4,185	5,768
Saskatchewan ¹	..	..	4,672 ^E	4,130	64,396
Alberta	121,827	123,970	138,568	150,373	136,522
British Columbia	15,424	15,200	29,635	32,481 ^E	23,826

1. Saskatchewan conducted a limited pilot of seven ministries in 2007/2008. The difference in expenditures contributes to the differences between the 2007/2008 pilot survey and 2008/2009 data results including fifteen ministries. A large one time capital expenditure increased related scientific activities expenditures in 2008/2009. Research and development expenditures increased in 2009/2010 due to actual data being received for a ministry which previously provided estimates.

Table 9-1
Payments to business enterprises by provincial governments — On scientific activities in the natural sciences and engineering

	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010
	thousands of dollars				
Total participating provinces	46,258	102,694	245,320	221,255	224,385
New Brunswick	..	..	13,422	10,040	9,654 ^E
Ontario	12,628	18,147	41,530	52,117	64,047
Manitoba	619	14,371	13,741	15,789	24,578
Saskatchewan ¹	..	..	4,851 ^E	10,597	5,634
Alberta	26,014	51,080	118,663	125,879	103,894
British Columbia	6,997	19,096	53,113	6,833 ^E	16,578

1. Saskatchewan conducted a limited pilot of seven ministries in 2007/2008. The difference in expenditures contributes to the differences between the 2007/2008 pilot survey and 2008/2009 data results including fifteen ministries. A large one time capital expenditure increased related scientific activities expenditures in 2008/2009. Research and development expenditures increased in 2009/2010 due to actual data being received for a ministry which previously provided estimates.

Table 9-2
Payments to business enterprises by provincial governments — On research and development in the natural sciences and engineering

	2005/2006 ^f	2006/2007	2007/2008	2008/2009 ^f	2009/2010
	thousands of dollars				
Total participating provinces	47,596	71,425	179,673	148,057	168,455
New Brunswick	..	..	8,850	7,046	6,658 ^E
Quebec	30,146	33,528	45,456	46,054	66,450
Ontario	173	891	12,900	12,514	14,998
Manitoba	486	996	218	2,081	3,908
Saskatchewan ¹	..	..	4,089 ^E	9,608	4,308
Alberta	11,354	21,808	62,545	66,186	58,827
British Columbia	5,437	14,202	45,615	4,568 ^E	13,306

1. Saskatchewan conducted a limited pilot of seven ministries in 2007/2008. The difference in expenditures contributes to the differences between the 2007/2008 pilot survey and 2008/2009 data results including fifteen ministries. A large one time capital expenditure increased related scientific activities expenditures in 2008/2009. Research and development expenditures increased in 2009/2010 due to actual data being received for a ministry which previously provided estimates.

Table 10-1
Payments to the higher education sector, by provincial governments — On scientific activities in the natural sciences and engineering

	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010
	thousands of dollars				
Total participating provinces	574,908	481,483	585,292	548,306	545,714
New Brunswick	..	..	2,450	2,103	1,520 ^E
Ontario	380,689	293,156	334,491	218,991	272,170
Manitoba	13,535	15,857	14,912	14,965	14,681
Saskatchewan ¹	..	..	24,094 ^E	92,911	21,957
Alberta	128,275	125,180	130,046	149,313	183,970
British Columbia	52,409	47,290	79,299	70,023 ^E	51,416

1. Saskatchewan conducted a limited pilot of seven ministries in 2007/2008. The difference in expenditures contributes to the differences between the 2007/2008 pilot survey and 2008/2009 data results including fifteen ministries. A large one time capital expenditure increased related scientific activities expenditures in 2008/2009. Research and development expenditures increased in 2009/2010 due to actual data being received for a ministry which previously provided estimates.

Table 10-2**Payments to the higher education sector, by provincial governments — On research and development in the natural sciences and engineering**

	2005/2006 ^r	2006/2007 ^r	2007/2008	2008/2009 ^r	2009/2010
	thousands of dollars				
Total participating provinces	755,821	626,659	796,212	730,195	766,110
New Brunswick	..	..	575	459	116 ^E
Quebec	212,850	186,619	246,683	258,943	253,972
Ontario	352,256	262,584	302,968	207,658	245,636
Manitoba	13,494	14,490	14,882	14,945	14,172
Saskatchewan ¹	..	..	23,854 ^E	31,459	21,909
Alberta	126,611	123,922	129,395	148,469	181,107
British Columbia	50,610	39,044	77,855	68,262 ^E	49,198

1. Saskatchewan conducted a limited pilot of seven ministries in 2007/2008. The difference in expenditures contributes to the differences between the 2007/2008 pilot survey and 2008/2009 data results including fifteen ministries. A large one time capital expenditure increased related scientific activities expenditures in 2008/2009. Research and development expenditures increased in 2009/2010 due to actual data being received for a ministry which previously provided estimates.

Table 11-1**Payments to other performers, by provincial governments — On scientific activities in the natural sciences and engineering**

	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010
	thousands of dollars				
Total participating provinces	99,893	167,827	192,248	137,618	107,614
New Brunswick	..	..	2,010	1,538	1,038 ^E
Ontario	37,208	88,244	78,020	94,817	56,366
Manitoba	2,297	3,291	3,328	2,413	488
Saskatchewan ¹	..	..	2,135 ^E	7,080	10,552
Alberta	11,757	27,344	26,530	24,263	31,000
British Columbia	48,631	48,948	80,225	7,507 ^E	8,170

1. Saskatchewan conducted a limited pilot of seven ministries in 2007/2008. The difference in expenditures contributes to the differences between the 2007/2008 pilot survey and 2008/2009 data results including fifteen ministries. A large one time capital expenditure increased related scientific activities expenditures in 2008/2009. Research and development expenditures increased in 2009/2010 due to actual data being received for a ministry which previously provided estimates.

Note(s): Other performers include the federal government, municipal governments, individuals, institutions not identified with any other sector and foreign performers.

Table 11-2
Payments to other performers, by provincial governments — On research and development in the natural sciences and engineering

	2005/2006 ^f	2006/2007	2007/2008	2008/2009 ^f	2009/2010
	thousands of dollars				
Total participating provinces	78,791	119,519	128,113	89,704	55,392
New Brunswick	..	..	589	497	152 ^E
Quebec ¹	14,809	46,507	13,442	9,179	2,648
Ontario	10,322	34,452	23,321	52,056	13,728
Manitoba	1,157	2,240	2,234	1,327	291
Saskatchewan ²	..	..	1,791 ^E	6,795	9,935
Alberta	6,394	20,641	16,317	15,124	22,369
British Columbia	46,109	15,679	70,419	4,726 ^E	6,269

1. Since 1994/1995, the Quebec provincial government collects only research and development activities. These research and development expenditures are not included in the science and technology totals.
2. Saskatchewan conducted a limited pilot of seven ministries in 2007/2008. The difference in expenditures contributes to the differences between the 2007/2008 pilot survey and 2008/2009 data results including fifteen ministries. A large one time capital expenditure increased related scientific activities expenditures in 2008/2009. Research and development expenditures increased in 2009/2010 due to actual data being received for a ministry which previously provided estimates.

Note(s): Other performers include the federal government, municipal governments, individuals, institutions not included with any other sector, and foreign performers.

Table 12-1
Personnel of provincial governments engaged in scientific activities — By activity and by province

	2005/2006 ^f	2006/2007 ^f	2007/2008 ^f	2008/2009	2009/2010
	number				
Participating provinces					
Total science and technology	4,792	5,176	5,925	6,074	5,674
New Brunswick	..	..	396	401	389 ^E
Ontario	2,152	2,244	2,339	2,210	2,051
Manitoba	575	628	601	684	488
Saskatchewan ¹	..	..	188 ^E	323	313
Alberta	1,329	1,480	1,580	1,649	1,594
British Columbia	736	824	821	806 ^E	840
Total research and development	1,619	2,338	2,699	2,702	2,629
New Brunswick	..	..	134	141	137 ^E
Quebec ²	154	791	775	785	785
Ontario	539	558	617	549	497
Manitoba	55	77	66	133	111
Saskatchewan ¹	..	..	71 ^E	75	63
Alberta	675	731	840	809	811
British Columbia	196	181	196	212 ^E	225
Total related scientific activities	3,326	3,630	4,002	4,156	3,830
New Brunswick	..	..	262	260	252 ^E
Ontario	1,613	1,687	1,723	1,662	1,554
Manitoba	519	551	535	551	377
Saskatchewan ¹	..	..	117 ^E	249	249
Alberta	654	749	740	840	783
British Columbia	540	643	625	594 ^E	615

1. Saskatchewan conducted a limited pilot of seven ministries in 2007/2008. The difference in expenditures contributes to the differences between the 2007/2008 pilot survey and 2008/2009 data results including fifteen ministries. A large one time capital expenditure increased related scientific activities expenditures in 2008/2009. Research and development expenditures increased in 2009/2010 due to actual data being received for a ministry which previously provided estimates.
2. Since 1994/1995, the Quebec provincial government collects only research and development activities. These research and development expenditures are not included in the science and technology totals.

Note(s): Full-time equivalent. Components may not add to total due to rounding.

Table 12-2
Personnel of provincial governments engaged in scientific activities — By activity and category, 2009/2010

	New Brunswick ^E	Quebec ¹	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total participating provinces
	number							
Total scientific activities	389	..	2,051	488	313	1,594	840	5,674
Scientific and professional	166	..	1,104	292	145	731	515	2,953
Technical	160	..	488	137	98	480	231	1,594
Other	63	..	459	59	69	384	94	1,128
Research and development	131	601	403	94	34	672	219	2,153
Scientific and professional	38	377	222	58	9	243	164	1,111
Technical	60	184	152	28	25	232	42	722
Other	33	40	29	8	0	197	13	321
Administration of extramural programs for research and development	6	184	94	16	29	139	6	474
Scientific and professional	3	92	63	14	6	70	3	250
Technical	2	68	3	1	1	17	1	92
Other	1	24	28	2	23	53	1	133
Related scientific activities	247	..	1,466	371	237	686	609	3,616
Scientific and professional	121	..	805	215	122	348	344	1,954
Technical	98	..	330	109	72	218	187	1,013
Other	28	..	332	48	43	119	78	649
Administration of extramural programs for related scientific activities	6	..	88	6	12	97	6	214
Scientific and professional	4	..	15	6	9	70	4	107
Technical	0	..	3	0	1	13	0	17
Other	1	..	69	0	3	14	3	90

1. Since 1994/1995, the Quebec provincial government collects only research and development activities. These research and development expenditures are not included in the science and technology totals.

Note(s): Full-time equivalent. Components may not add to total due to rounding.

Table 12-3
Personnel of provincial governments engaged in scientific activities — By activity, in the natural sciences and engineering

	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010
	number				
Participating provinces					
Total science and technology	3,814	4,086	4,605	4,552	4,307
New Brunswick	..	..	285	283	276 ^E
Ontario	1,709	1,739	1,820	1,685	1,575
Manitoba	287	334	304	320	290
Saskatchewan ¹	..	..	130 ^E	176	157
Alberta	1,256	1,375	1,403	1,447	1,377
British Columbia	562	638	663	641 ^E	631
Total research and development	1,512	1,969	2,294	2,247	2,174
New Brunswick	..	..	111	109	102 ^E
Quebec ²	154	529	513	526	515
Ontario	489	504	553	488	433
Manitoba	43	56	47	57	68
Saskatchewan ¹	..	..	62 ^E	62	49
Alberta	674	723	822	802	793
British Columbia	152	157	186	203 ^E	213
Total related scientific activities	2,457	2,647	2,826	2,831	2,649
New Brunswick	..	..	174	174	174 ^E
Ontario	1,220	1,235	1,268	1,197	1,142
Manitoba	244	278	258	263	222
Saskatchewan ¹	..	..	68 ^E	114	108
Alberta	583	652	581	645	584
British Columbia	410	482	477	438 ^E	419

1. Saskatchewan conducted a limited pilot of seven ministries in 2007/2008. The difference in expenditures contributes to the differences between the 2007/2008 pilot survey and 2008/2009 data results including fifteen ministries. A large one time capital expenditure increased related scientific activities expenditures in 2008/2009. Research and development expenditures increased in 2009/2010 due to actual data being received for a ministry which previously provided estimates.
2. Since 1994/1995, the Quebec provincial government collects only research and development activities. These research and development expenditures are not included in the science and technology totals.

Note(s): Full-time equivalent. Components may not add to total due to rounding.

Table 12-4
Personnel of provincial governments engaged in scientific activities — In the natural sciences and engineering, by activity and category, 2009/2010

	New Brunswick ^E	Quebec ¹	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total participating provinces
	number							
Total scientific activities	276	..	1,575	290	157	1,377	631	4,307
Scientific and professional	67	..	771	135	53	596	347	1,968
Technical	147	..	445	117	45	466	194	1,415
Other	62	..	359	38	58	316	90	924
Research and development	102	389	359	54	21	666	207	1,797
Scientific and professional	19	194	186	27	6	238	151	821
Technical	50	164	146	21	14	232	42	668
Other	33	31	28	6	0	196	13	308
Administration of extramural programs for research and development	0	125	74	14	29	128	6	376
Scientific and professional	0	62	50	11	5	60	3	192
Technical	0	46	1	1	1	17	1	66
Other	0	18	23	2	23	52	1	119
Related scientific activities	172	..	1,068	219	103	522	414	2,498
Scientific and professional	47	..	529	94	37	260	190	1,156
Technical	97	..	298	96	30	205	150	876
Other	28	..	242	30	35	58	74	466
Administration of extramural programs for related scientific activities	2	..	74	3	5	62	5	151
Scientific and professional	0	..	6	3	4	39	2	55
Technical	0	..	1	0	1	13	0	14
Other	1	..	67	0	1	10	3	82

1. Since 1994/1995, the Quebec provincial government collects only research and development activities.

Note(s): Full-time equivalent. Components may not add to total due to rounding.

Table 12-5
Personnel of provincial governments engaged in scientific activities — In the social sciences and humanities

	2005/2006 ^f	2006/2007 ^f	2007/2008 ^f	2008/2009	2009/2010
	number				
Total participating provinces	978	1,089	1,321	1,521	1,368
New Brunswick	..	..	111	119	113 ^E
Ontario	443	505	519	526	476
Manitoba	288	293	297	364	198
Saskatchewan ¹	..	..	59 ^E	147	156
Alberta	73	105	177	202	216
British Columbia	174	186	158	164 ^E	209

1. Saskatchewan conducted a limited pilot of seven ministries in 2007/2008. The difference in expenditures contributes to the differences between the 2007/2008 pilot survey and 2008/2009 data results including fifteen ministries. A large one time capital expenditure increased related scientific activities expenditures in 2008/2009. Research and development expenditures increased in 2009/2010 due to actual data being received for a ministry which previously provided estimates.

Note(s): Full-time equivalent. Components may not add to total due to rounding.

Table 12-6
Personnel of provincial governments engaged in scientific activities — In the social sciences and humanities, by activity and category, 2009/2010

	New Brunswick ^E	Quebec ¹	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total participating provinces
	number							
Total scientific activities	113	..	476	198	156	216	209	1,368
Scientific and professional	99	..	333	157	92	135	168	984
Technical	13	..	43	20	53	14	37	179
Other	1	..	99	21	11	68	4	204
Research and development	29	212	44	40	14	6	13	357
Scientific and professional	19	183	36	31	3	5	13	290
Technical	10	20	7	7	11	0	0	54
Other	0	10	1	2	0	1	0	14
Administration of extramural programs for research and development	6	58	20	3	1	12	0	99
Scientific and professional	3	30	12	3	1	10	0	58
Technical	2	22	2	0	0	0	0	26
Other	1	6	5	0	0	2	0	14
Related scientific activities	75	..	398	152	135	163	195	1,118
Scientific and professional	74	..	276	121	85	88	154	797
Technical	1	..	32	13	42	13	37	138
Other	0	..	90	18	8	62	4	183
Administration of extramural programs for related scientific activities	4	..	14	3	7	35	1	64
Scientific and professional	4	..	9	2	4	31	1	51
Technical	0	..	2	0	1	1	0	4
Other	0	..	3	0	2	4	0	8

1. Since 1994/1995, the Quebec provincial government collects only research and development activities.

Note(s): Full-time equivalent. Components may not add to total due to rounding.

Table 13
Provincial governments scientists and professionals engaged in scientific activities, by activity and by province

	2005/2006 ^r	2006/2007 ^r	2007/2008 ^r	2008/2009	2009/2010
	number				
Participating provinces					
Total science and technology	2,488	2,735	3,228	3,205	2,953
New Brunswick	..	..	171	180	166 ^E
Ontario	1,066	1,105	1,321	1,223	1,104
Manitoba	357	385	382	407	292
Saskatchewan ¹	..	..	115 ^E	210	145
Alberta	668	762	762	707	731
British Columbia	397	483	477	478 ^E	515
Total research and development	780	1,246	1,467	1,415	1,360
New Brunswick	..	..	41	48	41 ^E
Quebec ²	104	438	438	446	469
Ontario	263	257	378	342	284
Manitoba	38	45	37	77	72
Saskatchewan ¹	..	..	47 ^E	45	15
Alberta	253	386	389	311	313
British Columbia	122	120	137	146 ^E	167
Total related scientific activities	1,813	1,927	2,200	2,236	2,061
New Brunswick	..	..	130	132	125 ^E
Ontario	804	848	943	881	820
Manitoba	319	340	345	330	220
Saskatchewan ¹	..	..	68 ^E	165	131
Alberta	415	376	373	396	418
British Columbia	275	363	341	332 ^E	348

1. Saskatchewan conducted a limited pilot of seven ministries in 2007/2008. The difference in expenditures contributes to the differences between the 2007/2008 pilot survey and 2008/2009 data results including fifteen ministries. A large one time capital expenditure increased related scientific activities expenditures in 2008/2009. Research and development expenditures increased in 2009/2010 due to actual data being received for a ministry which previously provided estimates.
 2. Since 1994/1995, the Quebec provincial government collects only research and development activities. These research and development expenditures are not included in the science and technology totals.
- Note(s):** Full-time equivalent. Components may not add to total due to rounding.

Table 14
Total expenditures of provincial research organizations on scientific activities, by activity and by institute

	2005	2006	2007	2008	2009
	thousands of dollars				
Total science and technology	72,025	75,637	111,890	99,471	92,748
New Brunswick Research and Productivity Council	8,649	8,791	9,070	9,188	9,232
Centre de recherche industrielle du Québec	32,093	31,944	30,358	31,436	25,207
Industrial Technology Centre (Manitoba)	2,607	2,419	2,519	2,782	2,691
Saskatchewan Research Council	26,166	29,859	33,300	36,668	49,158
Northern Research Institute	984	888	809	1,674	2,519
Nunavut Research Institute	0	0	0	0	0
Aurora Research Institute (Northwest Territories)	1,526	1,736	35,834	17,723	3,941
Total research and development	23,026	21,812	56,910	38,240	35,531
New Brunswick Research and Productivity Council	1,989	2,021	2,268	1,838	2,488
Centre de recherche industrielle du Québec	10,360	7,820	8,882	8,323	11,149
Industrial Technology Centre (Manitoba)	0	0	0	0	0
Saskatchewan Research Council	10,467	11,646	11,322	12,101	20,329
Northern Research Institute	210	325	248	1,114	1,506
Nunavut Research Institute	0	0	0	0	0
Aurora Research Institute (Northwest Territories)	0	0	34,190	14,864	59
Total related scientific activities	48,999	53,826	54,980	61,231	57,217
New Brunswick Research and Productivity Council	6,660	6,770	6,802	7,350	6,744
Centre de recherche industrielle du Québec	21,733	24,125	21,476	23,113	14,058
Industrial Technology Centre (Manitoba)	2,607	2,419	2,519	2,782	2,691
Saskatchewan Research Council	15,699	18,213	21,978	24,567	28,829
Northern Research Institute	774	563	561	560	1,013
Nunavut Research Institute	0	0	0	0	0
Aurora Research Institute (Northwest Territories)	1,526	1,736	1,644	2,859	3,882

Note(s): As of 2006 the Yukon Research Institute is known as the Northern Research Institute. Components may not add to total due to rounding.

Table 15
Distribution of provincial research organization personnel, by institute, 2009

	Research and development			Science and technology		
	Scientific and professional	Technical	Other	Scientific and professional	Technical	Other
	number					
New Brunswick Research and Productivity Council	14	11	7	31	51	17
Centre de recherche industrielle du Québec	48	21	3	74	35	134
Industrial Technology Centre (Manitoba)	0	0	0	5	10	3
Saskatchewan Research Council	74	38	37	116	165	105
Northern Research Institute	7	0	1	14	0	2
Nunavut Research Institute	0	0	0	0	0	0
Aurora Research Institute (Northwest Territories)	0	0	0	3	2	8

Note(s): Full-time equivalent. As of 2006 the Yukon Research Institute is known as the Northern Research Institute. Components may not add to total due to rounding.

Survey methodology

Foreword

The information in this document is intended primarily to be used by science and technology (S&T) policy makers, both federal and provincial, largely as a basis for interprovincial and intersectoral comparisons. The surveys which generate these statistical estimates also provide input for the development of a national aggregate Research and Development (R&D) series, which are used to populate the Canadian components of international questionnaires for the Organization for Economic Co-operation and Development (OECD) and the United Nations Education, Scientific and Cultural Organization (UNESCO).

These statistical estimates are the aggregates of provincial government science surveys that are collected by individual provinces, and processed by Statistics Canada under contract with the provinces for the period 2005/2006 to 2009/2010. The provincial government sector consists of all provincial government departments, ministries, selected provincial agencies and provincial research organizations (PRO). The PRO are surveyed separately and included in this paper.

In the past, surveys have been conducted in as many as nine provinces, the exception being Prince Edward Island. For this reference period, surveys were conducted by Ontario, Manitoba, Saskatchewan, Alberta and British Columbia. The following ministries or departments are the respective survey sponsors: Ontario Ministry of Research & Innovation; Manitoba Department of Science, Technology, Energy & Mines; Saskatchewan Advanced Education, Employment and Labour; Alberta Advanced Education and Technology and British Columbia Ministry of Jobs, Tourism and Innovation.

2009/2010 reference year data were not obtained from New Brunswick. 2008/2009 reference year data were not obtained from British Columbia. Forecasted figures were used from these provinces' respective 2008/2009 and 2007/2008 survey results. These figures are marked through-out the tables as "use with caution", as they were not reported as final expenditures. As such, caution should be used when comparing these statistics for New Brunswick and British Columbia over time.

The difference in year-over-year expenditures, in Saskatchewan, can be attributed to the differences between the 2007/2008 pilot survey of seven ministries and the 2008/2009 survey of fifteen ministries. 2007/2008 expenditures by Saskatchewan are also marked as "use with caution".

The Institut de la Statistique du Québec conducts a similar survey that collects research and development (R&D) data but does not collect related science activities (RSA) data. For this reason, S&T data are not available for Quebec.

Science surveys, like other surveys, depend on the respondents' understanding of concepts, definitions and methods of calculation. Accounting records are rarely available in formats which use science-based classifications. Extensive efforts are undertaken each year to support provinces in communicating standard explanations of concepts, definitions and calculations to promote statistical coherence and provincial comparability. The same standards are applied to the data of each province as are applied to data of the federal government and all sectors, according to the principles of the OECD *Frascati Manual* that sets the international standard for the definition and measurement of S&T (R&D and RSA).

Recognizing that survey data are estimates, they still offer a good representation of science expenditures for the provinces. As in any ongoing statistical exercise, revisions will be necessary as definitions and procedures are clarified by respondents.

For Gross Domestic Expenditures on R&D (GERD), no estimates are made for provinces for which there are not corresponding surveys. *Gross Domestic Expenditures on Research and Development in Canada and the Provinces*,

National Estimates 2000 to 2011 Provincial Estimates 2005 to 2009 (Catalogue no. 88-221) are scheduled for publication in the fall of 2011.

Statistics Canada thanks respondents who supported provincial and PRO surveys. Without their invaluable help and cooperation, the production of this report would not have been possible.

History of provincial government science and technology surveys

Prior to 1974, estimates were made for provincial government S&T expenditures using provincial estimates and Public Accounts.

In 1974, Ontario, Alberta and Nova Scotia sought the assistance of Statistics Canada to conduct surveys of S&T spending by their respective governments. In 1975, Saskatchewan joined this group, followed by British Columbia in 1977, Manitoba and New Brunswick in 1984, Newfoundland and Labrador in 1986 and Quebec in 1989.

In 1993/1994, three provinces, Newfoundland and Labrador, New Brunswick and Nova Scotia, did not contract surveys with Statistics Canada due to budget constraints. In 1994/1995, the province of Quebec first began collecting only R&D expenditures instead of total S&T. In 2001/2002 Saskatchewan did not contract a survey with Statistics Canada.

Saskatchewan conducted a limited pilot of 7 ministries when collecting data for reference year 2007/2008. For 2008/2009 the survey included 15 ministries. This difference in survey coverage contributes to the year-over-year expenditure and personnel changes.

In 2008/2009, British Columbia did not contract Statistics Canada to conduct a survey, but they returned to the survey activity in 2009/2010. In 2006/2007, the province of Newfoundland and Labrador participated in the survey. In 2008/2009, New Brunswick successfully completed collection for three fiscal years 2007/2008, 2008/2009 and 2009/2010. We are pleased to announce the participation of Prince Edward Island, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia in the Provincial Scientific Activities Survey for the 2010/2011 reference year.

Provincial research organizations

All of these organizations have been established by their respective provincial and territorial governments, with a variety of enabling legislation and powers, to:

- provide technical support to primary and secondary industries;
- assist in the exploitation of provincial and territorial natural resources; and
- enhance the economy of their provinces and territories.

Small and medium-sized companies with limited in-house technical capability use the services of these provincial research organizations.

The questionnaire for the Scientific Activities of Provincial Research Organizations: Activities in the natural sciences and engineering was redesigned for reference year 2009.

Federal / provincial workshops on scientific and technological (S&T) statistics

In the fall of 1977, the first federal-provincial meeting was held in Ottawa. Representatives from British Columbia, Alberta, Saskatchewan, Ontario and Nova Scotia attended; as well as Statistics Canada and members of the Ministry of State for Science and Technology (MOSST).

The next meeting was held in 1984 with representatives from British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec and New Brunswick attending. Statistics Canada sponsored the meeting and invited

representatives from MOSST, Energy, Mines and Resources (EMR) and the Science Council. The objectives of the conference were to:

- Provide provincial science policy and statistical users with an overview of products and services of the Science and Technology Statistics Division (STSD);
- Provide a forum to allow discussion between STSD and provincial representatives to exchange views on science statistics; and
- Achieve consensus on how to proceed with future provincial surveys.

In 1999, Ontario proposed that Statistics Canada renew federal/provincial conferences as an annual event. Statistics Canada agreed and co-hosted the 1999 conference in Toronto. The agenda included topics such as innovation surveys, biotechnology surveys, intellectual properties in higher education, e-commerce and provincial needs and proposals.

Quebec and Statistics Canada co-hosted the 2000 conference held in Québec City. Discussions included economic indicators, an innovation study for Ontario, and biotechnology measurement.

In the fall of 2001, British Columbia and Statistics Canada co-hosted the conference in Victoria. Provincial representatives discussed high technology indicators, innovation index, and user needs and challenges. Statistics Canada presented an overview of current program developments and future plans.

Alberta and Statistics Canada co-hosted the 2002 conference held in Edmonton. Discussions included provincial indicators and an overview of current program developments and future plans.

In the fall of 2003, Statistics Canada did not host the 5th annual conference in Ottawa, which was postponed due to budget constraints. The conference has not been re-instated.

Definitions

This report covers those scientific and technological activities which involve the generation, dissemination and application of new scientific and technological knowledge. The central activity is research and experimental development (R&D). In addition, there are a number of activities closely related to R&D; these are termed related scientific activities (RSA).

R&D is creative work undertaken on a systematic basis in order to increase the stock of scientific and technical knowledge, including knowledge of humans, culture and society and the use of this stock of knowledge to devise new applications.

It requires the acquisition of knowledge and not just information. New knowledge involves the integration of newly acquired information into existing hypotheses or the re-evaluation of existing observations.

The major related scientific activities are education support, technical surveys, statistical surveys, information services, special services and studies, and museum services. Education support and museum services are largely self-explanatory.

Technical surveys are activities directed towards exploration and systematic description of the earth and its natural resources. The activities include gathering, processing, collating and analyzing of data on natural phenomena except when part of a research project or a museum service. The preparation of maps and survey reports, their printing and cataloguing, are also included.

Statistical surveys are activities directed toward the collecting, processing and disseminating of statistics on humankind, their economic and social activities. Included are the development of technical methodology, statistical analysis and vital statistics.

Information services are all work directed to recording, classifying, translating, and disseminating science and technology information. Included are the operations of specialized libraries and archives, the publication of

scholarly journals and bibliographies, and the organizing of scientific conferences. Grants for the publication of scholarly works are also included.

Special services and studies in the natural sciences are activities directed towards the establishment of national and provincial standards for materials, devices, products and processes; the calibration of secondary standards; non-routine quality testing; feasibility studies and demonstration projects.

In the social sciences, special services and studies are systematic investigations carried out in order to provide information needed for planning or policy formulation, including feasibility studies and demonstration projects.

Scientific and technological activities take place in both natural sciences and engineering and the social sciences and humanities. The natural sciences and engineering consist of disciplines concerned with understanding, exploring, developing or utilizing the natural world. The social sciences and humanities embrace all disciplines involving the study of human actions and conditions and the social, economic and institutional mechanisms affecting humans.

Six performing sectors are identified

1. **Intramural** refers to the provincial ministry, department or agency performing a scientific activity.
2. **Business enterprise** denotes largely private corporations but also includes crown corporations with a commercial function (e.g., power utilities) and industrial research institutes not controlled by another institution.
3. **Higher education sector** covers post secondary educational institutions and affiliated teaching and research facilities.
4. **Hospitals and health organizations** – Canadian hospitals and health organizations which are not part of university medical schools, as well as private non-profit organizations related to health.
5. **Provincial research organizations** include: New Brunswick Research and Productivity Council, Centre de recherche industriel du Québec, Industrial Technology Centre (Manitoba), Saskatchewan Research Council, Northern Research Institute, Nunavut Research Institute, Aurora Research Institute (Aurora College N.W.T.)
6. **Other** includes the federal government, municipal governments, individuals, institutions not identified with any other sector, and foreign performers.

Departmental personnel are classified into three major categories. Scientific and professional includes persons in a job requiring at least one academic degree or nationally recognized professional qualification. The Technical category includes people in jobs requiring specialized vocational or technical training beyond the secondary level. Other includes clerical, secretarial, administrative, operational and other support personnel. Personnel data are reported in full-time equivalent which is simply the portion of a person's time spent on S&T activities.

Objectives of expenditures on scientific activities

The objectives listed in this survey do not represent the total range of possible objectives; however, they are intended to cover the major areas of current technological interest. Respondents are asked to report expenditures under the objective which is primary to that expenditure. The following list of examples although not exhaustive was presented in the survey guide to assist respondents.

Socio-economic objectives allow departments/ministries/agencies to classify their S&T resource allocations according to the purpose for which the expenditure is intended. The objectives are listed on the questionnaire at the highest level of aggregation with sub-levels given here for clarification of categories. In many cases, projects have multiple objectives and a department should assign its expenditures consistent with the stated objectives of the department. Care must be taken to avoid "double counting".

Values are identified by either R&D or RSA, and by either intramural performers or extramural performers.

The objectives are based on the Nomenclature for the Analysis and Comparison of Scientific Programs and Budgets (NABS) produced by the Statistical Office of the European Communities (Eurostat).

1. Exploration and exploitation of the earth - scientific activities with objectives related to the exploration of the earth's crust and mantle, seas, oceans and atmosphere, and scientific activities on their utilization. It also includes climatic and meteorological research (e.g., drought management and the analysis of precipitation standards), polar exploration (under various headings, as appropriate) and hydrology.

- General scientific activities
- Mineral, oil and natural gas prospecting
- Exploration and exploitation of the sea-bed
- Earth's crust and mantle excluding sea-bed and studies of soil for agriculture (6)
- Hydrology - excludes scientific activities on: water supplied and disposal (2) and water pollution (3)
- Sea and oceans
- Climatic and meteorological services
- Atmosphere
- Other scientific activities on the exploration and exploitation of the earth

Excludes: scientific activities on pollution, soil improvement, land-use and fishing.

2. Infrastructure and general planning of land use - scientific activities on infrastructure and land development, including research on the construction of buildings. More generally, it covers all scientific activities relating to the general planning of land use. This includes scientific activities into protection against harmful effects in town and country planning but not scientific activities into other types of pollution.

2.1 Transportation systems – covers scientific activities on transport systems, including road accident prevention and ancillary services such as electronic traffic aids and radar stations. Also included is general scientific activities on transport systems, road and rail traffic, inland waterway and sea transport, air traffic, pipeline transport systems, works transport systems, combined transport systems and scientific activities on the potential effects on the environment of the planning and operation of transport systems. Scientific activities on transport equipment is included only when it forms part of the co-ordinated programs for the development of improved and safer transport systems, otherwise, such research is classified in Objective 9.

2.2 Telecommunication systems – covers scientific activities on telecommunications services and the planning and organization of telecommunications networks. It includes, in particular, general scientific activities on telecommunications systems, telephones, telex, data transmission, radio and television (including cable TV).

2.3 Other scientific activities on the infrastructure and general planning of Land use i.e.

- General scientific activities
- General planning of land use
- Construction and planning of building
- Civil engineering - excludes scientific activities on building materials and industrial processes (objective 9)"
- Water supply

3. Control and care of the environment – covers scientific activities into the control of pollution, aimed at the identification and analysis of the sources of pollution and their causes, and all pollutants, including their dispersal in the environment and the effects on man, species (fauna, flora, micro organisms) and biosphere. Development of monitoring facilities for the measurement of all kinds of pollution is included. The same is valid for the elimination and prevention of all forms of pollution in all types of environment.

- General scientific activities on the environment
- Protection of atmosphere and climate
- Protection of ambient air
- Solid waste
- Protection of ambient water
- Protection of soil and groundwater
- Noise and vibration
- Protection of species and habitats
- Protection against natural hazards
- Radioactive pollution
- Other scientific activities on the environment

Protection and improvement of human health - scientific activities aimed at protecting, promoting and restoring human health broadly interpreted to include health aspects of nutrition and food hygiene. It ranges from preventative medicine, including all aspects of medical and surgical treatment, both for individuals and groups, and the provision of hospital and home care, to social medicine and paediatric and geriatric research.

- General scientific activities
- Medical scientific activities, hospital treatment, surgery
- Preventative medicine
- Biomedical engineering and medicines
- Occupational medicine
- Nutrition and food hygiene
- Drug abuse and addiction
- Social medicine
- Hospital structure and organization of medical care
- Other medical scientific activities

Production, distribution and rational utilization of energy - covers scientific activities into the production, storage, transportation, distribution and rational use of all forms of energy. It also includes scientific activities on processes designed to increase the efficiency of energy production and distribution, and the study of energy conservation.

- General scientific activities
- Fossil fuels and their derivatives
- Nuclear fission
- Radioactive waste management including decommissioning with regard to fuel/energy
- Hydroelectric energy
- Nuclear fusion
- Conservation
- Renewable energy sources
- Rational utilization of energy
- Other scientific activities on production, distribution and rational utilization of energy

6. Agricultural production and technology - covers scientific activities on animal products, veterinary medicine, crops, agricultural technology, agricultural biotechnology and other scientific activities on agricultural production and technology. It includes: scientific activities on chemical fertilizers, pesticides, insecticides, herbicides, biological pest control and the mechanization of agriculture; evaluation of the impact of scientific activities promoting productivity and technology in agriculture.

7. Fishing – covers scientific activities on fishing, salting, drying and initial freezing of products (but not on preparation and canning; objective 9). Scientific activities on fish-farming, exploration of new fishing grounds, exploration and development of new and unconventional sources of seafood.

8. Forestry – covers scientific activities into the ecological and economic aspects of forestry and timber production.

9. Industrial production and technology - covers scientific activities on the improvement of industrial production and technology. It includes scientific activities on industrial products and their manufacturing processes except where they form an integral part of the pursuit of other objectives (e.g. energy, agriculture, fishing, forestry).

- General scientific activities
- Increasing economic efficiency and competitiveness
- Manufacturing and processing techniques
- Extraction and processing of non-energy minerals and derived products
- Products of the chemical industry
- Petrochemical and coal by-products
- Pharmaceutical products
- Manufacture of motor vehicles and other means of transport
- Aerospace equipment manufacturing and repairing

- Manufacture of motor vehicles and parts
- Manufacture of other modes of transportation
- Electronic and related industries
- Manufacture of office machinery and data-processing equipment
- Manufacture of radio, television and communications equipment and apparatus
- Software development
- Manufacture of electrical machinery and apparatus
- Manufacture of non-electronic and non-electrical machinery
- Manufacture of instruments
- Manufacture of medical and surgical equipment and orthopaedic appliances
- Manufacture of food products and beverages
- Manufacture of clothing and textiles and leather goods
- All other manufacturing products
- Recycling

10. Social structures and relationships – scientific activities on social objectives, as analysed in particular by social and human sciences, which have no obvious connection with other objectives. This analysis includes quantitative, qualitative, organizational and forecasting aspects of social problems.

- General scientific activities
- Education, training, recurrent education and retraining
- Cultural activities, sport and recreation
- Human resources
- Management of businesses and institutions
- Improvement of working conditions
- Social security system
- Political structure of society
- Social change, social processes and social conflicts
- Urban and regional studies
- Other scientific activities with regard to society

11. Exploration and exploitation of space - all civil space scientific activities. Although civil space research is not, in general, concerned with particular objectives, it frequently has a specific goal, such as the increase of general knowledge (e.g., astronomy), or relates to particular applications (e.g., telecommunications satellites).

- General scientific activities
- Applied research programs
- Other research on the exploration and exploitation of space

12. Basic research (advancement of science) - basic activities motivated by scientific curiosity with the objective of increasing scientific knowledge. It also includes funding used to support postgraduate studies and fellowships.

- Mathematics and computer sciences
- Physical sciences
- Chemical sciences
- Biological sciences
- Earth and related (environmental) sciences
- Engineering sciences
- Medical sciences
- Agricultural sciences
- Social sciences
- Humanities

13. Other civil research - civil scientific activities which cannot (yet) be classified to a particular objective.