Catalogue no. 88-001-XIE

Science Statistics

May 2007 edition

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Statistics Canada
Science, Innovation and Electronic Information Division

Science Statistics

May 2007 edition

Published by authority of the Minister responsible for Statistics Canada

May 2007

Catalogue no. 88-001-XIE, Vol. 31, No. 3

ISSN 1209-1278

Frequency: Irregular

Ottawa

La version française de cette publication est disponible sur demande (nº 88-001-XIF au catalogue).

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Symbols

The following standard symbols are used in Statistics Canada publications:

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

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Chart

Highlights

Biotechnology scientific activities in federal government departments and agencies, 2005/2006

- The federal government spent $861 million on biotechnology scientific activities in fiscal year 2005/2006, the higher education sector received $469 million or 54% (table 1-1).
- This federal spending was up 7.1% from $804 million in the previous year. Spending on biotechnology represented 9% of all federal spending on science and technology (S&T) (table 3).
- The majority (96%) of federal biotechnology spending was concentrated on research and development (table 1-1).
- The federal government departments and agencies performed almost one-third (32%) of the biotechnology S&T activities, the rest was performed outside the federal government. The higher education sector received $469 million or over half (54%) of the total (table 1-1).
- There was a total of 1,854 full-time equivalent (FTE) personnel dedicated to biotechnology S&T activities in the federal government in 2005/2006. This is an increase of 3.5% from the previous year's total of 1,792 (table 5-1).

Analysis

Biotechnology scientific activities in federal government departments and agencies, 2005/2006

Data on science and technology (S&T) expenditures and full-time equivalent (FTE) personnel allocated to biotechnology for fiscal year 2005/2006 were collected from selected federal government departments and agencies. This information contributes to the work of the Canadian Biotechnology Strategy.

The biotechnology S&T data comprise expenditures on research and development (R&D) and related scientific activities (RSA) for both intramural and extramural performers and the FTE personnel associated with these activities.

The federal government's science and technology expenditures on biotechnology in 2005/2006 reached $861 million with research and development accounting for 96% of this spending or $823 million (table 1-1). Spending on biotechnology represents 9% of total federal science and technology expenditures of $9.3 billion (table 3).

The largest recipient of federal science and technology expenditures on biotechnology continued to be the higher education sector receiving $469 million with the federal government departments and agencies placing second with $273 million (table 1-1).

The main contributors for science and technology funding of biotechnology activities in the higher education sector continued to be the Canadian Institutes for Health Research at $292 million, followed by the Canada Foundation for Innovation at $107 million and the Natural Sciences and Engineering Research Council at $63 million in 2005/2006 (table 1-2).

The National Research Council continued to account for the largest share of the federal government spending at $115 million followed by Agriculture and Agri-Food Canada at $67 million (table 1-2).

In 2005/2006 a total of 1,854 FTE personnel dedicated to biotechnology science and technology activities up 3.5% from the previous fiscal year and representing the first increase in federal government personnel devoted to these scientific activities since 2002/2003 (table 5-1).

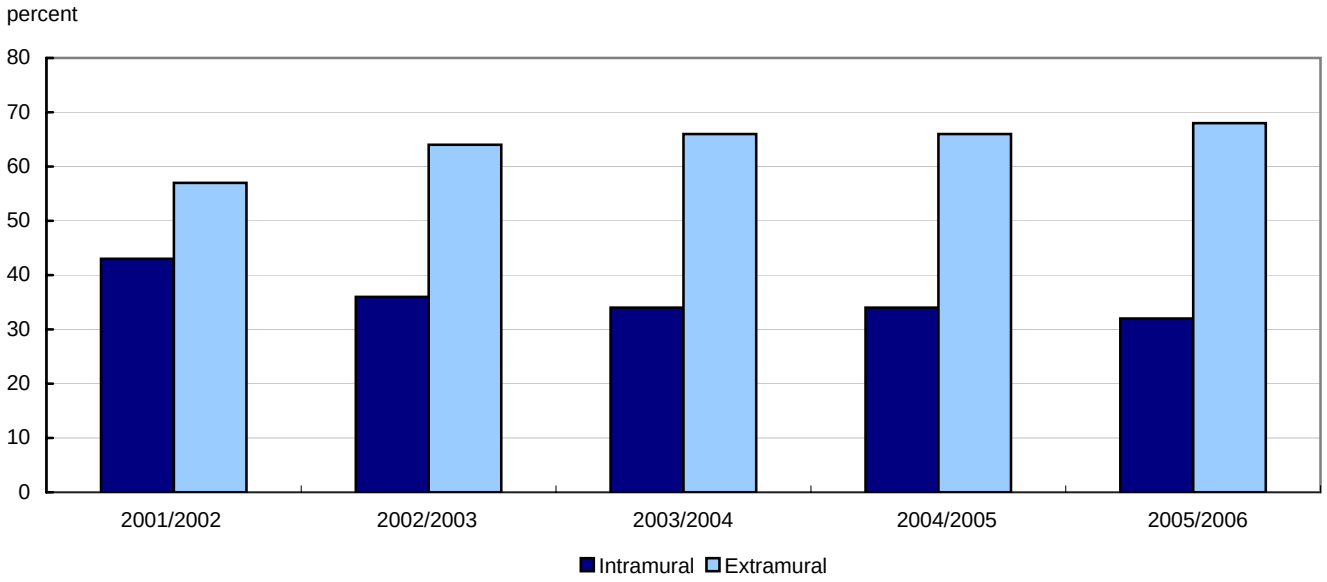
The largest share of FTE personnel dedicated to biotechnology science and technology activities in federal government departments and agencies was scientific and professional personnel (773 FTE) at 42% followed by technicians (639 FTE) at 34% and other (442 FTE) at 24% (table 5-2).

Genome Canada dedicated the highest share of its science and technology FTE personnel to biotechnology science and technology activities at 98% (table 7).

Genome Canada's primary responsibility is to fund research programs for genomics and proteomics which are components of biotechnology.

The National Research Council which had the largest number of FTE personnel dedicated to biotechnology science and technology activities (686 FTE) devoted just 17% of its total science and technology personnel to biotechnology (table 7).

Chart 1
Federal government S&T expenditures on biotechnology by performer, 2001/2002 to 2005/2006



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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

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

Selected summary tables from Statistics Canada

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

Statistical tables

Table 1-1
Federal government science and technology (S&T) expenditures on biotechnology — Activity and performer

	Intramural	Business enterprise	Higher education	Other performers [1]	Foreign performers	Total
	thousands of dollars					
2005/2006						
Total	**273,351**	**16,702**	**468,595**	**96,895**	**5,374**	**860,917**
Research and development	248,128	16,169	456,824	96,748	4,903	**822,772**
Related scientific activities	25,223	533	11,771	147	471	**38,145**
2004/2005 [r]						
Total	**274,868**	**34,043**	**402,621**	**87,992**	**4,637**	**804,161**
Research and development	250,248	33,467	393,321	86,837	4,123	**767,996**
Related scientific activities	24,620	576	9,300	1,155	514	**36,165**
2003/2004 [r]						
Total	**255,996**	**27,361**	**379,116**	**88,656**	**5,110**	**756,239**
Research and development	234,891	26,038	370,359	87,412	4,591	**723,291**
Related scientific activities	21,105	1,323	8,757	1,244	519	**32,948**
2002/2003 [r]						
Total	**246,346**	**31,352**	**340,096**	**57,798**	**4,810**	**680,402**
Research and development	228,100	30,056	332,745	56,819	4,294	**652,014**
Related scientific activities	18,246	1,296	7,351	979	516	**28,388**
2001/2002 [r]						
Total	**239,485**	**33,457**	**206,345**	**79,887**	**4,366**	**563,540**
Research and development	227,942	32,881	199,034	79,121	3,785	**542,763**
Related scientific activities	11,543	576	7,311	766	581	**20,777**

1. "Other performers" includes Canadian non-profit institutions and provincial and municipal governments.

Table 1-2
Federal government science and technology (S&T) expenditures on biotechnology — Department or agency and by performer, 2005/2006

	Intramural	Business enterprise	Higher education	Other performers [1]	Foreign performers	Total
	thousands of dollars					
Total	**273,351**	**16,702**	**468,595**	**96,895**	**5,374**	**860,917**
Agriculture and Agri-Food Canada	67,073	0	0	0	0	**67,073**
Canada Foundation for Innovation	2,312	0	107,385	0	0	**109,697**
Canadian Food Inspection Agency	15,959	68	65	17	0	**16,109**
Canadian Institutes of Health Research	20,868	0	291,531	8,025	3,506	**323,930**
Environment Canada	1,096	235	153	27	0	**1,511**
Fisheries and Oceans Canada	3,800	0	50	10	0	**3,860**
Genome Canada	3,700	0	0	87,408	0	**91,108**
Health Canada	14,062	0	33	0	91	**14,186**
Industry Canada	7,436	8,167	0	0	0	**15,603**
National Defence	9,297	1,381	1,673	184	668	**13,203**
National Research Council of Canada	115,400	6,128	0	1,200	0	**122,728**
Natural Resources Canada	7,802	52	493	24	12	**8,383**
Natural Sciences and Engineering Research Council of Canada	3,271	671	62,901	0	1,024	**67,867**
Public Health Agency of Canada	1,018	0	0	0	0	**1,018**
Social Sciences and Humanities Research Council of Canada	257	0	4,311	0	73	**4,641**

1. "Other performers" includes Canadian non-profit institutions and provincial and municipal governments.

Table 1-3
Federal government science and technology (S&T) expenditures on biotechnology — Department or agency

	2001/2002 r	2002/2003 r	2003/2004 r	2004/2005 r	2005/2006
	thousands of dollars				
Total	**563,540**	**680,402**	**756,239**	**804,161**	**860,917**
Agriculture and Agri-Food Canada	63,936	63,936	63,936	67,073	67,073
Canada Foundation for Innovation	43,915	82,700	78,261	71,005	109,697
Canadian Food Inspection Agency	6,721	11,686	12,265	12,399	16,109
Canadian Institutes of Health Research	176,406	232,291	271,135	299,230	323,930
Environment Canada	1,576	1,748	1,747	1,933	1,511
Fisheries and Oceans Canada	3,663	3,663	2,916	3,860	3,860
Genome Canada	34,268	50,013	80,701	82,663	91,108
Health Canada	7,552	14,369	14,592	10,665	14,186
Industry Canada	34,683	27,247	23,630	31,813	15,603
National Defence	0	8,612	13,850	13,453	13,203
National Research Council of Canada	130,592	124,772	121,389	134,319	122,728
Natural Resources Canada	9,110	6,110	8,537	8,173	8,383
Natural Sciences and Engineering Research Council of Canada	48,588	50,339	59,204	63,143	67,867
Public Health Agency of Canada	0	0	0	610	1,018
Social Sciences and Humanities Research Council of Canada	2,530	2,916	4,076	3,822	4,641

Table 2-1
Federal government expenditures on biotechnology in research and development (R&D) activities — Department or agency and by performer, 2005/2006

	Intramural	Business enterprise	Higher education	Other performers [1]	Foreign performers	Total
	thousands of dollars					
Total	**248,128**	**16,169**	**456,824**	**96,748**	**4,903**	**822,772**
Agriculture and Agri-Food Canada	67,073	0	0	0	0	67,073
Canada Foundation for Innovation	2,312	0	107,385	0	0	109,697
Canadian Food Inspection Agency	9,818	68	65	17	0	9,968
Canadian Institutes of Health Research	20,597	0	287,741	7,920	3,461	319,719
Environment Canada	711	0	153	9	0	873
Fisheries and Oceans Canada	3,300	0	50	10	0	3,360
Genome Canada	3,700	0	0	87,408	0	91,108
Health Canada	7,864	0	33	0	91	7,988
Industry Canada	0	8,167	0	0	0	8,167
National Defence	9,272	1,381	1,673	184	668	13,178
National Research Council of Canada	113,233	6,128	0	1,200	0	120,561
Natural Resources Canada	7,184	25	493	0	0	7,702
Natural Sciences and Engineering Research Council of Canada	2,857	400	55,364	0	648	59,269
Public Health Agency of Canada	0	0	0	0	0	0
Social Sciences and Humanities Research Council of Canada	207	0	3,867	0	35	4,109

1. "Other performers" includes Canadian non-profit institutions and provincial and municipal governments.

Table 2-2
Federal government expenditures on biotechnology in research and development (R&D) activities — Department or agency

	2001/2002 r	2002/2003 r	2003/2004 r	2004/2005 r	2005/2006
	thousands of dollars				
Total	**542,763**	**652,014**	**723,291**	**767,996**	**822,772**
Agriculture and Agri-Food Canada	63,936	63,936	63,936	67,073	67,073
Canada Foundation for Innovation	43,915	82,700	78,261	71,005	109,697
Canadian Food Inspection Agency	4,906	8,517	8,378	7,857	9,968
Canadian Institutes of Health Research	172,912	229,448	268,290	296,378	319,719
Environment Canada	1,322	1,223	962	1,357	873
Fisheries and Oceans Canada	2,924	2,924	2,320	3,360	3,360
Genome Canada	34,268	50,013	80,701	82,663	91,108
Health Canada	4,988	6,711	7,462	5,557	7,988
Industry Canada	29,840	21,658	17,305	22,001	8,167
National Defence	0	8,150	13,780	13,316	13,178
National Research Council of Canada	129,177	124,072	118,819	131,183	120,561
Natural Resources Canada	8,983	5,181	7,238	7,210	7,702
Natural Sciences and Engineering Research Council of Canada	43,359	44,922	52,277	55,755	59,269
Public Health Agency of Canada	0	0	0	0	0
Social Sciences and Humanities Research Council of Canada	2,233	2,559	3,562	3,281	4,109

Table 3
Comparison of federal government in S&T expenditures and biotechnology S&T expenditures by department or agency, 2005/2006

	Total S&T expenditures [1]	Biotechnology S&T expenditures	Biotechnology S&T expenditures as a percentage of total S&T expenditures
	thousands of dollars		percent
Total	**9,260,316**	**860,917**	**9**
Agriculture and Agri-Food Canada	360,745	67,073	19
Canada Foundation for Innovation	444,305	109,697	25
Canadian Food Inspection Agency	53,732	16,109	30
Canadian Institutes of Health Research	767,960	323,930	42
Environment Canada	633,691	1,511	0
Fisheries and Oceans Canada	279,201	3,860	1
Genome Canada	92,513	91,108	98
Health Canada	306,346	14,186	5
Industry Canada	449,933	15,603	3
National Defence	430,885	13,203	3
National Research Council of Canada	803,396	122,728	15
Natural Resources Canada	514,323	8,383	2
Natural Sciences and Engineering Research Council of Canada	869,925	67,867	8
Public Health Agency of Canada	75,033	1,018	1
Social Sciences and Humanities Research Council of Canada	574,146	4,641	1
Other	2,604,182	..	..

1. Federal science expenditures and personnel 2006/2007 survey.

Table 4
Comparison of federal government research and development (R&D) expenditures and biotechnology R&D expenditures, department or agency, 2005/2006

	Total R&D expenditures [1]	Biotechnology R&D expenditures	Biotechnology R&D expenditures as a percentage of total R&D expenditures
	thousands of dollars		percent
Total	**5,769,355**	**822,772**	**14**
Agriculture and Agri-Food Canada	254,656	67,073	26
Canada Foundation for Innovation	444,305	109,697	25
Canadian Food Inspection Agency	18,569	9,968	54
Canadian Institutes of Health Research	757,976	319,719	42
Environment Canada	230,300	873	0
Fisheries and Oceans Canada	79,534	3,360	4
Genome Canada	92,513	91,108	98
Health Canada	57,313	7,988	14
Industry Canada	375,427	8,167	2
National Defence	310,612	13,178	4
National Research Council of Canada	711,291	120,561	17
Natural Resources Canada	304,976	7,702	3
Natural Sciences and Engineering Research Council of Canada	759,837	59,269	8
Public Health Agency of Canada	39,006	0	0
Social Sciences and Humanities Research Council of Canada	475,223	4,109	1
Other	857,817	..	..

1. Federal science expenditures and personnel 2006/2007 survey.

Table 5-1
Federal government personnel engaged in biotechnology science and technology (S&T) activities — Category

	Research and development	Related scientific activities	Administration of research and development	Administration of related scientific activities	Total
	number [1]				
2005/2006					
Total	**1,326**	**285**	**234**	**9**	**1,854**
Scientific and professional (includes executive)	561	163	45	4	**773**
Technical	544	90	5	0	**639**
Other [2]	221	32	184	5	**442**
2004/2005 [r]					
Total	**1,316**	**262**	**205**	**9**	**1,792**
Scientific and professional (includes executive)	505	159	38	4	**706**
Technical	577	69	12	0	**658**
Other [2]	234	34	155	5	**428**
2003/2004 [r]					
Total	**1,368**	**271**	**186**	**15**	**1,840**
Scientific and professional (includes executive)	535	161	46	9	**751**
Technical	616	73	4	0	**693**
Other [2]	217	37	136	6	**396**
2002/2003 [r]					
Total	**1,468**	**232**	**141**	**5**	**1,846**
Scientific and professional (includes executive)	579	140	30	3	**752**
Technical	660	64	4	0	**728**
Other [2]	229	28	107	2	**366**
2001/2002 [r]					
Total	**1,361**	**88**	**114**	**2**	**1,565**
Scientific and professional (includes executive)	538	48	33	1	**620**
Technical	613	34	9	0	**656**
Other [2]	210	6	72	1	**289**

1. Full-time equivalent.
2. Includes administrative and foreign service, administrative support, operational and military personnel.

Table 5-2

Federal government personnel engaged in biotechnology science and technology (S&T) activities — Department or agency and by category, 2005/2006

	Scientific and professional	Technical	Other [1]	Total
	number [2]			
Total	**773**	**639**	**442**	**1,854**
Agriculture and Agri-Food Canada	160	160	80	**400**
Canada Foundation for Innovation	5	5	3	**13**
Canadian Food Inspection Agency	51	93	10	**154**
Canadian Institutes of Health Research	23	0	126	**149**
Environment Canada	9	4	0	**13**
Fisheries and Oceans Canada	15	18	2	**35**
Genome Canada	0	0	45	**45**
Health Canada	91	28	7	**126**
Industry Canada	56	0	22	**78**
National Defence	12	10	2	**24**
National Research Council of Canada	274	283	129	**686**
Natural Resources Canada	42	27	1	**70**
Natural Sciences and Engineering Research Council of Canada	17	0	11	**28**
Public Health Agency of Canada	18	11	1	**30**
Social Sciences and Humanities Research Council of Canada	0	0	3	**3**

1. Includes administrative and foreign service, administrative support, operational and military personnel.
2. Full-time equivalent.

Table 6

Federal government personnel engaged in biotechnology research and development (R&D) activities, department or agency and by category, 2005/2006

	Scientific and professional	Technical	Other [1]	Total
	number [2]			
Total	**606**	**549**	**405**	**1,560**
Agriculture and Agri-Food Canada	160	160	80	**400**
Canada Foundation for Innovation	5	5	3	**13**
Canadian Food Inspection Agency	28	41	5	**74**
Canadian Institutes of Health Research	23	0	124	**147**
Environment Canada	4	4	0	**8**
Fisheries and Oceans Canada	15	10	2	**27**
Genome Canada	0	0	45	**45**
Health Canada	55	27	3	**85**
Industry Canada	0	0	0	**0**
National Defence	12	10	2	**24**
National Research Council of Canada	255	270	129	**654**
Natural Resources Canada	35	22	1	**58**
Natural Sciences and Engineering Research Council of Canada	14	0	9	**23**
Public Health Agency of Canada	0	0	0	**0**
Social Sciences and Humanities Research Council of Canada	0	0	2	**2**

1. Includes administrative and foreign service, administrative support, operational and military personnel.
2. Full-time equivalent.

Table 7
Comparison of federal government in science and technology (S&T) personnel and biotechnology S&T personnel, department or agency, 2005/2006

	Total S&T personnel [1]	Biotechnology S&T personnel	Biotechnology personnel in S&T as a percentage of total S&T personnel
	number [2]		percent
Total	**35,182**	**1,854**	**5**
Agriculture and Agri-Food Canada	2,348	400	17
Canada Foundation for Innovation	49	13	27
Canadian Food Inspection Agency	479	154	32
Canadian Institutes of Health Research	357	149	42
Environment Canada	3,469	13	0
Fisheries and Oceans Canada	1,841	35	2
Genome Canada	46	45	98
Health Canada	2,709	126	5
Industry Canada	1,005	78	8
National Defence	2,069	24	1
National Research Council of Canada	3,988	686	17
Natural Resources Canada	3,012	70	2
Natural Sciences and Engineering Research Council of Canada	309	28	9
Public Health Agency of Canada	484	30	6
Social Sciences and Humanities Research Council of Canada	184	3	2
Other	12,833	..	..

1. Federal science expenditures and personnel 2006/2007 survey.
2. Full-time equivalent.

Table 8
Comparison of federal government research and development (R&D) personnel and biotechnology R&D personnel, department or agency, 2005/2006

	Total R&D personnel [1]	Biotechnology R&D personnel	Biotechnology personnel in R&D as a percentage of total R&D personnel
	number [2]		percent
Total	**14,123**	**1,560**	**11**
Agriculture and Agri-Food Canada	1,724	400	23
Canada Foundation for Innovation	49	13	27
Canadian Food Inspection Agency	129	74	57
Canadian Institutes of Health Research	352	147	42
Environment Canada	970	8	1
Fisheries and Oceans Canada	506	27	5
Genome Canada	46	45	98
Health Canada	543	85	16
Industry Canada	356	0	0
National Defence	1,572	24	2
National Research Council of Canada	2,870	654	23
Natural Resources Canada	1,494	58	4
Natural Sciences and Engineering Research Council of Canada	268	23	9
Public Health Agency of Canada	272	0	0
Social Sciences and Humanities Research Council of Canada	106	2	2
Other	2,866	..	..

1. Federal science expenditures and personnel 2006/2007 survey.
2. Full-time equivalent.

Biotechnology scientific activities in federal government departments and agencies, 2005/2006

Definitions

Biotechnology

The application of science & technology (S&T) to living organisms as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods and services.

Natural sciences and engineering

The natural sciences and engineering (NSE) field embraces the disciplines of study concerned with understanding, exploring, developing or utilizing the natural world. Included are the engineering, mathematical, life and physical sciences.

Social sciences and humanities

The social sciences and humanities (SSH) field embraces all disciplines involved in studying human actions and conditions and the social, economic and institutional mechanisms affecting humans. Included are such disciplines as anthropology, demography, economics, geography, history, languages, literature and linguistics, law, library science, philosophy, political science, psychology, religious studies, social work, sociology, and urban and regional studies.

Scientific research and experimental development (R&D)

Creative work undertaken on a systematic basis in order to increase the stock of scientific and technical knowledge and to use this knowledge in new applications.

The central characteristic of R&D is an appreciable element of novelty and of uncertainty. New knowledge, products or processes are sought. The work is normally performed by, or under the supervision of, persons with postgraduate degrees in the natural sciences or engineering.

An R&D project generally has three characteristics:

- a substantial element of uncertainty, novelty and innovation;
- a well-defined project design;
- a report on the procedures and results of the projects.

Related scientific activities (RSA)

Those activities which complement and extend R&D by contributing to the generation, dissemination and application of scientific and technological knowledge.

Intramural performance

Where the S&T activities are managed and carried out primarily by federal government employees they are classified as intramural S&T. Even where major components of the project are provided by outside agencies, such as computer services, laboratory construction, testing of prototype equipment, if the planning, supervision, reporting, and key operating functions are performed by federal personnel, then the activity is considered to be intramural. This also applies to S&T activities carried out by a department or agency on behalf of another federal department or agency on a cost recovery basis.

The intramural expenditures reported for scientific activities are those direct costs, including salaries, associated with scientific programs. These costs include that portion of a program's contribution to employee benefit plans (e.g. superannuation) which is applicable to the scientific personnel within the program. Non-program ("indirect") costs, such as the value of services provided by other departments without charge and accommodation provided by the reporting program are also included.

Administration of extramural programs

The costs of identifiable units engaged in the administration of contracts and grants and contributions for scientific activities that are to be performed outside the federal government. These expenditures are broken down by the type of scientific activity supported, i.e., R&D or RSA.

Extramural performance

The management and conduct of an S&T activity is entrusted to a non-federal organization. The six extramural performance sectors used in surveying S&T expenditures by the federal government are:

Canadian business enterprises — This sector is composed of business and government enterprises, including public utilities and government owned firms and frequently referred to as the industry sector. Incorporated consultants providing scientific and engineering services are also included. Industrial research institutes located at Canadian universities are considered to be in the university sector.

Higher education — This sector is made up of all Canadian universities, including affiliated institutes owned, administered or staffed by universities.

Canadian private non-profit institutions — Charitable foundations, voluntary health organizations, scientific and professional societies, and other organizations not established to earn profits comprise this sector. Private non-profit institutions primarily serving or controlled by another sector should be included in that sector (e.g., the Pulp and Paper Research Institute is in Canadian business enterprises).

Canadian provincial and municipal governments — Departments and agencies of these governments form this sector. Government enterprises, such as provincial utilities are included in the Canadian business enterprises sector, and hospitals in the Canadian non-profit institutions or university sector.

Other Canadian performers — This sector includes all individuals or organizations not belonging to any of the above sectors. In particular, it includes provincial research councils and foundations.

Foreign performers — All foreign governments, foreign companies (including foreign subsidiaries of Canadian firms), international organizations, non resident foreign nationals and Canadians studying or teaching abroad, are included in this sector.

Personnel

Intramural expenditure data should be supported by data on the personnel devoted to scientific activities by all the employees engaged in these activities.

Full-time equivalent (FTE)	A measure of the time actually devoted to the conduct of scientific activities. An employee who is engaged in scientific activities for a half a year has a full-time equivalence of 0.5. Personnel data reported should be consistent with expenditure data.
Scientific and professional	People in jobs that require at least one academic degree or nationally recognized professional qualification (e.g., Professional Engineer P.Eng.), as well as those with equivalent experience.
Technical	People in jobs that require specialized vocational or technical training beyond the secondary level (e.g., community colleges and technical institutes) as well as those with experience equivalent to this training.
Other	Clerical, secretarial, administrative, operational and other support personnel.

In regard to personnel resources there are two caveats:

- where the S&T activities are a part of the program being reported only the auxiliary staff relevant to the S&T activities are reported on a prorated basis;
- whenever financial and administrative support is provided from another program that support is allocated to the S&T resources for the program being reported.