Federal government spending on science and technology, 2015/2016 (final), 2016/2017 (preliminary) and 2017/2018 (intentions)

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Intentions 2017/2018

Following two consecutive years of increases, total spending on science and technology activities by federal government departments and agencies is expected to decrease 1.2% to $11.3 billion in 2017/2018, largely attributable to a decline in activity related to Statistics Canada's 2016 Census Program.

Science and technology activities encompass two types of scientific activities: research and development and related scientific activities. The drop is attributable to a 6.7% decrease in spending on related scientific activities to $4.0 billion, while expenditures on research and development, which account for 64% of total science and technology, are expected to increase 2.1% to $7.3 billion.

Science and technology activities of the federal government can be performed in-house (intramural) or by external partners (extramural) located in Canada or abroad. Extramural performance of science and technology in 2017/2018 is anticipating making up its highest share on record (56%), while intramural performance is expected to hit its lowest share of total science and technology spending on record (since 1983/1984) at 44%.

Spending on intramural science and technology activities is expected to decline 6.6% to $5.0 billion in 2017/2018. Decreases are anticipated in spending on research and development (-4.7%), as well as related scientific activities (-8.0%).

Extramural payments typically made by federal government departments and agencies through contracts, or grants and contributions, are expected to increase 3.4% to $6.3 billion. The anticipated gain is attributable to a 52.5% rise in 2017/2018 in extramural science and technology payments to the provincial and municipal government sectors.

Federal government departments and agencies expect to spend $2.5 billion in 2017/2018 on scientific and technological activities in the social sciences, humanities and the arts, down 10.5% from 2016/2017. In turn, science and technology expenditures in natural sciences and engineering are expected to increase 1.7% to $8.8 billion in 2017/2018. Overall, natural sciences and engineering expenditures should account for over three-quarters of total spending on science and technology.

Full-time equivalent science and technology personnel

The Federal Science Expenditures and Personnel survey, Activities in the Social Sciences and Natural Sciences requests information on the amount of time workers dedicate to scientific and technological activities. This information is summed up and reported as full-time equivalent personnel. For example, a count of one full-time equivalent can represent the sum of five employees who each work 20% of their time on science and technology activities or two employees who each dedicate 50% of their time.

Federal government departments and agencies expect that work on intramural scientific and technological activities will require an estimated 34,594 full-time equivalent employees in 2017/2018, down 0.7% from 2016/2017. In 2017/2018, more than half (55.9%) of these positions are expected in the scientific and professional category. Over two-thirds (69.0%) of employees in science and technology positions are expected to work in the natural sciences and engineering field.

Preliminary 2016/2017

Preliminary data for 2016/2017 indicate a 10.4% increase in spending, to $11.4 billion, on science and technology activities by federal departments and agencies, up from $10.4 billion in 2015/2016. The overall rise can be attributed to increases in both research and development expenditures (+7.6%) and related scientific activities (+15.3%). Increases were reported in both intramural and extramural expenditures in each of these scientific activities.

In 2016/2017, research and development activities made up 62% of total science and technology expenditures, with the remaining 38% dedicated to related scientific activities. Meanwhile, the intramural and extramural shares of total science and technology spending were reported at 46% and 54% respectively.

A total of 34,854 full-time equivalent personnel were reported for 2016/2017, up 2.7% from 2015/2016. This increase was led by a 4.5% rise in full-time equivalent personnel involved in related scientific activities, as personnel involved in research and development activities was relatively unchanged from the previous year.

Final 2015/2016

The federal government spent $10.4 billion on science and technology in 2015/2016, with research and development representing almost two-thirds of these expenditures ($6.6 billion). Overall, 85% of the research and development expenditures were made in the natural sciences and engineering field.

Intramural science and technology spending decreased 9.6% to $4.7 billion from 2014/2015 to 2015/2016, while extramural expenditures made to Canadian and foreign performers increased by 11.7% to $5.7 billion. This shift in performing expenditures is primarily due to Atomic Energy of Canada Limited's transition to its planned Government-owned, Contractor-operated model.

Intramural science and technology spending in the National Capital Region increased 8.5% to $3.0 billion and comprised 65% of total intramural expenditures.

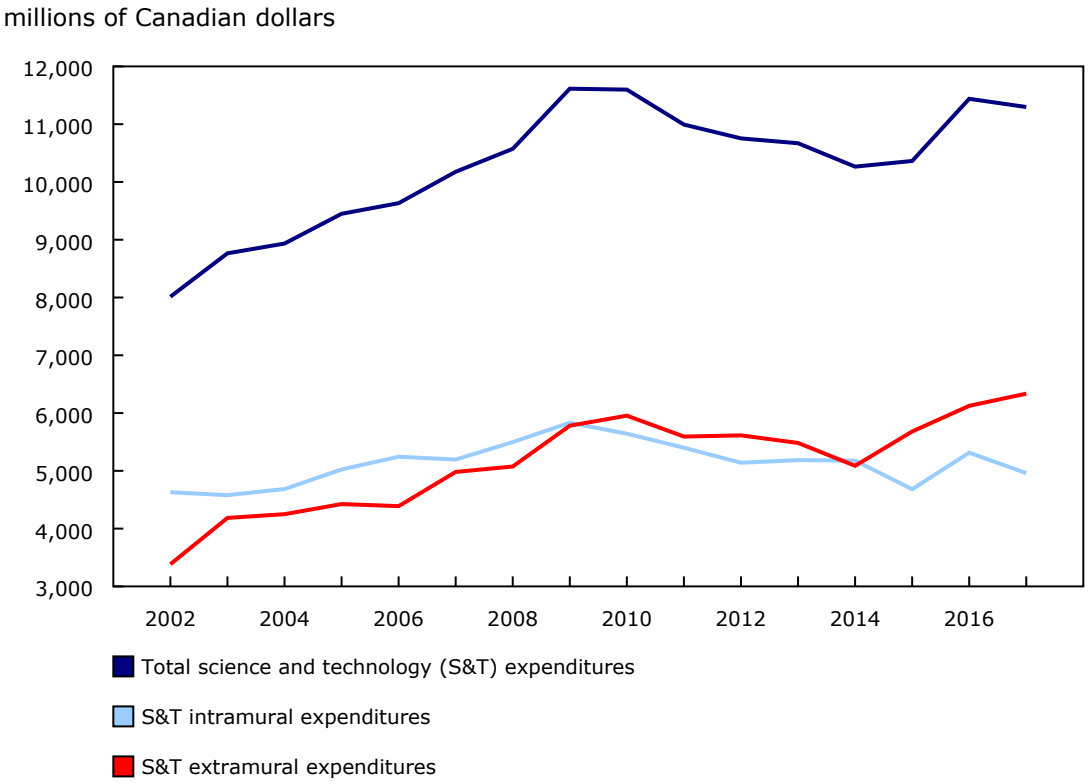
There were 33,925 federal government full-time equivalent employees engaged in scientific and technological activities in 2015/2016, down from 35,496 in 2014/2015. Research and development personnel represented 37.8% of all science and technology personnel.

The Federal Science Expenditures and Personnel survey, Activities in the Social Sciences and Natural Sciences also collected information by socio-economic objective, meaning scientific activity according to its societal or economic purpose, and by region for the year 2015/2016.

Protection and improvement of human health was the socio-economic objective with the largest spending by federal departments and agencies in 2015/2016, making up over one-fifth of total science and technology expenditures at $2.2 billion. The top three socio-economic objectives for federal government intramural science and technology spending were: social structures and relationships ($965 million); protection and improvement of human health ($753 million); and agricultural production and technology ($679 million). In comparison, the socio-economic objectives with the largest federal extramural science and technology spending in 2015/2016 were: protection and improvement of human health ($1.5 billion); industrial production and technology ($866 million); and non-oriented research ($726 million). Non-oriented research covers basic activities motivated by scientific curiosity with the objective of increasing scientific knowledge.

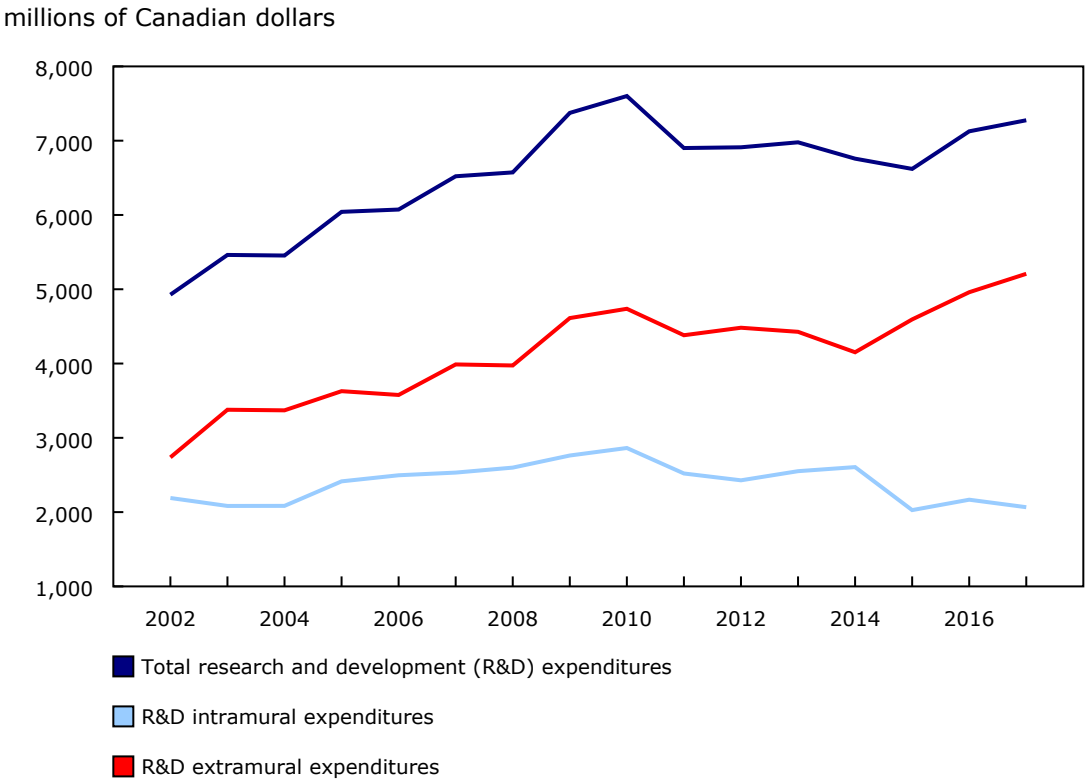
In 2015-2016, federal government science and technology expenditures showed a decline from the previous year in Canada's central and eastern provinces, and the territories. Western provinces showed increases in science and technology spending, with the exception of Alberta (-0.2%).

Chart 1
Science and Technology expenditures by performing sector (2002 to 2017)



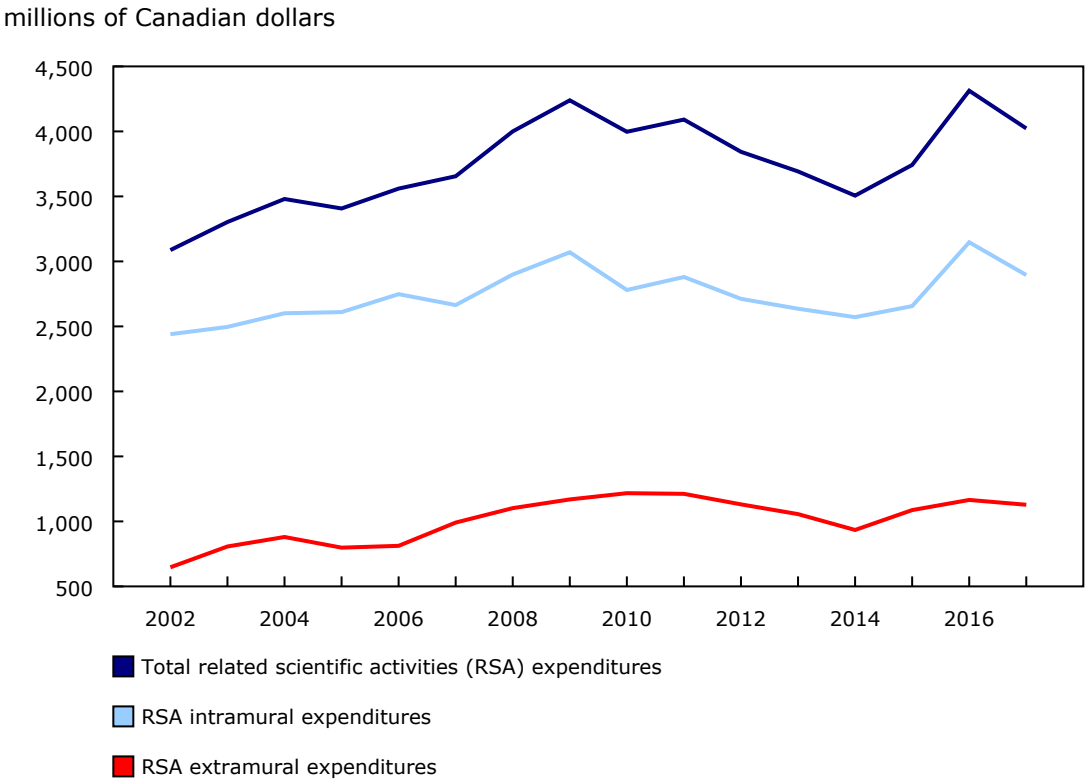
Source(s): CANSIM table 358-0143.

Chart 2
Research and Development expenditures by performing sector (2002 to 2017)



Source(s): CANSIM table 358-0143.

Chart 3
Related Scientific Activities expenditures by performing sector (2002 to 2017)



Source(s): CANSIM table 358-0143.

TELLING CANADA'S STORY IN NUMBERS #ByTheNumbers

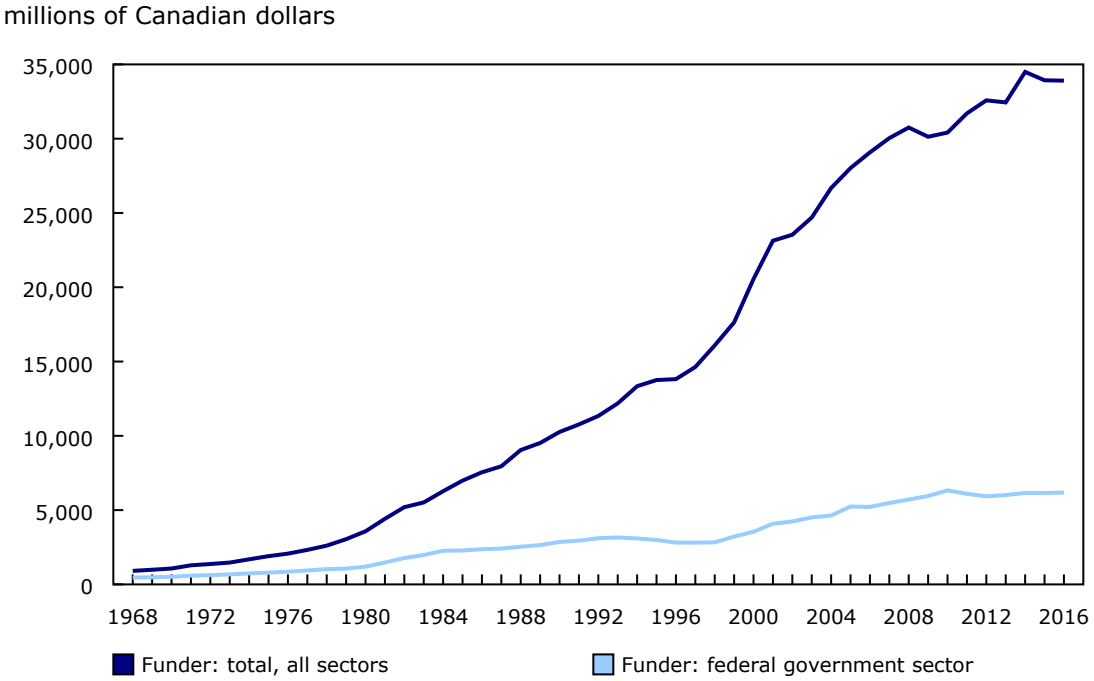
In celebration of the country's 150th birthday, Statistics Canada is presenting snapshots from our rich statistical history.

In 1967, Canada's centennial year, the federal government's funding of research and development activities was $853 million, which comprised nearly half of total research and development spending in the country. Almost half a century later, federal government funding reached $6.2 billion in 2015, accounting for one-fifth of research and development spending by all sectors. Similar trends can be seen in the federal government's performance of research and development. While the federal government performed 30% of all research and development in Canada in 1971, from 2001 onwards this proportion has declined to less than 10%.

Research and development is also funded and performed by business enterprises, higher education institutions, private non-profit organizations, provincial governments and provincial research organizations, and foreign groups (for funding only).

Source: Gross domestic expenditures on research and development, CANSIM table 358-0001.

Chart 4
Gross domestic expenditures on research and development in Canada (1967 to 2015)



Source(s): CANSIM table 358-0001.

Table 1
Federal government spending on science and technology, by type of science

	2014/2015	2015/2016	2016/2017	2017/2018	2016/2017 to 2017/2018
	millions of dollars				% change
Total, science and technology	**10 265**	**10,363**	**11,439**	**11,297**	**-1.2**
Research and development	6 758	6,620	7,126	7,275	2.1
Related scientific activities	3 506	3,742	4,313	4,023	-6.7
Natural sciences and engineering	**7 855**	**7,930**	**8,692**	**8,838**	**1.7**
Research and development	5 764	5,598	6,112	6,277	2.7
Related scientific activities	2 091	2,332	2,580	2,561	-0.7
Social sciences, humanities and the arts	**2 410**	**2,433**	**2,747**	**2,459**	**-10.5**
Research and development	995	1,023	1,014	998	-1.6
Related scientific activities	1 415	1,410	1,733	1,461	-15.7

Note(s): Conceptual changes were implemented for the 2016/2017 survey cycle to account for non-program costs (indirect costs). The value of services provided without charge to the responding department by other federal government departments will not be added. As a result, data for 2010/2011 onward are not comparable with data for previous years.

Source(s): CANSIM table **358-0143**.

Table 2
Federal government spending on science and technology, by performing sector

	2014/2015	2015/2016	2016/2017	2017/2018	2016/2017 to 2017/2018
	millions of dollars				% change
Total, all performing sectors	**10,265**	**10,363**	**11,439**	**11,297**	**-1.2**
Federal government (intramural)	5,177	4,682	5,314	4,961	-6.6
Business enterprise	947	1,447	1,363	1,355	-0.6
Higher education	3,109	3,110	3,351	3,385	1.0
Canadian non-profit institutions	483	403	437	421	-3.7
Provincial and municipal governments	144	153	415	633	52.5
Foreign performers	382	541	531	513	-3.4
Other Canadian performers	22	27	28	29	3.6

Note(s): Conceptual changes were implemented for the 2016/2017 survey cycle to account for non-program costs (indirect costs). The value of services provided without charge to the responding department by other federal government departments will not be added. As a result, data for 2010/2011 onward are not comparable with data for previous years.
Source(s): CANSIM table **358-0143**.

Table 3
Federal government personnel engaged in science and technology, by type of science

	2014/2015	2015/2016	2016/2017	2017/2018	2016/2017 to 2017/2018
	full-time equivalent positions				% change
Total personnel, all sciences	**35,496**	**33,925**	**34,854**	**34,594**	**-0.7**
Scientific and professional personnel	19,583	18,989	19,376	19,343	-0.2
Technical personnel	7,796	6,951	7,066	6,948	-1.7
Other personnel	8,117	7,985	8,413	8,303	-1.3
Total personnel, natural sciences and engineering	**25,774**	**23,410**	**23,949**	**23,871**	**-0.3**
Scientific and professional personnel	13,067	12,147	12,323	12,353	0.2
Technical personnel	6,953	5,971	6,076	5,986	-1.5
Other personnel	5,755	5,292	5,550	5,531	-0.3
Total personnel, social sciences, humanities and the arts	**9,722**	**10,514**	**10,904**	**10,723**	**-1.7**
Scientific and professional personnel	6,516	6,842	7,053	6,990	-0.9
Technical personnel	844	980	989	962	-2.7
Other personnel	2,362	2,692	2,862	2,772	-3.1

Source(s): CANSIM table **358-0147**.

Note to readers

The Federal Science Expenditures and Personnel survey, Activities in the Social Sciences and Natural Sciences is an annual survey of all federal government departments and agencies that perform or fund science and technology activities. Actual data for 2015/2016, preliminary data for 2016/2017 and intentions for 2017/2018 were collected from September 15, 2016 to January 13, 2017.

***Science and technology activities** comprise two types of scientific activities: research and development, and related scientific activities. It is defined as all systematic activities which are closely concerned with the generation, advancement, dissemination and application of scientific and technical knowledge in all fields of science and technology.*

***Research and Development** comprises creative and systematic work undertaken in order to increase the stock of knowledge – including knowledge of humankind, culture and society – and to devise new applications of available knowledge.*

***Related scientific activities** are all systematic activities which are closely concerned with the generation, advancement, dissemination and application of scientific and technological knowledge.*

***Natural sciences and engineering** consist of all disciplines concerned with understanding, exploring, developing or utilizing the natural world. Included are the engineering and technology, mathematical, computer and information sciences, physical sciences, medical and health science, and agricultural sciences, veterinary sciences and forestry.*

***Social sciences, humanities and the arts** consists of disciplines involving the study of human actions and conditions and the social, economic and institutional mechanisms affecting humans. Included are such disciplines as arts, economics and business, education, history and archeology, law, language and linguistics, media and communications, philosophy, ethics and religion, psychology and cognitive sciences, social and economic geography, and sociology.*

***Socio-economic objective** is a classification of scientific activity according to its societal or economic purpose or outcome. The objectives in this survey are based on the Nomenclature for the Analysis and Comparison of Scientific Programs and Budgets produced by the Statistical Office of the European Union, Eurostat.*

More information on the concepts and definitions of the survey (4212) is available from this release's Related information tab.

Available in CANSIM: tables 358-0142 to 358-0151 and 358-0163 to 358-0166.

Definitions, data sources and methods: survey number 4212.

For more information, or to enquire about the concepts, methods or data quality of this release, contact us (toll-free 1-800-263-1136; 514-283-8300; **STATCAN.infostats-infostats.STATCAN@canada.ca**) or Media Relations (613-951-4636; **STATCAN.mediahotline-ligneinfomedias.STATCAN@canada.ca**).