

SCIENCE AND TECHNOLOGY

Science and technology (S&T) is a term used to encompass activities which involve the generation, dissemination and initial application of new scientific knowledge and technology. In Canada S&T is used to foster the development of natural resources, to aid industry, and to stimulate economic growth both nationally and regionally. The federal and provincial governments, industry and universities fund and perform S&T.

Science and technological activities are undertaken in the natural sciences and engineering (NSE) and in the social sciences and humanities (SSH). In both of these fields of science two types of scientific endeavour are undertaken: research and development (R&D) which is creative work undertaken on a systematic basis to increase the stock of knowledge, and related scientific activities (RSA) which are activities that complement and extend R&D by contributing to the generation, dissemination and application of scientific and technological knowledge.

In this chapter the primary focus is on the federal resources devoted to S&T including federal support to industrial development, basic research and the development of highly skilled people through the university sector. The final section describes briefly the national effort on R&D in the natural sciences and engineering including contributions by the governments, industry and universities.

The bulk (31%) of the federal government's expenditures is in the national capital region (NCR), 22% in Ontario (excluding Ottawa), 14% in Quebec (excluding Hull), 10% in the Atlantic provinces and the remaining 23% in the western provinces.

12.1 Federal resources for science and technology

Total expenditures for S&T were estimated at about \$4 billion in 1984-85, having doubled since 1979-80 and with an 11.5% increase since 1983-84. Over 60 federal departments and agencies spend funds for S&T to support departmental missions and to aid industrial development through both in-house (intramural) activities and by funding S&T to be performed by the private sector (extramural). Basic research in the university sector is funded by the government primarily through three granting

councils: the Natural Sciences and Engineering Research Council, the Medical Research Council and the Social Sciences and Humanities Research Council.

About 35,000 persons were engaged in performing the government's S&T activities in 1984-85, essentially unchanged from the previous year but about a 5% growth since 1979-80. The largest employers were Environment Canada, Statistics Canada, Agriculture Canada and the National Research Council.

12.1.1 Natural sciences and engineering

In the natural sciences such as biology, chemistry, physics, astronomy and geology and in engineering, estimated expenditures were \$3.2 billion in 1984-85, with \$2.4 billion (75%) for R&D and \$0.8 billion (25%) for RSA. Most of the RSA expenditures (\$364 million) was for data collection related to oceanographic and hydrographic needs and for environmental baseline studies.

About 55% of R&D expenditures were for intramural activities, 21% for R&D performed by industry and 19% for R&D performed by the university sector. The remaining expenditures were for R&D by private non-profit organizations, provincial and municipal governments, the foreign sector and other Canadian performers.

Since 1979-80 total expenditures in natural sciences and engineering have increased by 107% with R&D exhibiting the highest growth of 115% compared to RSA with a total growth of only 85%.

Human resources for R&D in the natural sciences and engineering totalled 16,508 person-years and RSA, 7,567 not including personnel engaged in administration.

Further details of the five largest participants are provided in section 12.2.

12.1.2 Social sciences and humanities

The social sciences and humanities embrace all disciplines involved in studying human actions and conditions and the social, economic and institutional mechanisms affecting humans. Estimated 1984-85 expenditures in this field of science were \$771 million with 82% for RSA and 18% for R&D.

The bulk of the RSA expenditures was planned for data collection, dominated by the statistical activities