

is studying the applications of computer-aided design and manufacturing (CAD/CAM) and robotics.

The Ontario Research Foundation, established in 1928 as an independent Crown corporation, had a 1985 budget of \$27.8 million. It performs research in energy conservation and solar systems, on long-range transport of pollutants, waste treatment, building materials including fire and flammability studies, pulp and paper, microelectronics, mineral processing, hydro-metallurgy, and waste utilization. It operates a centre for alternate fuel utilization and a centre for powder metallurgy.

The Manitoba Research Council had a budget of \$6.1 million for 1985. The Council operates a technical information service for industry, an industrial technology centre and the Canadian Food Products Development Centre. It performs research in the areas of plastics extrusion, fibreglass, atomic absorption spectroscopy, solid waste, wood stove testing, meat processing, and bacteria in milk products.

The Saskatchewan Research Council had a 1985 budget of \$15.3 million. The Council performs research in biomass production and refining, farm energy use, sediments, ceramics, geochemistry, computer systems, computer-aided design and computer-aided manufacturing, and applied climatology. It operates a Canadian centre to design and develop innovative instruments.

The Alberta Research Council, created in 1921, had a 1985 budget of \$48.7 million, making it by far the largest of the eight organizations. The Council performs research on the geology of Alberta oil-bearing sands, bitumen recovery, steam separation of hydrocarbons from sand, coal conversion, groundwater, soil salinization, microbiology, and solar and wind energy. The Council also operates an oil sands information branch.

BC Research is a non-profit industrial research society with offices and laboratories in Vancouver, BC. Its activities enable even the smallest firms to improve their competitive position in Canadian and world markets by the use of up-to-date scientific knowledge. It is active in applied biology, chemistry, engineering—physics, ocean engineering, operations research, industrial engineering—and social impact and economic studies. In 1985, it had a budget of \$8.4 million.

12.8 National expenditures on R&D

The activity of research and development (R&D) is defined as creative work undertaken on a systematic basis to increase the stock of scientific and technical knowledge and to use this knowledge in new applications. Expenditures on R&D are an important indicator of the effort devoted to creative activity in science and technology. This effort is associated with the ability to develop new products and processes, necessary for economic and industrial growth. This is particularly true of R&D in the business enterprise sector but the level of R&D expenditures in other sectors is also useful as an indicator of Canada's contribution to world science, of the intellectual activity in Canadian institutions, and of the search for solutions to Canadian problems.

The GERD, or "gross domestic expenditure on research and development", total R&D expenditures represent all R&D performed in a country's national territory during a given year. The GERD includes R&D performed within a country and funded from abroad but excludes payments sent abroad for R&D performed by others. It is calculated by adding together the intramural expenditures reported by institutions which performed R&D, grouped into appropriate sectors and sub-sectors.

In 1986, research and development expenditures are expected to total about \$6.9 billion, a slight increase over 1985. This increase of 4.6% follows expenditure growth of 10.6% and 10.1% for 1984 and 1985.

In Table 12.10, GERD statistics are presented in two forms. Besides its value in current dollars, the GERD is compared to Gross Domestic Product (GDP) from 1971. The GERD/GDP ratio is used to show the R&D effort in proportion to total economic activity. The figures for 1985 and 1986 are estimates and may be expected to be revised.

The GERD is made up, as noted above, from data supplied by the institutions performing R&D, grouped into sectors and sub-sectors. One of the questions asked of the performers is the source of funds for the R&D they carry out. By combining the responses of the performers, a matrix can be formed of expenditures by performing and funding sectors.

A shift in activity between different sectors of the economy is apparent. The federal government has become less important both as a performer and as a source of funds, while the importance of the business sector in both areas has grown.

Source

Science, Technology and Capital Stock Division, Statistics Canada.