

In some sense, Canada shares many of the characteristics of small economies with regard to R&D expenditures.⁴⁰ A paper discussing the relevant contributions of science and technology to economic growth in small advanced economies argues that the nature of the science and technology developed by a small country may be determined by the existence of a technological paradigm outside of the country. This can be seen in Canada's commitment of resources to space science and technology through its involvement in the U.S. Space Station program.⁴¹

Lacking a large domestic market, firms are obliged to export to recoup the money spent on R&D. However, the risks and uncertainties involved in marketing the innovation on an international scale are magnified. Together with the non-appropriability problem, this adds to disincentives to expend scarce resources on R&D. One author writes: "All other things being equal (such as the probability of success), there is a stronger incentive to commit resources to an innovation where the market is large than where it is small."⁴²

It has also been noted by the OECD that there is a tendency for researchers from small countries to emigrate to larger ones where more resources are allocated to their discipline.⁴³ Furthermore, the paper concludes that "while small countries contribute to the international pool of knowledge (in fields chiefly determined by the larger countries) thus providing research results accessible to the larger countries, the larger countries contribute more heavily to innovation-oriented R&D which is more likely to be subject to commercial or national secrecy and therefore not freely available to the smaller countries. The implication of this is that indirectly, the larger countries are exploiting the small ones, as a result of small countries' lack of resources."⁴⁴

⁴⁰ According to some authors, it is debatable whether Canada can legitimately be included in the group of "small" economies. A discussion of the size debate is found in Vivian Walsh, "Technology, Competitiveness and the Special Problems of Small Countries", *STIREVIEW*, (September 1987). She writes: "Dividing these countries into two groups, large and small, is fairly arbitrary. By any standards the U.S. is a large country and Luxembourg and Iceland are small ones. For the purposes of this discussion, the line has been drawn after the largest seven countries. Australia, the largest of the "small" countries thus defined has a GDP about half that of Canada, the smallest of the "large" countries, although other studies, (e.g., Tisdell, 1982; Arnold, 1986) have included Canada as a small country." (p. 87).

⁴¹ The Canadian Space Agency's (CSA) contribution to the space laboratory is budgeted at \$1.3 billion to the year 2000. During fiscal year 1990/91, the CSA contributed \$207 million to 45 alliances, while non-federal partners contributed \$2 million. Source: ISTC, *Federal Science and Technology Alliances Report* (1992), p. 11.

⁴² *Op. cit.*, Walsh, p.101.

⁴³ OECD 1984 document cited in Walsh, p. 106.

⁴⁴ *Ibid.*, p.108.