

2.2% in Japan, 1.9% in the U.S., 2% in Germany, and 1.5% in France.⁵⁰ R&D expenditures by firms in Canada remained stagnant in real terms in 1991. 1992 projections suggest only a marginal increase in real expenditures. Moreover, of over 40,000 manufacturing companies in Canada, only about 3,500 reported performing any R&D in 1990, and of these only 15 companies spent more than \$50 million each⁵¹. In the not-unrelated field of private sector training programmes, the record is no better.⁵² The amount spent by Canada's private sector on training and education (0.25% of GDP) is less than half of U.S. and only about one-eighth of U.K. and German expenditures.

We can offer several explanations for this disappointing performance, some of which are less convincing than others. First, resource-based sectors of Canadian industry (of continuing importance to our prosperity) are affected by a propensity to significant price fluctuations, higher extraction costs, uncompetitive labour costs, and increasingly strict environmental controls. However, these factors do not constitute a convincing explanation of poor R&D performance. Firms in a resource-rich industrialized country like Sweden spend twice as much on R&D as their Canadian counterparts as a proportion of GDP. To take another example, Canadian forest product firms invest a meagre 0.3 - 0.4% of their sales in R&D (1990), less than half the level in western Europe and the U.S.. Canadian resource industries have simply under-rated R&D for too long.⁵³

Second, given Canada's traditionally low military posture, defence-related expenditures make little contribution to R&D in Canada compared to the U.S. in particular, but also the U.K. and France⁵⁴. But Canada's situation in this regard is similar to that of Japan, Germany and the Netherlands, all of which enjoy much higher total R&D expenditures as a proportion of GDP.

⁵⁰ Statistics Canada, *Industrial Research and Development, 1992 Intentions*, Catalogue No.88-202, pp.14, 58, with 1990 GDP in Table 2, p.58 corrected to reflect current dollars.

⁵¹ *Ibid.*, p.17.

⁵² OECD, *Canada*, p.69.

⁵³ However, resource industries may be more prone to "shop-floor" or "mine-face" innovation by staff that is not easily picked up as formal R&D.

⁵⁴ OECD, *Canada*, p.71.