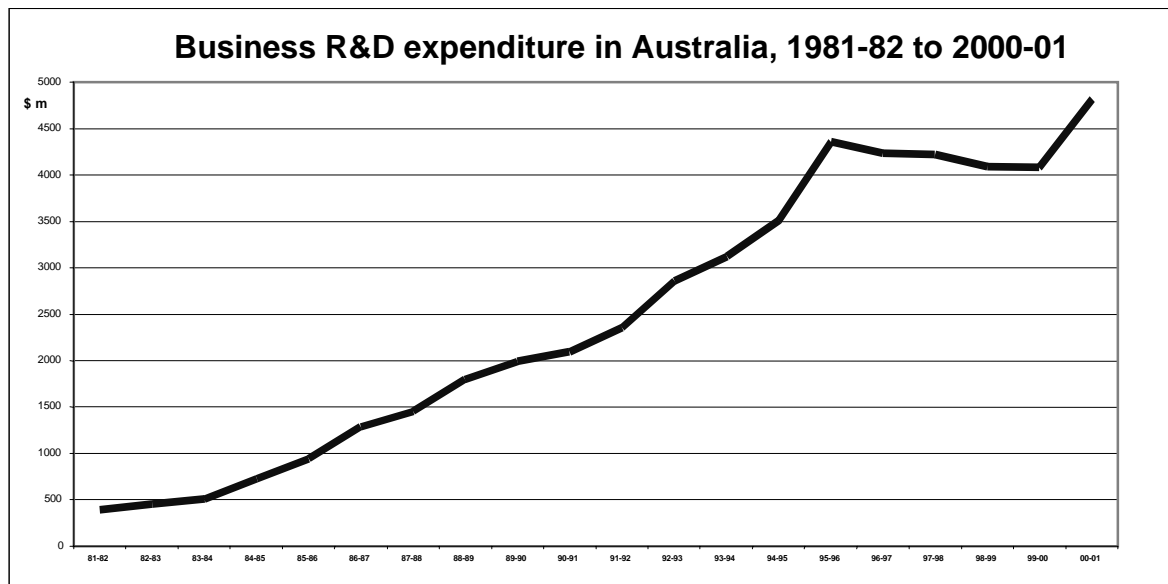


Business investment in R&D

- 4.1 In 2000-01 the business sector spent \$4,825 million (at current prices) on R&D which amounted to 47% of Australia's gross expenditure on R&D (see Table 3.3, on page 23 of the preceding chapter). By comparison, the federal and state governments spent \$2,372 million, or 23%, of gross expenditure on R&D. The higher education sector spent \$2,775 million or 27% of the gross expenditure on R&D, and the private non-profit sector spent \$283 million, or 3% of the total expenditure (all figures are derived from Table 3.3).
- 4.2 The twenty-year long-term trend line of BERD is strongly upward, as shown in the following chart covering the period 1981-82 to 2000-01 in current dollars. In this time, BERD has grown 'from around 0.25% to 0.72% of GDP, representing an almost ten-fold increase in current dollar BERD and an almost three-fold increase as a per cent of GDP'.¹ The 2000-01 figure for BERD was 12% higher than the level recorded in 1999-2000, once the effect of changes in prices and wages and salaries is removed.²

1 Commonwealth Department of Industry, Tourism and Resources, Submission No. 38, p. 6. Source: Australian Bureau of Statistics (ABS), Bulletins, Cat. Nos. 8104.0, 8109.0, 8111.0, 8112.0, 8114.0 (various years) and 5206.0 (March 2002).

2 Australian Bureau of Statistics (ABS), *Research and Experimental Development, Businesses Australia*, Cat. No. 8104.0, July 2002, p. 3.



Source: ABS Cat. No. 8104 for 1992-93 and 1994-95 onwards; ABS Cat. No. 8114 for 1991-92 and 1993-94.

- 4.3 The Productivity Commission considered that ‘the rate of growth in BERD is internationally comparable to, if not ahead of, the pack’.³
- 4.4 There were two reasons given by DITR for the dip in the trend line between 1995 and 1999. They were the ending of the mining boom after 1997-98 and the ‘significant one-off increase in the utilisation of R&D incentives’ in 1996 related to changes to the tax concession arrangements, removal of R&D syndication, amendments to the types of deductions that could be claimed and limits on the time within which companies could submit claims.⁴
- 4.5 The Department of Industry, Tourism and Resources stated that ‘a striking trend’ has been the increase in business expenditure on services:

Over the period since 1992-93 [there] has been a relatively strong growth in R&D expenditure in services, particularly in computer and communications-related services (ICT services). The 2000-01 BERD data indicate that, for the first time, R&D expenditure in services and construction industries exceeds that in manufacturing. 37% of Australia’s

3 Mr Gary Banks (Productivity Commission), Transcript, p. 487.

4 Commonwealth Department of Industry, Tourism and Resources, Submission No. 38, pp. 5-6.

business effort in R&D now relies on an ICT-related skills base.⁵

4.6 In broad terms, 55% of BERD was spent on engineering and technology, and 26% was spent on information, computing and communication sciences. In greater detail, business expenditure on R&D went into the following industry sectors:

- \$2,170 million into manufacturing (45% of total business expenditure on R&D);
- \$831 million into property and business services (17% of BERD);
- \$456 million into mining (9% of BERD);
- \$388 million into wholesale and retail (8% of BERD);
- \$264 million into finance and insurance (5% of BERD);
- \$218 million into scientific research (5% of BERD); and
- \$498 million into 'other' sectors (10% of BERD).⁶

4.7 Greater detail on where BERD is spent appears in Table 4.1 below. Most BERD was spent on experimental development, which confirms the view that 'business commitment to research is for research that will produce short-term gain', usually related to 'the development of new or improved products, processes, materials or services'.⁷ The ABS stated that:

In 2000-01, experimental development was the most significant type of R&D activity undertaken by businesses. Expenditure on experimental development was \$3,333 million (69% of total R&D expenditure). Applied research accounted for \$1,188 million (25%), while basic research accounted for \$304 million (6%). The industry with the highest proportion of its R&D expenditure directed towards experimental development was the wood and paper products industry (92%). Applied research was highest in the industrial machinery and equipment industry (40% of its R&D expenditure) and the scientific industry (38%). Basic

5 *ibid.*

6 Australian Bureau of Statistics (ABS), *Research and Experimental Development, Businesses Australia 2000-2001*, Cat. No. 8104.0, July 2002, p. 15 (Table 8).

7 CSIRO, Submission No. 22, p. 15 and p. 18.

research was low in all industries, with the scientific research industry recording the highest percentage (14%).⁸

Table 4.1: Where BERD is spent

Research field	BERD (\$m)	% of total BERD
Computer software	\$729	15
Communications technologies	\$548	11
Manufacturing engineering	\$390	8
Automotive engineering	\$349	7
Other information, computing and communication sciences	\$309	6
Other engineering and technology	\$305	6
Medical and health sciences	\$299	6
Resources engineering	\$288	6
Information systems	\$221	4
Chemical sciences	\$174	4
Mechanical and industrial engineering	\$163	3
Metallurgy	\$158	3
Agricultural, veterinary and environmental sciences	\$154	3
Electrical and electronic engineering	\$147	3
Industrial biotechnology and food sciences	\$129	3
Biological sciences	\$122	3
Materials engineering	\$103	2
Chemical engineering	\$ 73	2
Physical sciences	\$ 51	1
Earth sciences	\$ 50	1
Mathematical sciences	\$ 31	1
Other research fields	\$ 31	1
Total [not add to 100 due to rounding]	\$4824	99

Source: ABS, *Research and Experimental Development, Businesses 2000-2001*, Cat. No. 8104.0, p. 15.

4.8 Medium and large firms accounted for most expenditure on R&D by businesses:

The largest businesses, employing 1000 or more, accounted for 39% of total R&D expenditure (34% in 1999-2000). On average, this was more than \$14 million per business undertaking R&D...

⁸ ABS, *Research and Experimental Development, Businesses Australia, op. cit.*, p. 5.

Small businesses accounted for 11% of R&D expenditure in 2000-01... and businesses employing less than ten people accounted for 6% of the R&D (5% in 1999-2000). This averaged out at approximately \$242,000 for each business undertaking R&D.⁹

- 4.9 Notwithstanding this finding by the ABS, one SME pointed to a trend among large companies to increasingly use SMEs for their R&D because:

... they are unable to do the R&D as cheaply as we could do it and, in some instances, are simply unable to do the R&D themselves because of the way they are internally structured—mainly for operations as opposed to R&D.¹⁰

- 4.10 Foreign-owned businesses were responsible for over 40% of BERD, with the ABS finding that:

Within the manufacturing industry, 44% of BERD came from foreign businesses (71% in the case of BERD on motor vehicles, parts and other transport equipment; 47% in the case of BERD on electronic and electrical equipment/appliances). Within the wholesale and retail industries, foreign-owned businesses accounted for 75% of the industry BERD. Within the property and business service industry, foreign firms accounted for 45% of industry BERD. For businesses mainly involved in scientific research, only 8% of industry BERD came from foreign firms.¹¹

- 4.11 Businesses with majority ownership in the United States provided 22% of total BERD in 1999-2000 and businesses with majority ownership in the European Union provided 12%. Other countries provided 8%, with Australian businesses providing the balance (58% of total BERD).¹²

9 *ibid.*, p. 6.

10 Mr John Corrigan (Filtra Ltd), Transcript, p. 587.

11 Australian Bureau of Statistics (ABS), *Australia Now: Science and Innovation – Foreign ownership characteristics of business undertaking research and experimental development activity in Australia*, August 2002, pp. 2-5. Reproduced from ABS, *Australian Economic Indicators*, Cat. No. 1350.0, August 2002.

12 *ibid.*, p. 6.

- 4.12 In terms of where the money for BERD came from, the ABS found that:

... the business sector provided most of the R&D expenditure itself: \$4,337 million (90%) was sourced from Own funds and \$78 million (2%) came from Other businesses. The Commonwealth government provided \$171 million (4%) while 207 million (4%) came from Overseas.¹³

- 4.13 Most of BERD was spent in-house:

Extramural R&D expenditure (payments to other organisations to undertake R&D projects) by businesses was [only] \$408 million in 2000-01, of which \$343 million was paid to organisations located in Australia and \$65 million to organisations located overseas.¹⁴

- 4.14 Labour costs accounted for 44% of BERD, with the ABS finding that:

Labour costs as a proportion of R&D expenditure was low for the Mining industry (22%) and high for the Property and business services industry (61%).¹⁵

Conclusion

- 4.15 Business expenditure on R&D (BERD) in Australia is substantial and rising at internationally comparable rates. Most of BERD is spent on experimental development activity. Just under half of BERD is spent in the manufacturing sector but R&D expenditure in the services sector is rising quickly. Foreign firms are responsible for over 40% of BERD. The funding of BERD is largely internally generated from businesses.

13 ABS, *Research and Experimental Development, Businesses Australia*, op. cit., p. 5.

14 *ibid.*, p. 7.

15 *ibid.*, p. 5.