

# Assessing Australia's Innovative Capacity in the 21<sup>st</sup> Century

Professor Joshua Gans  
MBS & IPRIA  
University of Melbourne

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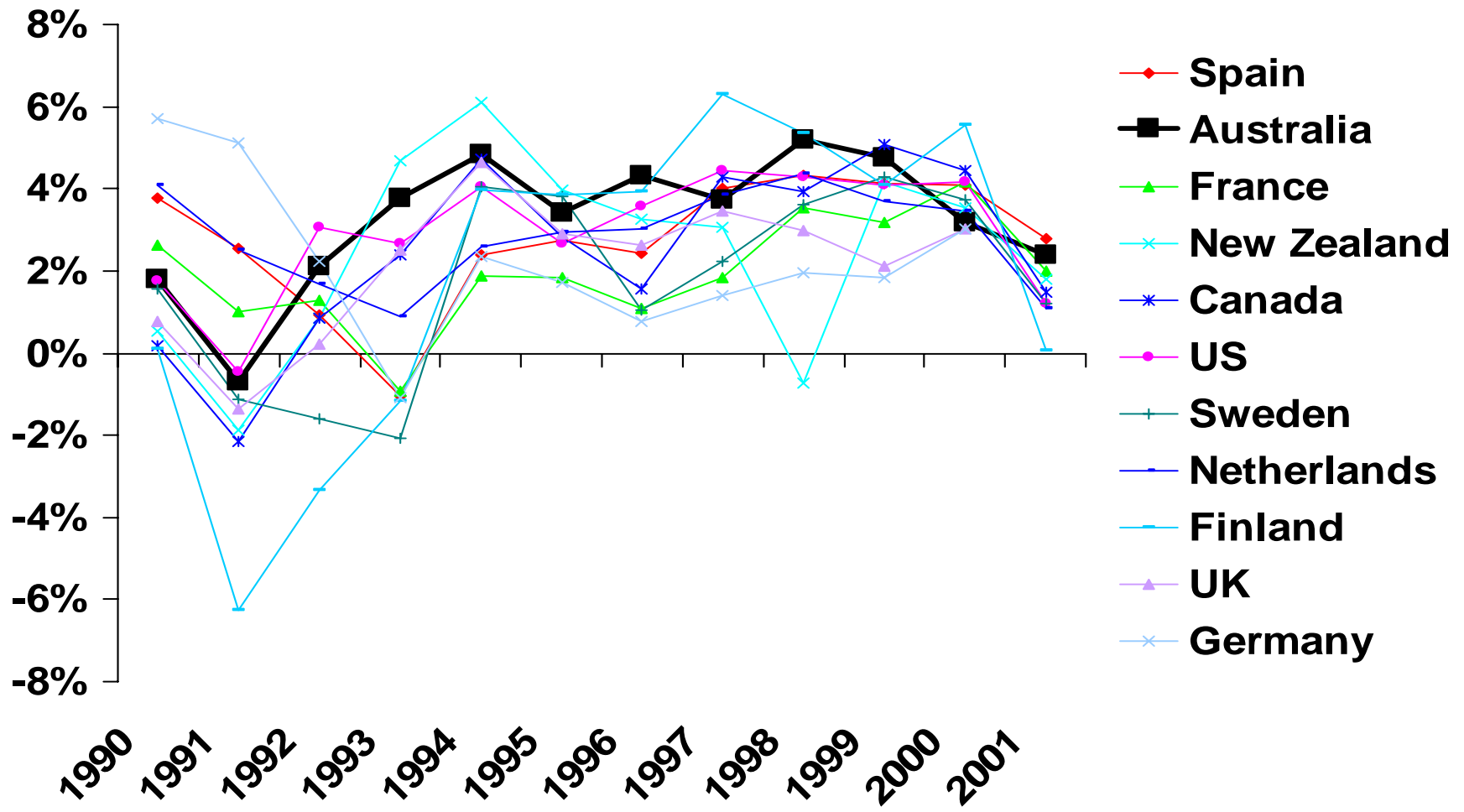
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This presentation is based on the National Innovative Capacity Project, whose contributors include Jeffrey Furman, Richard Hayes, Scott Stern, and Michael E. Porter. Our paper is available at [www.mbs.edu/jgans](http://www.mbs.edu/jgans)

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# The Last Decade of Australian Economic Growth Stands Out Among Leading Nations

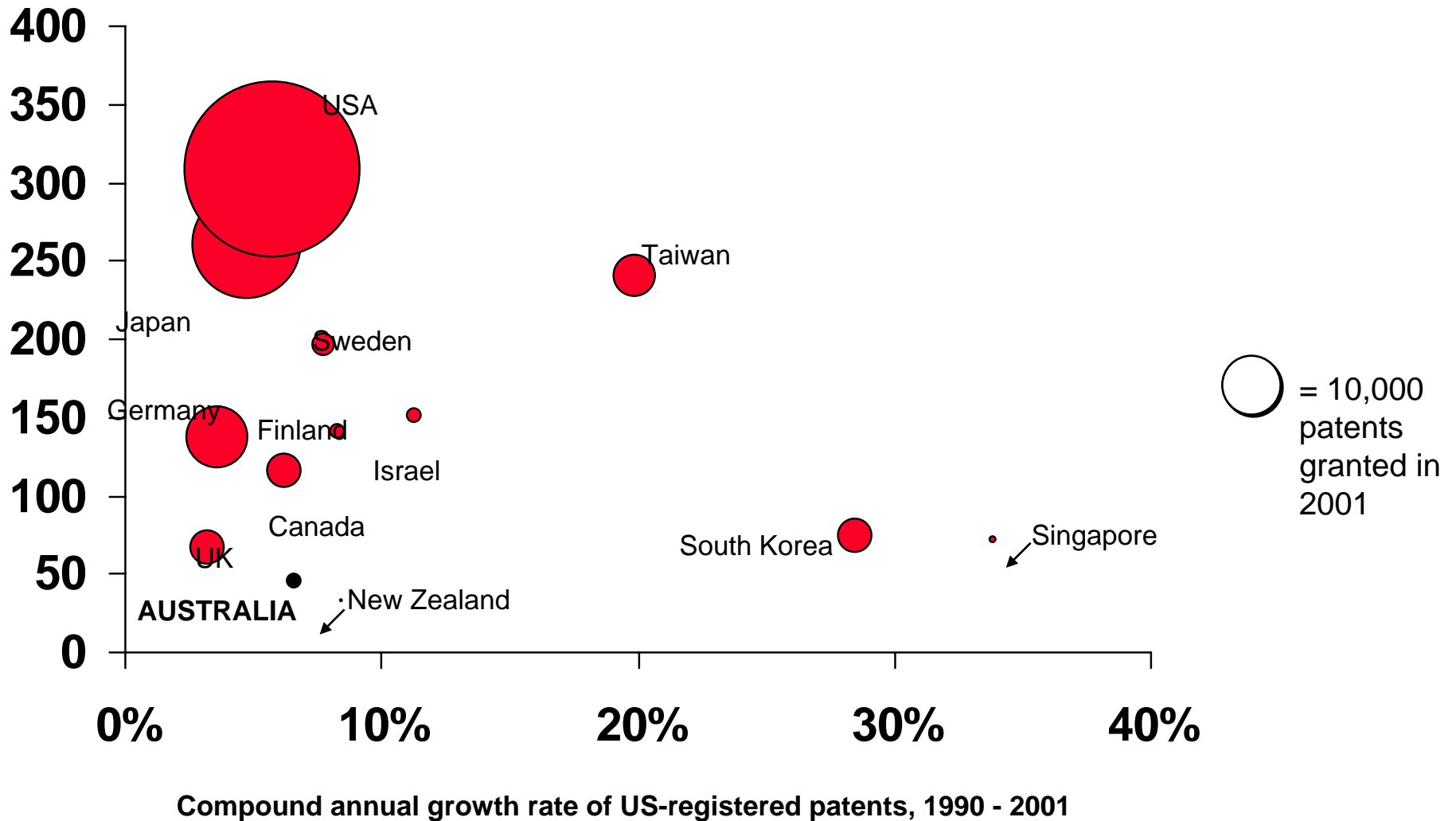
## Real GDP Growth Rates



Source: EIU (2001), OECD (2002), Singapore Statistics (2002)

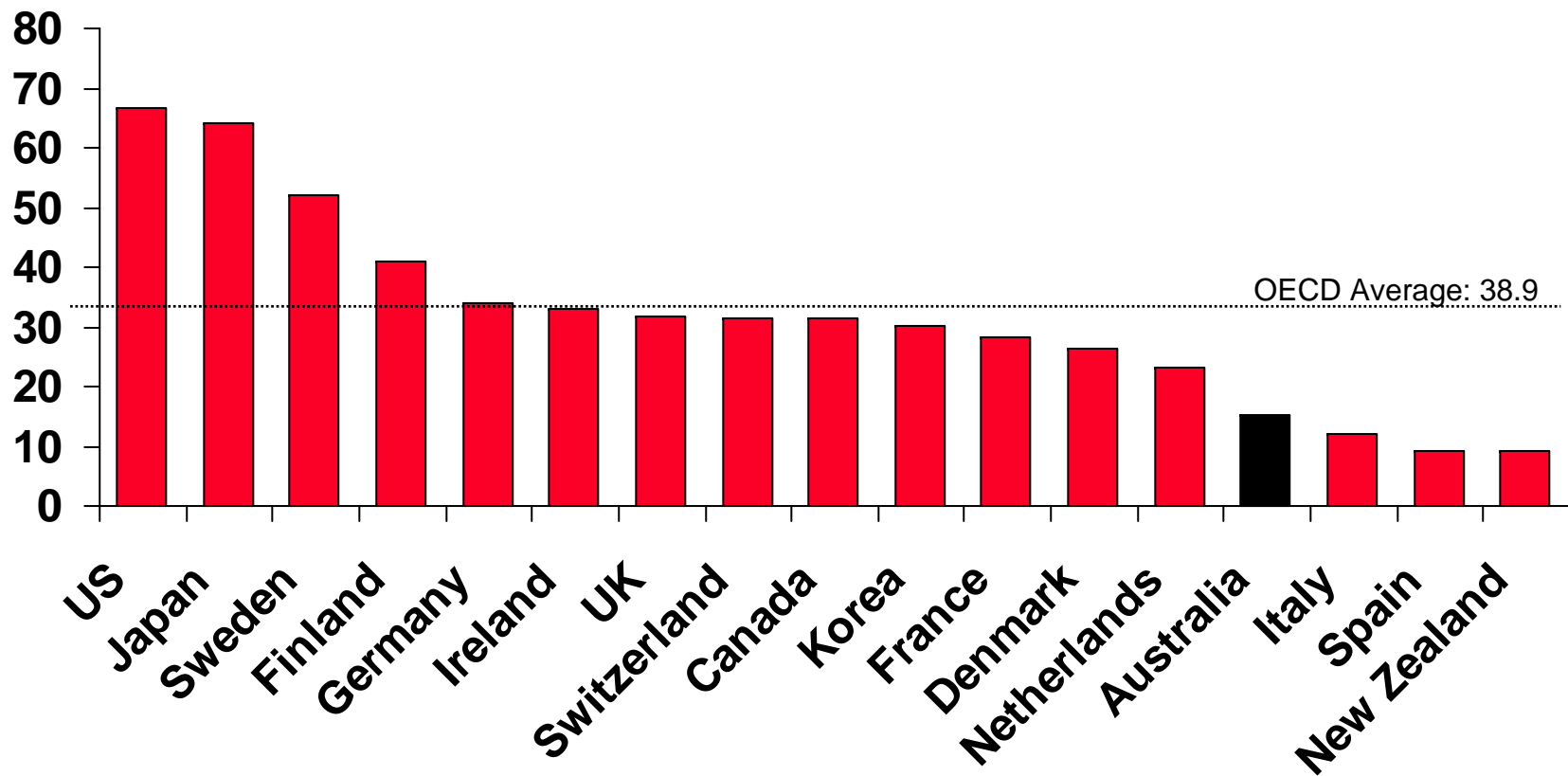
# Despite this impressive performance, the Australian record on innovation is mixed

Annual U.S. patents  
per 1 million  
population, 2001

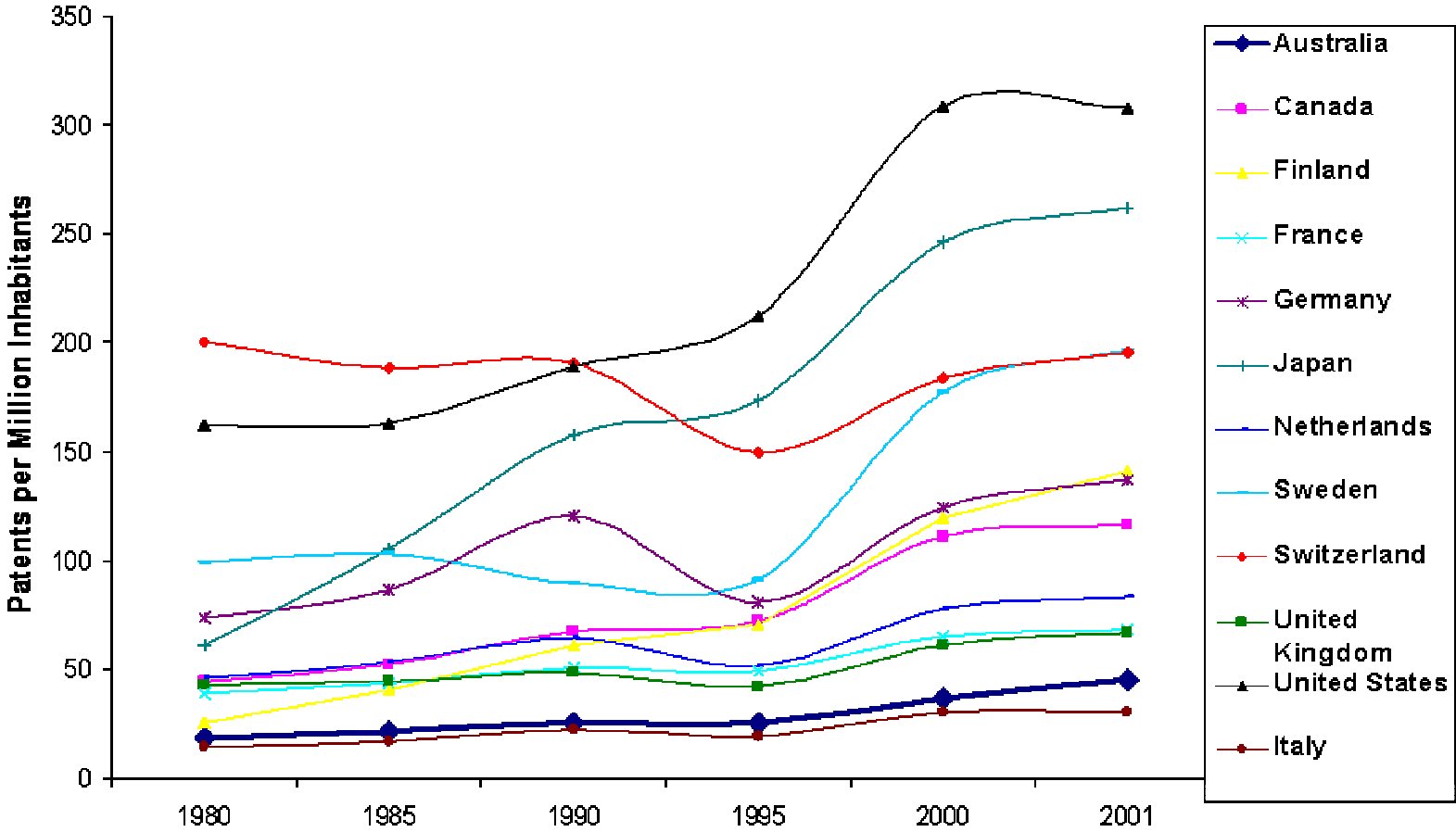


# Not simply an “IP” problem, Australian firm employs fewer innovators than other leading nations

Company Researchers  
per 10'000 Employed,  
1998



# Our Goal: Explain the Concentration of Innovation around the World



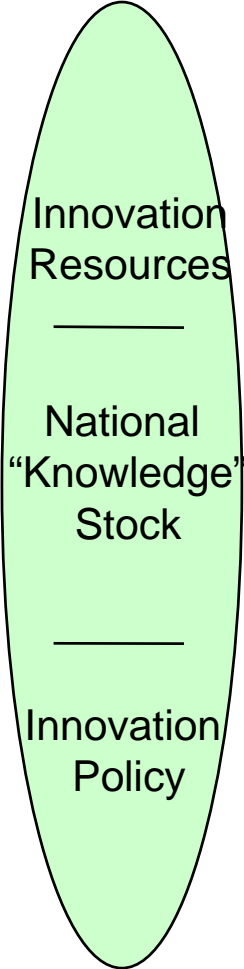
# Assessing National Innovative Capacity

- Approach: “Weighted” Sum of National Innovative Capacity Drivers
  - Weights derived from regression analysis relating the **development** of new-to-the-world technologies to drivers of national innovative capacity
    - Technology “output” is measured by **international** patents
    - National Innovative Capacity drivers:
      - Innovation Infrastructure, Cluster Environment, Linkages
- Advantage of this Approach
  - Avoids ‘ad-hoc’ weighting of proposed drivers
  - Per capita evaluation in order to allow international comparison
  - Focuses attention on **relative** changes in National Resources and Policies versus other nations

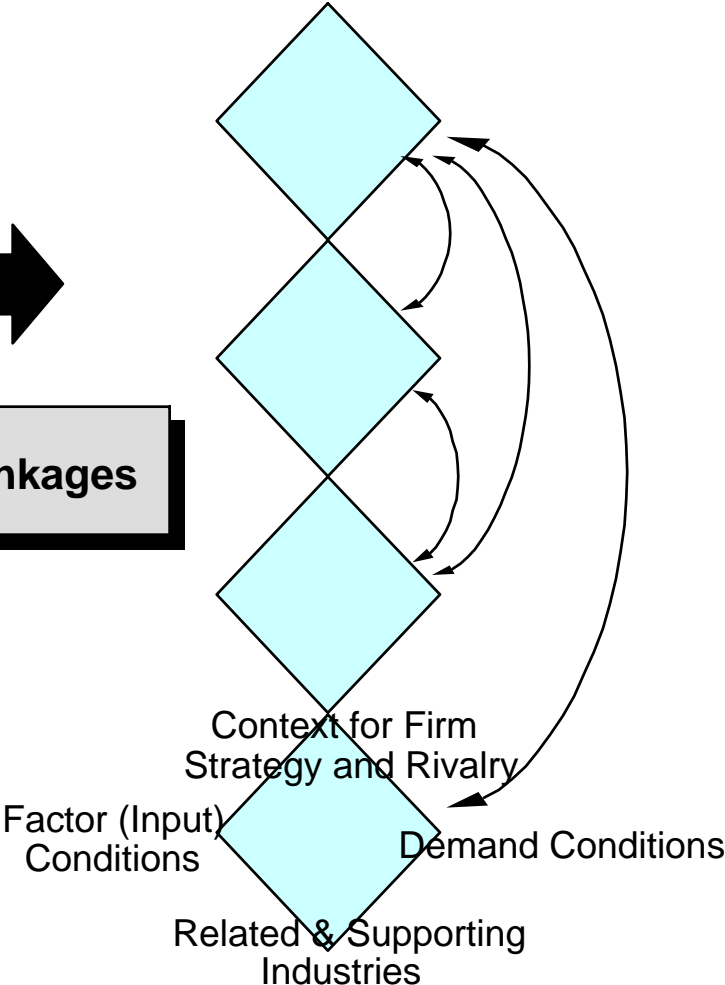
# What Makes Up National Innovative Capacity?

**Common Innovation Infrastructure**

**Cluster-Specific Environment for Innovation**



**Quality of Linkages**



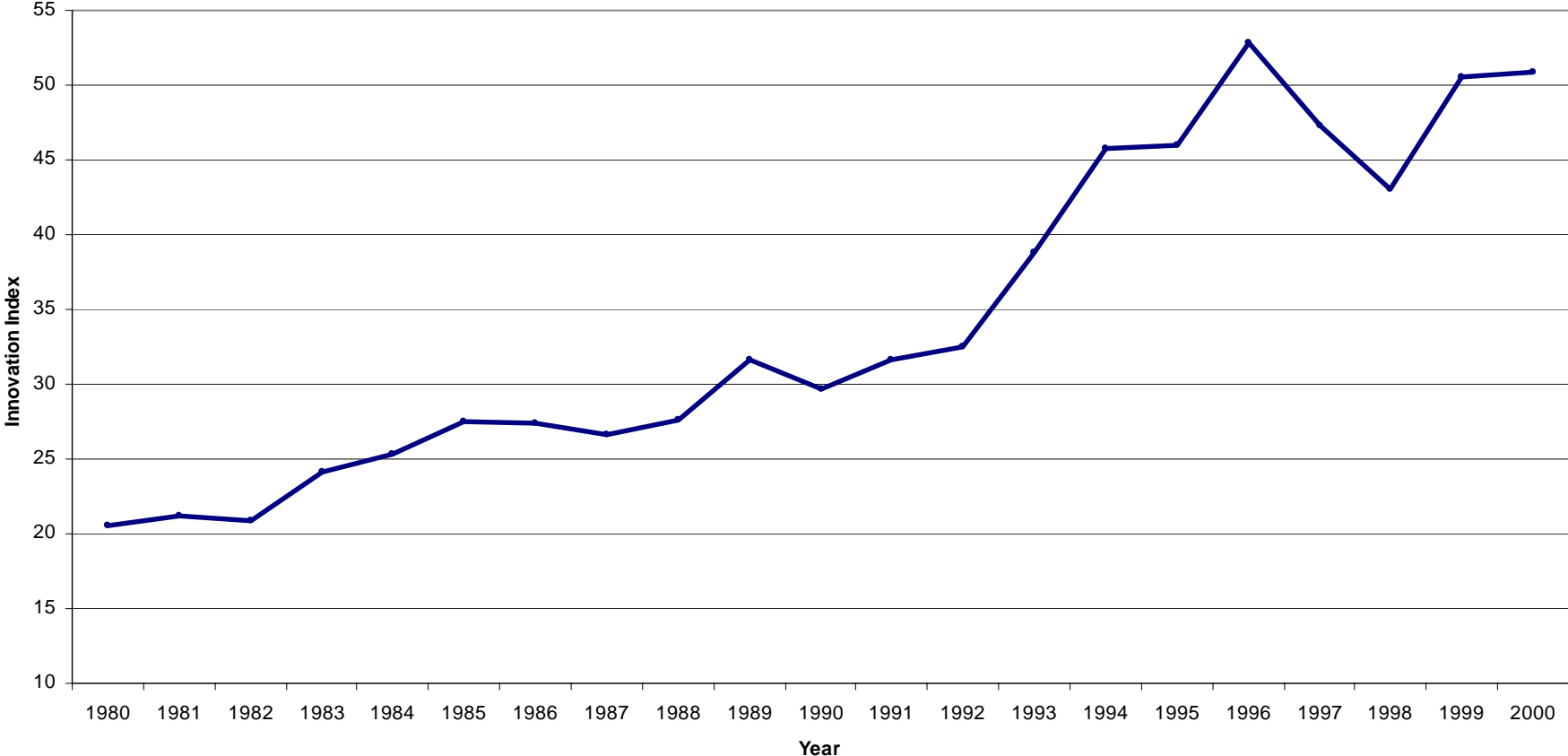
# The Evolution of Innovation Capacity Over Time

- Looking across the OECD for more than 20 years, key Innovative Capacity measures are **highly significant** in explaining international patenting output
- Infrastructure Investments and Policies have a significant influence
  - R&D spending & Employment
  - Strength of Intellectual Property Protection
  - Higher Education & Overall Technological Sophistication
- R&D **composition** has an additional impact
  - R&D spending by **business** more productive than Govt. R&D
  - **Innovation productivity** is higher for countries **specialised** in (broad) technology areas
  - **Universities play a key role** in translating funding into innovation performance



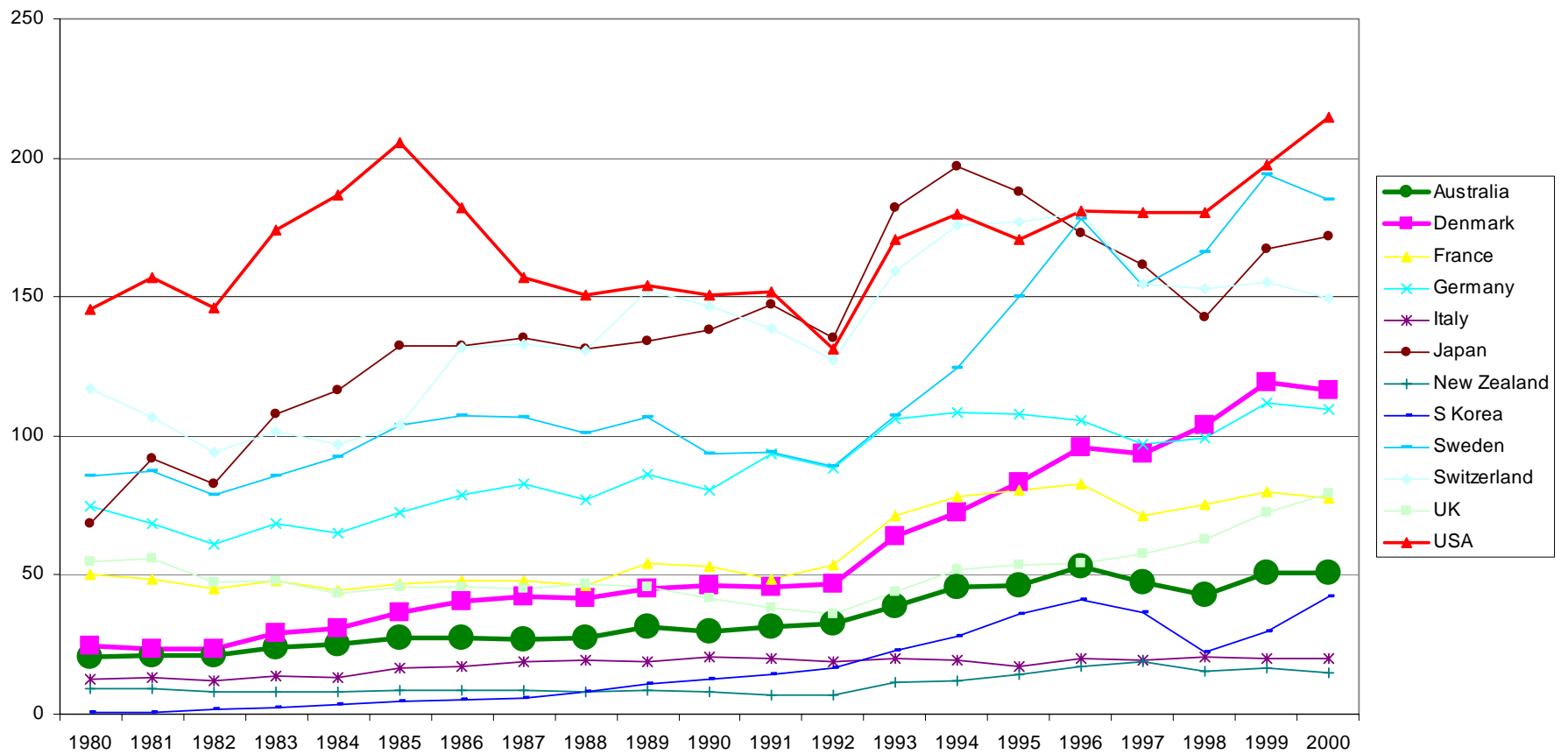
# Finding 1: Over the past two decades, Australia has evolved from a classic “imitator” to a second-tier “innovator” nation

Australia Innovation Index



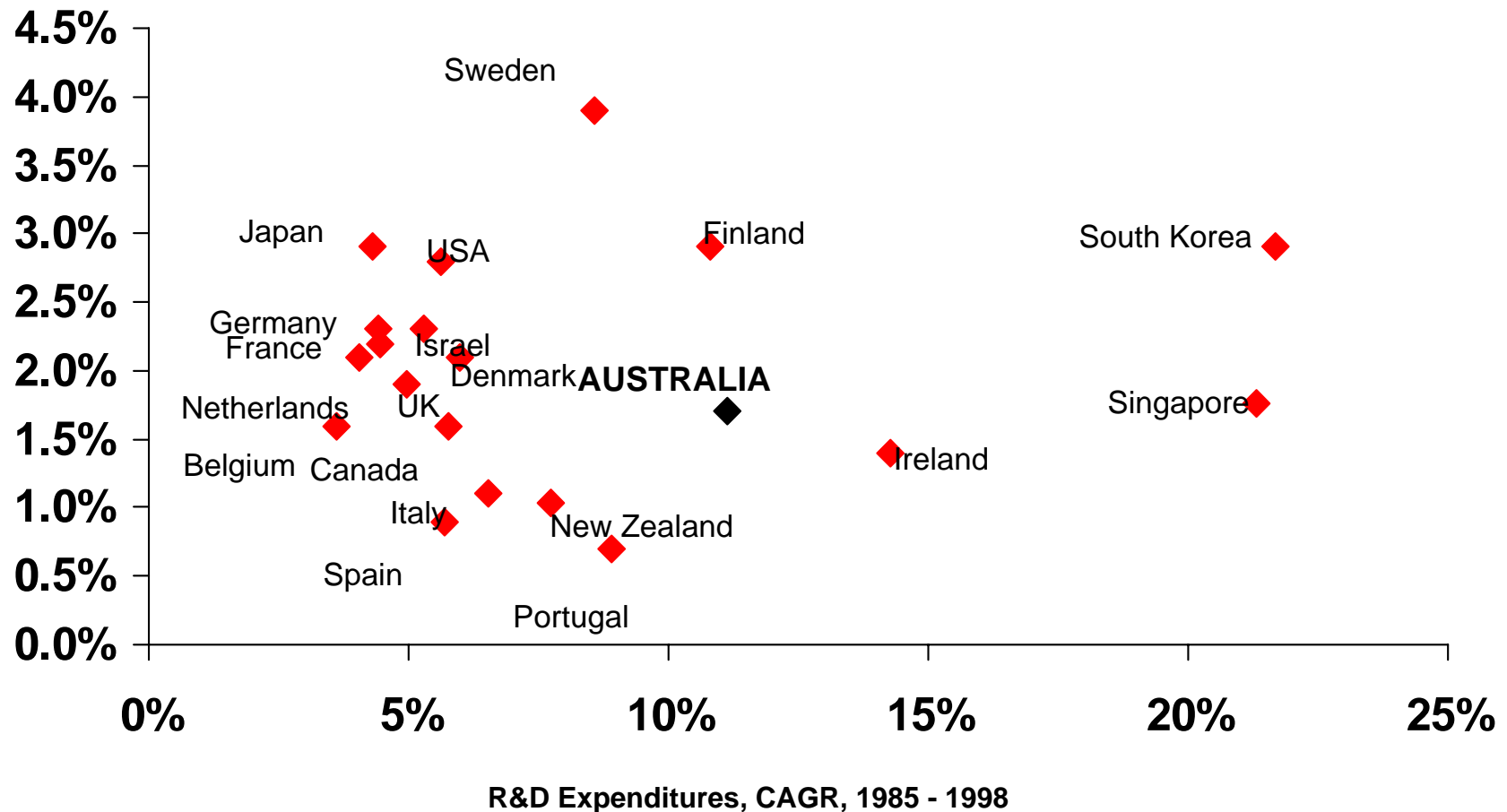
# Finding 2: Despite Advances Australia Maintains its Place at the lower end of Second-Tier Innovators

The Innovation Index for Selected Countries



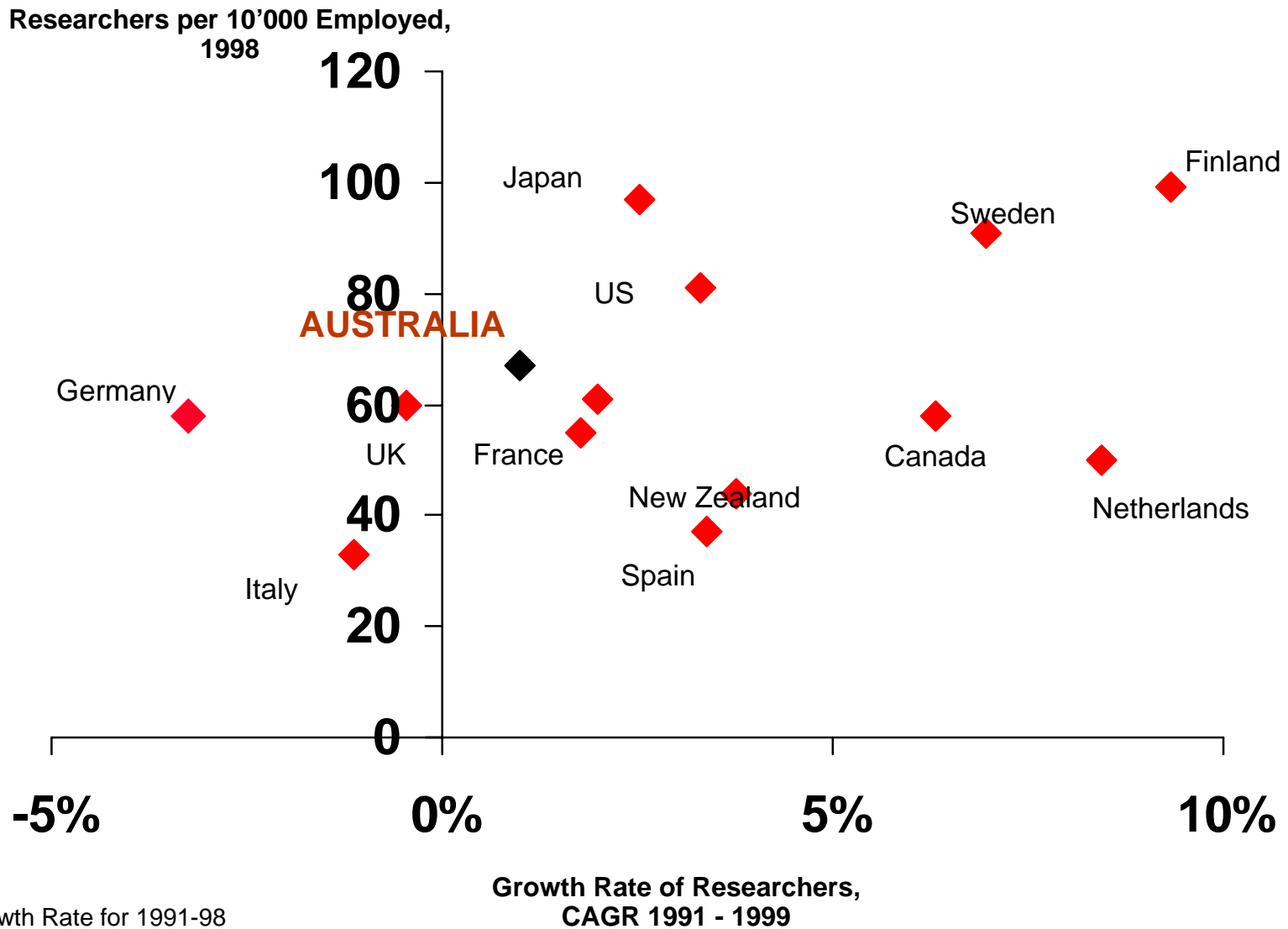
# The R&D spending boom of the late 1990s outpaced international competitors

R&D Spending as Share of GDP, 1998



Source: OECD Science, Technology and Industry Scoreboard 2001.

# However, after strong growth in the 1980s, Australia science and engineering labour force intensity has slowed relative to similar countries

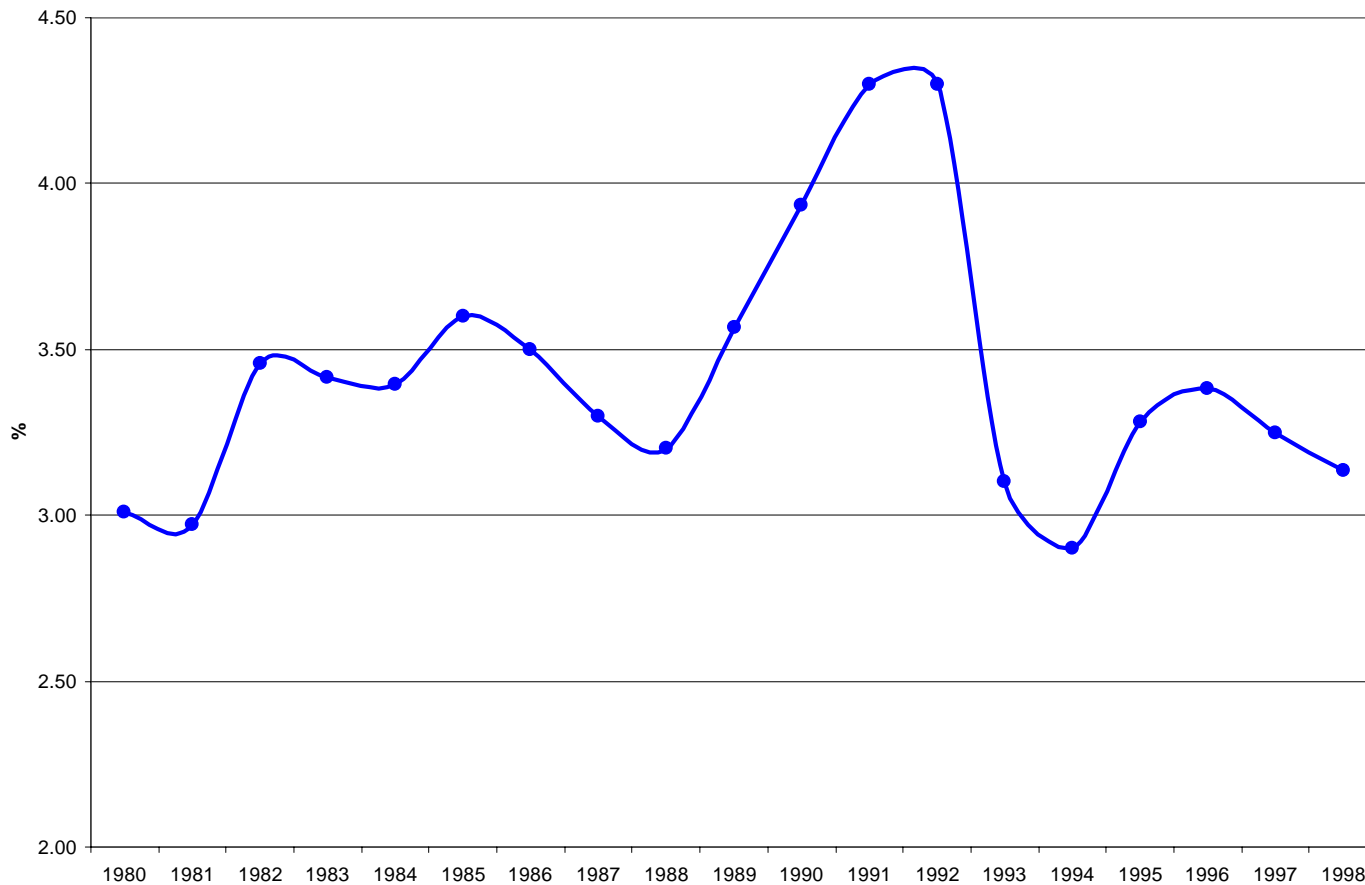


Note: Finnish Growth Rate for 1991-98  
Source: OECD, 2001

# Australia's position among "second-tier" innovator nations is limited by the erosion of educational spending

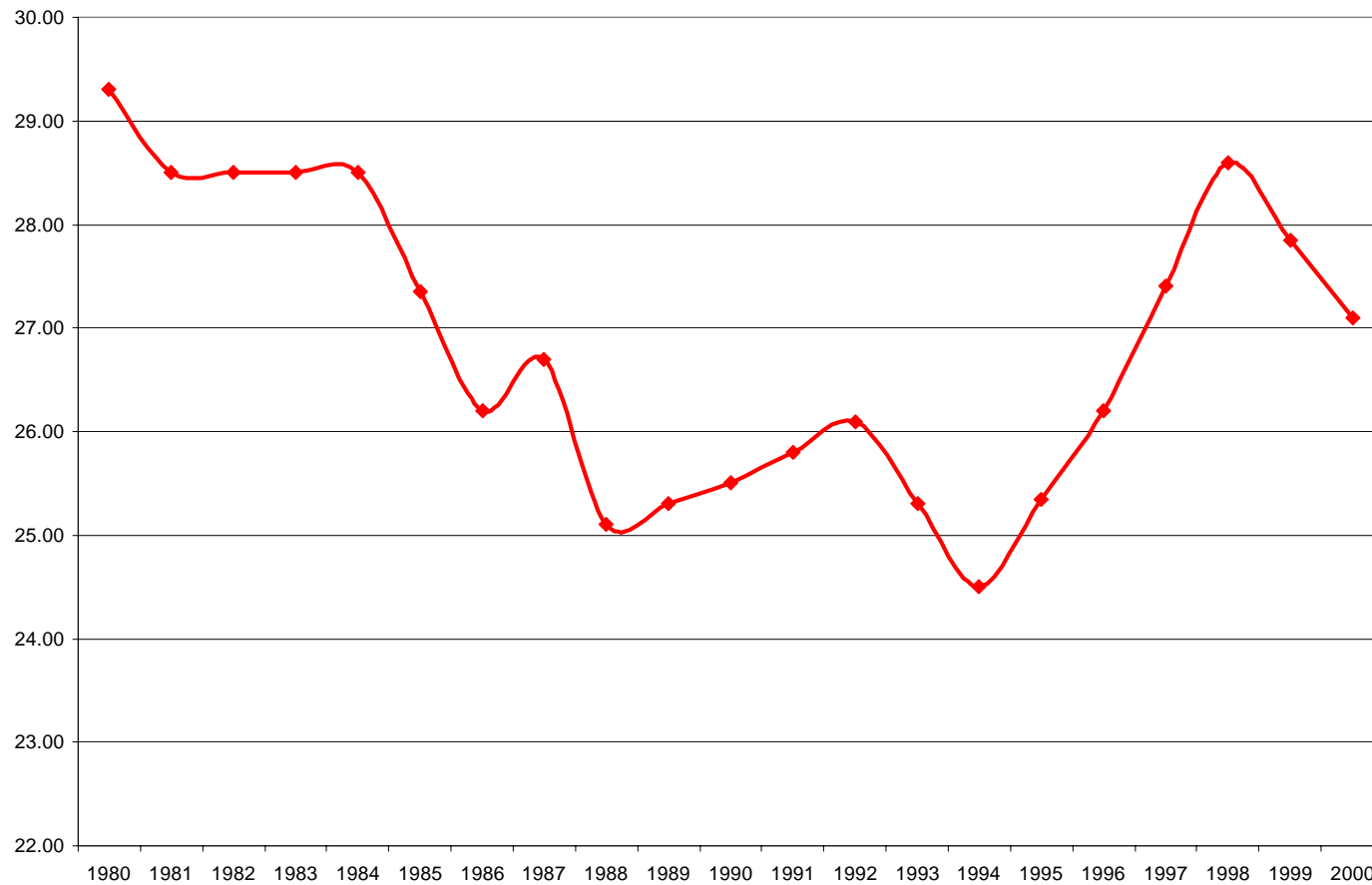
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Education share of GDP

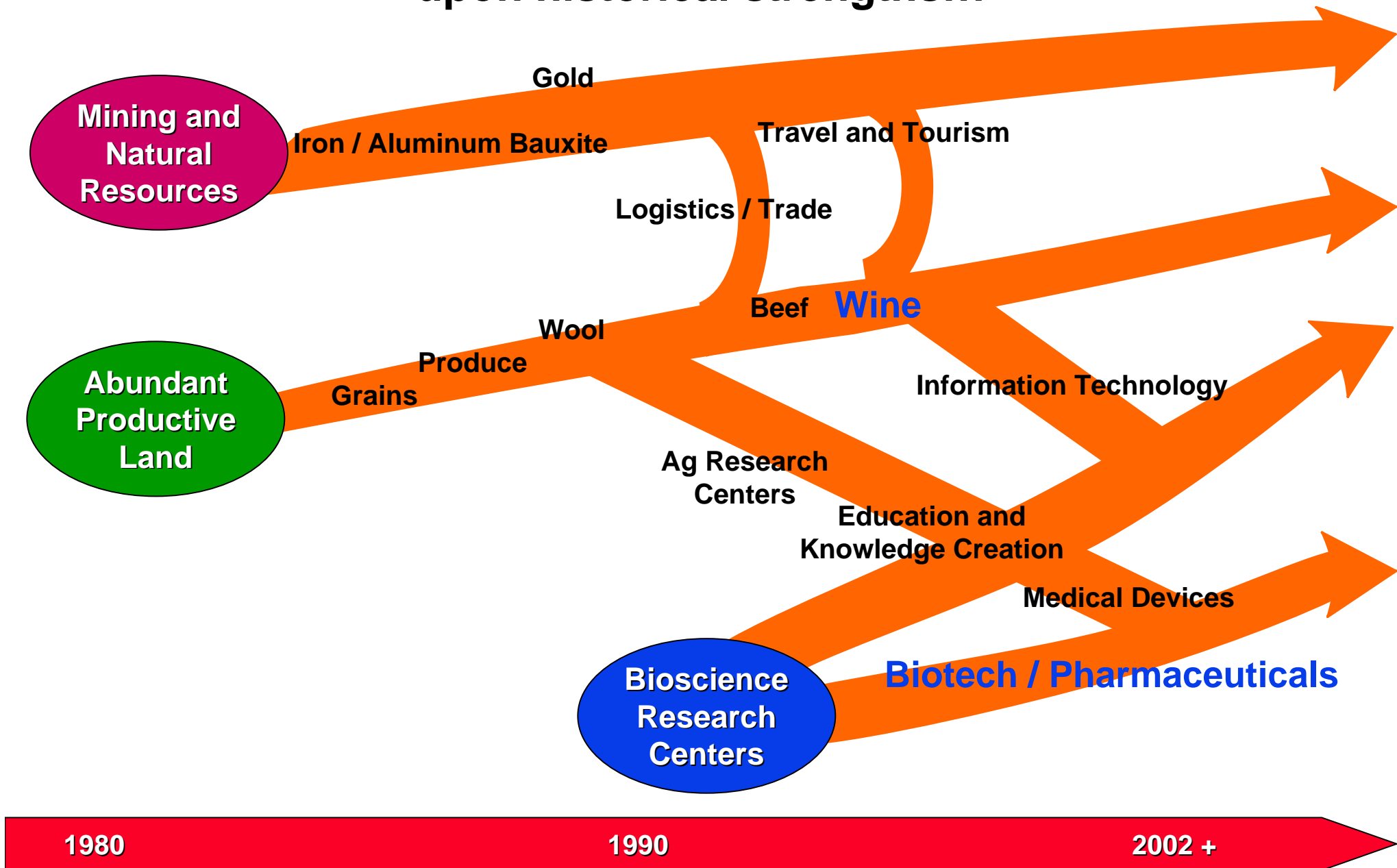


# And stagnation in the development of effective institutions linking the innovation infrastructure to local cluster requirements

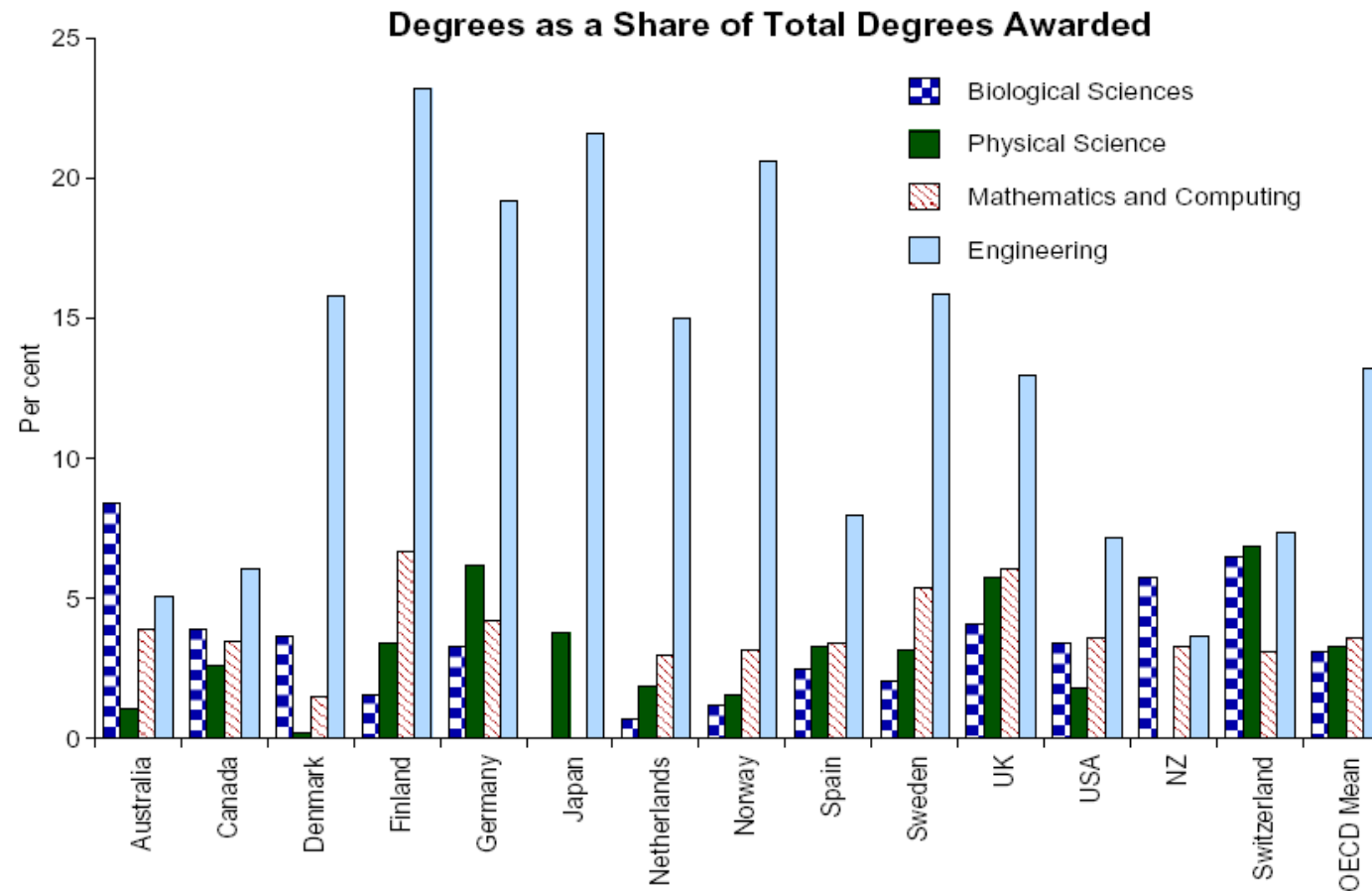
R&D performed by universities (%)



# Dynamic Australian clusters have begun to evolve building upon historical strengths...



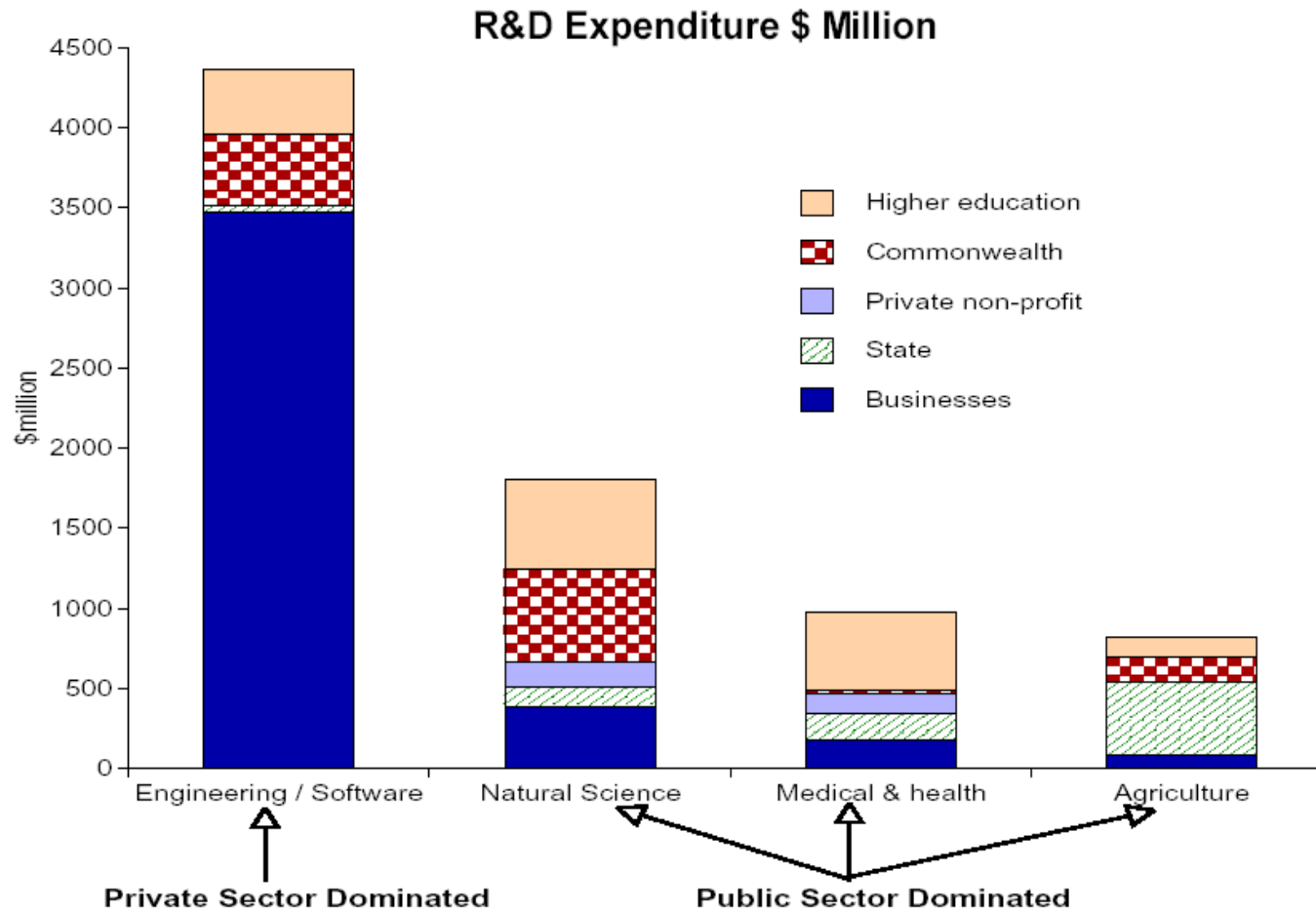
# ...and an internationally competitive scientific personnel base in life and agricultural sciences...



Source: Bureau of Industry Economics (1996), *Science System: International Benchmarking*



# However, to date, leading clusters are driven by public rather than private research expenditures...

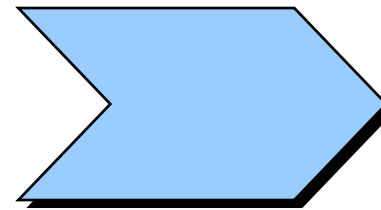


Source: ABS Cat No. 8112.0

# Nurturing Australian Innovative Capacity: An Innovation Policy Agenda

## Current Assessment

- Macroeconomic Stability
- Improved Cost / Quality Competitiveness
- Diversifying away from traditional industrial sectors
- Some Examples of Globally Relevant Cluster Development (e.g. Wine and Biotechnology)



**How to Build  
Capacity for  
World-Class  
Innovation?**

## Projected Innovation Rankings (2005)

Country	2005 Rank	2005 Innovation Index
Sweden	1	258.0
Iceland	2	208.9
USA	3	204.9
Finland	4	198.8
Japan	5	186.3
Denmark	6	181.4
Switzerland	7	156.0
Norway	8	97.8
Germany	9	97.1
France	10	93.5
Ireland	11	91.1
Canada	12	84.8
Netherlands	13	84.2
UK	14	84.0
Belgium	15	81.4
S Korea	16	73.7
<b>Australia</b>	<b>17</b>	<b>63.9</b>
Austria	18	60.8
New Zealand	19	29.0
Greece	20	19.0
Spain	21	16.3
Czech Republic	22	15.3
Italy	23	14.9
Portugal	24	14.4
Slovak Republic	25	6.1
Poland	26	4.4
Hungary	27	2.3
Turkey	28	1.4
Mexico	29	1.4

# Key Lessons

- In a global economy, innovation-based competitiveness provides a **more stable** foundation for productivity growth than low-cost production
- Having secured a position as a leading user of global technology, Australia has an historic **opportunity** to pursue policies and investments to establish itself as a leading innovator nation
- Australia must build upon a foundation of **openness** to international competition, the **protection** of intellectual property rights, and the enforcement of an **innovation-focused antitrust policy**
- Among the many facets contributing to national innovative capacity, Australia can significantly increase investment in...
  - A **university system** responsive to the science and technology requirements of emerging industrial clusters
  - Incentives for the emergence of **industrial clusters** that exploit historical strengths and foster innovation-focused domestic competition
  - Higher education (beyond high school literacy), and, in particular, *incentives* for pursuing **science and technology-based careers** in Australia