



UNIVERSITY OF  
TECHNOLOGY SYDNEY

# Australia's knowledge-based future – how innovation policy can create long-term growth and jobs

UTS

THINK.CHANGE.DO

**Roy Green**

**Dean, Faculty of Business**

***UTSpeaks, July 14 2009***

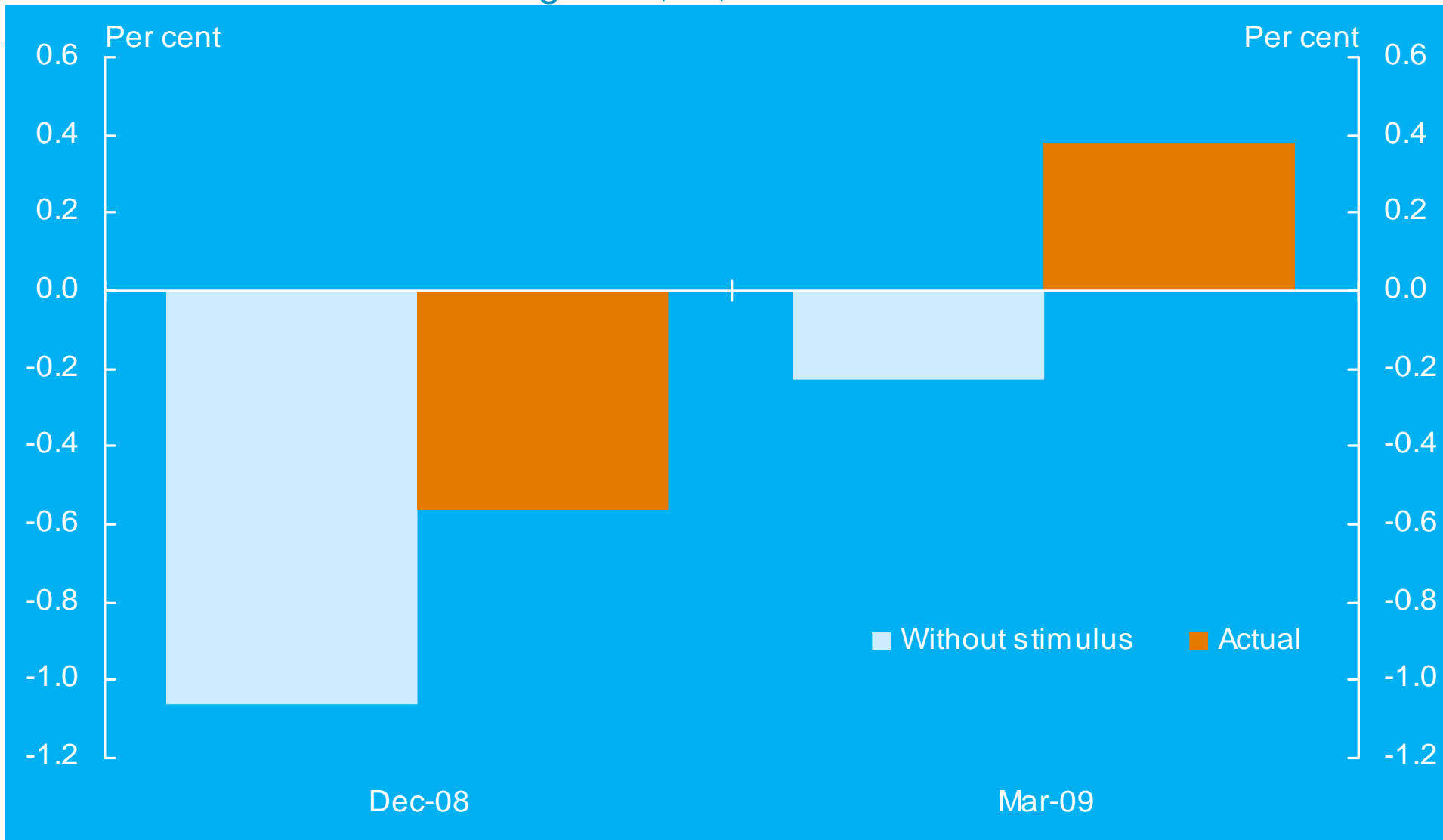
The global financial crisis changes everything...

But for knowledge and innovation, it changes nothing.

Our challenge is to *link short-term recovery to longer term competitive advantage.*

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## Stimulus effect on GDP growth, %, 2008-09





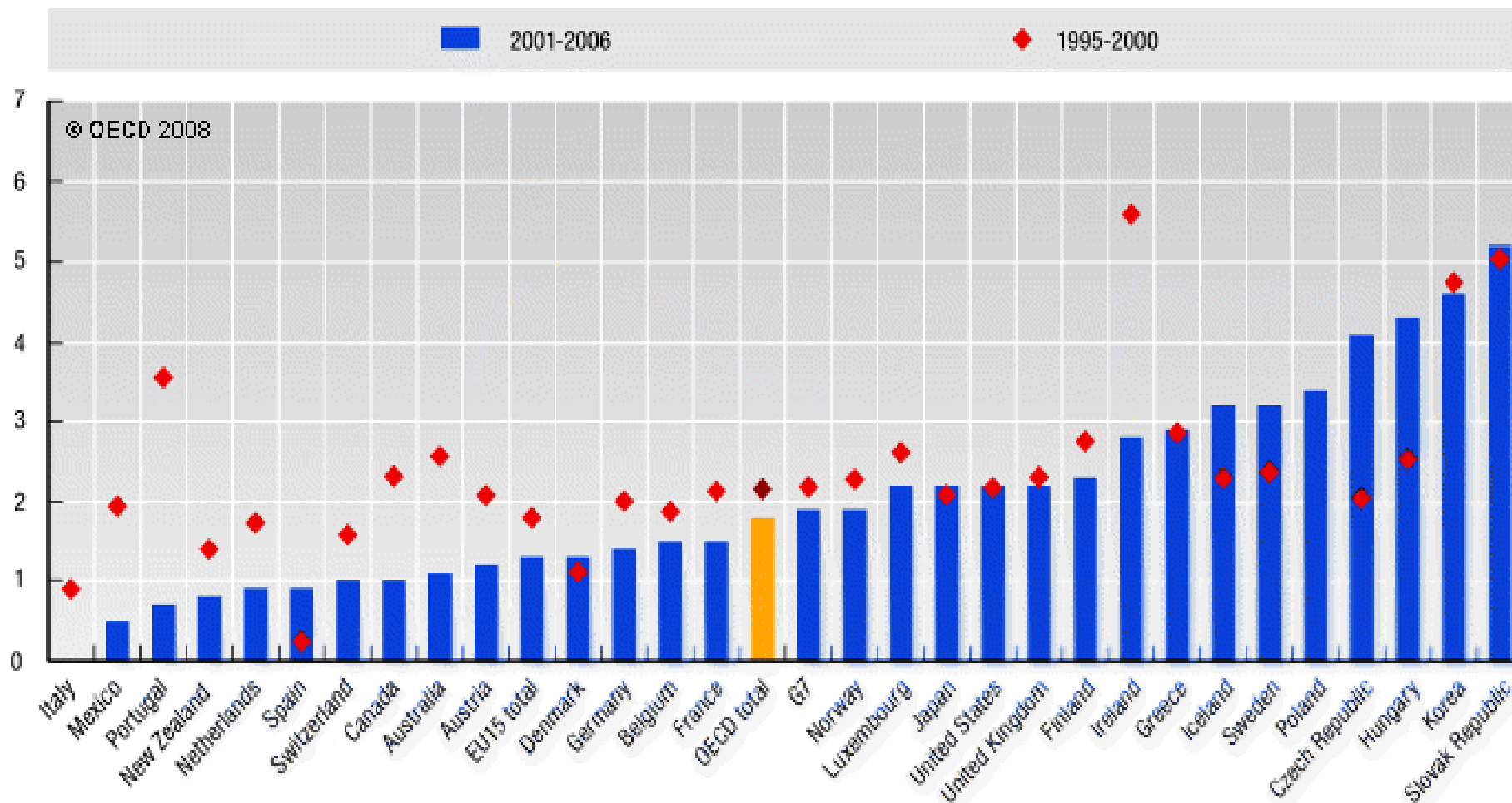
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‘As the global economic momentum has faded, firms can no longer “ride the waves” created by others. **They need to build their own momentum for innovation...**’

*Erkko Autio, Imperial College London*

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## Labour productivity growth (GDP per hour), 1995-2006





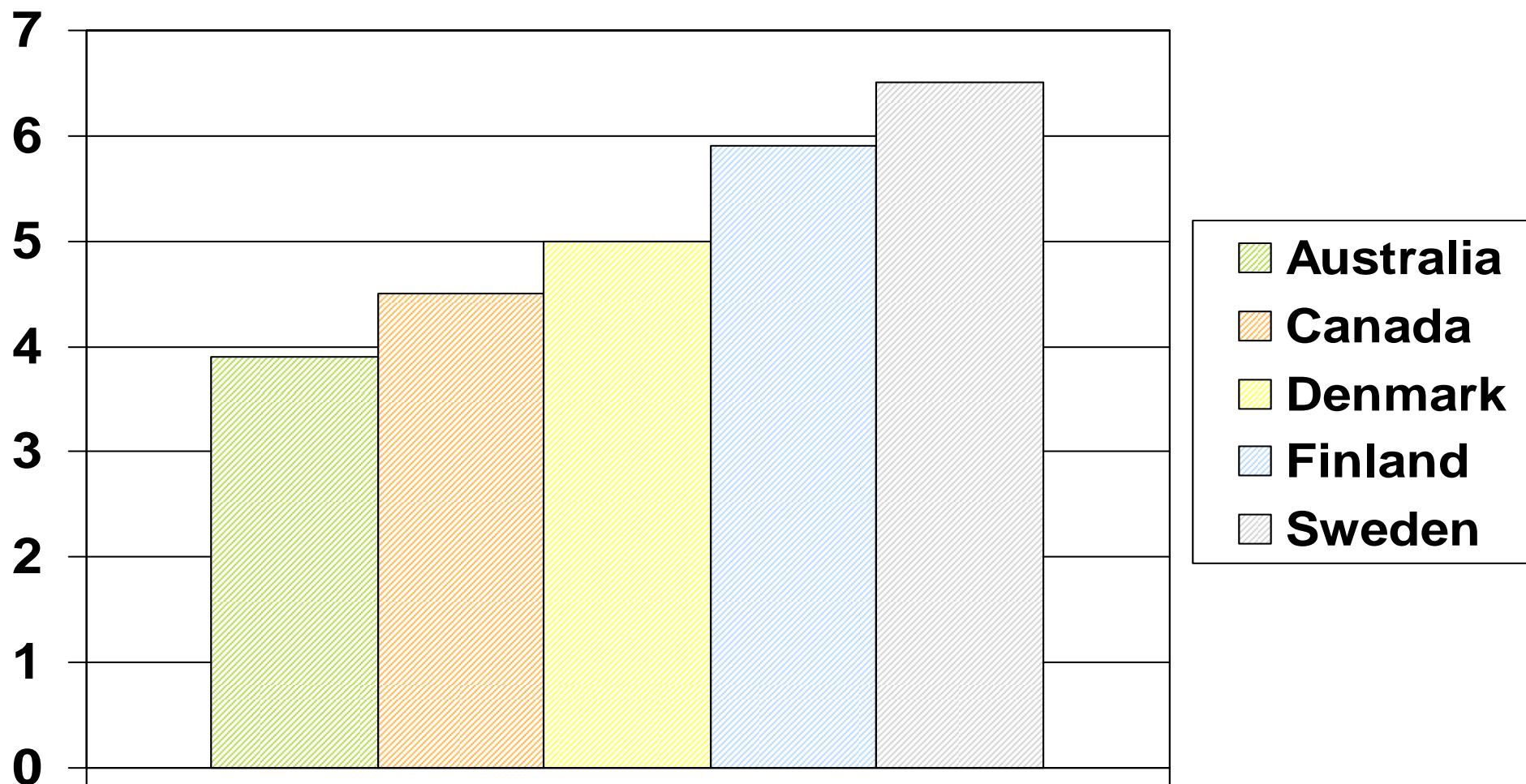
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### Resource-based economies

- Australia's terms of trade boom masked structural deterioration of the economy and future capacity for innovation
- Scenarios for resource-rich economies include: 'Dutch disease' of 1970s, British missed opportunities of 1980s...
- Or Norway's investment in research and innovation infrastructure

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Investment in Knowledge (R&D, Higher Education, Software), % of GDP, 2004



‘The university today finds itself in a quite novel position in society. It faces a new role with few precedents to fall back on... We are just now perceiving that the *university’s invisible product, knowledge, may be the most powerful single element in our culture*, affecting the rise and fall of professions, and even of social classes, of regions, and even of nations.’

*Clark Kerr, The Uses of the University, 1963*

- ❑ **EU:** Lisbon – ‘the most competitive and dynamic knowledge-based economy in the world’
- ❑ **US:** ‘Rising above the Gathering Storm’
- ❑ **UK:** ‘Race to the Top’, ‘Innovation Nation’
- ❑ **Canada:** ‘Benchmarking against Global Best’



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**The world is not flat  
(Tom Friedman)**

**.... it's 'spiky'  
(Richard Florida)**



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Knowledge economies

- Small economies on the periphery of larger markets (Ireland, Finland, Singapore, Taiwan)
- Regions in large economies (Silicon Valley, Carolinas 'Research Triangle', Austin TX, Massachusetts in the US, and Cambridge, Munich, Grenoble and Sophia Antipolis in Europe)



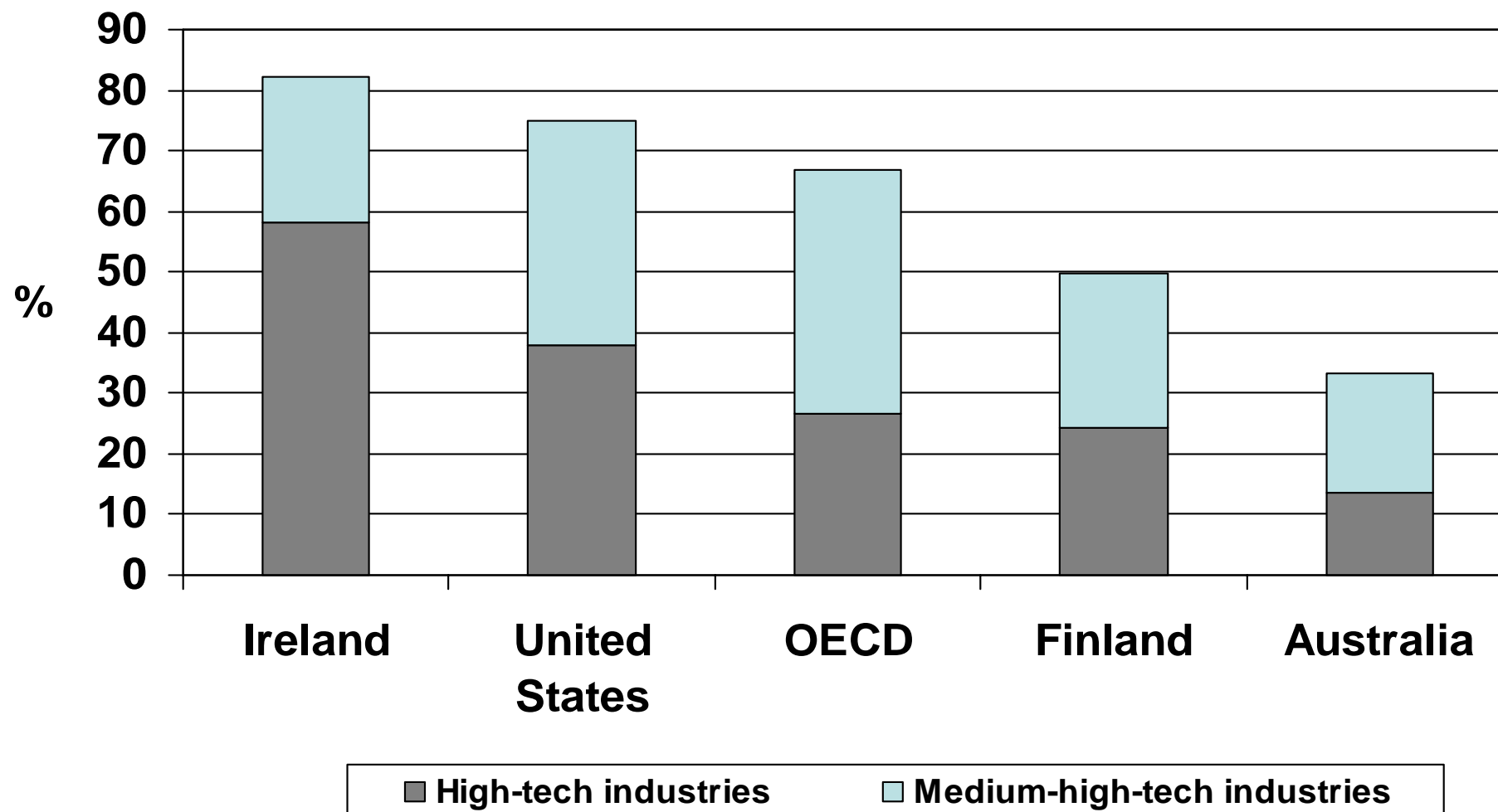
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Ireland's transformation

‘There is a strong link between investment in the research and innovation base of the economy and sustained economic growth... The accumulation of “knowledge capital” will facilitate the evolution of the knowledge-based economy.’

*Ireland's National Development Plan 2000/06*

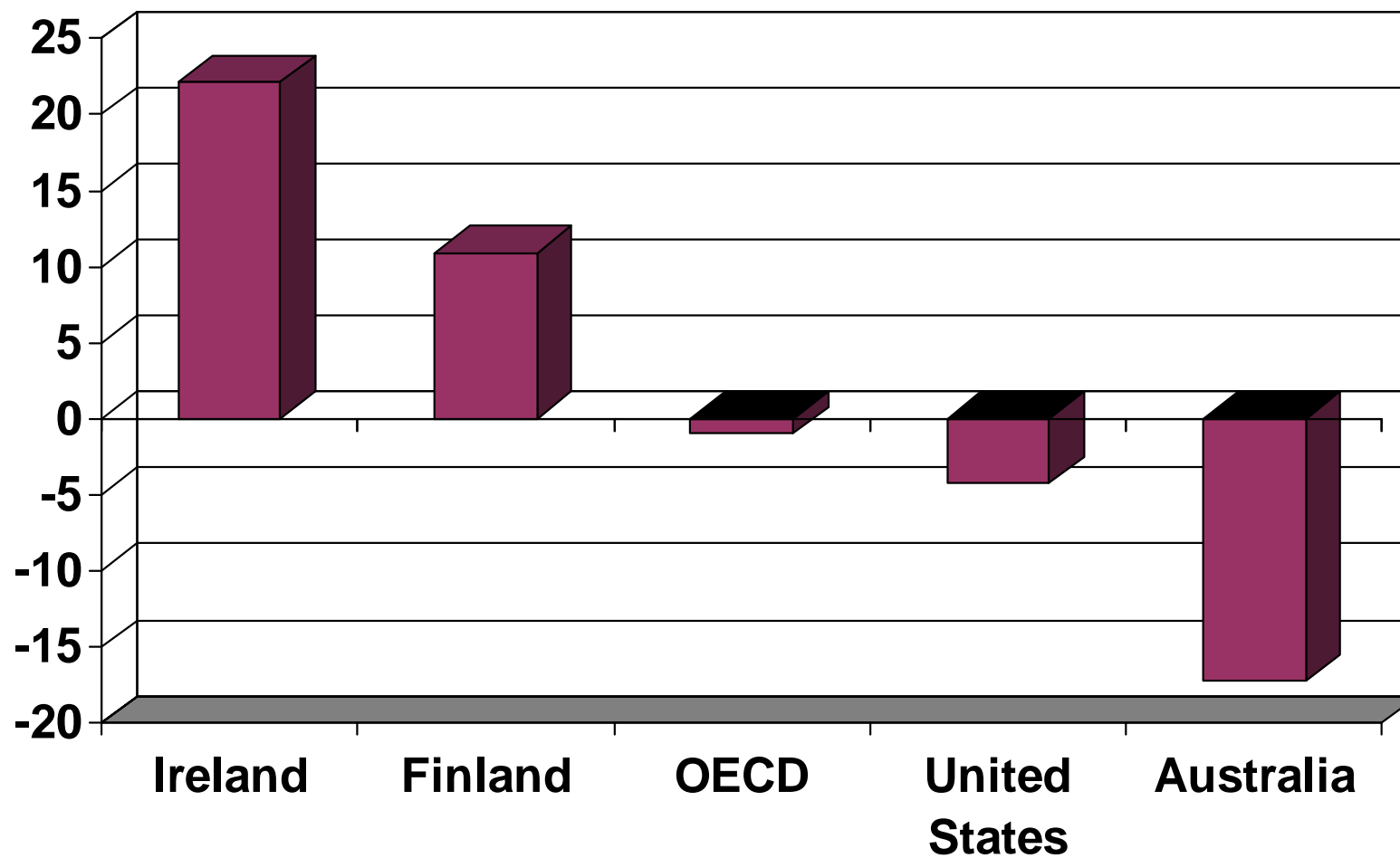
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Share of high & medium high tech industries in manufacturing exports (%)



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Information & communications technologies trade balance (%)





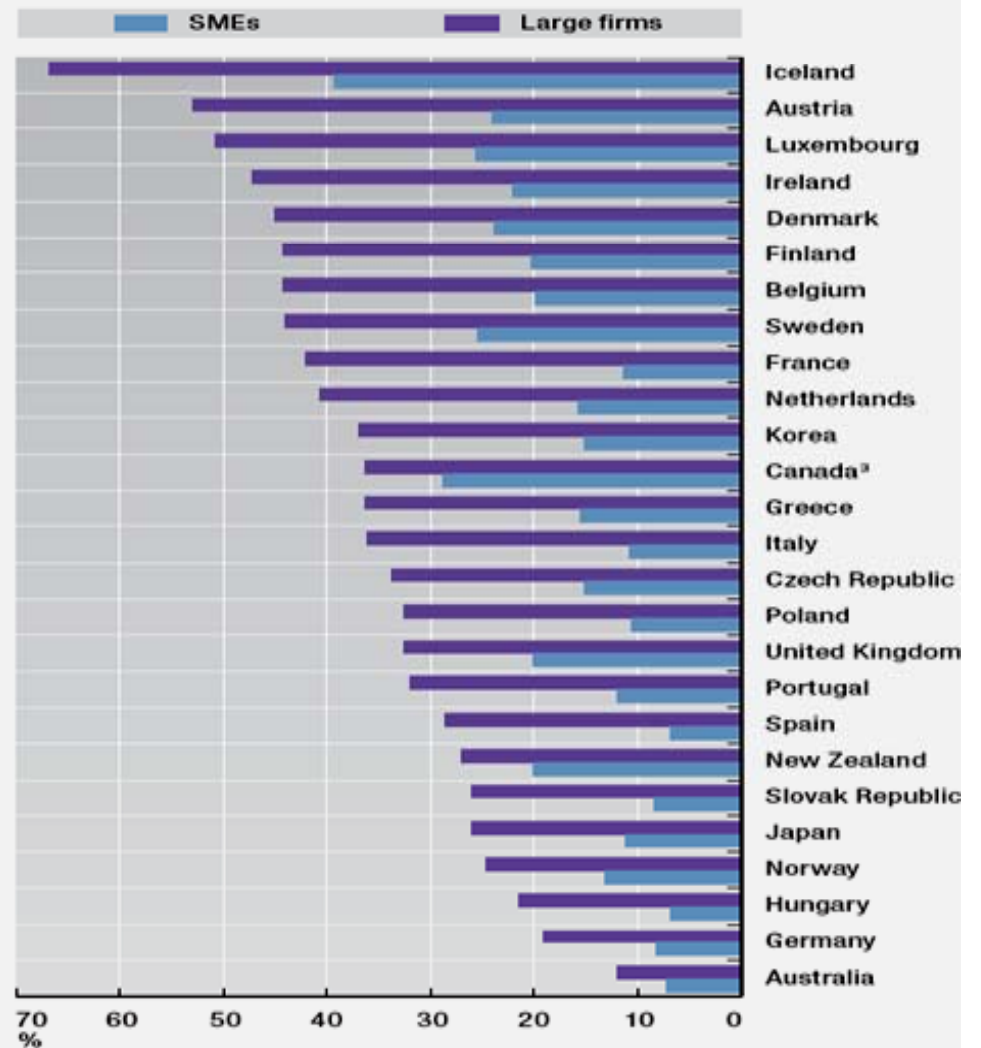
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‘Today, innovation – the development of new products, new services, new or improved production process, and new business models – drives growth.’

*Robert Atkinson & Scott Andes, Information  
Technology and Innovation Foundation, 2009*

Product innovation by Australian firms lagging the world

### Firms with new-to-market product innovations by size,<sup>1</sup> 2002-04<sup>2</sup> As a percentage of all firms



1. SMEs: 10-249 employees for European countries, Australia 20-249 for Canada.
2. Or nearest available years.
3. Manufacturing only.

Source: OECD Science, Technology and Industry Scoreboard, 2007



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Reviews of Australia's innovation system

Reviews of national innovation system, higher education, CRCs, automotive, pharmaceuticals and TCF industries.

[www.innovation.gov.au](http://www.innovation.gov.au)



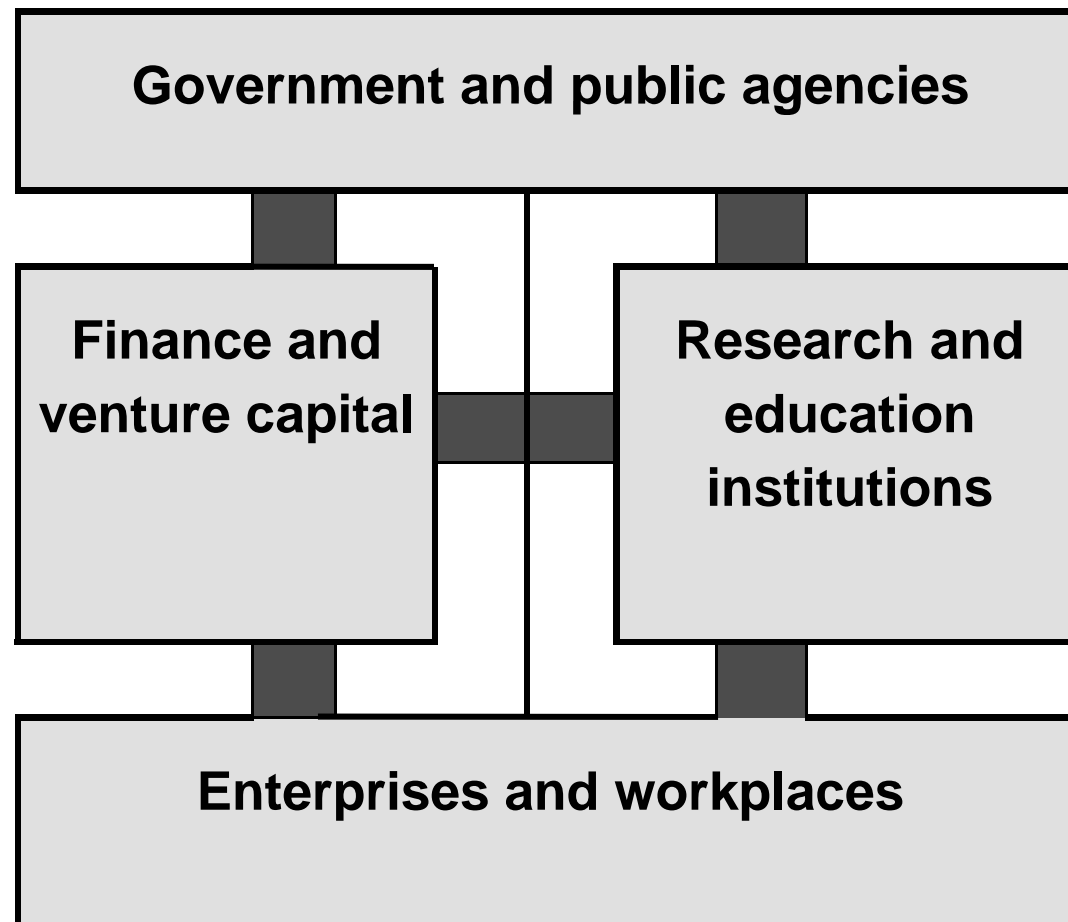


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### Why innovation

- Innovation drives ***productivity growth*** and competitiveness of firms
- Innovation promotes ***social inclusion*** through expanded opportunities
- Innovation will contribute to achieving ***environmental sustainability***

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National innovation system



‘Many... programs in Australia are directed at technological or scientific innovation while only a few are directed at *strengthening innovation management inside organisations, including leadership and culture...* The challenge is how best to promote successful adoption and diffusion of high performance work systems in both the public and private sectors.’

*Review of National Innovation System, 2008*



# Powering Ideas

An Innovation Agenda  
for the 21st Century



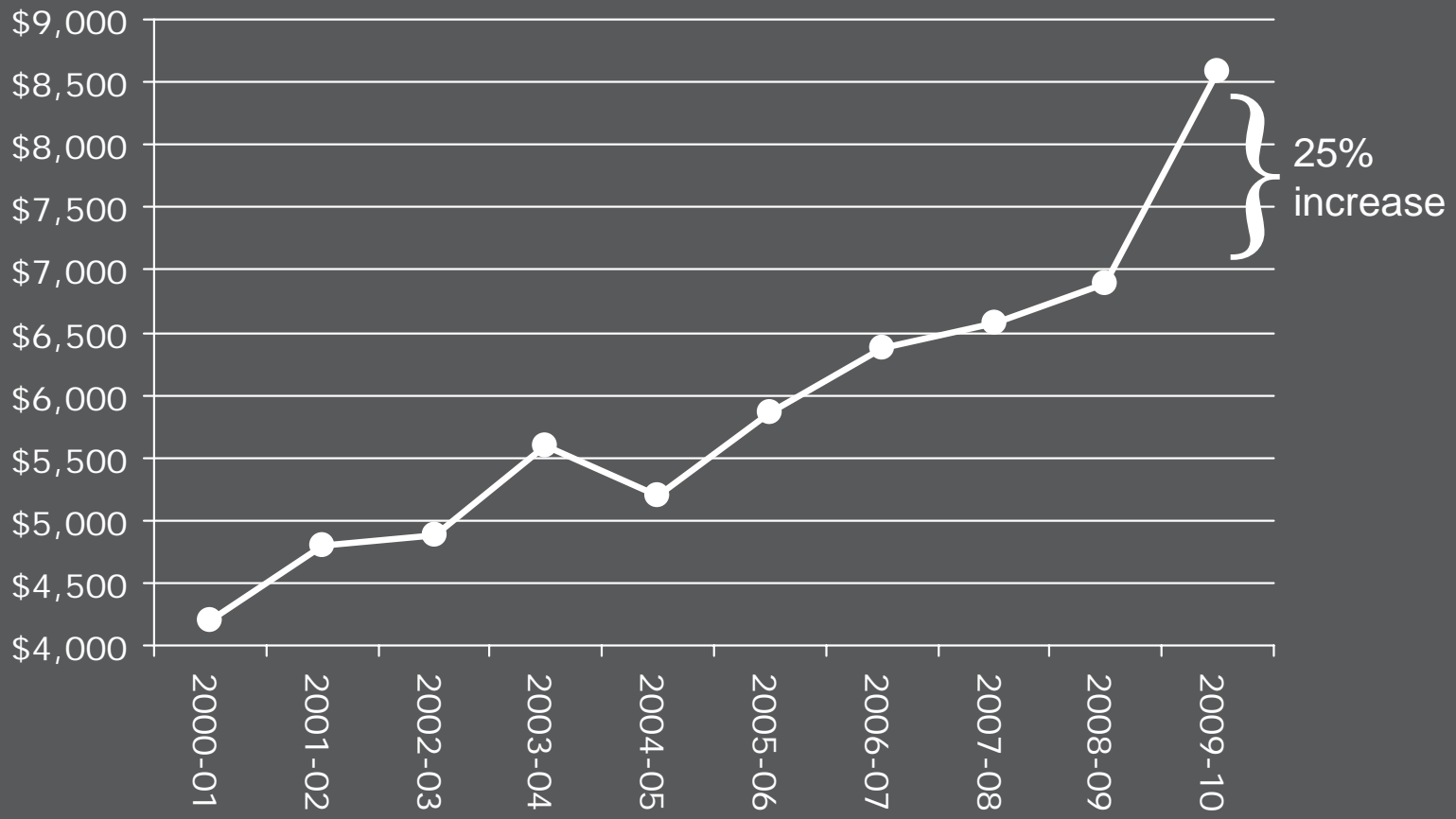
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### Powering Ideas: Key points

1. More effective and coherent **national framework** for innovation policy and priorities
2. Increased **funding support** for public research and business innovation

# Research and innovation budget

\$ millions



Source: DIISR



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Powering Ideas: Key points

3. Key role for Enterprise Connect as **delivery mechanism** for firms and organisations
4. New emphasis on **collaboration and networks**, in both local and global context
5. Recognition of importance of **innovation skills and capability-building** at the workplace



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Building innovation capacity

‘One future focus of the Australian Government’s industry and innovation policies will be on **building innovation capacity and performance at the enterprise level...** Government support for business innovation... must recognise the complexity of the innovation process and the **different forms innovation can take.**’

*Australian Government, Powering Innovation: An Innovation Agenda for the 21<sup>st</sup> Century, 2009*



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**Broad approach to innovation is  
about more than research and  
technological development...**

- Innovation is increasingly **‘organisational’**
- It is about new business models, technology ‘absorption’, systems integration
- Also ‘design thinking’ for the workplace of the future, which is agile, engaged and collaborative

- Innovation can be **incremental** and evolutionary, as well as breakthrough and ‘disruptive’
- How does innovation add value?  
Toyota production system (Edward Deming) vs the world wide web (Tim Berners-Lee)



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### 3 Low tech innovation

- Innovation is taking place as much in **low tech** industries and organisations as in high tech industries
- Review of TCF industries: trends in fashion, ‘smart fabrics’, mass customisation and ‘ethical’ supply chain management

- Innovation is becoming ‘**non-linear**’ with multiple sources of knowledge and creativity
- ‘Hidden innovation’ occurs in the spaces and interfaces within and between organisations
- ‘Problem-solving’ vs ‘intuitive’ reasoning (Richard Lester)



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### 5 Collaboration and networks

- Innovation is everywhere driven increasingly by **collaboration** and networks, not silos
- Growth of linkages between companies, public agencies and research and educational institutions
- Illustrated by four decades of US innovation data (Fred Bloch)

‘Universities are powerful drivers of innovation and change... They produce people with knowledge and skills; they generate new knowledge and import it from diverse sources; and they apply knowledge in a range of environments. They are also the seedbed for new industries, products and services and are at the hub of business networks and industrial clusters of the knowledge economy.’

*DTI, Opportunity for All in a World of Change, White Paper on Enterprise, Skills and Innovation, 2001*

- MIT Local Innovation Systems project
- Structured interviews in 22 locations in 6 countries, 2002-05
- Investigation of ‘local innovative capability’ and diversity of university-industry interactions

Undergraduates  
Graduates  
Mid-career  
Executive

**Educating  
people**

Contract research  
Cooperative research  
with industry  
Technology licensing  
Faculty consulting  
Providing access to  
specialized  
instrumentation and  
equipment  
Incubation services

**Problem-  
solving for  
industry**

**Providing  
public  
space**

- Forming/accessing networks and stimulating discussion of industry development pathways.
- Influencing the direction of search processes
  - Meetings and conferences
  - Hosting standard-setting forums
  - Entrepreneurship centers & mentoring programs
  - Alumni networks
  - Personnel exchanges (internships, faculty exchanges, etc.)
  - Industrial liaison programs
  - Visiting committees
  - Curriculum development committees
  - Creating the built environment to support this

**Adding to  
the stock of  
codified  
knowledge**

Publications  
Patents  
Prototypes





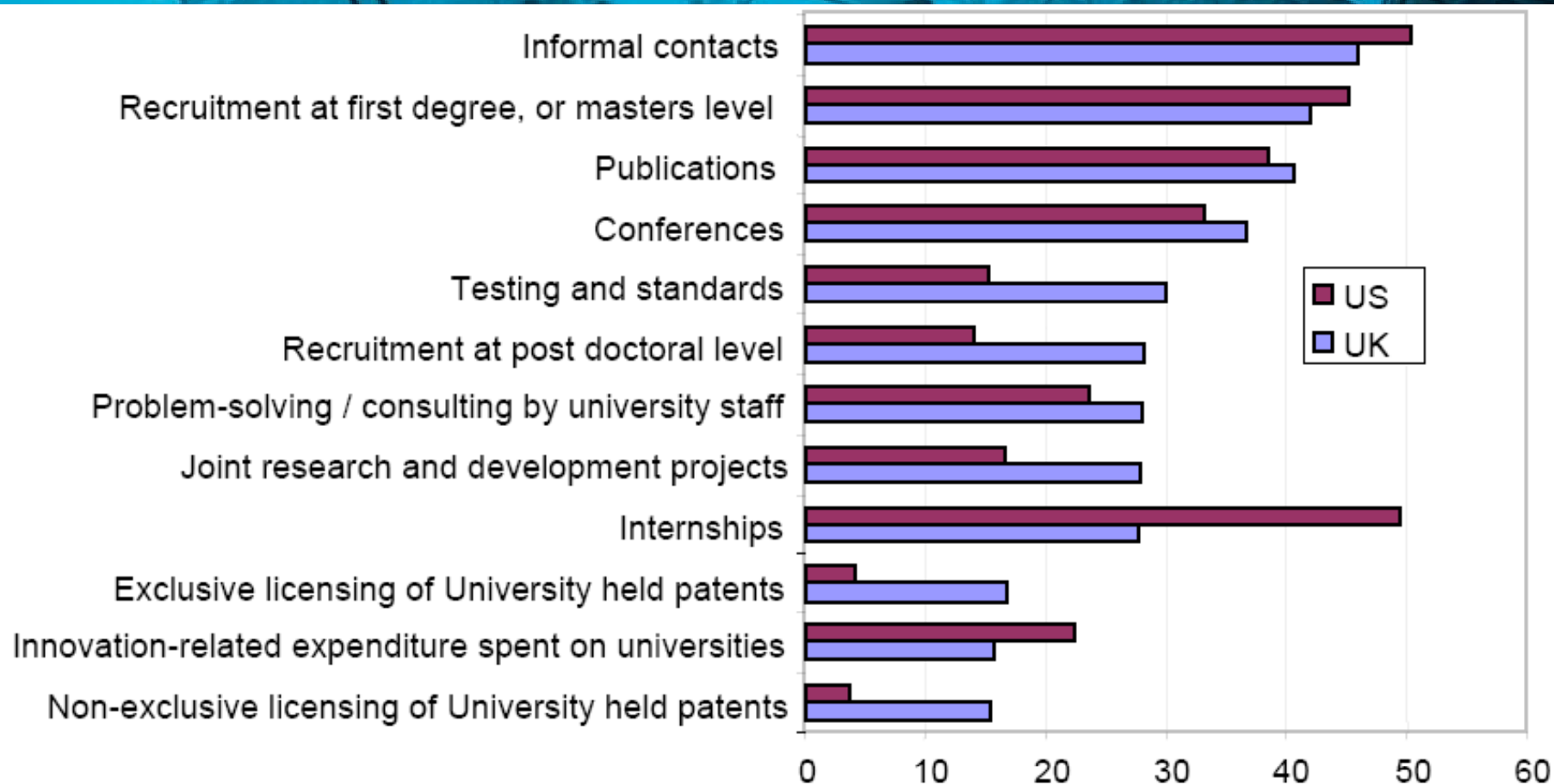
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### Which interactions matter?

- Cambridge-MIT UK-US Innovation Benchmarking project
- Firm-level survey in UK (n=2129) and US (n=1540), 2004-05
- Investigation of interactions contributing to innovative activity in firms

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### University-industry interactions contributing to innovation (% firms)



Source: A. Cosh, A. Hughes and R. Lester *UK PLC Just How Innovative Are We?* Cambridge MIT Institute 2005



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Leadership and management at the workplace

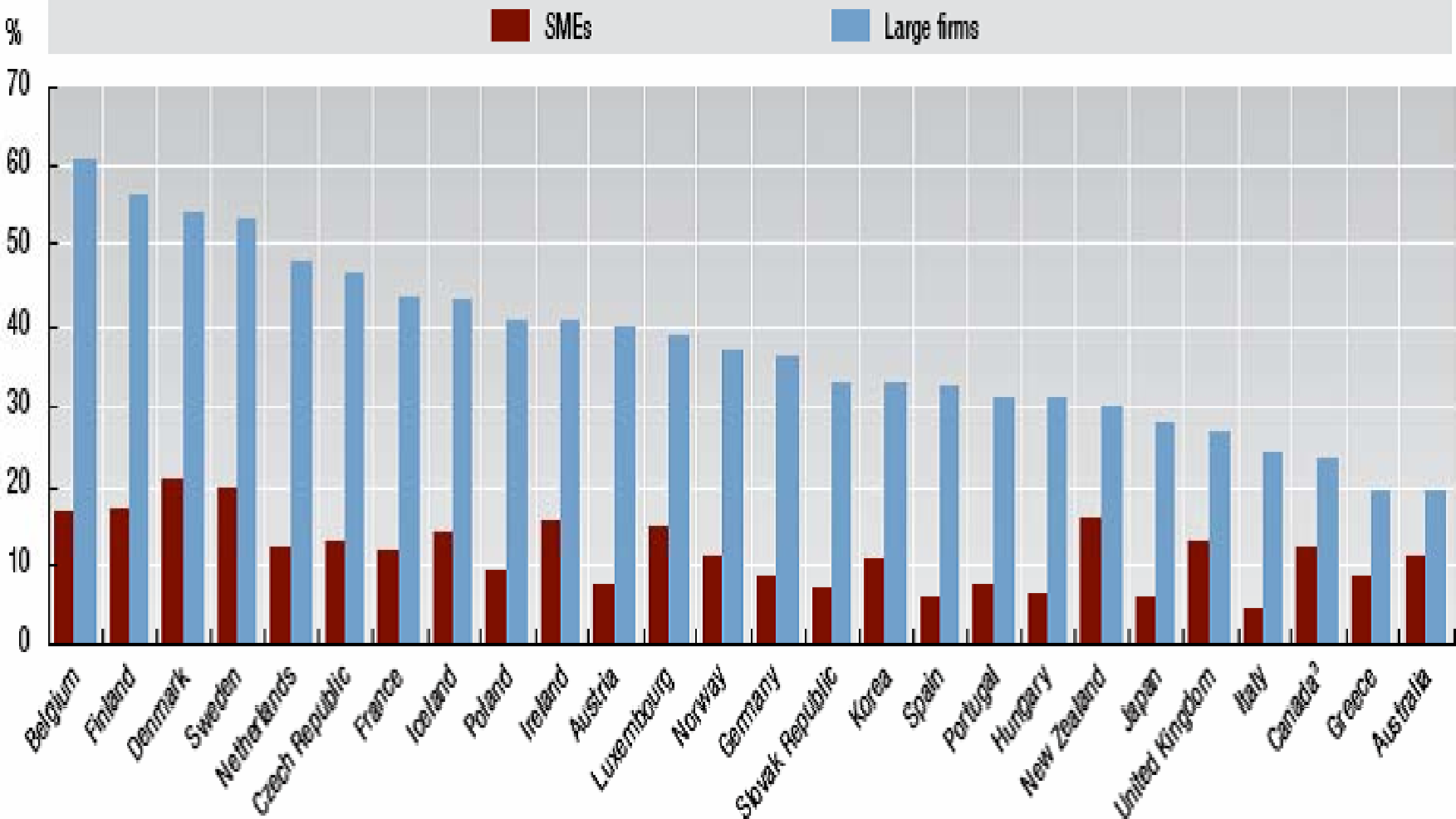
‘Making innovation work requires a workforce with sophisticated **skills of all kinds – including leadership and management skills.** It also requires cooperative workplaces in which creativity is encouraged. Few organisations command all the skills needed to innovate successfully on their own. They must **network and collaborate – locally and globally.**’

*Australian Government, Powering Innovation: An Innovation Agenda for the 21<sup>st</sup> Century, 2009*



# Firms collaborating in innovation activities, by size<sup>1</sup>, 2002-04<sup>2</sup>

As a percentage of all firms

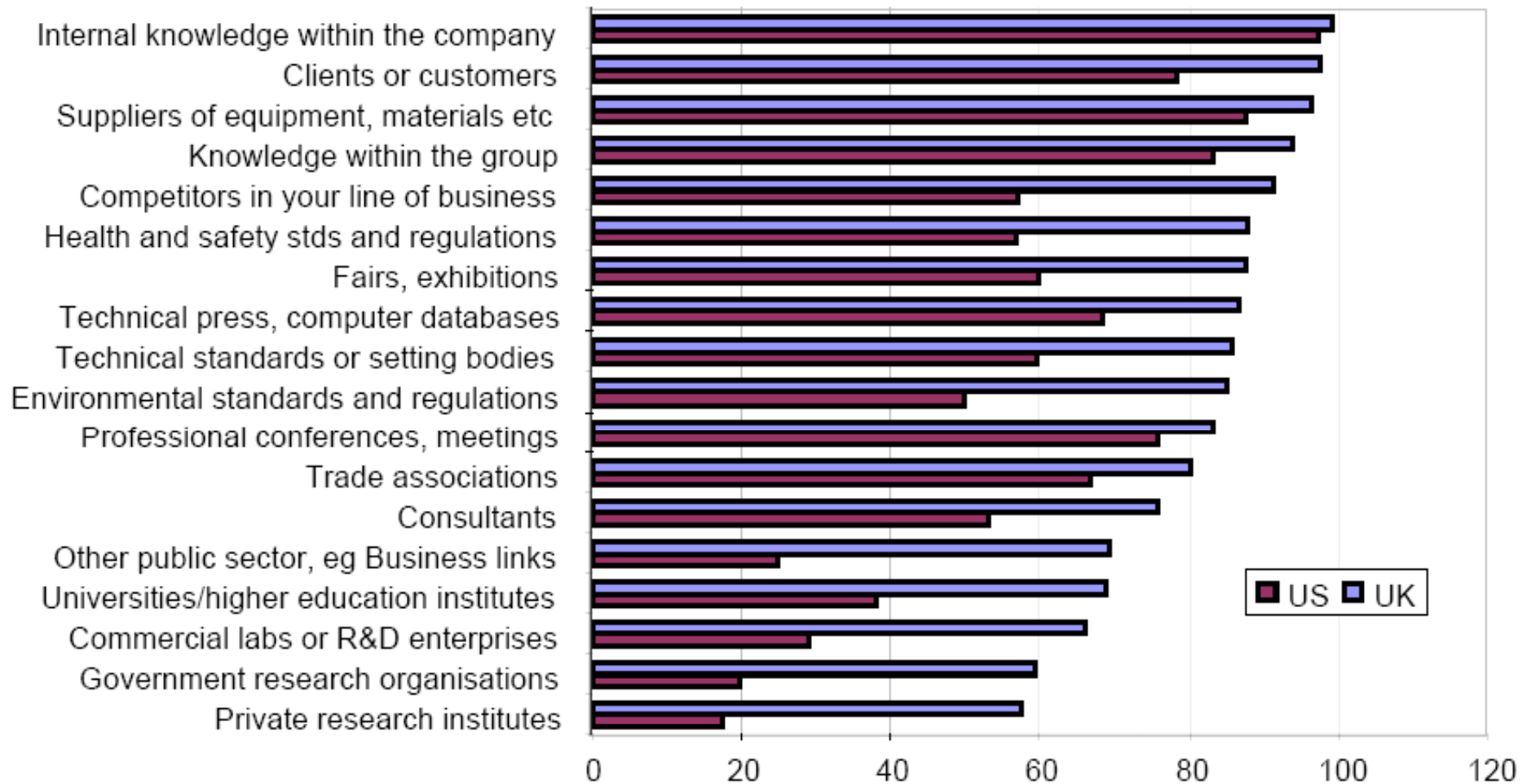


‘The aim of a national forum on the workplace of the future would be... a **shared vision of the future of Australia’s workplaces**, based on evidence and data gathering... and [of] the actions and policy measures required to bring it about. [This] would strengthen innovation capabilities, leadership skills and management practices at the level of the workplace.’

*Review of National Innovation System, 2008*

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## Sources of knowledge for innovation (% companies)



Source: A. Cosh, A. Hughes and R. Lester *UK PLC Just How Innovative Are We?* Cambridge MIT Institute 2005



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Workplace innovation: US

US research has found that:

- *a third of US output growth* stems from productivity enhancing innovations at the workplace level (Sandra Black & Lisa Lynch on organisational innovation and productivity, 2001, 2004)
- When employees are highly engaged, their companies achieved *26% higher labour productivity*, lower turnover and *13% higher returns to shareholders* over last 5 years (Watson Wyatt *WorkUSA Survey 2008/09*)



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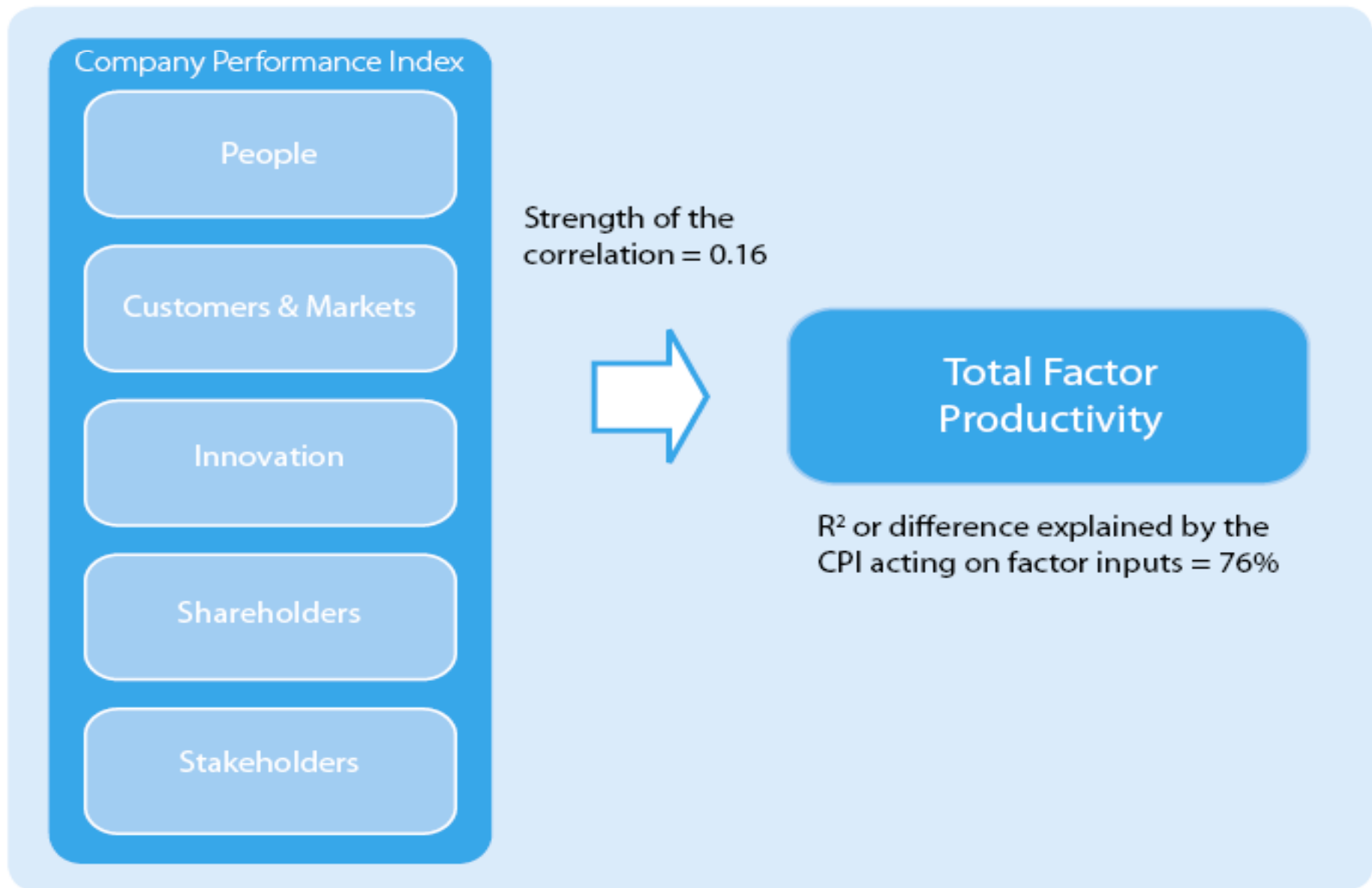
### Workplace innovation: UK

- UK study found that the best managed, most innovative 30% of companies achieved higher growth, sales per employee, profitability and exports
- Increasing the performance of just 10% of companies in bottom third to average of top third would add GBP 2.5 billion to UK GDP and 0.25% to trend growth

*Work Foundation, Cracking the Performance Code, 2003, 2005*

Figure 1.4

# Performance & Productivity



Source: The Work Foundation, 2005



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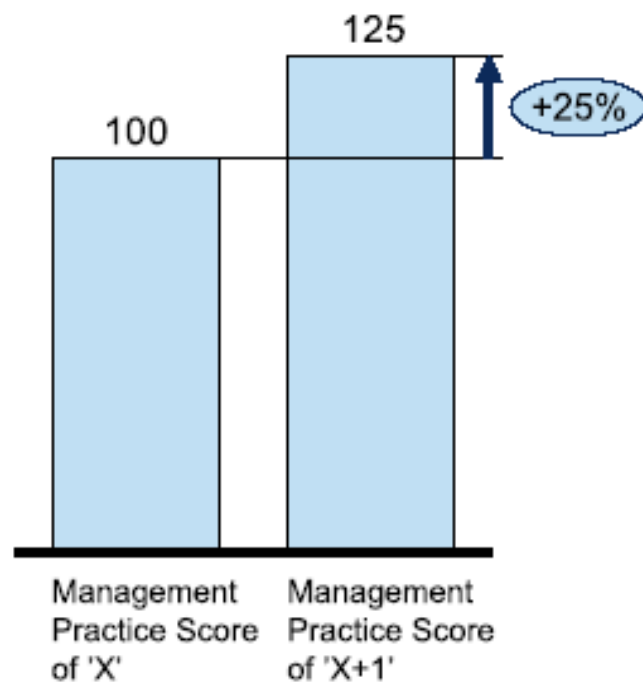
Workplace innovation: Global

A 16 country comparative study found that 'improving management practice is... associated with large increases in productivity and output. Across all the firms... a single point improvement in management practice score is associated with the same increase in output as a **25% increase in the labour force or a 65% increase in invested capital**'.

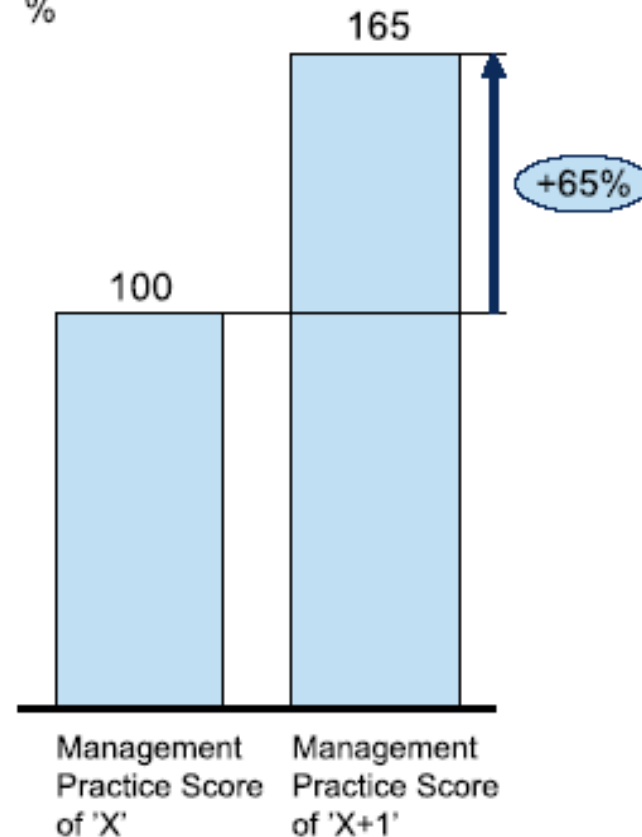
*LSE-McKinsey study of Management Practice and Productivity, 2007*

# Exhibit 4: Output increases associated with improved management practice are large relative to labour and capital investment\*

## Labour-Management Practice Equivalency %



## Capital-Management Practice Equivalency %



- Improved management practice is equivalent to large increases in existing – Labour – Capital
- This is true for all companies\* irrespective of the quality of current management practices



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### Workplace innovation: Policy

‘Governments can play their part in encouraging the take-up of good management behaviour. Doing so may be the ***single most cost-effective way of improving the performance of their economies...***

‘Relentless improvement in educational standards is also essential. Better-managed firms need more highly skilled workers and they make better use of them, while better educated managers will be a key component of the performance transformation...’

*LSE-McKinsey study of Management Practice and Productivity, 2007*

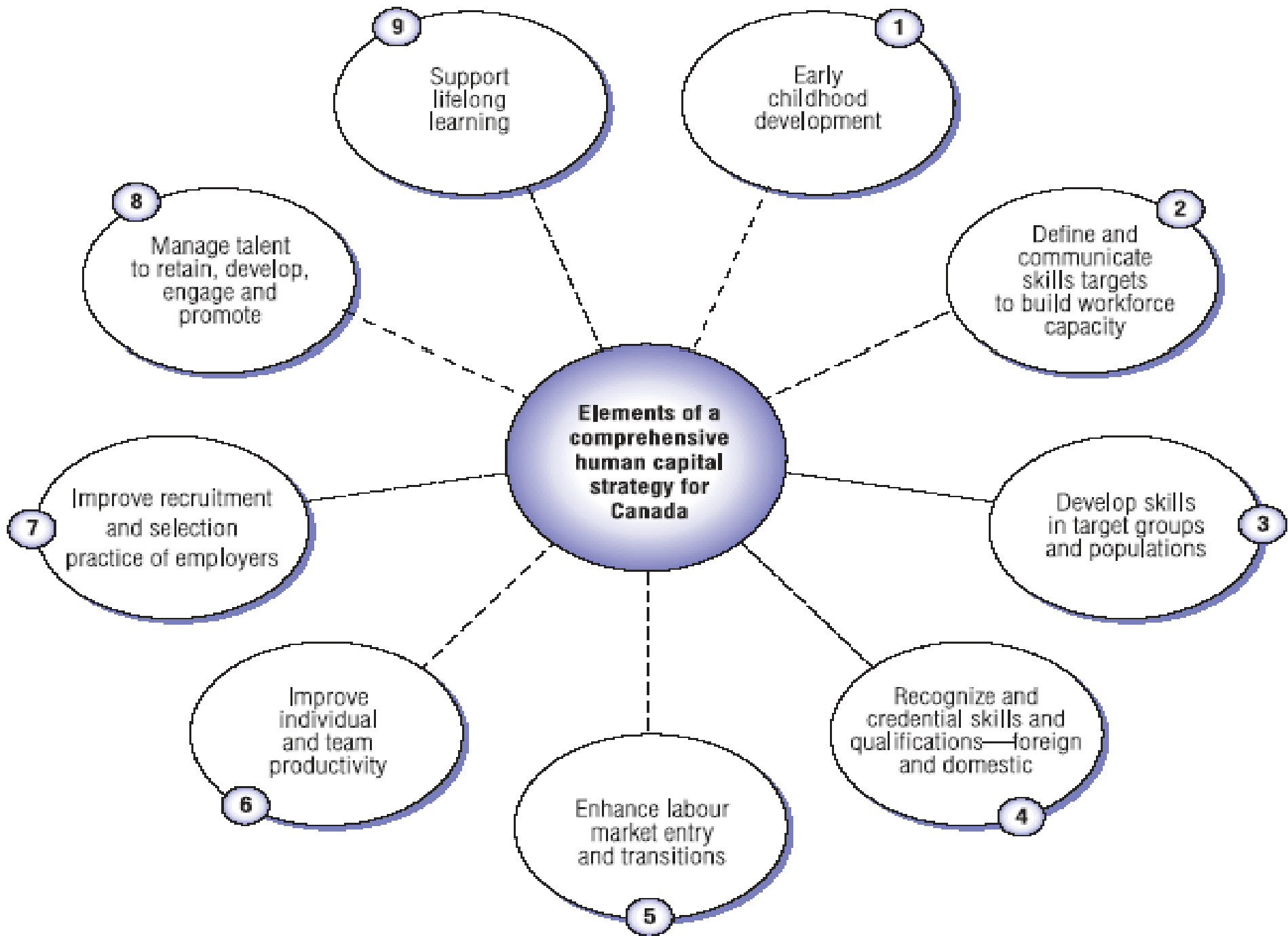


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Canada's Human Capital Strategy

*'A comprehensive strategy is important because human capital demands a central place in the federal government's plans for developing Canada's society and economy in order to achieve the overarching goal of sustainable prosperity.'*

*Conference Board of Canada and Ministry of Human Resources and Skills Development, 2005*





# Skills for Jobs

PRIORITIES FOR DEVELOPING  
SOUTH AUSTRALIA'S WORKFORCE

The Training and Skills Commission's Five Year Plan  
for Skills and Workforce Development

We must 'ensure that what is being done to minimise the impact of the downturn is consistent with long-term measures which governments and industry are taking... *Transformational change... will be necessary*'.

*SA Training & Skills Commission, Skills for Jobs, 2009*

- Invest in *innovation*
- Invest in *capabilities and skills for innovation*
- Invest in the *management of innovation*