



# ICT Research and Government Policy

## Bridging the ICT Innovation Gap

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**Chief Operating Officer, NICTA**



Australian Government  
Department of Broadband, Communications  
and the Digital Economy  
Australian Research Council

### NICTA Funding and Supporting Members and Partners



- **ICT Innovation gap – some indicators**
  - Input
  - Process
  - Output
  - Outcome
- **NICTA's role and model**
- **Have we got the right innovation model in Australia?**



# **What Gap? Indicators**

- **Australia R&D expenditure: ~\$21 B; 2.01% of GDP**
  - OECD average 2.26% of GDP (Australian gap ~\$2.6B)
  - EU target 3% of GDP by 2010, likely to achieve 2.6%
  - Many countries invest over 3% (eg Sweden, Japan,...)
  - BERD: 59%, GOVERD: 14.5%, HERD: 26.5%
- **Australian ICT R&D expenditure: ~\$2.3B (~11%)**
  - BERD: 84%, GOVERD: 5%, HERD: 11% (EU >20%)
  - We're under-investing in ICT R&D

BERD: Business Expenditure on R&D

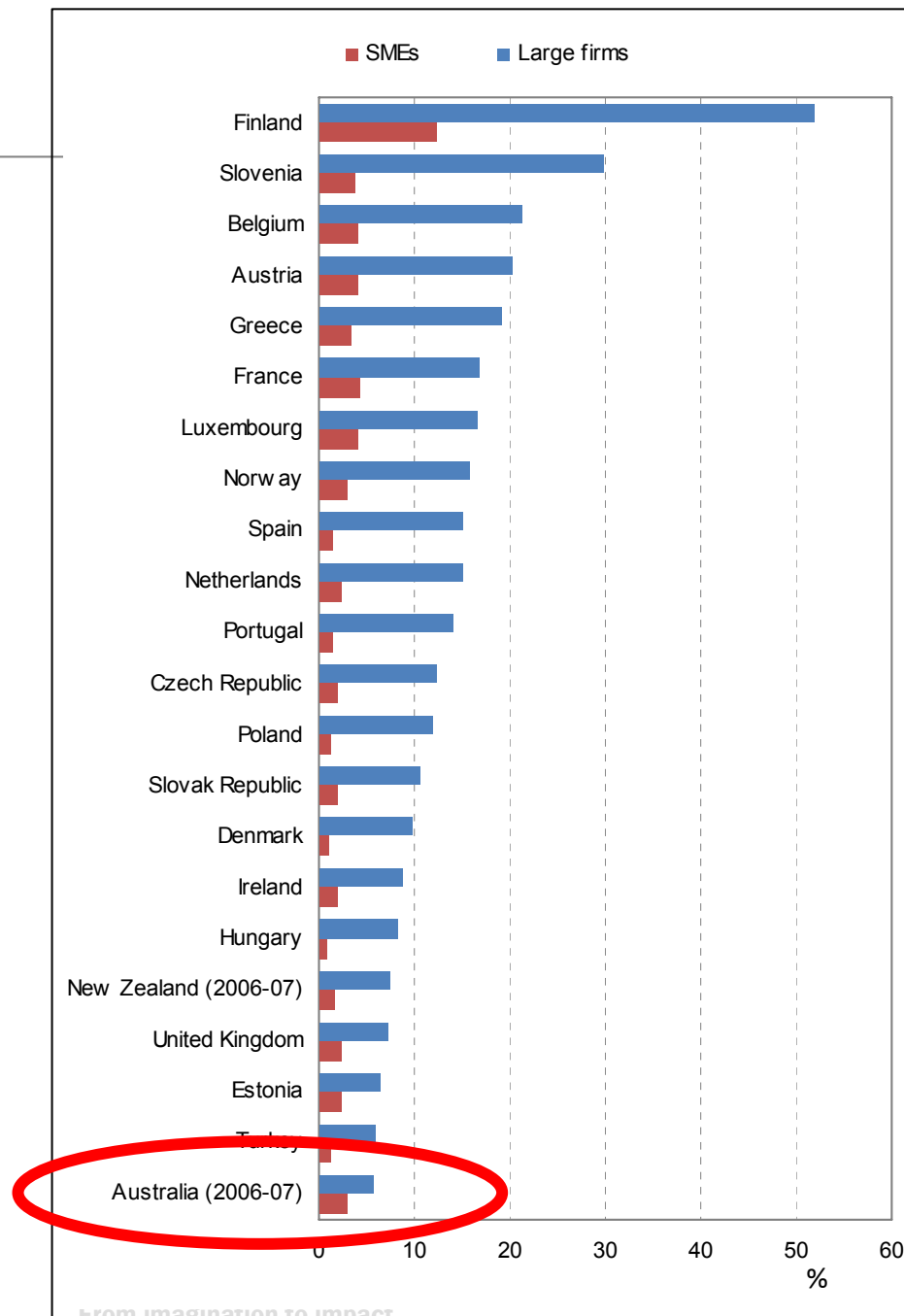
GOVERD: Government Expenditure on R&D

HERD: Higher education Expenditure on R&D

# Collaboration

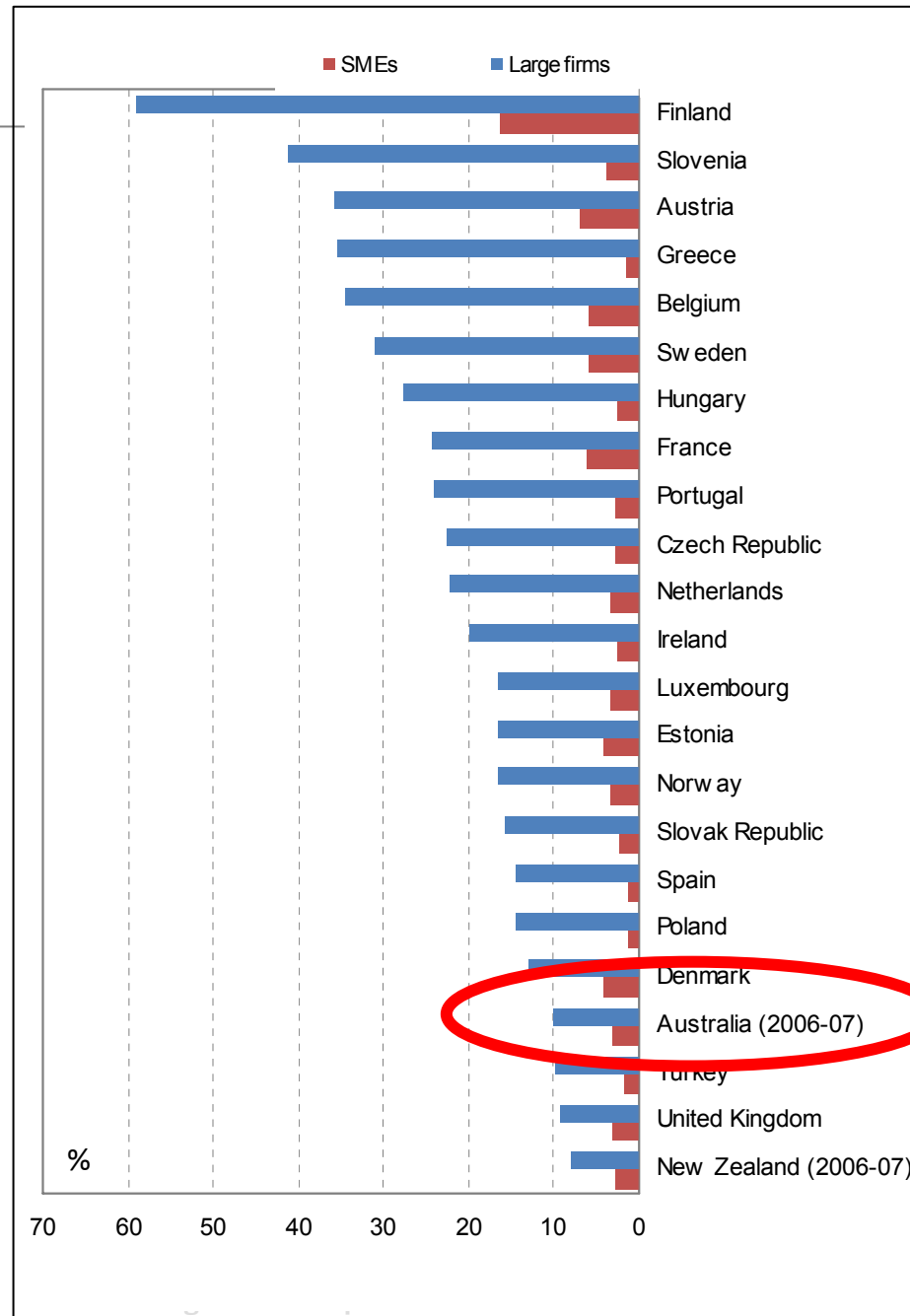
Firms collaborating on innovation with government research institutes by size, 2004-06

OECD Science, Technology and Industry Scoreboard 2009 - OECD © 2009



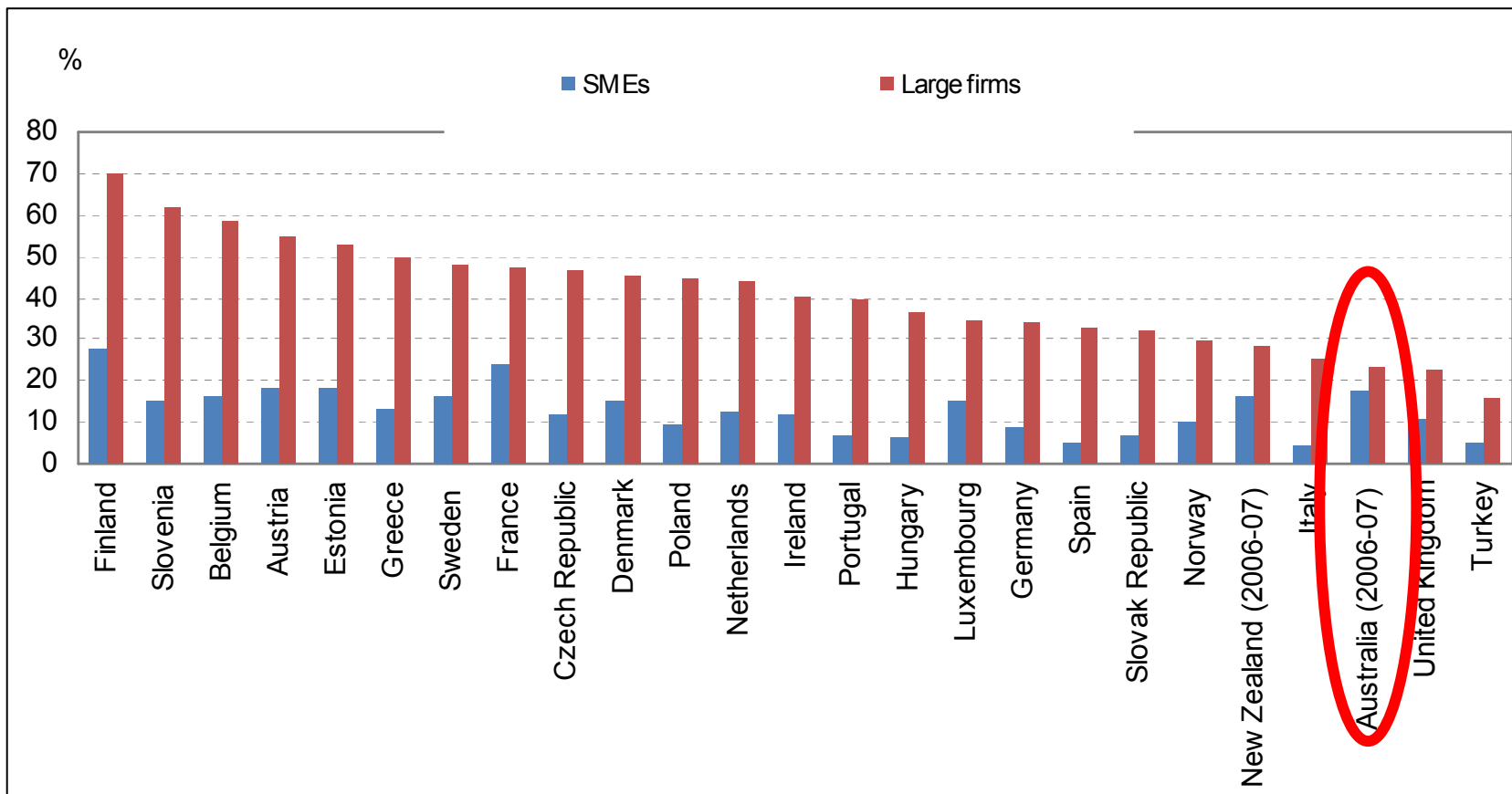
# Collaboration

Firms collaborating on innovation with higher education institutions by size, 2004-06



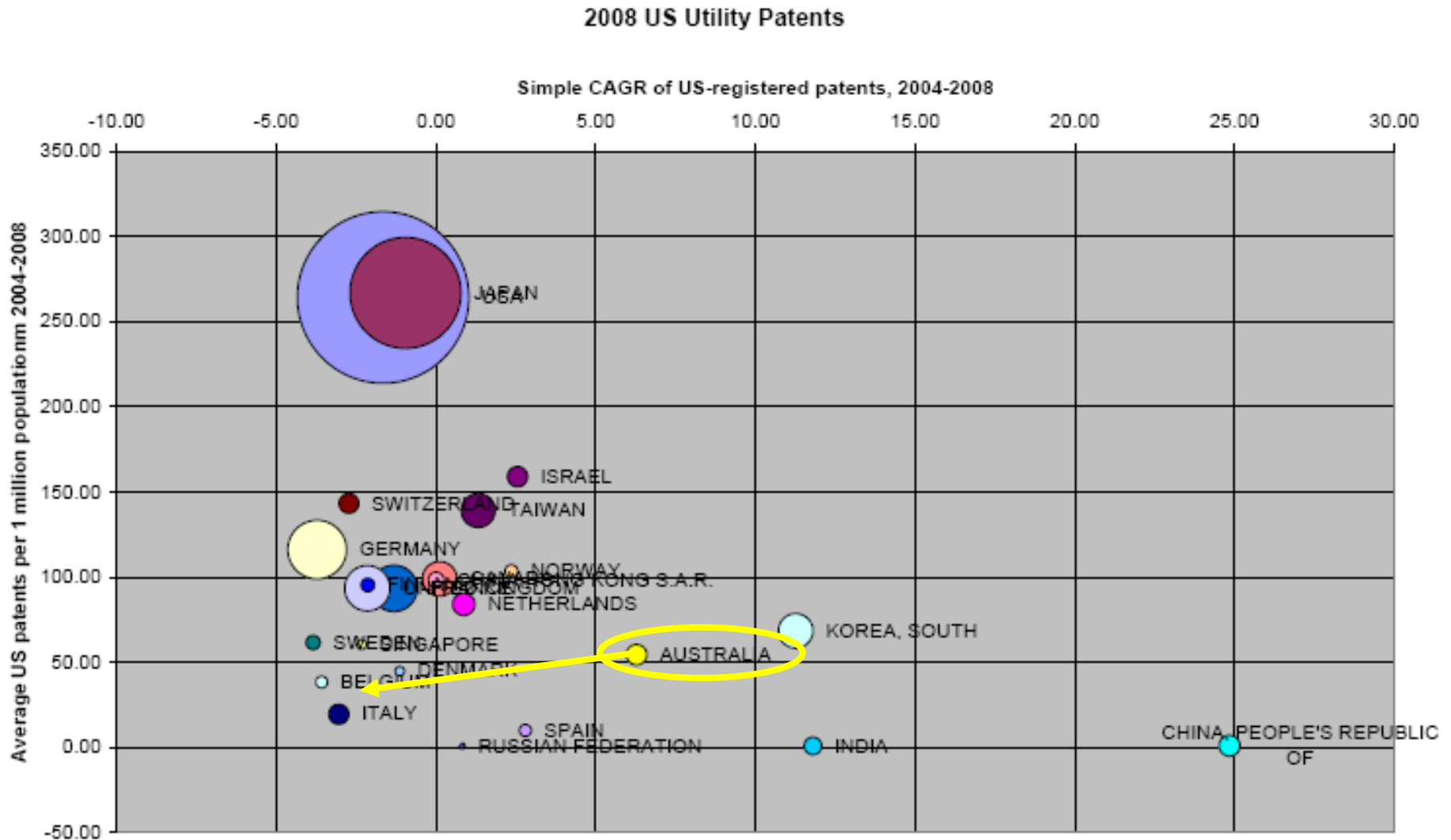
# Collaboration - Firms

## Firms collaborating on innovation activities by size, 2004-06



OECD Science, Technology and Industry Scoreboard 2009 - OECD © 2009

# Australian patenting in US





# US patents by Australians (by org'n)



First-Named Assignee	2005	2006	2007	2008	2009	Total
SILVERBROOK RESEARCH PTY. LTD	247	510	533	608	474	2372
~INDIVIDUALLY OWNED PATENT	129	157	132	94	113	625
CANON KABUSHIKI KAISHA (CiSRA)	27	39	40	21	24	151
CSIRO	23	30	13	10	19	95
RESMED LIMITED, AN AUSTRALIAN COMPANY	21	27	17	10	19	94
AVAYA TECHNOLOGY CORP.	3	11	7	15	16	52
COCHLEAR LIMITED	1	5	10	12	16	44
TECHNOLOGICAL RESOURCES PTY, LTD	1	1	1	3	15	21
COMPUTER ASSOCIATES THINK, INC.	0	1	2	3	10	16
CISCO TECHNOLOGY, INC.	7	7	6	14	9	43
QUALCOMM, INC.	4	1	6	14	9	34
UNIVERSITY OF QUEENSLAND	6	11	8	8	8	41

# 2005 US Patents – Top 10 US Universities



390	University of California
136	Massachusetts Institute of Technology
101	California Institute of Technology
90	Stanford University **
90	University of Texas **
77	University of Wisconsin
71	Johns Hopkins University **
71	University of Michigan **
64	University of Florida
57	Columbia University

20 US Universities had 30 or more US patents granted in 2005

# 2009 US patents - Top 10 Organisations



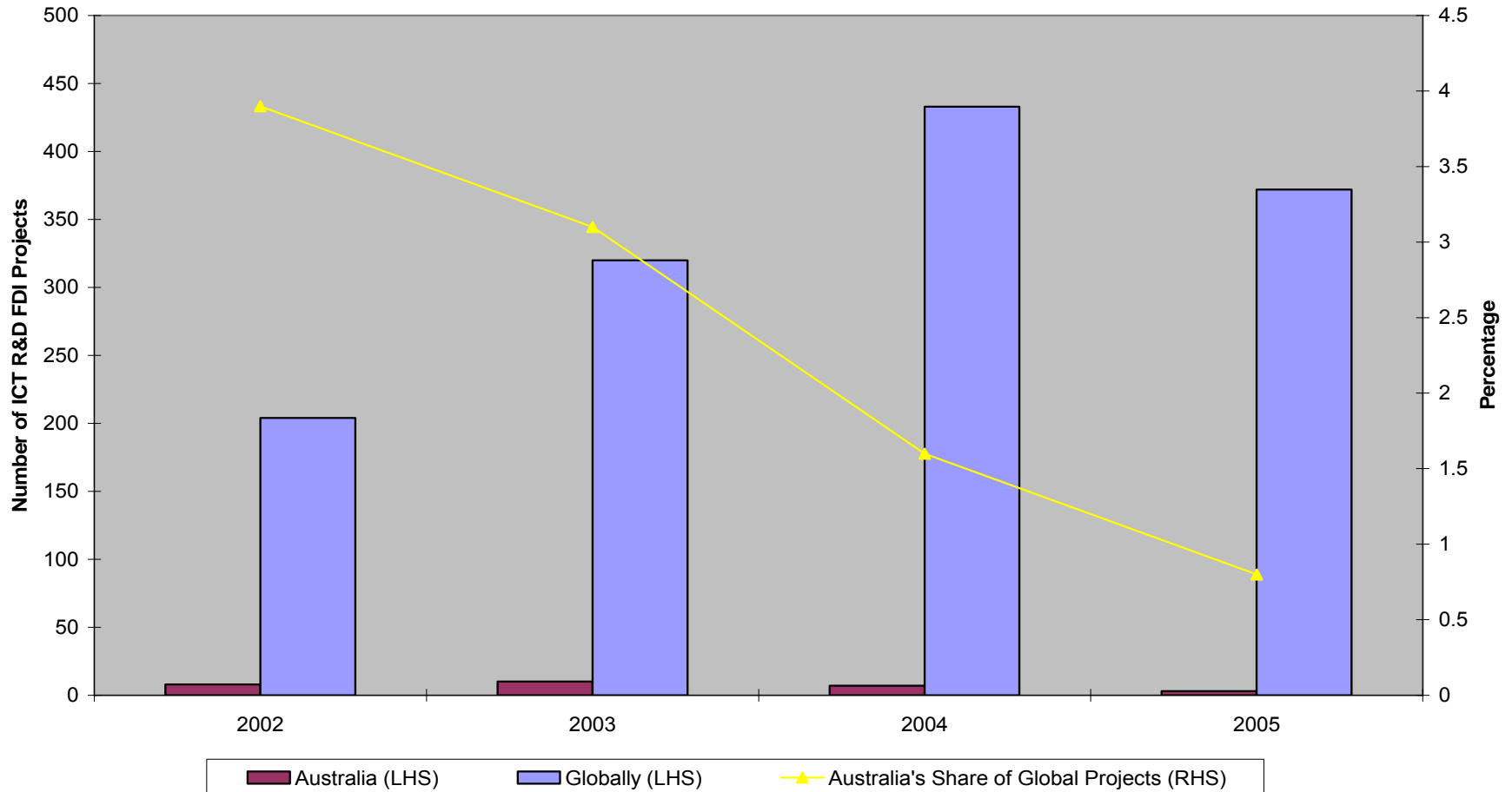
	2009
<b>INTERNATIONAL BUSINESS MACHINES CORPORATION</b>	<b>4887</b>
<b>SAMSUNG ELECTRONICS CO., LTD.</b>	<b>3592</b>
<b>MICROSOFT CORPORATION</b>	<b>2901</b>
<b>CANON KABUSHIKI KAISHA</b>	<b>2200</b>
<b>Panasonic Corporation</b>	<b>1759</b>
<b>TOSHIBA CORPORATION</b>	<b>1669</b>
<b>SONY CORPORATION</b>	<b>1656</b>
<b>INTEL CORPORATION</b>	<b>1534</b>
<b>SEIKO EPSON CORPORATION</b>	<b>1328</b>
<b>HEWLETT-PACKARD DEVELOPMENT COMPANY, L.P.</b>	<b>1269</b>

And note that software can be patented  
....

A high proportion of these are ICT companies....

# ICT R&D FDI Trends

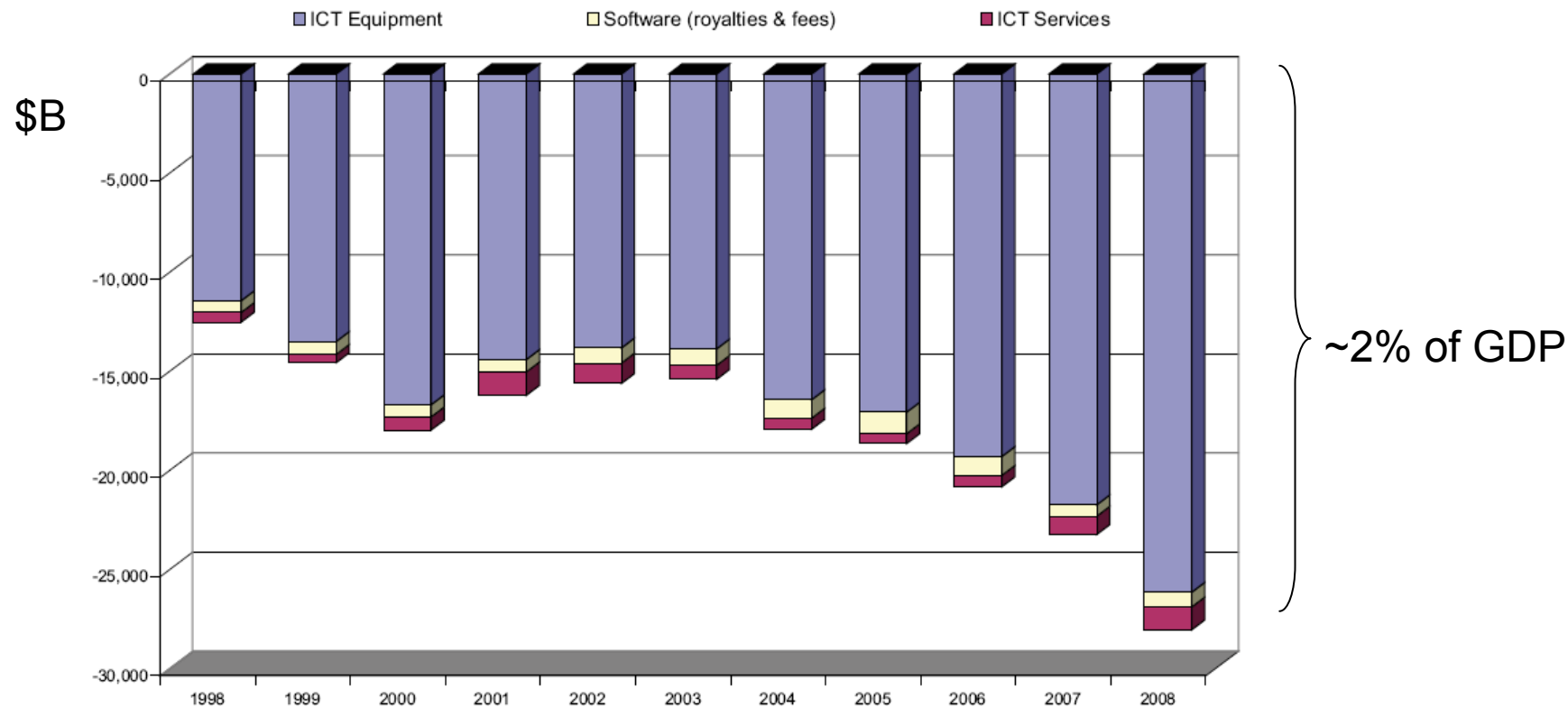
### Australia's Share of ICT R&D FDI Projects



Source: OCO Consulting, LOCOMonitor database, accessed May 2006

# Australia's ICT Trade Deficit

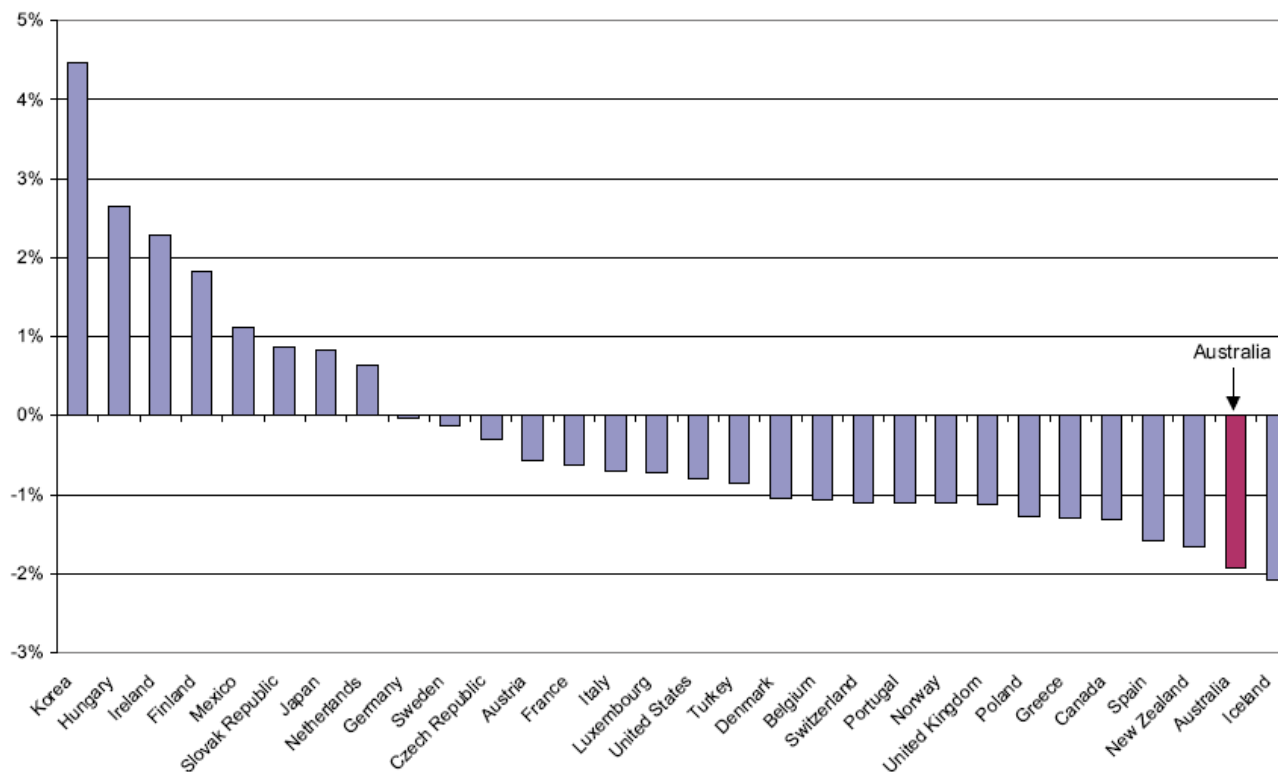
Figure 13 Australia's ICT Trade Balance, 1998 to 2008 (AUDm)



Sources: ABS and TradeData ([www.tradedata.net](http://www.tradedata.net)), CSES Analysis.

# The Cost of Australia's ICT Trade Deficit

Figure 7.3 ICT Equipment Surplus/Deficit as a Percentage of GDP, 2007 (per cent)



Source: OECD, CSES Analysis.

- **Strong relationship between R&D and productivity (16 countries, ~20 yrs)\***
  - 1% increase in business R&D corresponds to 0.13% increase in productivity
  - 1% increase in public R&D corresponds to 0.17% increase in productivity

(av increase in MFP over study period = 0.8%)
- **Australian relationship #**
  - 1% increase in business R&D corresponds to a 0.11% increase in productivity
  - 1% increase in public R&D corresponds to a 0.28% increase in productivity

\*Gullec & Van Pottelsberghe, From R&D to productivity growth: Do the Institutional Settings and Source of Funds Matter?, OECD 2001  
# Sources of Knowledge and Productivity: How Robust is the Relationship, OECD 2006

- **ICT industry structure**

- 95% of all ICT companies have less than 20 staff
- <1% of ICT companies have over 100 staff (265 companies)
- Few multinational companies have R&D groups in Australia
- Low SME global engagement

- **ICT public sector research scale**

- University research is fragmented, with few groups achieving globally competitive critical mass
- NICTA, CSIRO and DSTO together are a major part of ICT research in Australia
- Few local opportunities for researcher / industry cross-flow

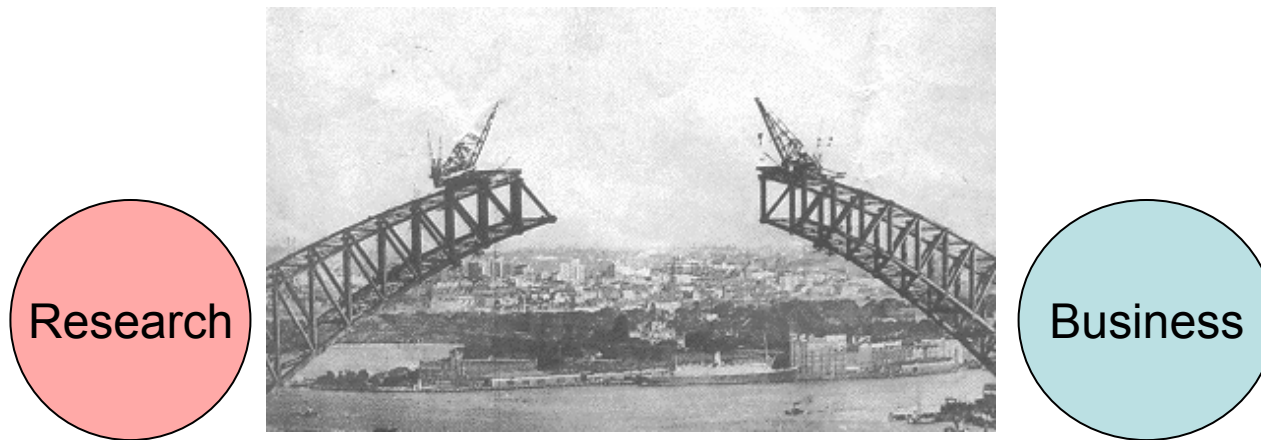
- **Publishing and patenting**

- Publishing on par internationally
- Global patenting ~1/3<sup>rd</sup> rate of countries with similar capabilities
- ICT sector patenting below pro-rata



# The (ICT) Innovation Gap

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**We're not leveraging enough of our public sector R&D**



# NICTA's role and model



Australian Government  
Department of Broadband, Communications  
and the Digital Economy  
Australian Research Council

## NICTA Funding and Supporting Members and Partners



# About NICTA



Recruit commercial and research staff from Australian and global communities

## NICTA

- National ICT Research Centre of Excellence
- Not-for-profit Company
- 5 Labs
- ~\$80m pa cash and in-kind

Seven university “joint venture” partners contribute researchers and students

Advanced ICT skills

- Research for globally competitive products & services
- R&D partnerships

IP licensed to industry, including spinouts

- **NICTA**

- Australia's National Centre of Excellence in Information and Communication Technology (ICT) Research
- The largest organisation dedicated to ICT research in Australia

- **Our role in Australia is**

- Helping to build a sustainable, globally competitive Australian ICT sector
- Developing advanced ICT systems to address major national priorities
- Training ICT researchers to build national capability

# NICTA Founders & Partners



The University of Sydney



(2002)

(2003)

(2004)

(2005)

- **Balance between “Lab research” and Projects**
  - ~35% / 65%
- **Projects target impact from the outset**
  - Commercial and/or national benefit
- **Support processes**
  - Research theme and project reviews
  - Commercialisation “lifecycle” and \$\$ support
  - IP strategies and patenting support



# Examples of projects



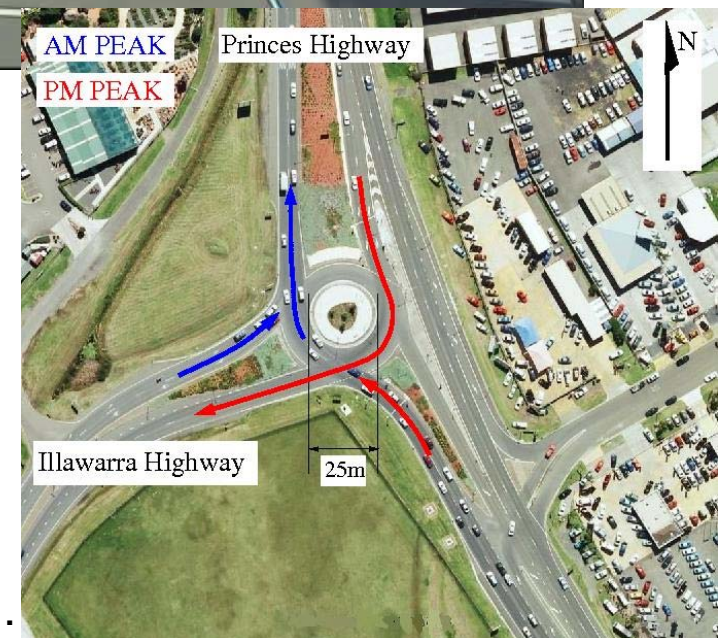
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## NICTA Funding and Supporting Members and Partners



# Smart Roads

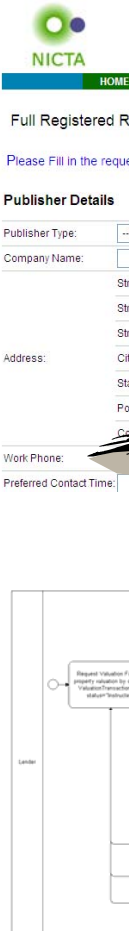
- **NSW RTA is a world pioneer in ITS**
  - SCATS used in over 140 cities
  - Reduces trip times 20%, start-stop up to 40%
- **NICTA working with RTA**
  - Improvements in throughput (>10%)
  - New sensors, traffic lights that “see”
  - New control algorithms
- **Next generation active safety**
  - Vehicle ↔ vehicle real-time cooperation
  - Vehicle ↔ infrastructure



In practice at Albion Park...



- **NICTA collaboration with LIXI to achieve on-line loan applications, etc**
  - Schema by LIXI
  - Processes and architectures by NICTA
- **Digitalisation lead to Lending Industry Structure Change**
  - Innovative aggregators are emerging
- **Industry changes lead to Cost Savings**
  - Savings estimate is approx \$120 million savings a year



The screenshot shows a web form for publisher registration. At the top left is the NICTA logo. Below it is a navigation bar with a 'HOME' button. The main content area is titled 'Full Registered R' and contains a form with the following fields: 'Publisher Type:' (a dropdown menu), 'Company Name:' (a text input field), 'Address:' (a multi-line text area), 'Work Phone:' (a text input field), and 'Preferred Contact Time:' (a text input field). A 'Submit' button is visible at the bottom right of the form. The form is partially obscured by the text on the right.

- **OKL Inc and OKL Pty Ltd**
  - Spun-out of NICTA January 2007
  - VC investment from [Neo Technology Ventures](#), [Chrysalis Ventures](#), [Citrix® Systems, Inc.](#) in 2008/2009
  - Currently ~40 staff in Sydney and growing
  - Contracts with several multi-nationals (Qualcomm, Motorola, Toshiba + Ericsson)
- **On-going research Collaboration with NICTA**
  - World first proof that the operating system is implemented as specified (L4 verified)
- **Collaboration with local SME - Fluffy S|**
- **>900 million devices worldwide**
  - Android, HTC, Toshiba, Motorola

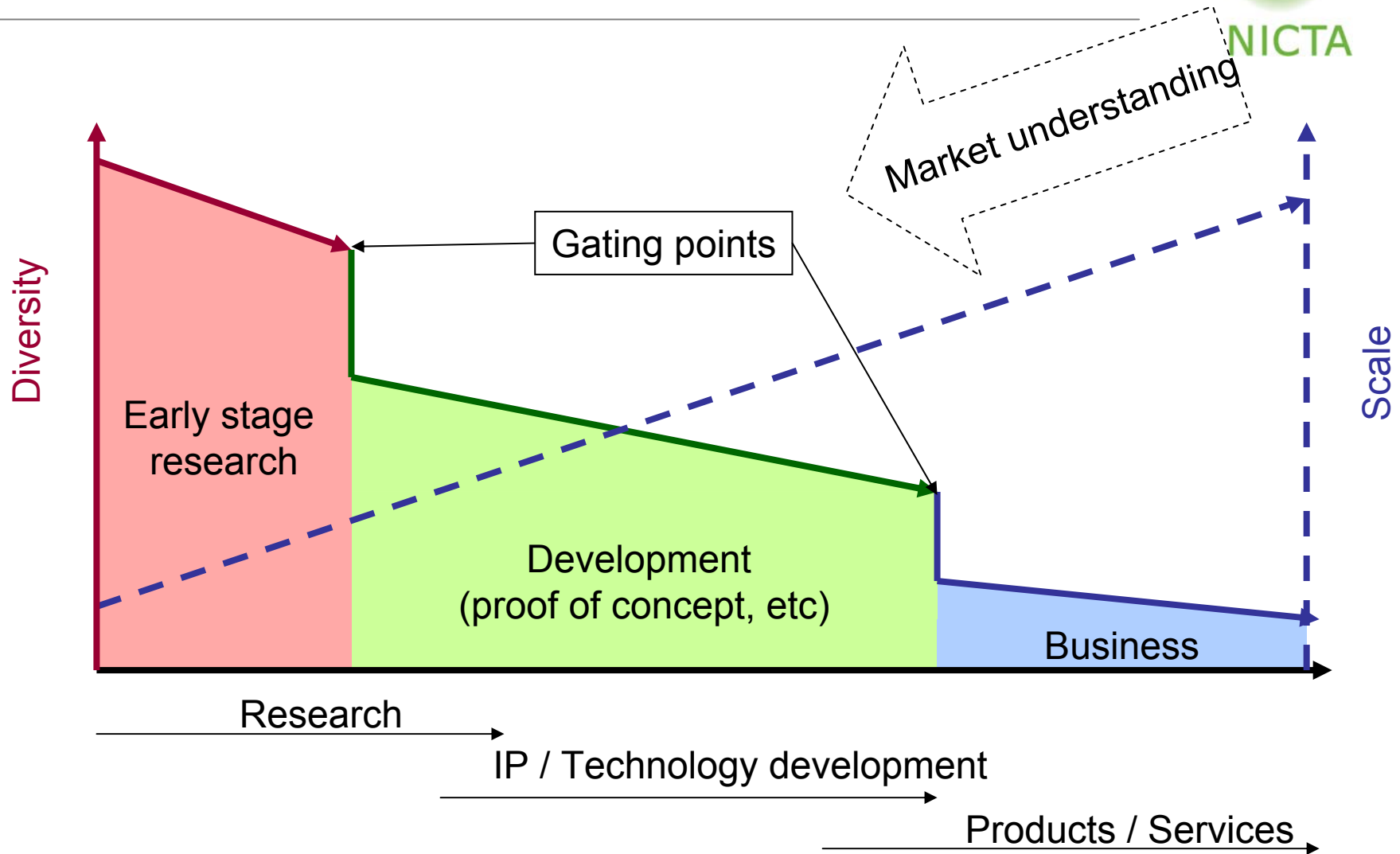




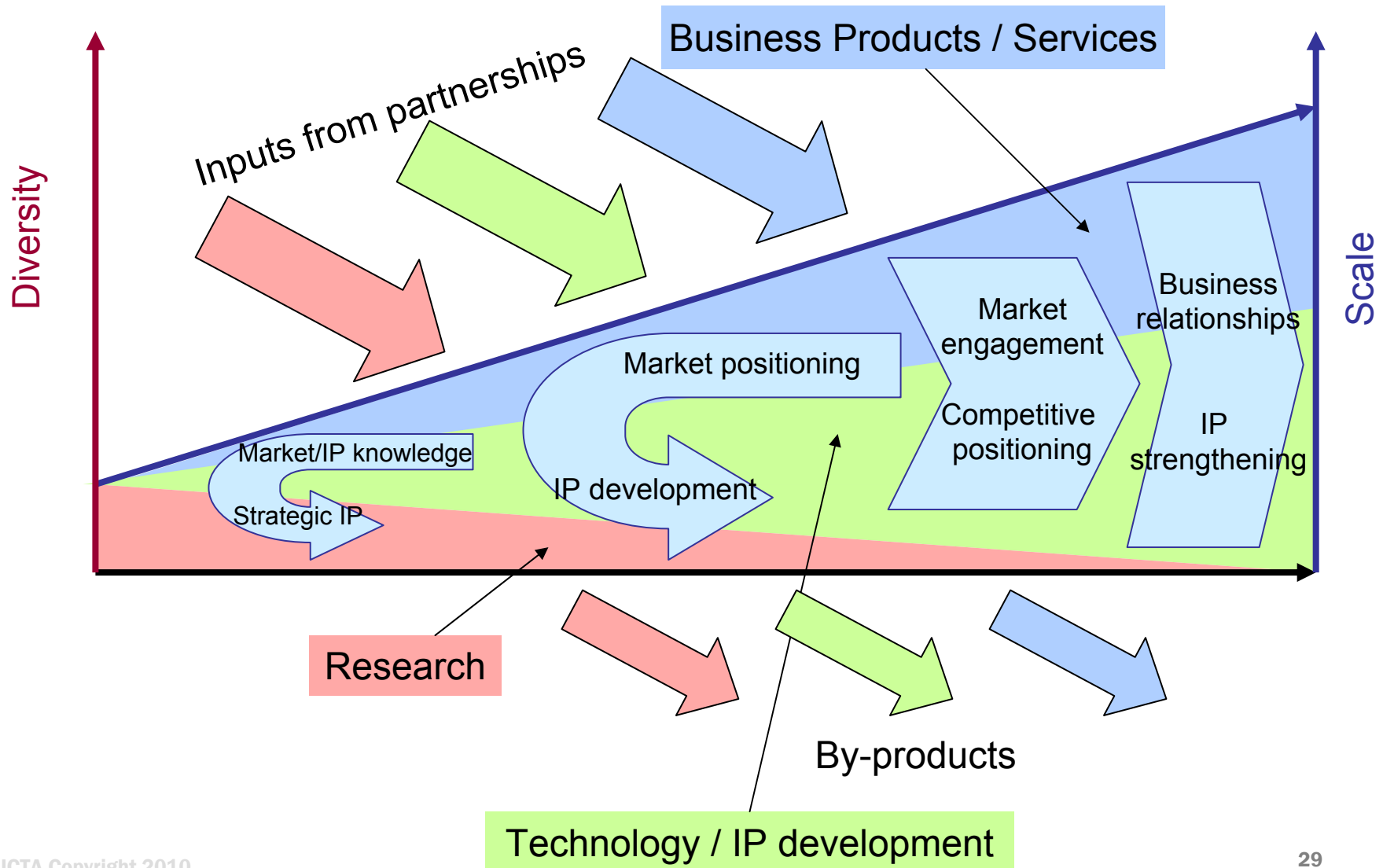
NICTA

**Have we got the  
right Innovation  
Model in  
Australia?**

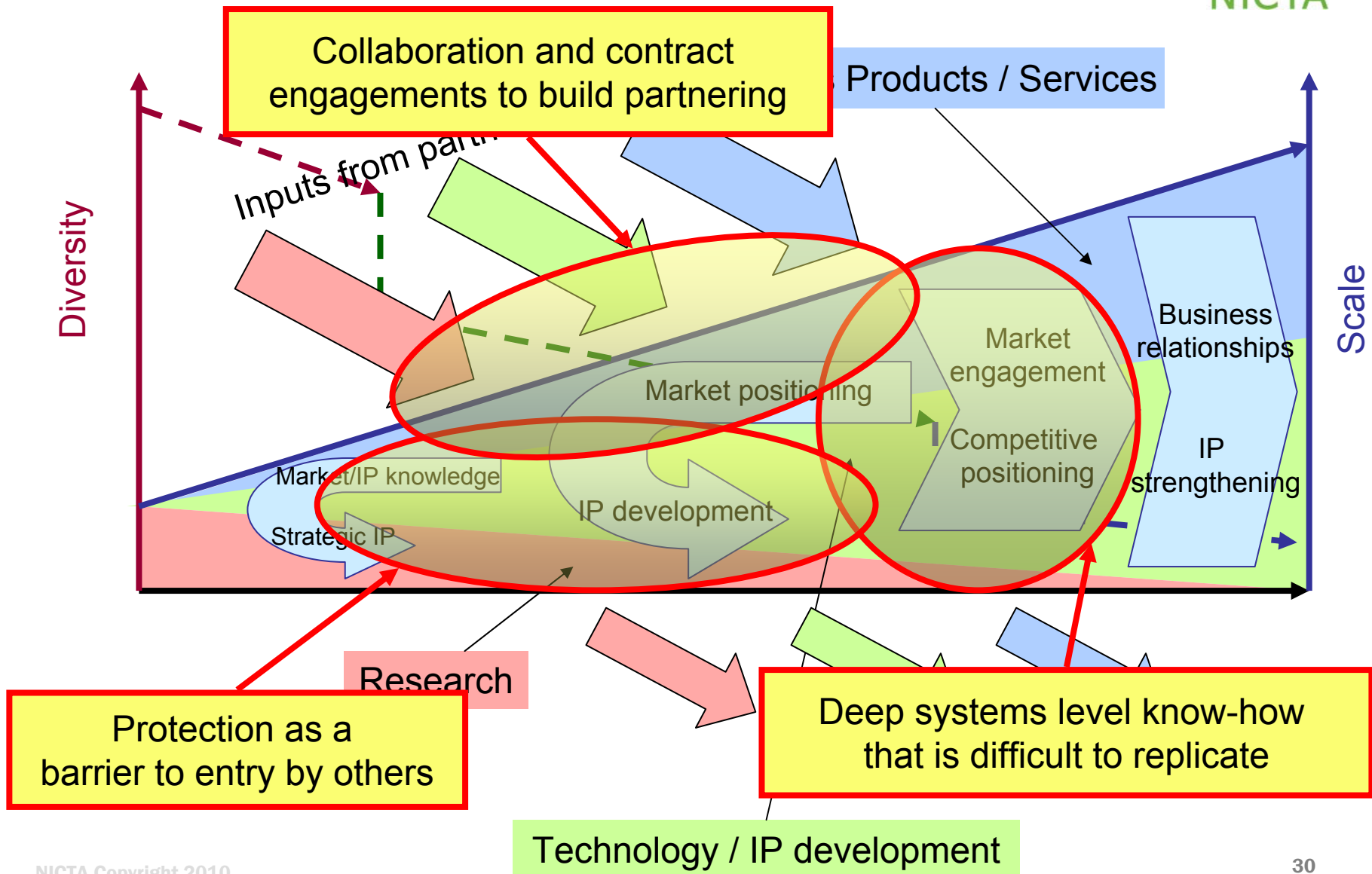
# Traditional Innovation “Funnel”



# Target Innovation Model



# Building competitive advantage



# The importance of R&D Services



- **Study of Cambridge region development - “Exploding the myths of UK Innovation Policy”:**
  - ...that university research is the key source of technology and innovation
    - It is more often “soft” R&D services companies started by scientists and engineers
  - ...that VC funding is the primary financial resource for technology based start-ups
    - Most successful companies had a “soft” start, undertaking R&D contracts directly or via incubation
  - ...that co-funding collaborative research is the best way to support technology development
    - Successful companies made little or no use of collaborative R&D grants

**Exploding the Myths of UK Innovation Policy:** How ‘Soft Companies’ and R&D contracts for Customers Drive the Growth of the Hi-Tech Economy, *David Connell and Jocelyn Probert, Centre for Business Research, University of Cambridge, Jan 2010*

- **Invest more in ICT R&D**
  - (Input indicator)
- **Collaborate for greater innovation**
  - (Process indicator)
- **Take a strategic approach to IP**
  - (Output indicator)
- **Put more emphasis on R&D Services**
  - (Outcome indicator)



Thank you

For further information on  
NICTA...

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