



**NZITP**

Vocational education for prosperity

## Conference 2011

Vocational Education for Productivity and Economic Growth

**T R I B A L**



# Clean, Green and clever

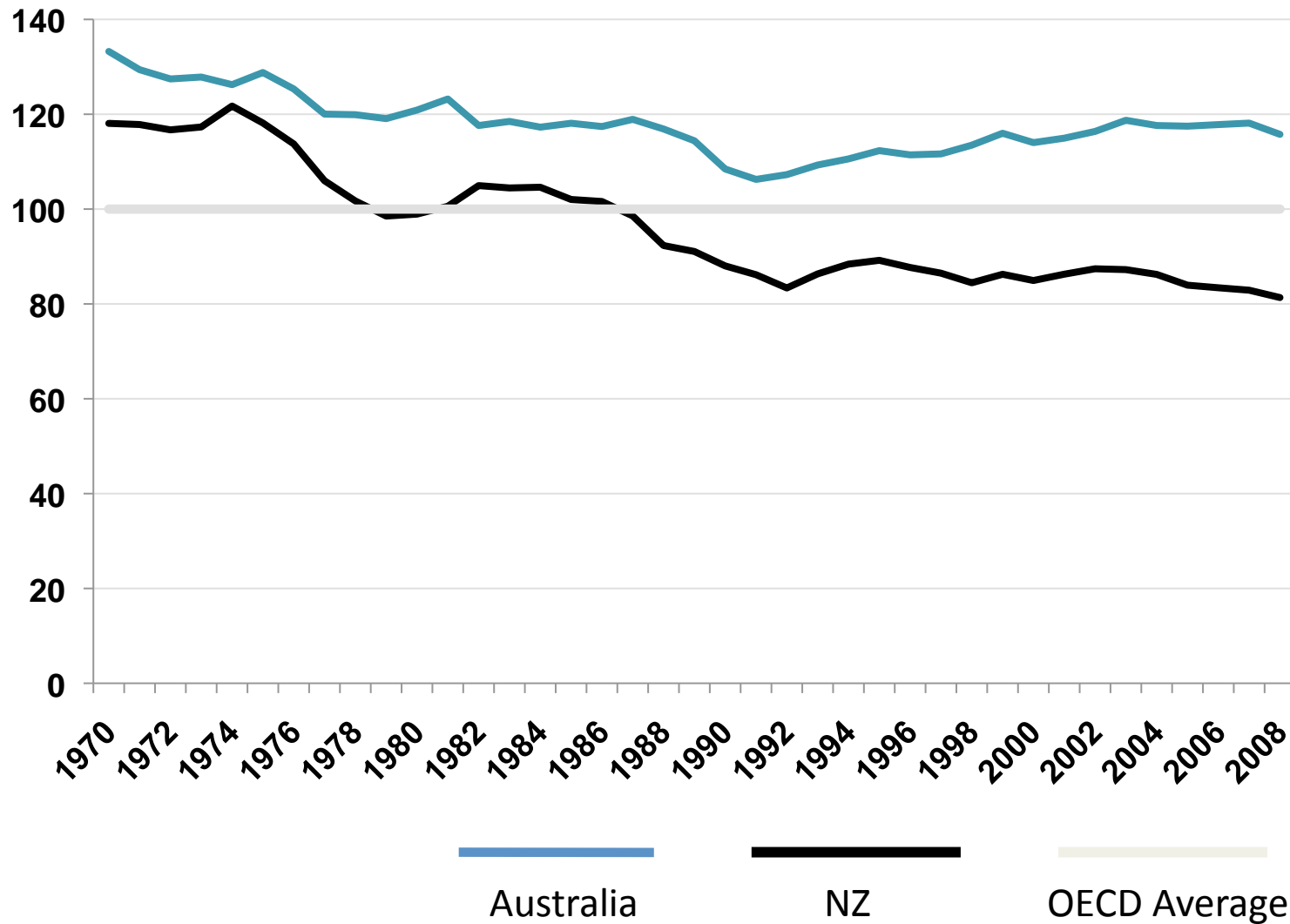
## New Zealand looking forward

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# GDP Per Capita 1970-2008



# New Zealand Export Overview

- NZ has been below the OECD average for GDP per capita since 1988
- NZ has not kept up with OECD export growth since 1973
- Rely on commodity sector – 73% of NZ export growth from 2003 to 2009 was in food, live animals and other commodities
- To rely (hope) commodity prices will rise in the future is not a strategy
- GDP rises as business and innovation score rises – however, NZ in bottom half of chart
- Labour productivity one of the lowest in OECD
- We have very smart thinkers and ideas – need to harness through improving our skill / vocational abilities to our green advantages





# The Need to Change

We must break new ground, rather than only improving on our current situation

## *Why Change?*

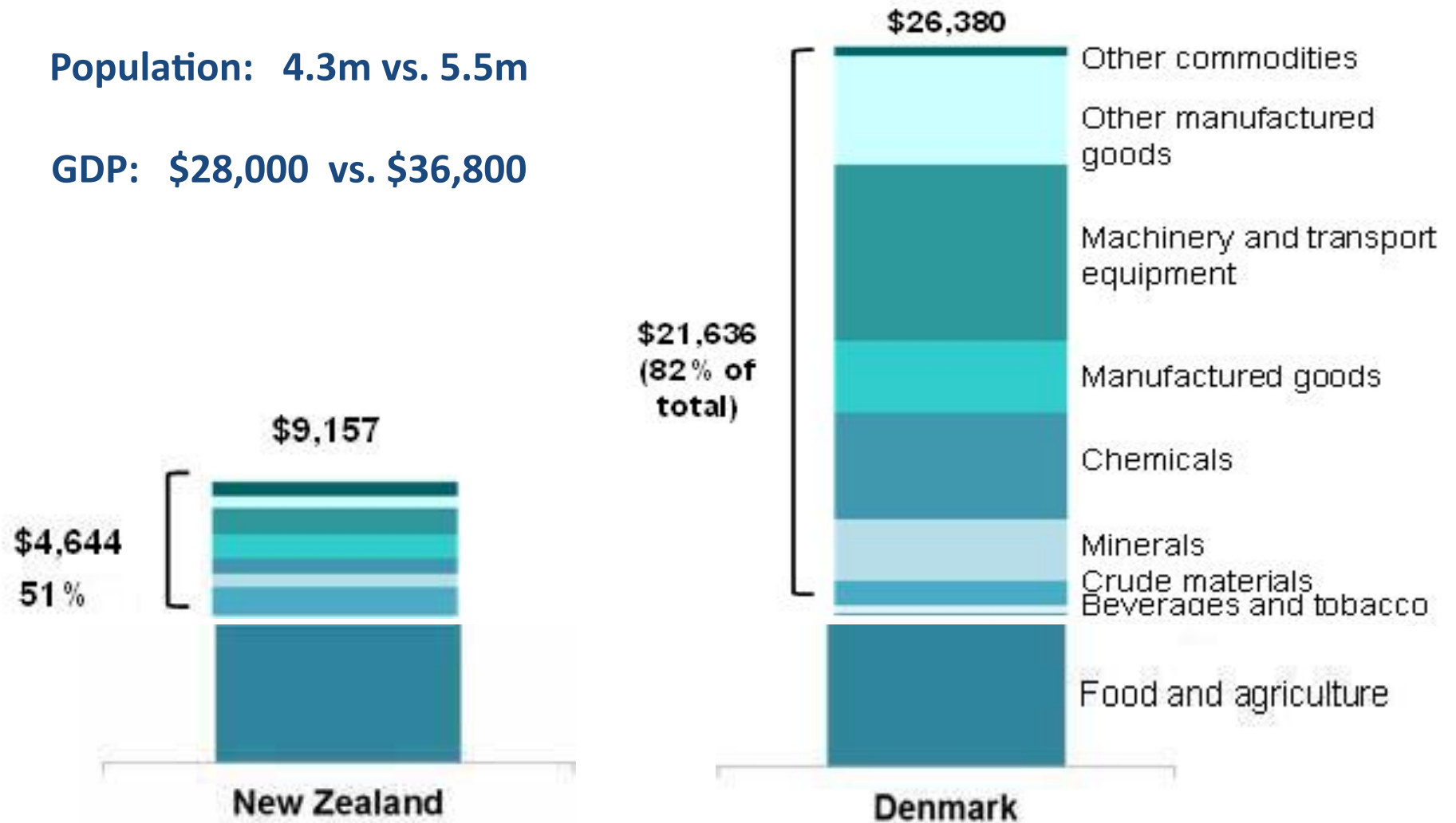
- To catch Australia economically – need to increase land and water take 5 – 6 times we don't have the capability to do this even twice over
- Relative value of commodities continues to slide. 40 years ago meat exports paid our pharmaceuticals 18 times over – today, it pays for them 4 times over
- Overseas competitors will produce cheaper protein than us in 5-10 years KMPG May 2010

This is an **AND** not an **OR** – agriculture + other high value industries

# NZ vs. Denmark

Population: 4.3m vs. 5.5m

GDP: \$28,000 vs. \$36,800



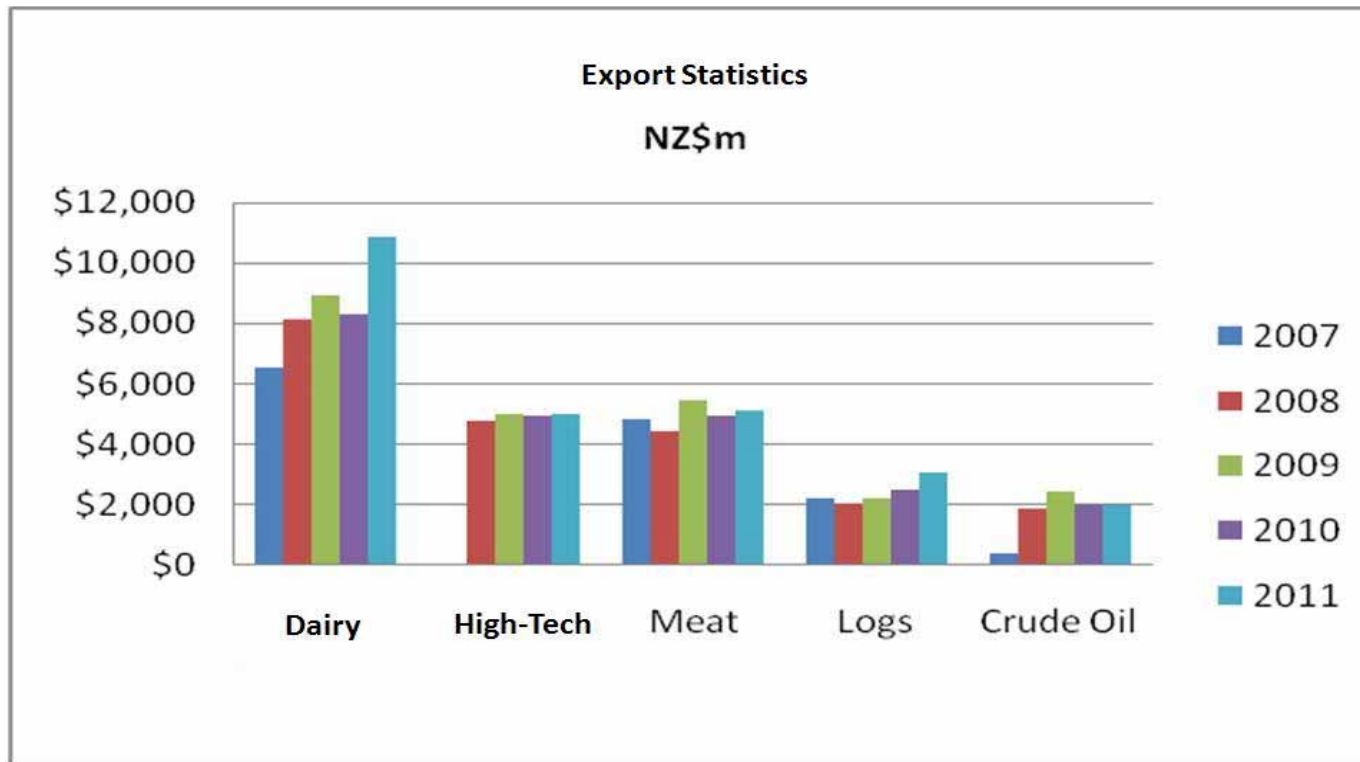
Exports per Capita, 2009, \$NZD

# We have many advantages



- Active high-tech sector - top 100 high tech firms in NZ produced **\$6.5 billion** in 2010 – 78% exported (**3<sup>rd</sup>** behind dairy and tourism in sector value) – *the invisible sector of our economy*
- Sector growing at around 5% per year, in a sustainable fashion – with largely carbon-light exports – 78% exported
- Agriculture projected to grow between 2.6 – 3.7% per year through to 2030, roughly half of the projected growth in the high-tech sector (5%)
- A great brand – NZ's clean, green image is worth **\$13.5 billion**, ranks as 21<sup>st</sup> most lucrative global brand *worldwide*, between Samsung and Dell.
- Education system consistently in top 10 globally – and smart ideas
- Good tertiary institutions high quality graduates – able to practically turn knowledge into exports, up the productivity of our companies, highly skilled jobs

# Significance of the High-Tech Sector



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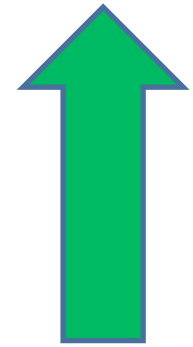
# Cleantech on the Rise Globally

- 69% of largest 1,200 companies in the world, will be making money from products and services that address climate change (PWC 2009).
- Fuji-Keizai - Global market for cleantech products and services to reach US\$1.7 trillion in annual business by 2017
- Venture capital investment in cleantech rising in US to US\$1.5 billion in 2<sup>nd</sup> Quarter 2010 - a 4.5% increase from previous year
- Cleantech investment in China US\$34 billion in 2009, (almost double the US investment of US\$18 b)
- Korea to spend \$84 billion to promote clean-tech over next 5 years – about 2% of GDP
- **For NZ – business opportunity of \$9 - \$22b, rising by 4.5% annually** (PWC 2009)





## NZ's Clean-tech Advantages



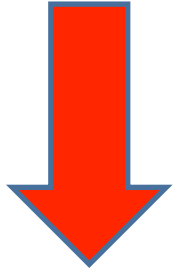
- Renewable electricity generation both hydro and geothermal
- An emissions trading scheme (although flawed) – a price-based measure for reducing greenhouse gas emissions
- World leader in agricultural emissions reduction science
- 250 companies and organizations that are researching, developing and commercialising clean technologies, 60 of these companies are potentially world class

# Clean-green-hi-tech Firms in New Zealand



- **LanzaTech** founded in early 2005
- Commercialize technologies to produce ethanol from the carbon monoxide waste gases produced by the steel industry
- China very interested. If half of China's steel mills use this technology it will produce 20% of China's liquid fuel needs
- Smart thinking, green approach, high value
- New Zealand's only company in the Guardian Clean Tech Top 100





## NZ's Disadvantages

- Lack of investment in R&D
- Poor Commercialisation and management skills
- International disconnectedness
- Lack of capital at crucial stages of companies developing
- Silo behaviour between universities, CRIs and business
- A vision and long term economic goal?

# How do we create a different future ?

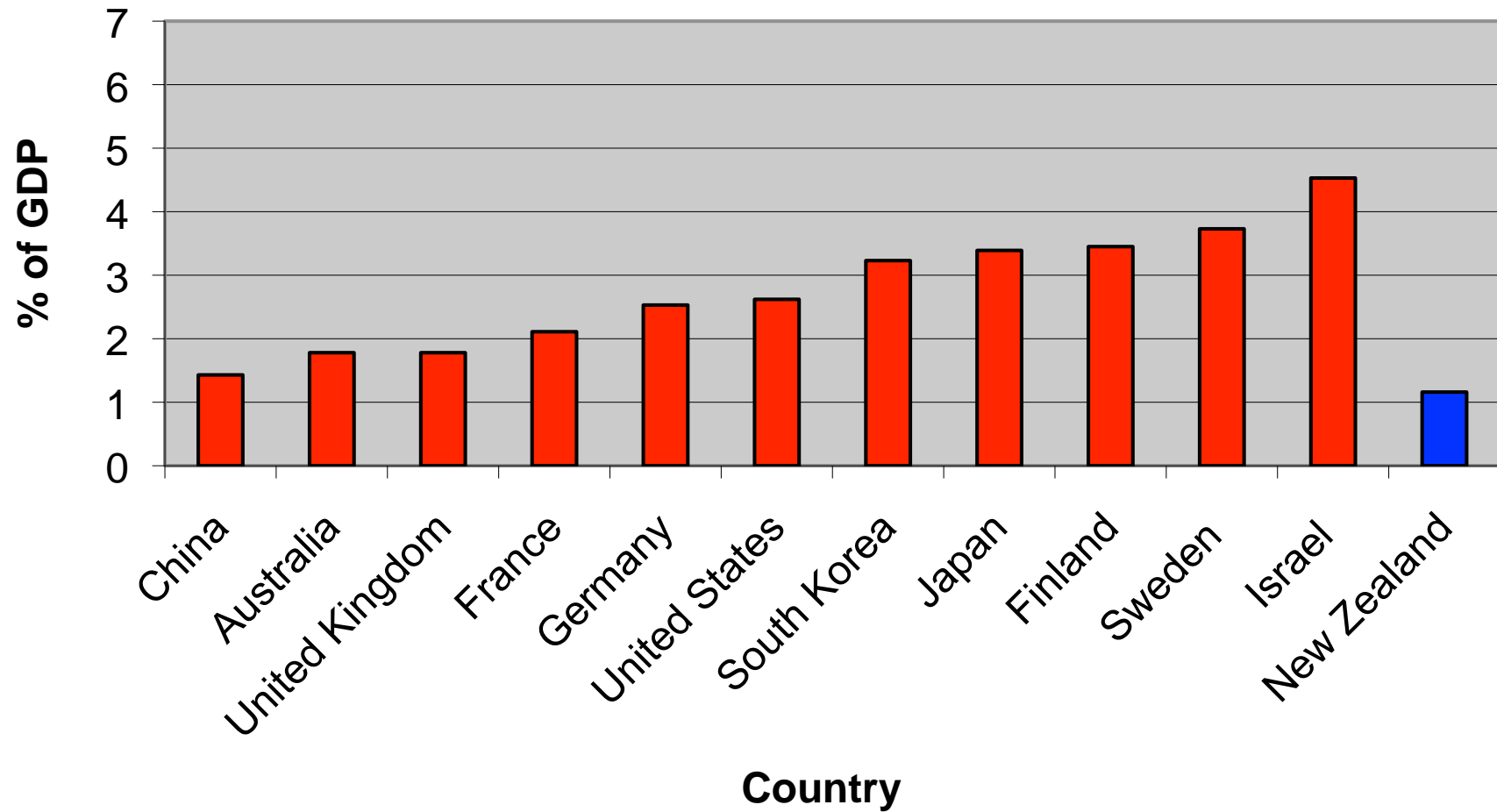
- Grow high-tech and green companies  
(average productivity of \$280,000 / job)
- Plan 20 years out to where we would like to be
- R & D – double output over next 10 years
- Capital – raise \$2 billion over next 20 years
- Train / harness our talent – double our scientists, engineers, designers at all levels
- Focus our polytechnics and universities on innovation and the skills



**Think boldly** – if Denmark, Singapore, Finland, Israel can do it, so can we

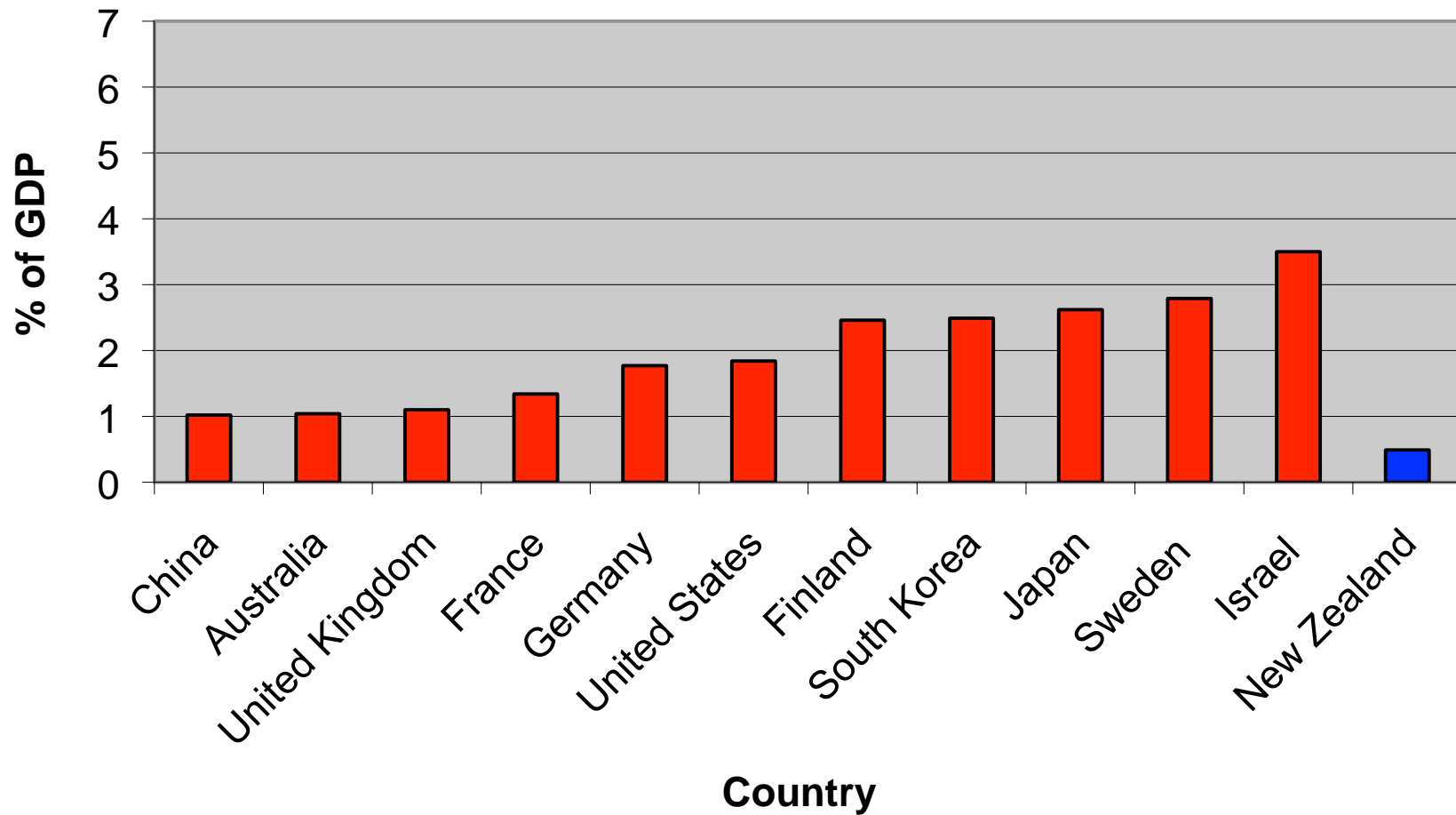
# Invest in R&D

Gross Expenditure on R&D as a % of GDP 2008



# Invest in R&D

## Business Expenditure on R&D as a % of GDP 2008



# New Directions



- Increase in publicly funded R&D – research shows a direct correlation with levels of R&D innovation and economic growth
- The TIN100 have identified that an area of leverage for the high-tech sector would be an integration of Government R&D spend with the private sector to encourage growth
- Labour has proposed a 12.5% R&D tax credit – this **will** boost business R&D
- Comprehensive review of innovation and R&D across business, CRI and university sectors – to eliminate silo, competitive behaviours
- Elevate role of science and scientists – science in schools, teacher support, curriculum support, a new emphasis in tertiary education
- Boost to venture capital for innovative companies



## Why tax credits?



- Low transaction / costs – National's grants and vouchers government administered handouts
- Changes the culture of companies and industries towards R&D
- Worth twice what National is proposing (2008 promised increase of \$100m / year, delivered \$55m in last year's budget)

### **Will it lead to tax rip-offs?**

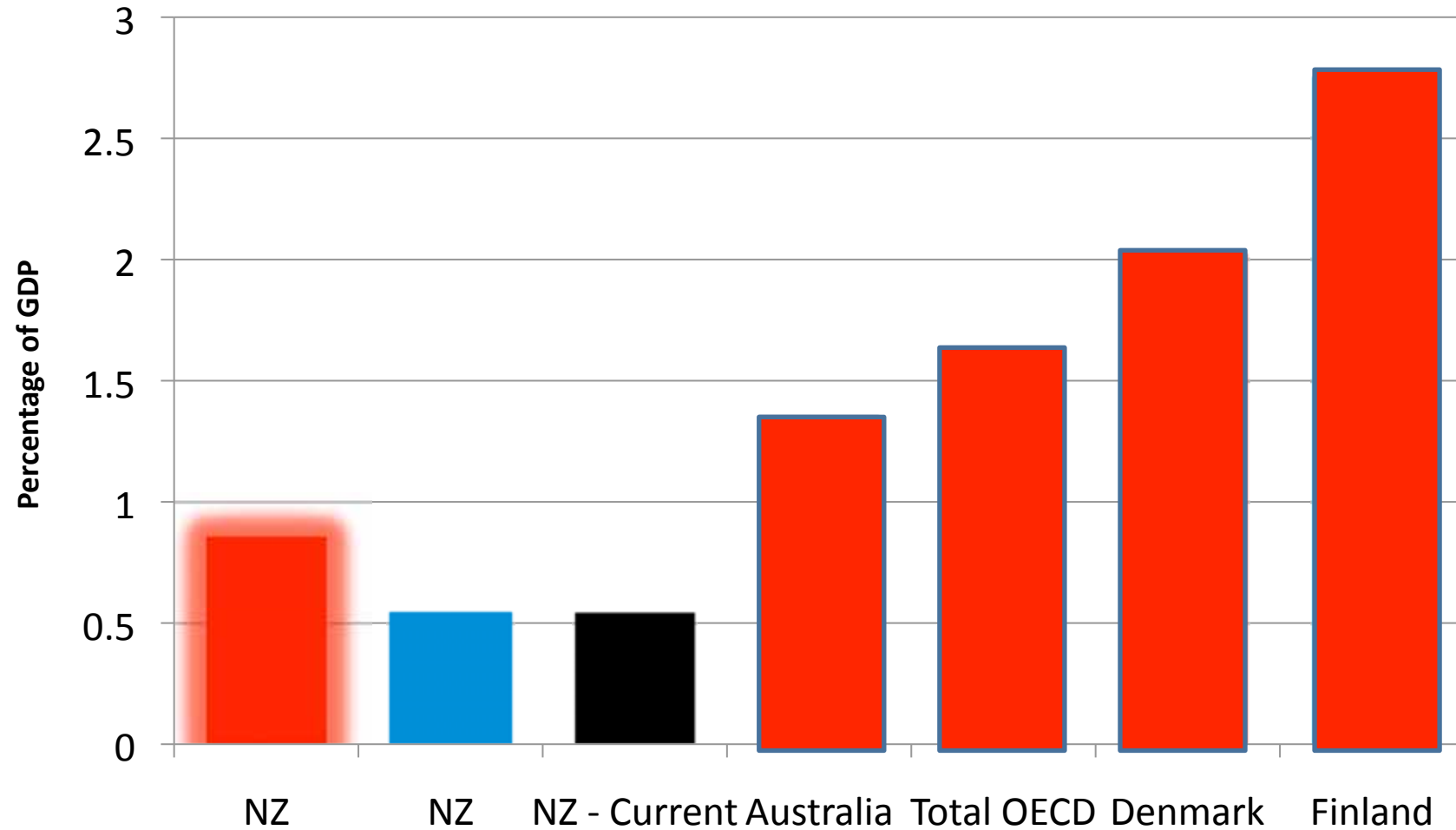
- Australia has copied our tax credit policy lock, stock and barrel – currently before Senate
- Two-thirds of OECD countries have tax credits – the new subsidies
- There maybe some leakage but look at the benefits compared to the alternative

## The R+D Tax Credit – Fully Costed and Fully Paid For

- The 12.5% credit cost – approx. \$30 million in the first year, rising to \$200 million in year five (these costs are net of the savings from cancelling National's grant-based initiatives).
- Cost of \$800 million over 5 years (\$160 million a year on average), to be *fully paid for* by the savings from ensuring agriculture pays for its *fair share* of greenhouse emissions under the ETS.
- Agriculture will pay \$800 million towards its emissions over the period 2013-17. This money will be *available for reprioritised spending*, and will be used to fund the restoration of the R&D tax credit.



## Impact of tax credit on Business R&D as a percentage of GDP

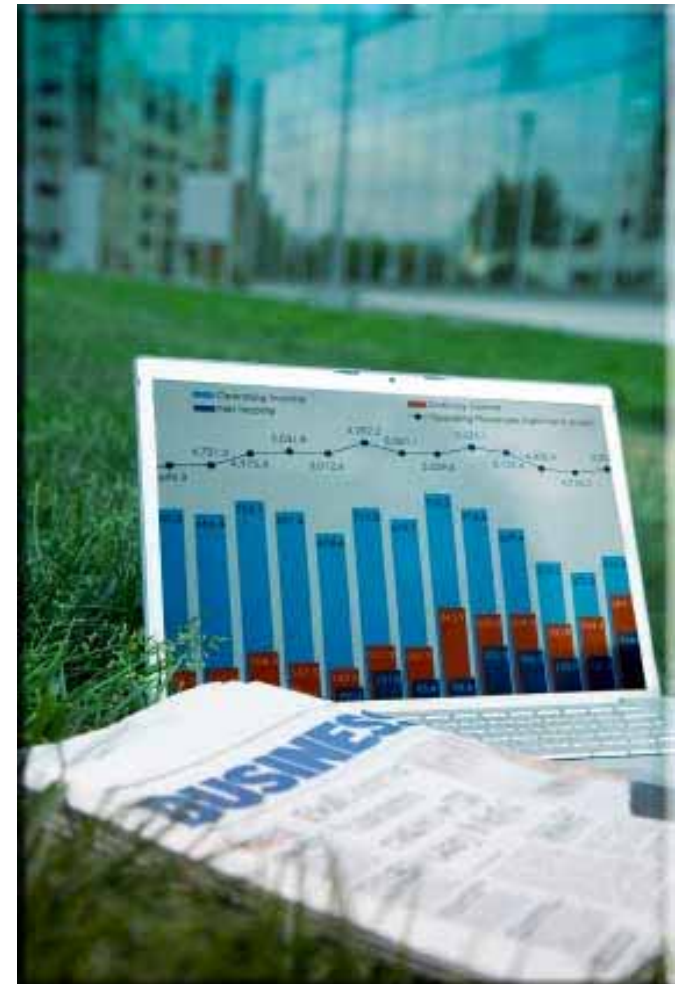




 (\$1.013b)  
 12.5% Tax Credit  
 2009 – 11  
 budgets  
 No Change

# Enhancing Commercialization Opportunities

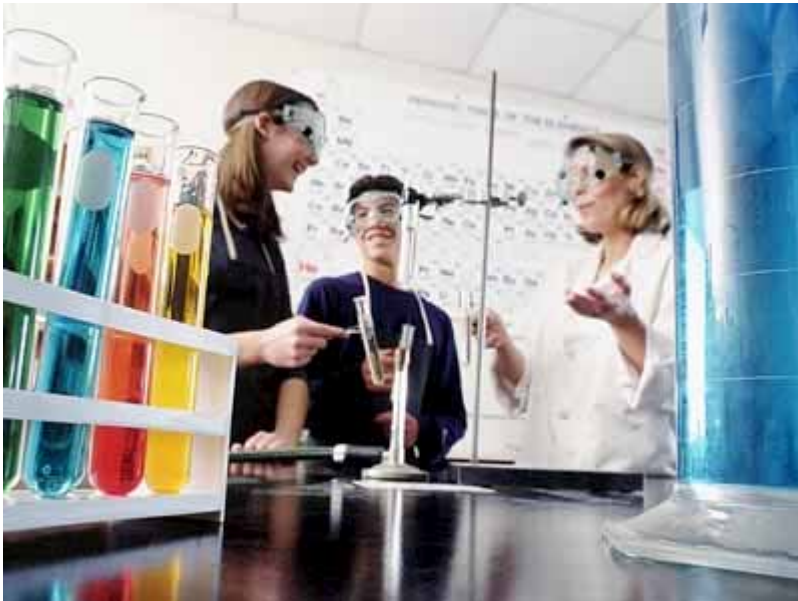
- There is a gap between business and research institutions.
- Collaboration leads to gains.
- Clustering – breaking down barriers while retaining standards.
- Maximisation.
- Too few of our clean/green-tech companies use our research institutions.





# Valuing Science

- The incentives for top scientists can be expanded.
- Maintain and enhance our investment in fundamental science.
- The efforts to promote science have been good, but still not extensive enough.
- Boost interest in science in schools.
- Restore funding back to science advisers to support our science teachers.



- Better recognise and reward talent in science through the mainstream media.
- More support for science teachers, prizes, money for outreach, incentives for tertiary students to enter teaching.

# Capital Constraints on Innovation



- We need to remove impediments blocking the growth of innovative companies
- There is a vibrant ‘angel’ investment sector willing to put in the region of \$250,000 –\$2 million into businesses with exciting ideas
- But, \$2 million - \$10 million difficult to raise in venture type capital
- In a recession, government funding is limited

# New Ideas in Venture Capital Markets



*Aim to raise \$2 billion in capital over next 20 years*

- Investment from Superfund / Kiwisaver into NZ companies

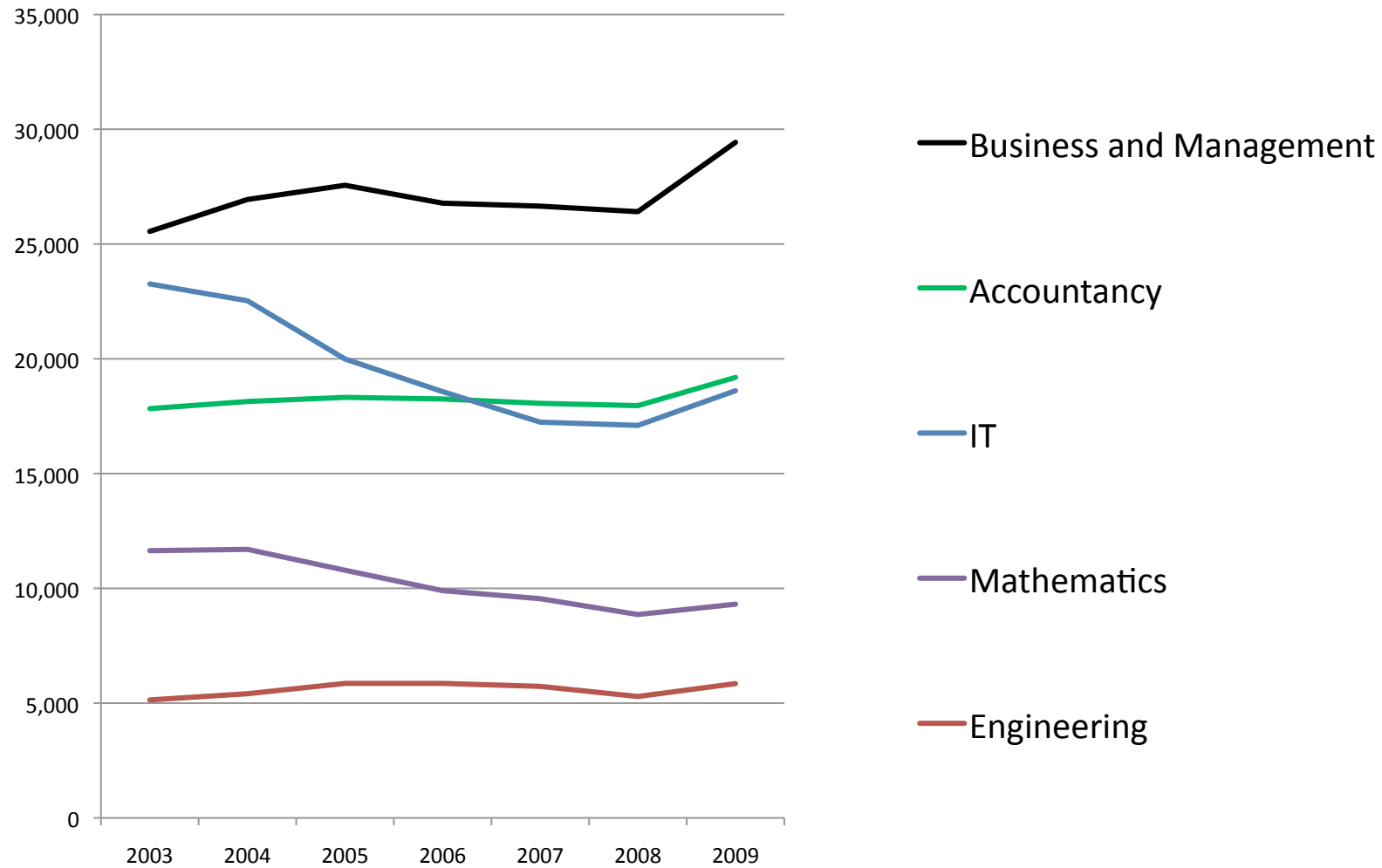
## *Kiwi Innovation Bonds*

- Retail bonds to raise capital for exciting, high-growth NZ companies with great ideas with some form of government guarantee
- It would tell a story about great Kiwi ideas, and would encourage NZ investors to back NZ ideas, grow our economy in the areas where it adds the greatest value.
- High worth immigrants



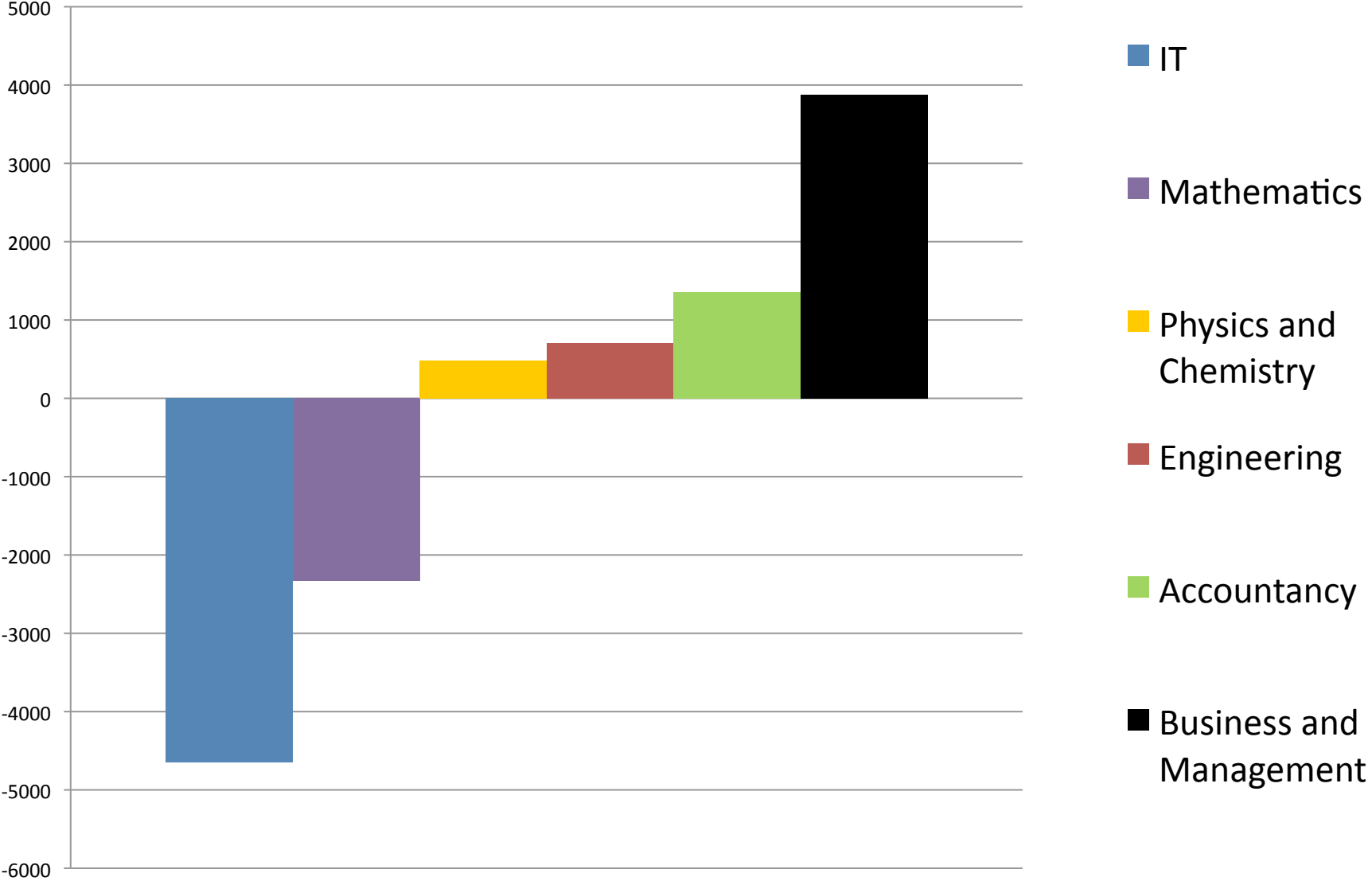
# Tertiary Education - A Need for a Focus on Innovation

## Total Bachelors Enrolments by Subject, 2003-2009

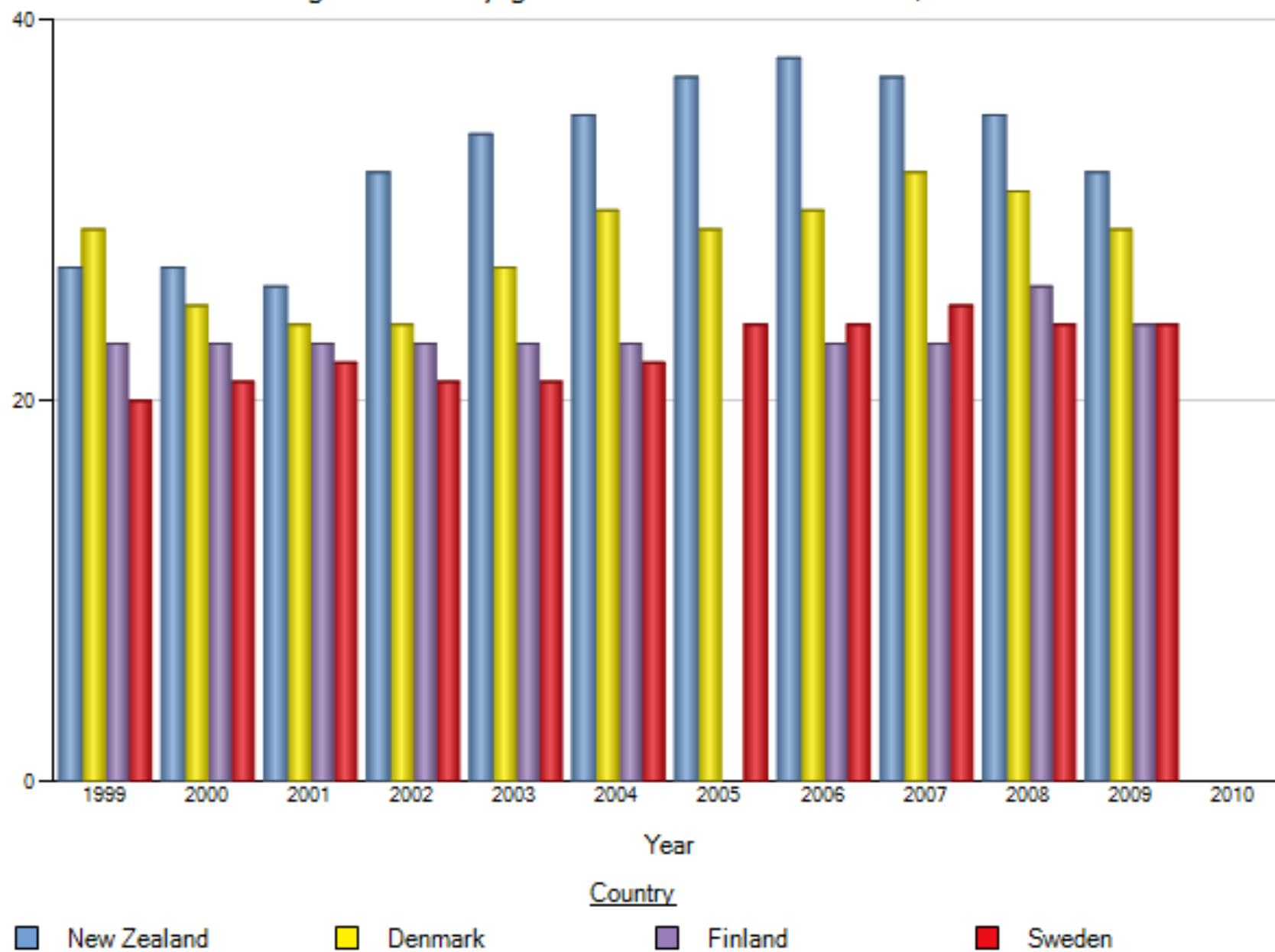


# *Are we training the right talent ?*

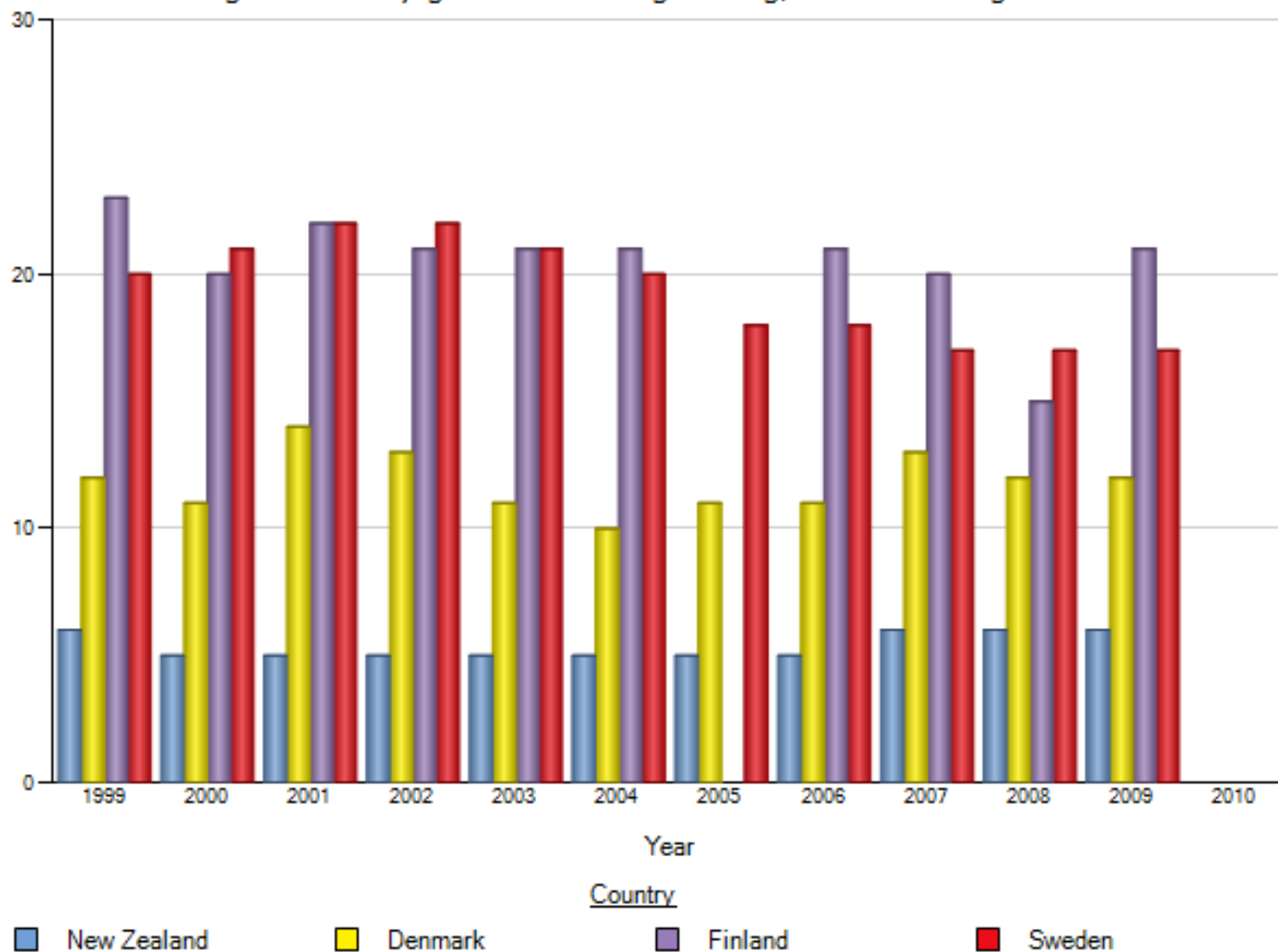
## **Bachelors Enrolment Growth by Subject, 2003 vs 2009**



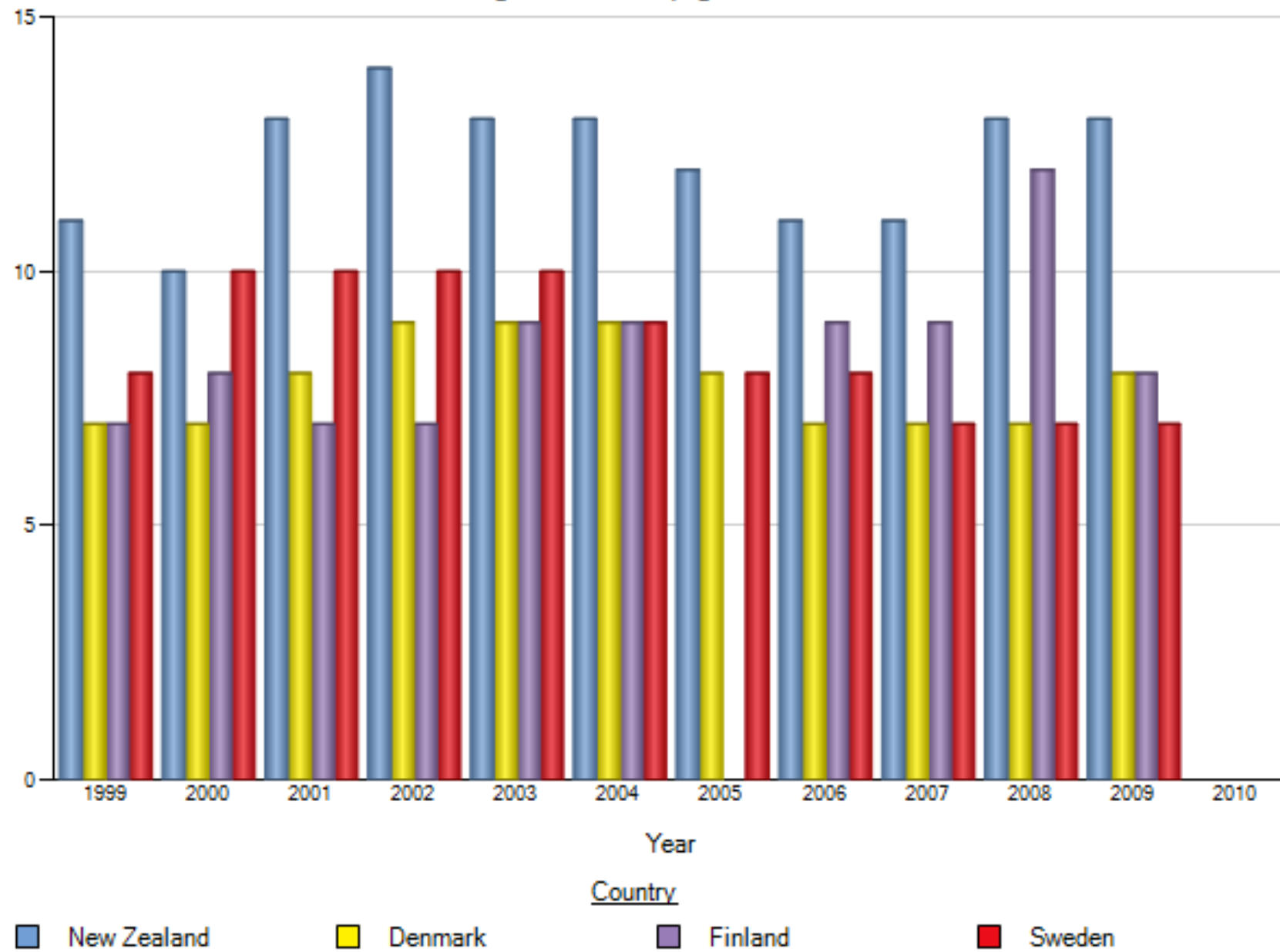
Data: Percentage of tertiary graduates in social sciences, business and law



Data: Percentage of tertiary graduates in engineering, manufacturing and construction



Data: Percentage of tertiary graduates in science



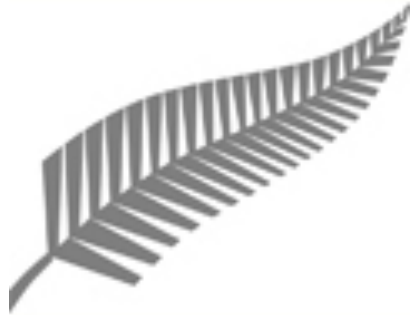
# *Looking forward and investing in Talent*

## **Challenge # 1**

### **The future shape of work will challenge our institutions**



- No longer get skills, get a job and go on to work to retirement
- Need to develop a culture of innovation and continual improvement
- Need to look forward rather than rely on the past – needs of learners, not providers – what will the world be like / need?
- Need to shape courses, timing, qualifications around learners – different types of learning – on-site, different times and intensity
- Need better business – ITP links/ more developed to business strategies, work organisations – particularly to our Small-Medium businesses
- Need to recognise the essential role of polytechnics in driving regional development – underestimated



## *Looking forward and investing in Talent*



### **Challenge # 2**

#### **Transition from school to tertiary education**

Currently **24,000** under 20 not in employment or education ... and growing

A 16 year old leaving school – unskilled, lowly paid, insecure employment

- 24% Pakeha leave school without a qualification
  - 40% Maori
  - 45% Pasifika
- 
- Approach transition differently, engage students
  - Better careers advice
  - Reaching in to schools, transitioning to polytechnics
  - Tertiary High Schools, Trades Academies – centred on polytechnics



## ***Looking forward and investing in Talent***



**These issues are at the heart of the ITP sector and NZ's future prosperity**

Major challenge to Polytechnics

- can they forge those links with business and industry with a focus on productivity
- Leadership and governance – 12 person boards – responsive
- Role of ITOs – a brake on collaboration?
- Role of government and funding – full qualifications vs. fit for purpose
- Forge links with secondary schools



# Finland's Experience

- By the 1990s – 5 million people, reliance on agriculture and crude manufacturing
- High unemployment, dropping GDP
- Debt-laden government
- In 1991 a new government came in. It froze all spending – except for education and R&D
- It decided that its real resource was its brains, focusing on **education and innovation**
- This country is now at the top of the OECD in almost every criterion.
- The critical elements of Finland's transformation:
  - A public consensus that there was a crisis.
  - A consensus that the answers lay within Finland.
  - A consensus that it needed to focus on, and maximise, what it was best at.

**Their answer was to be smarter.**



## ***Conclusion ...***



For New Zealand to be a high-growth, high-tech, innovative export economy in 20 years time, key decisions must be made.

- New emphasis on science and innovation, in government policy and in education
- Graduates prepared for New Zealand's innovative, high-tech future. Current trends do not produce the skill base we need as a forward-looking nation
- Boost private-sector R&D and capital to lift new growing industries
- Cross-government action – a bold strategy and vision for the long term, that we stick to ... this is about New Zealand's future, not Labour or National's.



## *... Conclusion*



- Turn our clean, green world-beating image into the foundation to market our brains esp. through high-tech / clean-tech industries
- Add to – not replace – our flagship agricultural industry
- Use our environment to champion our economy and our economy to champion our environment
- Our brand is world renowned. It brands us not only as a nation, but is part of the way we see ourselves
- We need to become – and be seen – as

**a clean, green and clever nation**



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**T R I B A L**

