etb
Progress through partnerships

PHEE Annual Conference: The Future of Engineering

What does Industry need for its future development?

Peter Williams

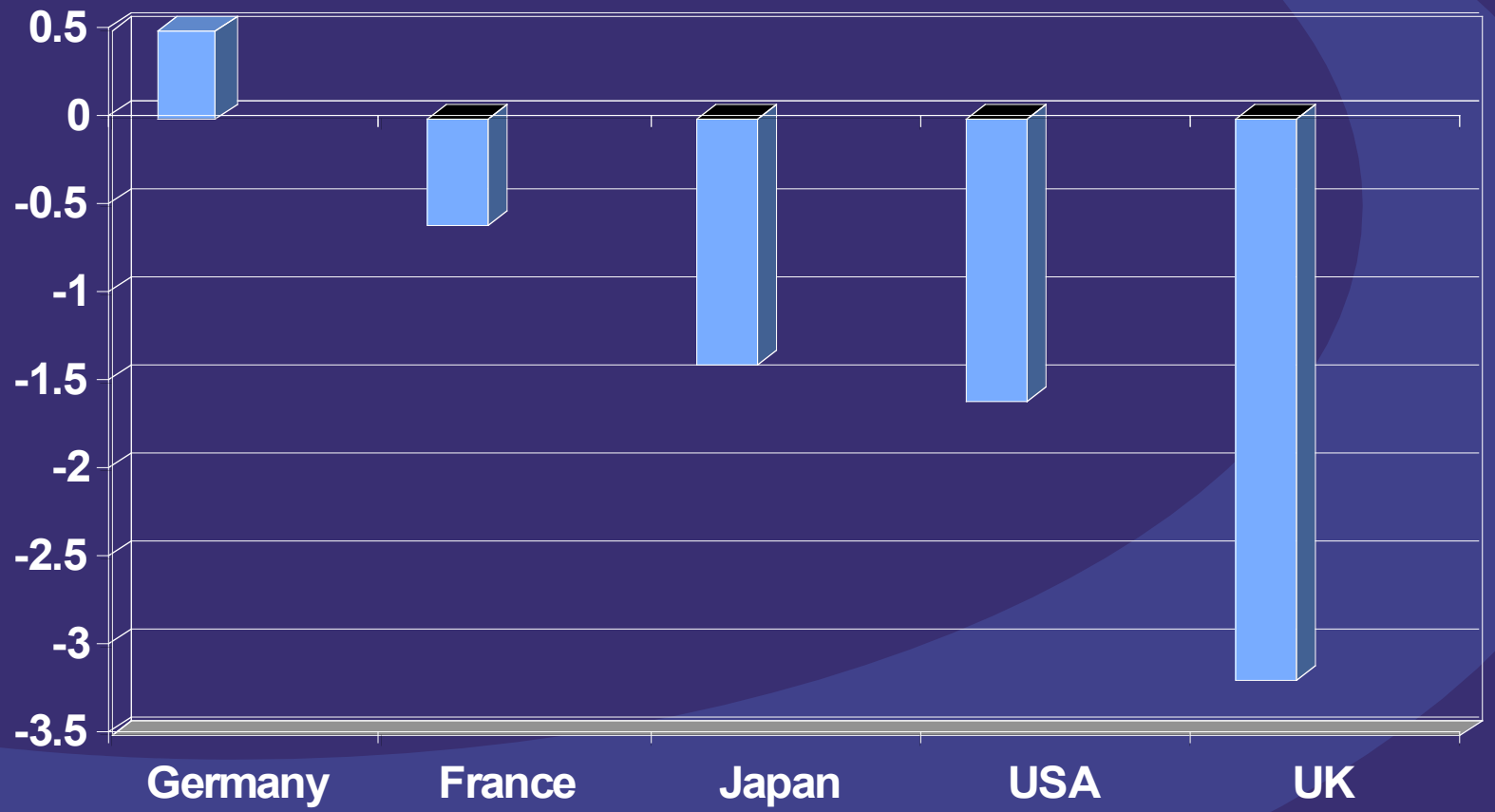
A partnership to promote science, engineering and technology

What is Engineering – based Industry?

- ‘Traditional’ view tends to be centred on manufacturing, *but*
- Manufacturing only 14% workforce, *though*
- Manufacturing 19% economic output *and*
- 63% Exports

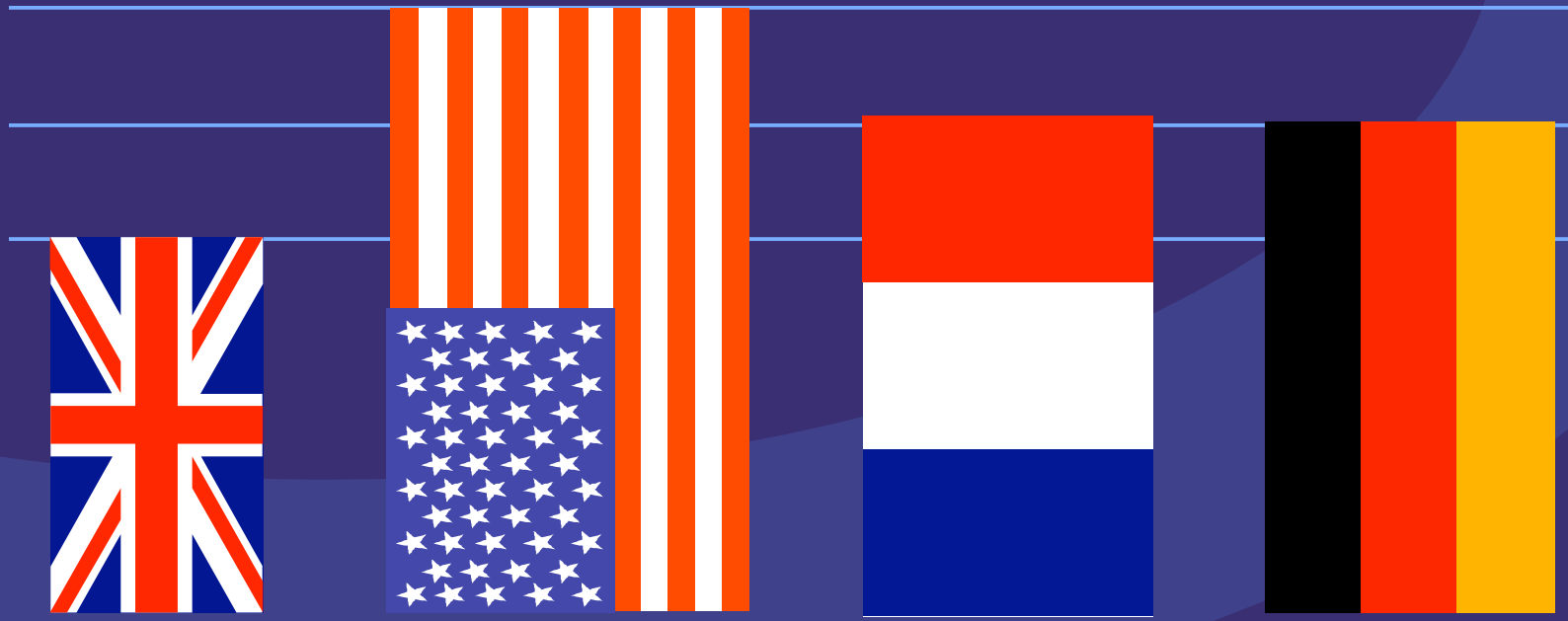
Trends in manufacturing % GDP

Source : OECD/McKinsey & Co. **1995 to 2000**



Also :

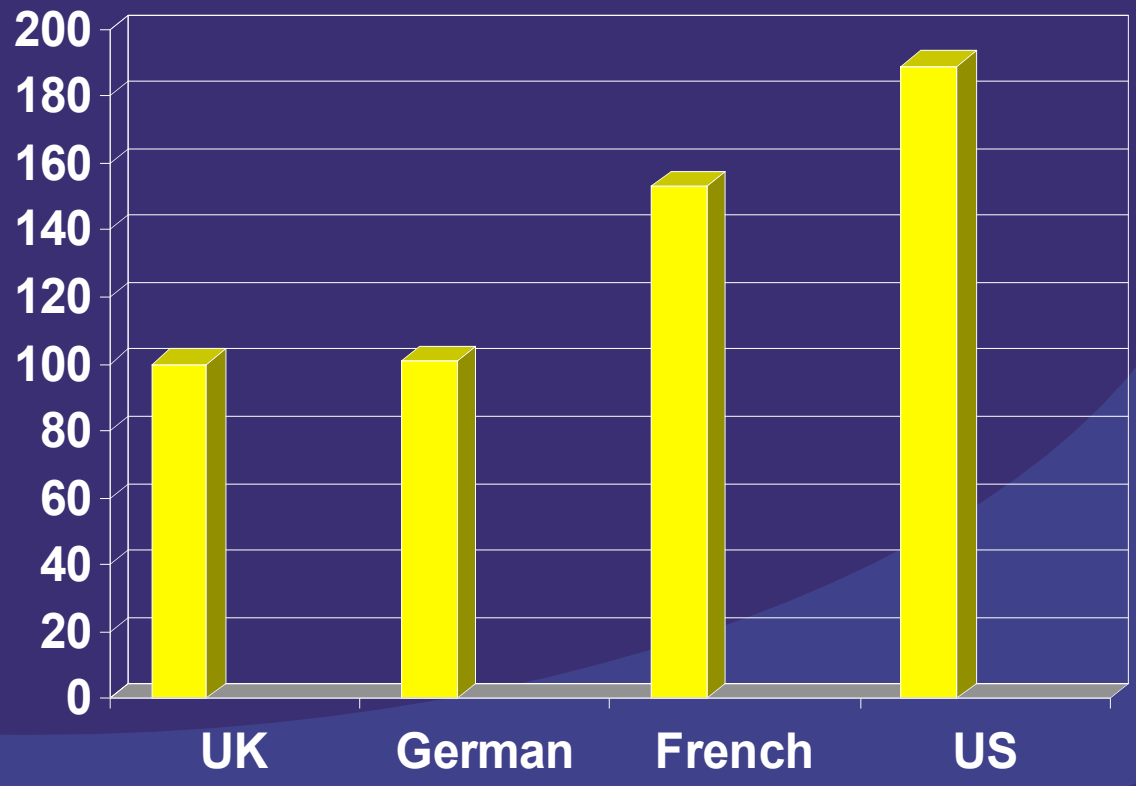
Our productivity levels lag behind those of many of our competitors, output per employed worker is around 30% below the US, and 15% below France and Germany



UK productivity by *ownership*

Source OECD/McKinsey & Co.

UK = 100



Manufacturing Sector : Challenges

- Management, education and training in UK called into question by data

Nevertheless:

- UK economy currently performing well
- Malpas ‘Universe of Engineering’ showed significant engineering presence outside manufacturing sector

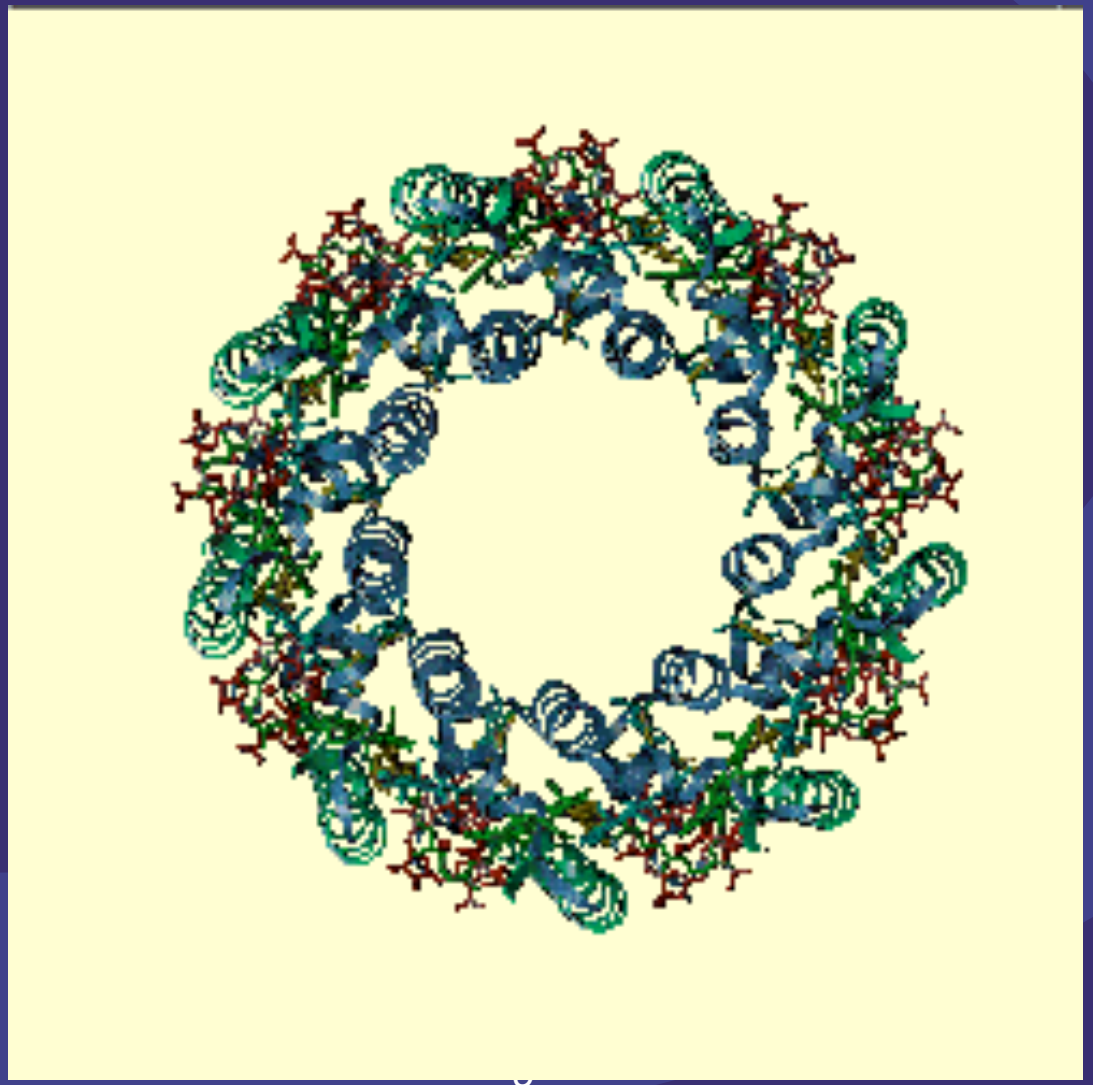
The Future?

- So, historic demarcations no longer relevant
- Knowledge based industries offer the only way to address adverse trends
- Malpas ‘2 million’ includes engineers and scientists
- Implies ‘Engineering’ must be considered as a part of SET, coupled intimately with Science
- *Some* specialisation will nevertheless still be needed, but how much?

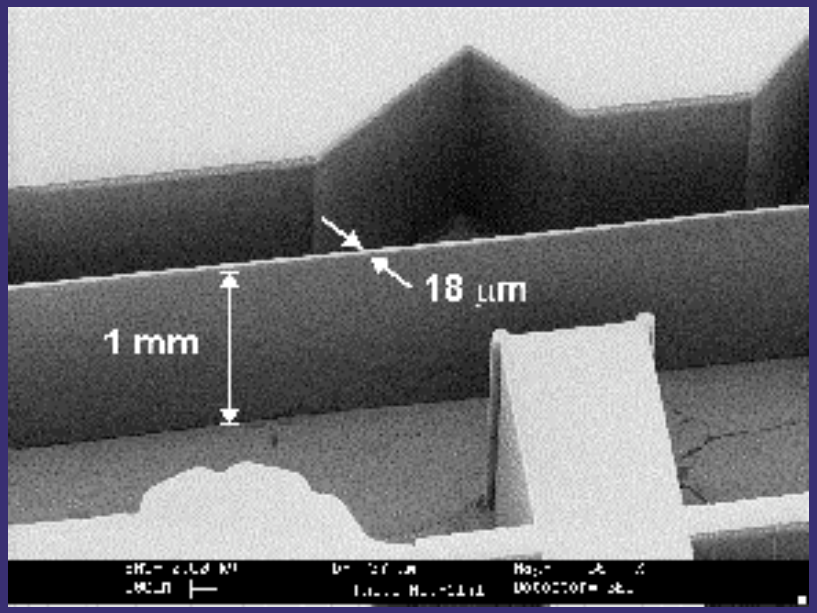
21st Century SET Based Industry

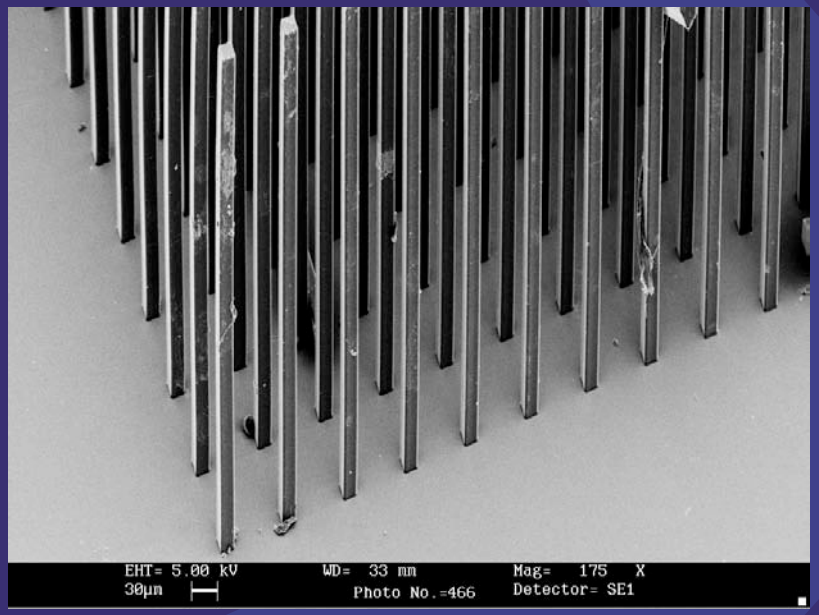
- Biosciences and the genome revolution
- Nanotechnology
- Universities and spin-outs
- Venture funding

Bioscience-based Industries



Nanotechnology





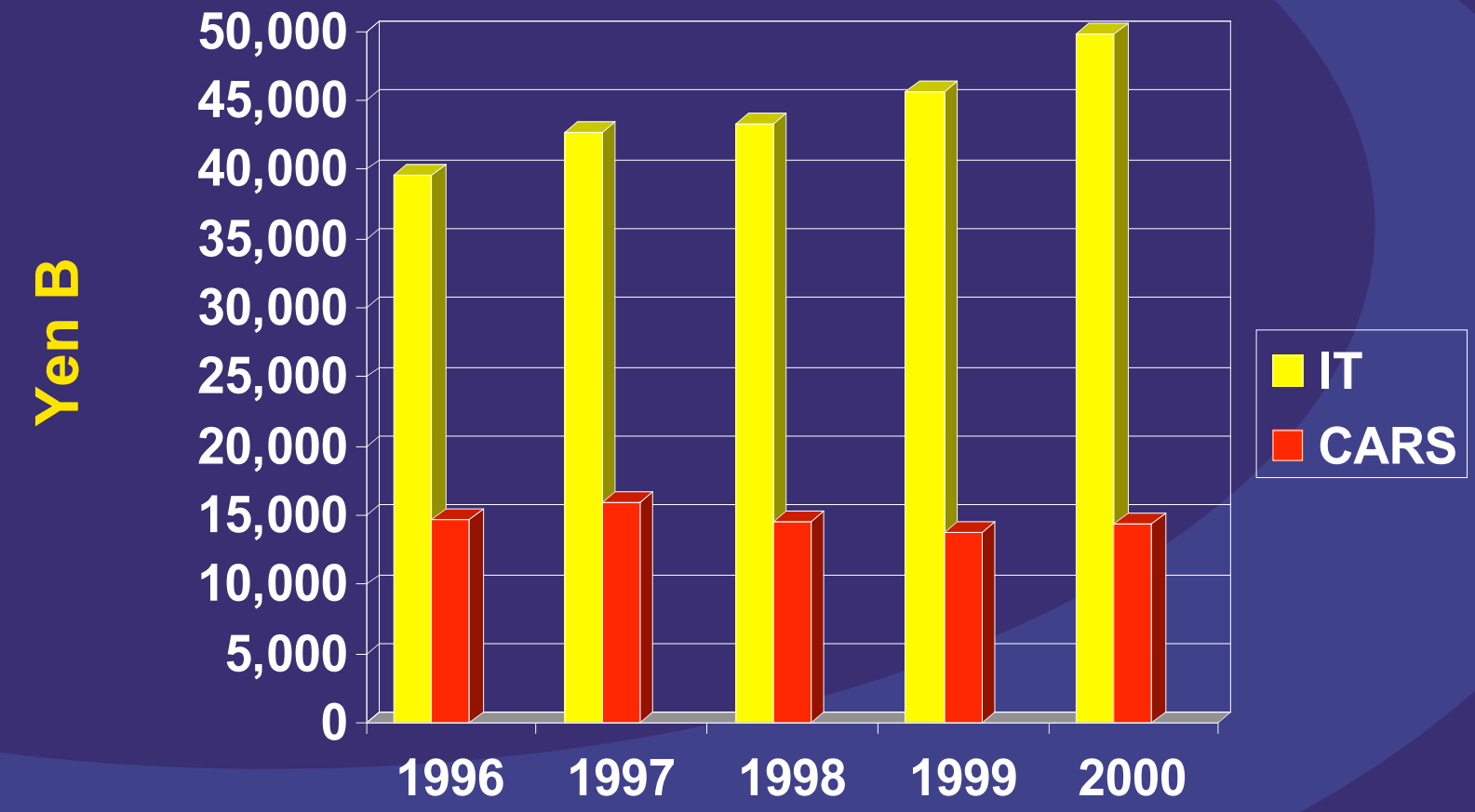
“There will always be room at the bottom”

Innovation Centre - Oxford Science Park

Venture Capital : BVCA Data 2001

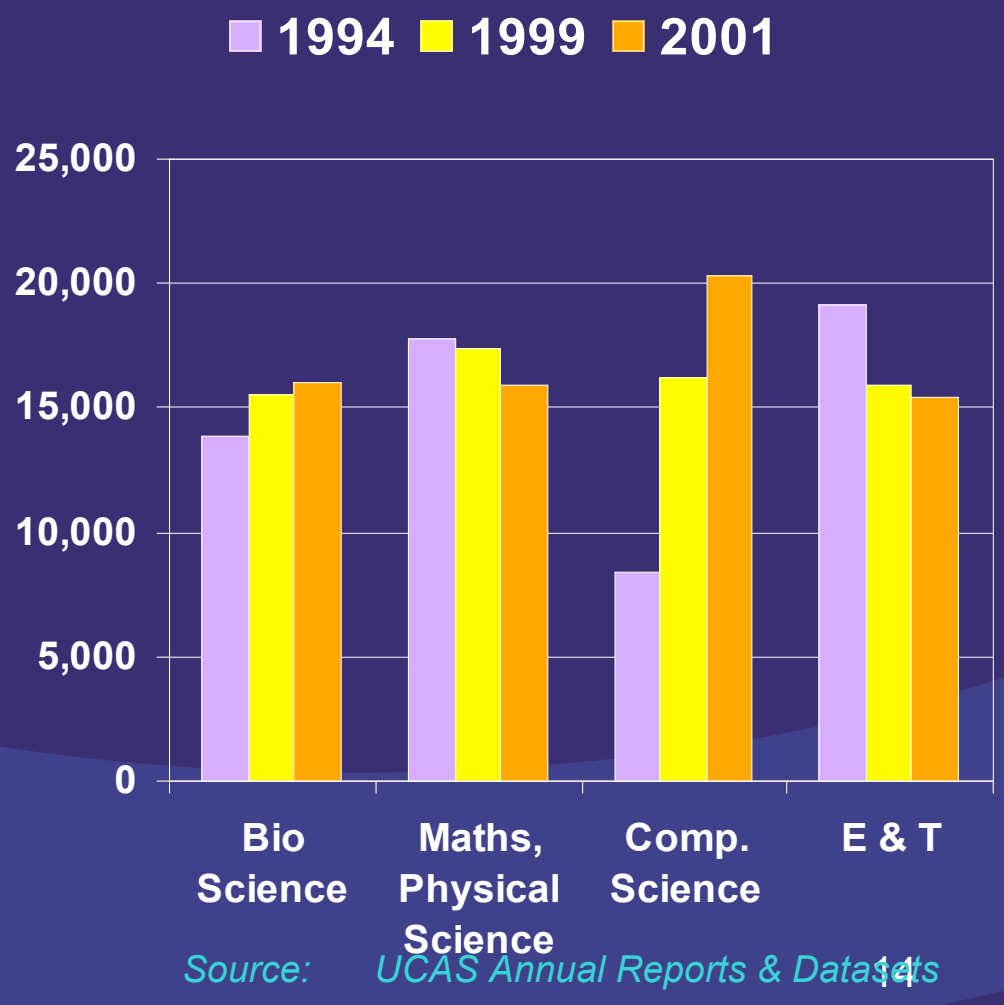
- Private equity investments since 1983 - £50 billion in 23,000 companies in UK
- £1.6 billion invested in UK high technology companies in 2001
- UK leading market after USA

JAPAN : IT vs. CARS



Modest Increase in SET Students Entering University

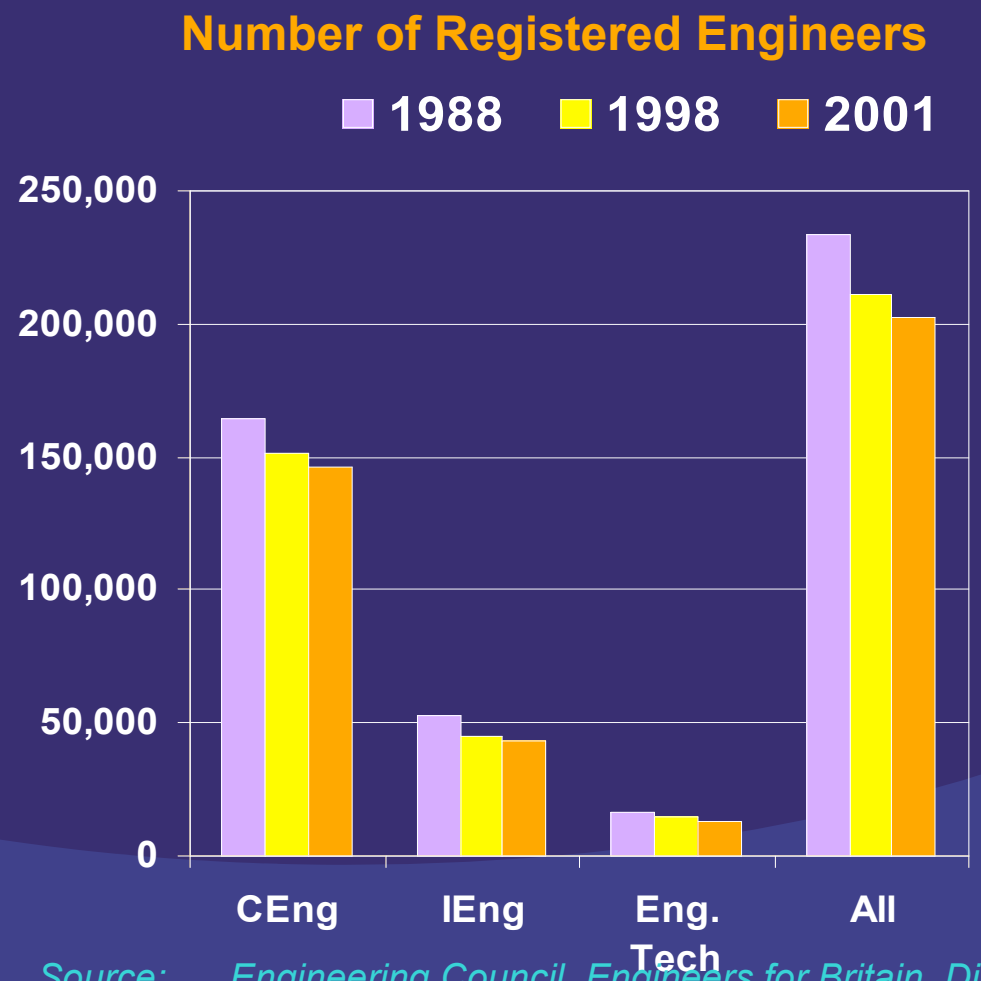
Students Entering University to take Engineering, Technology or Science Degrees



Source: UCAS Annual Reports & Datasets

- Increase dominated by Biosciences (+18%) & Computer Science (+170%).
- 12% drop in Physical Sciences.
- 19% decline in Engineering and Technology.

Continued Decline in Numbers of Registered Engineers of all Grades



- Number registered engineers fell – in all grades – in the ten years 1988 to 1998, and in each of the four years 1998 to 2001.
- Age profile will bring further downward trend.
- Low, and declining numbers in IEng and EngTech are of particular concern.

Source: Engineering Council, Engineers for Britain, Digest of Engineering Statistics 2002

The ETB's Goals

- Capture interest of the young and reverse trends at 'A' level
- Establish Industry's needs and priorities
- Promote coherence among the profession
- Communications and perceptions

The ETB Programme:

- SEAS (with SETNET)
- Teachers attitudes to SET
- Maths in Schools (with Science Council)
- Careers advice structures (with EMTA et al)
- SET promotion in Schools (WISE, YE)
- Technicians (status and transferable skills)
- Chartered Technologist (with EC(UK) et al)
- Wealth creation from SET (with RS & RAE)

Progress report to members Q1 2003

Conclusions : a Personal View

- The key challenge for all stakeholders, including industry, is to change the perception of the young regarding SET
- Clear, united messages are needed to accomplish this – fragmentation will harm
- Industry must engage with the world of education and articulate its needs much more clearly this it usually does

Conclusions and Questions cont.

- Technicians – ***if*** industry's needs are as great as stated, what about pay and status? (the young are very perceptive!!)
- Likewise, is the decline in C.Eng a signal from Industry, and if so, of what? ***C.£ng?***
- Sartor review – is the product right today?
- The Malpas ***'missing million'*** – who are they and how can we engage them?

Conclusions and Questions cont.

- In education as in life, flexibility will be demanded – 19th century definitions of ‘Engineering’ and ‘Science’ will have to change towards multidisciplinarity
- How will universities adapt to this (esp. post Bologna) while preserving excellence in cognate disciplines?
- What are the SET needs of Bio-engineering, IT, financial services etc.?

Disraeli, Commons debate 1874

- “Upon the education of the people of this country the fate of this country depends”