

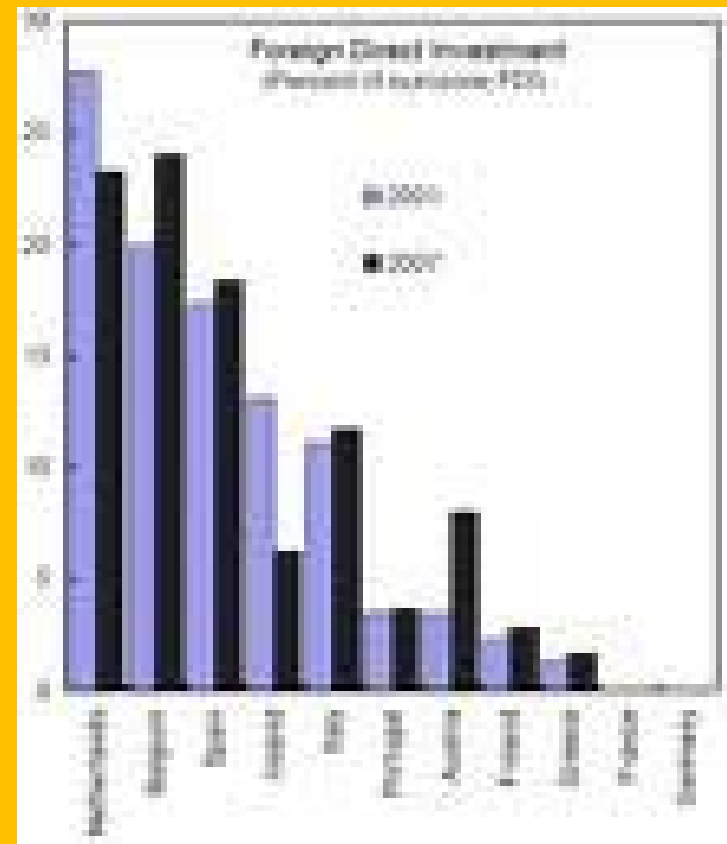
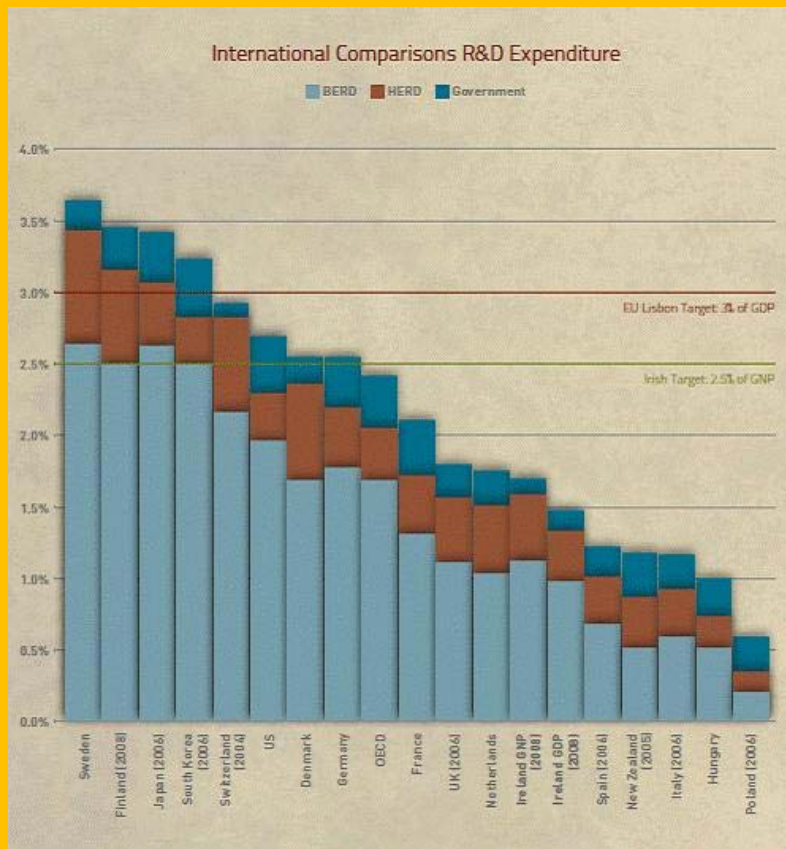
Engineering Education: Non-Traditional Specialisms and the Smart Economy

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Topics to Discuss and Debate

- The current context
- The Smart Economy: a driving influence in Engineering Education
- Existing Engineering degrees to feed the Smart Economy
- Adaptation of engineering education towards the aspirations of the Smart Economy
- In the context of Engineering Education: What could impact on this initiative?
- Should we embrace the ‘The Smart Economy’?

R&D and FDI in the Last Decade



The Current Context in Ireland

- Decline in R&D and FDI through the last decade
- Formation of the Innovation Taskforce
- Adaptation of the Smart Economy model
- Appointment of Màire Geoghegan-Quinn as the EC minister for science, innovation and research
- More student interest in technological, scientific and engineering degree programmes
- The 'Innovation Island' brand; part of an all-Ireland approach to overseas marketing products and services in the sectors of **Environment, Energy and ICT**



WHAT IS THE VISION OF THE INNOVATION TASKFORCE?

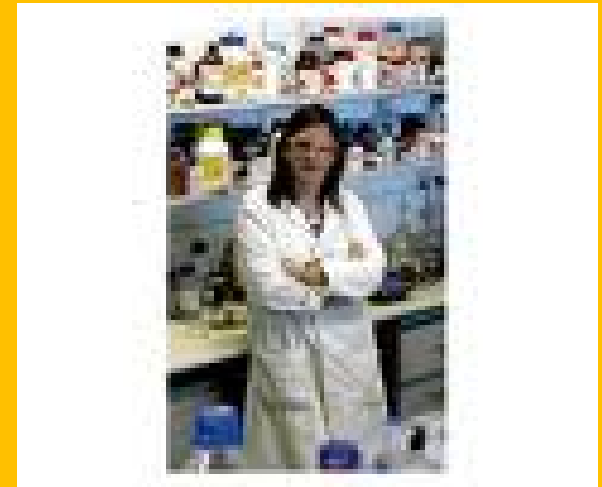
Our aim is that by 2020 Ireland will have a significant number of large, world leading, innovation-intensive companies, each having a global footprint, many of which are Irish headquartered and owned.

These companies will provide high quality employment and generate exports and tax receipts. They will vary in scale, type of activity and pattern of company ownership. What will be distinctive about these companies is that they will be ambitious, export focused and, above all, innovative.



The Smart Economy

- Strategy adopted from countries such as Japan
- Low-cost technologically based companies
- Highly skilled science, engineering and technologically based workforce
- Business and entrepreneurship holistically inherent
- Estimate of half a million new jobs in 10-15 years



Environment

- Improved waste management systems
- Reduction of greenhouse gases
- Development of green goods and services
- Use of ICT and advanced sensor technologies
- More effective control of water resources

Oil Spill: Gulf of Mexico: 2010



Energy

- New energy sources
 - geothermal
 - bio-waste/anaerobic digestion
 - solar
 - wind
 - ocean
- Control and monitoring of resources

Bio-Energy Plant



Information and Communications Technology (ICT)

- Packet Burst Networks: high speed method of data transfer
- Web 3.0: greater and dynamic interaction of user and network infrastructure/capacity
- Metropolitan Area Networks (MANs)
- Virtual services, eg cloud computing: (see the EU 2020 strategy for innovation for growth and jobs - April 2010)
- The exemplar 'smart network' architecture, including 'green' ICT applications

Cloud Computing



Driving Bodies in the Republic of Ireland

- Department of the Taoiseach
- Science Foundation Ireland (SFI)
- Sustainable Energy Ireland (SEI)
- Enterprise Ireland
- Industrial Development Agency (IDA)
- Programme for Research in Third Level Institutions: umbrella for bodies such as National Digital Research Centre and Biomedical Diagnostics Institute
- Higher Education Institutions: Universities and Institutes of Technology



Emerging Characteristics of Engineering Graduates

- Interdisciplinary in nature
- Grounded in fundamental engineering principles: non-discipline specific, problem solving, lateral thinking, flexibility
- Has 'Life-centred' approach to development
- Entrepreneurial and self-working in abilities
- Can work alongside arts and humanities
- Life-long learning aspirations and work with HEIs

Existing Degrees

- BE Degree in Environmental Engineering at NUI Galway
- M.Eng.Sc in Sustainable Energy at UCC
- B.E. in Biomedical Engineering at NUI Galway
- B.Eng in Audio-Visual Media Technology (AVMT) at IADT Dun Laoghaire
- Other interdisciplinary degrees e.g. in Food Science and Fire Safety Engineering

Engineering Degrees in the Smart Economy



The Adaptation of Engineering Degrees to the Smart Economy

- Critical and timely, post-recession (!!)
- Adaptation of existing programmes
- Flexible provision of modules and programmes
- Greater liaison with industry here and abroad
- On-campus companies and incubators
- National committee to advise on Engineering Education in the Smart Economy

Potential Influencers

- More international environmental protection agreements
- Soaring costs of oil
- Very high demands for data at speed
- Economic restructuring/bank lending for new enterprises (NAMA)
- Changes/restructuring of the Irish HEI sector: the Hunt Report
- **Is the 'Smart Economy' an appropriate vehicle for modernising Engineering Education?**