

# Ireland's doomed goal to become a world-class knowledge economy

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# 2004

“Until now, Ireland’s principal enterprise strengths have been in the operational aspects of manufacturing and services, rather than in markets and product development.

This is particularly true of the foreign-owned sector, which accounts for most of our exports and which, **for the most part, produces goods that were designed elsewhere, to satisfy market requirements that were specified elsewhere, and sold by other people to customers with whom the Irish operation has little contact and over whom it has little influence.**“

"We need to ensure that **research in Ireland is led and informed by market needs** (demand-driven), so that we obtain economic value from the research investment.“

- **Enterprise Strategy Group's 'Ahead of the Curve - Ireland's Place in the Global Economy' report**

# 2006

Only one in five Irish households had broadband access while 48% of households did not have any Internet access.

**- Data collected as part of Census 2006 in April 2006**

“What is different here in Ireland is the way in which we tackle issues, solve problems and seek other new and better ways to meet needs. It requires ambition, vision, cooperation and partnership among many players. It reflects a mindset and an approach that is innate.

Ireland...has a unique capacity to improve, to innovate and to initiate new ideas, new processes and new methods of operating that can make business more dynamic, more efficient, and ultimately more profitable.”

**- Seán Dorgan, CEO of IDA Ireland, May 2006**

**"In Ireland, everything works together." - IDA Ireland's 'Irish Mind' promotion**

## Dreams or Delusions?

...a new strategy on science and technology would "see Ireland secure its position as one of the most advanced knowledge economies in the world and become renowned for the excellence of its research."

- **Micheál Martin, minister for enterprise, trade and employment, November 2006**

"...we are asking you to help us find ways to put Ireland in pole position in the new world economic order - How do we create a 'European Silicon Valley' in Ireland?"

- **Brian Cowen, taoiseach, September 2009**

"As I have said before, our industrial policy must not just be aimed at attracting the next Google or Microsoft to Ireland - we must strive to create the next Google or Microsoft here in Ireland."

- **Richard Bruton, minister for jobs, enterprise and innovation, September 2012**

# Key issues 1

- a) Scientific discovery and the exponential improvement of products, processes and services to meet human needs have dramatically impacted the quality of life for a significant number of humankind compared with what Thomas Hobbes (1588-1679) wrote in 1651 of "the life of man, solitary, poor, nasty, brutish, and short."
- b) Innovation is not just about discoveries in public or commercial laboratories. It is also about how technology is utilised and is relevant for mature businesses as well as modern sectors. For example, Achille Gaggia launched the espresso coffee machine in Italy in 1948. However, it was a native of Brooklyn who sought to replicate the atmosphere in Italian espresso bars and today Starbucks is a global brand. Ryanair became one of Europe's biggest airlines without having to pay a royalty to anyone.
- c) University research should not be subordinate to enterprise policy and enterprise policy should be about much more than monetising university research.
- d) Foreign-owned firms, mainly American, are responsible for about 90% of Irish tradeable goods and services exports. These firms have no significant research and development centres in Ireland and there is no evidence that they do a significant amount of high level research in Ireland.

## Key issues 2

- e) For new Irish indigenous firms, the absence of a record of developing sales in the small domestic market compounded by subdued public procurement for years ahead, is a serious challenge for developing exports. The likelihood is that any spinout from university research with potential, would be sold to a bigger overseas firm before it scales up and the Irish taxpayer sees any payback.
- f) A Google or Microsoft could never develop in Ireland because of the small market. **A startup with potential would be snapped up by an outside firm.**
- g) Israel is the only foreign location where the Silicon Valley model has been successfully cloned. **Ireland could not replicate Israel's success.**
- h) The OECD says that there is **limited evidence of success in commercialisation of university research.**
- i) Ireland's enterprise data is limited with no reliable firm survival information. Neither is there data available from longitudinal studies.
- j) The model of globalisation where there would be knowledge economies in the West while low-wage manufacturing would dominate in regions such as Asia, is already out of date.
- k) There has been no serious accountability in respect of Irish public spending in the science area.

# Innovation 1

Bart Clarysse, professor of Entrepreneurship, Imperial College, London , said in 2009 that companies which try to commercialise their own ideas are seen by policymakers and technology transfer offices as vital to the economy.

"People think of the big names like Microsoft, Apple, HP, Intel and Xerox as once being new tech-startups... **most of these highly successful companies did not develop their own ideas. They bought other businesses to help them succeed and appear credible.**"

Real technology startups tend to grow slowly, have a poor survival rate and **contribute little to the wider economy in economic terms.**

In Europe, after 7 years these new firms comprise, on average, **18.5 employees with revenues of £250,000 and a mere 36% likelihood of surviving beyond 10 years.**

**In the UK there were over 2,900 of these companies that had been in business since 1991. Despite spending over £2.5bn, they were responsible for only 40,000 jobs**

# Innovation 2

Kauffman Foundation: **“rather than following the conventional expectation that high-growth companies are grouped into a narrow technology category, they represent exceptionally diverse industry segments. These findings offer important lessons for economic development leaders, such as to target firms that are high-growth rather than high-tech.”**

Booz & Co., the US consultancy which produces an annual survey of the global top 1,000 business research and development spenders, says there is no statistically significant relationship between financial performance and innovation spending, in terms of either total R&D dollars or R&D as a percentage of revenues.

Over 50% of all US firms in the 2009 top 1,000 global companies ranked by R&D spending, were founded after 1975, in Europe the figure was just 18% and in Japan a mere 2%.

Between 2004 and 2007 - - the years leading to Apple’s first iPhone launch - - Nokia’s total research and development spend was €17.1bn (\$22.2bn at today’s exchange rate), against Apple’s \$2.5bn in the same period.

Not only are European firms likely to be old, they also excel in old technology sectors.

About three-quarters of venture-backed firms in the US don't return investors' capital, according to recent research. Less than one-in-five of the fastest-growing and most successful companies in the United States had venture investors.



# Innovation 3

Foreign-born scientists and engineers, whether educated in the United States or abroad, are a critical part of the US Science & Engineering (S&E) workforce: about one in four S&E master's degree holders and one in three S&E doctorate holders are foreign born.

This reliance is greatest on those with engineering and math/computer science degrees. Among them, about 40% of master's degree holders and 50% of doctorate holders are foreign born.

Immigrants were among the founders of 44% of startups in Silicon Valley in the period 2006-2011, down from 52% in the ten years to 2005. The big successful companies employ a fraction of their counterparts in the past.

General Motors had over 618,000 employed in the US in 1979 - - in well-paid jobs; today, General Electric employs 133,000 and Apple 47,000.

Last year, for the first time, spending by **Apple and Google on patent lawsuits and unusually big-dollar patent purchases exceeded spending on research and development of new products**, according to public filings.

# S& T Indicators 1

<b>GERD: Gross Expenditure R&amp;D</b>	2004	2010
Ireland as ratio GNP	1.46%	2.15%
EU27 GDP (EU25 in 2004)	2.86%	2.00%
US GDP	2.66%	2.79%
Finland GDP	3.51%	3.87%
Sweden GDP	3.70%	3.42%
Germany GDP	2.49%	2.82%
UK GDP	1.79%	1.77%
<b>BERD: Business Enterprise Expenditure R&amp;D</b>	2004	2010
Ireland GNP	0.96%	1.47%
EU27 (EU 25 in 2004)	1.20%	1.23%
Value (data for 2003)	€1.10bn	€1.90bn
Foreign-owned firms	€775m	€1.32bn
Irish-owned firms	€330m	€583m

# S&T Indicators 2

<b>GBAORD: Government Sector Expenditure R&amp;D</b>	2004	2010
Ireland GNP	0.50%	0.68%
EU27 (EU 25 in 2004)	0.65%	0.77%
Value	€635m	€890m
<b>Irish Science Budget</b> €23.7bn constant prices 2002/11	€2.03bn	€2.34bn
<b>High Tech/Life Sciences Jobs</b>	2002	2011
Foreign-owned firms	104,500	101,800
Irish-owned firms	29,200	29,100
<b>Patents</b>	2007	2011
Patent applications at Irish Patent Office	925	490
PCT applications at European Patent Office	422	421

# S&T Indicators 3

- a) Irish Universities and Institutes of Technology **receive very modest income from licence fees** (less than €1m a year).
- b) Patent applications from Irish residents (including foreign companies and also inventions that were not made in Ireland) in 2011 were at the lowest since 1982.
- c) **30 spinout companies** established in each of the last few years. 3-4 employees at early stage.
- d) R&D tax credit: applications rose from 200 in 2004 to 1,172 in 2010; Self-assessment; Cost in 2010 €223.7m
- e) IDA Ireland, the inward investment agency, has no minimum level for the R&D 'component' of new projects.
- f) In 2010, 20,483 FTE (full-time equivalent) researchers and support staff were employed in Ireland: 12,104 in the business enterprise sector and 8,289 in Irish higher education and public bodies (987).
- g) R&D personnel as a percentage of persons employed in the business enterprise sector in 2009 was at 0.53% in the EU27; 0.57% in Ireland; 0.82% in Germany; Denmark 1.16%; Finland 1.14% and Sweden 1.10%.
- h) R&D staff in Ireland in 2005 was at 16,681

# S&T Indicators 4

## R&D Performance and Targets, 2003 and 2013 + actual 2009/2010

### Strategy for Science, Technology and Innovation 2006 report

	2003	2009/ Report	2010	2013
	€1.08 bn	€1.9 bn	€2.5bn	
	(0.93% GNP)	(1.9% GNP)	(1.7% GNP)	
Business Investment in R&D				
Number of Indigenous Companies with meaningful R&D activity (>€100,000)	462	570	1050	
Number of Indigenous Companies performing significant R&D (>€2m)	21	48	100	
Number of foreign affiliate companies with minimum scale R&D activity	213	331	520	
Number of Foreign Affiliates companies performing significant R&D	60	84	150	

# Patents

- a) Patent applications from Irish residents (including foreign-owned companies operating in Ireland. However, a filing may not have an Irish resident inventor) in 2011 amounted to 494, down from 733 in 2010. The 199 total was 966.
- b) Patent grants to Irish residents totalled 195 in 2011, 211 and 286 in 2010 and 2006 respectively.
- c) There were 422 Irish PCT applications to the European Patent Office in 2007 and 421 in 2011.
- d) The number of Irish triadic patents issued in 1999, 2006 and 2009 was 74, 74 and 76.
- e) The number per million inhabitants, was 17 in Ireland, with Switzerland in the lead at 113.5, followed by Japan at 104.48, Sweden at 96.79 and Germany at 70.37.

# European Patent Office Patent Cooperation Treaty

## PCT Top Irish Applicants (Publication Year = 2011)

<b>Applicant</b>	<b>Publicati on</b>	<b>Rank</b>
Skype Limited	41	434
Tibotec Pharmaceuticals Ltd.	12	1419
Accenture Global Services Ltd.	11	1548
College of the Holy and Undivided Trinity of Queen Elizabeth near Dublin (Trinity College)	11	1548
University College Cork	11	1548
Depuy (Ireland) Limited	9	1843
Nellcor Puritan Bennett Ireland	8	2028
Dublin City University	7	2287
Revolt Technology Ltd.	7	2287
Scientific Games Holdings Ltd.	7	2287

# Journals

- a) Journals: cites per paper at rank 20 in 2011 with Switzerland at No. 1; Denmark at 2; Germany at 10 and Israel at 13.
  
- b) The SIR (Scimago Institutions Rankings) World Report 2012 tracks papers in the Scopus database from 3,290 institutions that together are responsible for more than 80% of worldwide scientific output. **UCD (University College Dublin)** gets a world rank of 356; **Trinity College, Dublin**, 428; **UCC (University College Cork)** 571; **NUI Galway** 797; **DCC (Dublin City University )** 1039; **University of Limerick** 1122; **NUI Maynooth** 1663; **RCSI (Royal College of Surgeons, Dublin)** 1785; **Teagasc**, the Irish Agricultural Institute, 2047.



# International rankings 1

- a) **Programme for International Student Assessment (PISA)** - - Between 2006 and 2009 Ireland dropped from 5th to 17th place for reading literacy, from 16th to 25th place for mathematical literacy, while results in scientific literacy remained more stable.
- b) **The European Union's annual Research and Innovation Scoreboard 2011** - - The EU's 'Innovation leaders' are Sweden, Denmark, Germany and Finland. Ireland is among 'followers.'
- c) **World Economic Forum: The Global Technology Report 2011/2012** - - Ireland has a 25th ranking. It had a ranking of 19 in 2001/2002.
- d) **Economist Intelligence Unit: Digital Economy Rankings 2010** - - Ireland had a 17th ranking in 2010. In 2004, Ireland's e-readiness rank was 15.
- e) **The World Bank's Knowledge Assessment Methodology** - - Ireland had a No. 11 rank in both 2000 and 2012.
- f) **IMD's annual World Competitiveness Yearbook 2012** - - Ireland has a 20th ranking. It had a ranking of 7 in 2001.

# International rankings 2

- a) **World Economic Forum's annual Global Competitiveness Report 2012/2013** - - Ireland has a 27th ranking. It had a ranking of 11 in 2001.
- b) **OECD fixed broadband ranking 2011** - - Switzerland led with 39.9 subscribers per 100 inhabitants, followed closely by the Netherlands (39.1) and Denmark (37.9). The OECD average was 25.6. Ireland was at 22.2.
- c) The **Global Innovation Index (GII) 2012** produced by INSEAD and the World Intellectual Property Organisation (WIPO) - - Switzerland is in the lead and Ireland has a 9th rank, ahead of the United States!
- d) **Doing Business 2012**, the World Bank index on ease of doing business in 183 countries - - Ireland has an impressive 10th ranking; Greece is at 100 with Yemen at 99 and Papua New Guinea at 101; Italy is at 87 with Mongolia, a communist ruled country until 1990, at 86 and Jamaica at 88.
- e) **University rankings 2012** - - Ireland has no university among the top 100 universities in the 2012 Times Higher Education Rankings. In 2012, University College Dublin (UCD) has dropped from 159 to 187 and Trinity College Dublin (TCD) rises from 117 to 110. The QS World University Rankings is an annual league table of the world's top 700 universities. The rankings are based on four key pillars -- research, teaching, employability and internationalisation.

TCD is the only Irish university to be ranked in the top 100 at 67. UCD is at 131.

a) Clusters

b) Spinouts

c) What should Ireland do?