



Measuring Ireland's Research Performance

1. Research Outputs

The purpose for which all research is undertaken is to add to or improve knowledge in a particular area. The first output from such work is normally a paper published in a peer-reviewed journal. Peer-reviewed publication is essentially the quality control part of scientific research. The peer-review is carried out by anonymous referees, whose work is supervised by an editor or an editorial board. The purpose is to double-check that the work was properly carried out, that it is not a repetition of something that already exists, that the conclusions are validly drawn, and that both the work and the publication meet appropriate professional standards. In very broad terms, the number of peer-reviewed publications is a measure of the output of a scientific programme, whether this is assessed at the level of an individual, a team, an institution or a country.

The impact that such a publication makes can be approximated by the number of times it is cited in subsequent publications by others. As for the number of papers published, the value of this measure can vary greatly from one field to another. At a very broad level, however, it reflects the attention paid to the work by others working in the same field worldwide.

These two indicators measure the intermediate output of science. The practical value to society lies in the application of this new knowledge to the lives of people. This might be through new products (e.g. lasers), improved procedures (disease diagnosis), products (food quality) or services (radio communication). Bringing these products into use in daily life creates economic opportunities, wealth and jobs. It also makes us healthier, more comfortable, more mobile, and perhaps more fulfilled. In other words, the chain from research through innovation into our daily lives is the stuff of progress in society.

An important recent report¹ analyses the performance of Ireland's research establishment in the first stage of this chain, peer-reviewed publication and citation.

The report tracked publication and citation levels for Ireland's higher education institutions in the ten year period to 2007. The analysis was based on a global database of 10,000 of the most highly cited journals in the world. All seven Universities were included, together with the Royal College of Surgeons, Dublin Institute of Technology and the Dublin Institute for Advanced Studies. During that period the number of peer-reviewed papers published per year more than doubled to approximately 5,000. Most of this gain is in the last five years of the period. The output of France, Germany and the UK was roughly level over the same period, while the output of a group of seven comparator countries (FIN, DK, SW, BE, NL, NZ, AUS) increased at less than half the rate in Ireland.

The report also tracks the number of citations to the papers published in Ireland, and calculates a 'citation impact' (citations per paper). The report states "Ireland's share of world citations is greater than its share of world papers... so its output is cited more than is typical within the comparator group... For the size of its research base this must be seen as an exceptional achievement for Ireland".



2. University Rankings

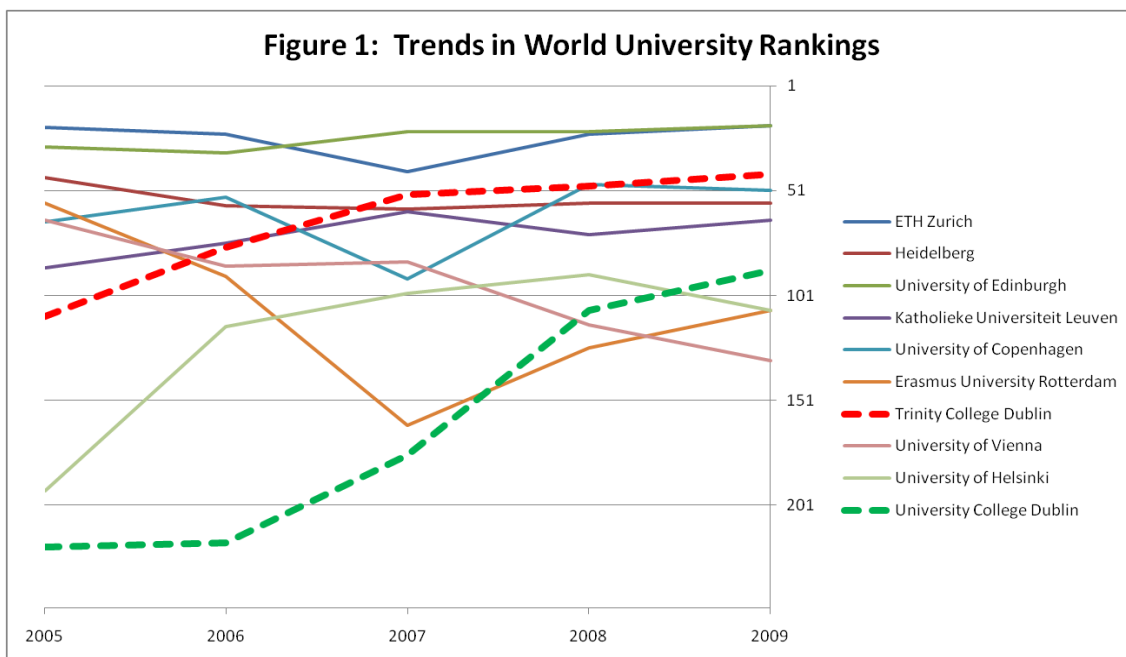
The ranking of Universities began in the US in 1983 when the *US News and World Report* published a league table of American Universities. The intention was primarily to guide students in their choice of institution. Shanghai Jiao Tong University took the idea worldwide in 2003 with a global league table, and *The Times Higher Education Supplement (THES)* began to issue its rankings in 2004.

Each of these has its limitations, and its critics. However, despite their limitations, they are taken seriously, and Ireland's Universities' international reputations will be substantially determined by their place in these rankings.

The THES scores have six components. Two of these are based on opinion surveys from academics worldwide (given 40% of the total weight) and from employers (10%). The remaining 50% is based on statistics reflecting quality of teaching as represented by staff student ratio (20%), quality of research, measured as citations per staff (20%) and extent of international staff and students (5% each). The overall score then determines the University's rank.

The THES publish detailed rankings for the top 200 Universities worldwide. Two Irish Universities feature on this list, Trinity and UCD. In 2009, Trinity ranked 43rd in the world, and 13th in Europe, while UCD came in 89th in the world and 32nd in Europe. This puts our two leading Universities in very respectable international company.

Even more impressive is how they have changed relative to their peers in recent years. In a report² published by the Royal Irish Academy leading Universities in eight European countries were compared in detail with Trinity College. The rankings of these eight Universities, together with those of Trinity and UCD are shown in figure 1. What is remarkable is that, on average, the eight European institutions have more or less maintained their place in the rankings, while the two Irish Universities have greatly improved over the five year period, Trinity from 83rd to 43rd place and UCD from 180th to 89th.





Taken together, these rankings and indicators suggest that we are making progress towards the declared aim of the SSTI³, that “Ireland by 2013 will be internationally renowned for the excellence of its research, and will be to the forefront in generating and using new knowledge for economic and social progress, within an innovation driven culture.”

¹**Research strengths in Ireland: A bibliometric study of the public research base**

Forfás/HEA, December 2009

<http://www.forfas.ie/publication/search.jsp?ft=/publications/2009/title,5126,en.php>

²**Cumhacht Feasa**, Royal Irish Academy, 2004 (<http://www.ria.ie/reports/pdf/feasa.pdf>)

³**Strategy for Science, Technology and Innovation 2006-2013**,

The Department of Enterprise, Trade and Employment, July 2006

<http://www.entemp.ie/publications/science/2006/sciencestrategy.pdf>