

OPINION

Science in the UK: doing well, could do better

Lord May of Oxford OM

As I write this, the Beijing Summer Olympics are about to begin. If past performances are a guide, the daily presentation of cumulative medal totals will give the impression that the USA dominates, although China might challenge. But this impression confuses a country's sheer size with its athletic proficiencies. A medal count (scoring 3 for gold, 2 for silver, 1 for bronze) scaled against population size would not have put the USA – or the UK – in the top dozen in the past three Summer Olympics.

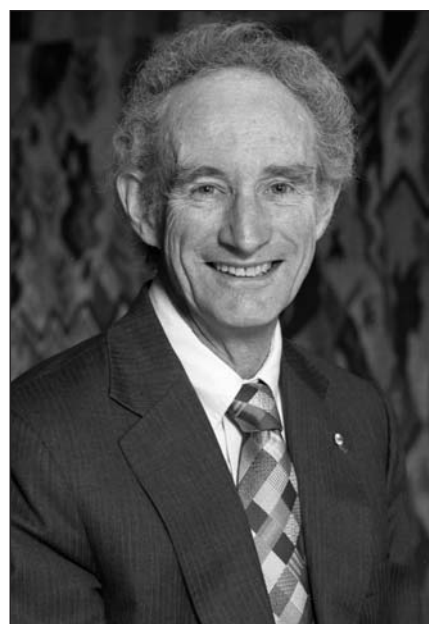
There is a different story, however, when it comes to ranking nations by their contributions to scientific understanding of how the natural world works. Here the USA and the UK are comfortably in the top ten, along with a collection of smaller countries (mainly Anglo or Scandinavian, and led by Switzerland and Israel). Of the most cited 1% of papers in Science, Medicine and Engineering over the past two decades, the USA produced 32.5% and the UK 8.8%. With the USA population five times that of the UK, we significantly outperform on this basis (and on others, such as major scientific prizes similarly rescaled).

Another interesting measure of scientific performance is the ratio of output (such as citations or papers) in relation to the inputs (in particular, the money spent on basic research some 3-4 years earlier). The UK has topped this league table for the past two decades, partly because its research is

excellent and partly because our expenditure – as a fraction of GDP – has been among the lowest in the comparison set (which is essentially the OECD countries); as the funding for scientific research has increased during the Major and Blair Governments, the UK's lead in this 'efficiency measure' has narrowed, but persisted.

What explains this excellence? I think it derives partly from Britain's 'fast track' education system, which typically delivers young people to the frontiers of research at a younger age than prevails in the more rigidly structured systems of many other countries, combined with a willingness to set these people free to pursue their own agendas, rather than entrain them in hierarchies of academic deference and servitude to their elders. The inspired management of the MRC's Laboratory of Molecular Biology at Cambridge over the past half-century is an iconic example.

The newly established European Research Council, ERC, aims to emulate soccer's Champions' League, exemplifying and disseminating 'best practice' in managing the scientific research enterprise. I think it has got off to a good start with its first awards to help establish some 300 outstanding young investigators. Significantly, British Institutions are home to a disproportionate 20% of these awards. On the other hand, the nationality of the successful 300 tends more to reflect country sizes, with



Germany providing the most; roughly half the awards in the UK are to non-British researchers. I believe all this suggests the ERC is indeed achieving its aims.

It is thus ironic that some of the recent changes in the UK are arguably carrying us backward, towards the bureaucratic rigidities that other countries are striving to escape. I see this unfortunate – and fairly easily reversible (at least in principle!) – trend as an unintended consequence of good things that have happened. These good things include a remarkable increase in the number of people going on to tertiary education in the UK, accompanied by a notable increase in faculty positions and other research opportunities, and a steady increase in funding, in real terms, for research in science, medicine and engineering. Unfortunately, however, student numbers have increased faster than faculty positions, whilst the money available for research has increased slower than the number of researchers chasing it. Thus, although these three increases are all good for the UK in general, the lives of research faculty have become less agreeable: more students per researcher, and tougher competition for research grants (exacerbated by including faculty salaries within 'full economic

costs', which has effectively reduced funds available for the research itself).

The Research Assessment Exercise, RAE, very sensibly introduced as a mechanism for the appropriately competitive distribution of universities' indirect infrastructure costs – which are every bit as real and important as the direct costs of research – has become more bureaucratically burdensome with each iteration. The RAE currently under way, in putatively 'simplified' form, has some bizarre features. The restriction that at most four papers may be submitted, intended to counter the charge of 'salami-slicing' (for which there is no shred of evidence), is silly enough. But the new restriction that no two members of the same department can submit the same (jointly authored) paper is surreal. Imagine the discussion between Watson and Crick, had today's RAE been around then!

Apart from anything else, the sheer cost of the exercise in administrative salaries – both centrally and in individual universities – and faculty time, when the outcome at the overall level of the University has a better than 95% correlation with the University's total value of competitively gathered research money, should be kept in view.

If the RAE is to be continued as a separate enterprise, at very least the process should be made truly simpler. Panels of people recognised for their research excellence and judgment, unimpeded by others added 'for balance', should look at no more than one side of A4 per submitted researcher. Too many officials worry about such a process being 'elitist'. But of course it should be: 'democratically elitist' in the memorable phrase coined by the first Head of the Office of Science and Technology, Sir William Stewart, recognising that elite

performance in science has everything to do with demonstrated excellence and nothing to do with unearned privilege.

Beginning as a chemical engineer, later a theoretical physicist, finally transmogrified to ecologist and epidemiologist, I have spent a lucky and enjoyable life in science. When I started, the world of science was much smaller, with the global population of scientists a few percent of today's. The science community's growth is good; humanity's growing numbers and impacts need ever more understanding of natural processes, from molecules to ecosystems. But the growing scale of the enterprise, nationally and internationally, creates new problems. Then and now, Britain has been a leader, both in advancing the frontiers of knowledge and in how we go about doing it. Today it is hugely important that we think a bit more about the latter.

Intellectual Property - the Challenges for the UK Intellectual Property Office

Ian Fletcher

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It is a great privilege and responsibility to lead the UK Intellectual Property Office (UK-IPO) at a time when Intellectual Property (IP) is more important than it has ever been. It is easy for IP to be seen as a specialist subject, remote from the reality of

business. Nothing could be further from the truth: IP is an essential part of the UK's economic infrastructure; the work done by the UK-IPO in policy, delivery and maintenance of Intellectual Property Rights (IPRs), and awareness raising, is fundamentally an

economic, business-focused task, albeit in a technical and legal form.

For the UK to be making best use of all its IP there must be effective systems and frameworks for formal IPR, ie patents, trade marks, designs