The economic-impact fallacy

Research councils in the UK have recently introduced "economic-impact criteria" into the peer-review process used to determine which research projects should receive funding. **Philip Moriarty** argues that this will harm the country's science and innovation

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Cash in hand Researchers in the UK are now required to fulfil economic-impact criteria in order to secure funding.

Before the UK budget was announced in April, there had been excited expectations of an "Obama-style" £1bn stimulus package for science. That prospect prompted research councils and learned societies in the UK to rush to identify "shovel-ready" projects that could benefit from a fresh injection of funds. However, their efforts were in vain – the stimulus did not arrive. Instead, John Denham, secretary of state for Innovation, Universities and Skills, has had to put a brave face on an immensely disappointing budget settlement for science. The Department for Innovation, Universities and Skills (DIUS), which Denham runs, must now make £0.5bn in savings over the next two years.

Indeed, Prime Minister Gordon Brown's fine words on the societal and economic importance of science during the 2009 annual Romanes Lecture at Oxford University earlier this year now ring rather hollow. From the £500m in savings, some £106m must be delivered by Research Councils UK (RCUK) – the umbrella organization for the country's seven research councils. A short statement buried in the budget announcement sums up the core problem rather pithily: "Savings delivered by the research councils within the science and research budget [are] to be re-invested within that budget to support key areas of economic potential."

Denham has claimed that the new priority areas to which funding must be "re-invested" include the green economy, life sciences and the digital economy. He says that these areas have all been identified by "the research community" as being the most promising for the future economy. It is not at all clear what, if any, evidence was used to select these economy-boosting areas in the first place.

Denham's statement is, however, representative of three key problems that lie at the heart of RCUK's economic-impact agenda: a lack of meaningful consultation with the academic community; an erosion of research-council autonomy; and an absence of appropriate metrics or strategies to gauge economic impact and return on taxpayers' investment.

Worryingly naive

The "re-investment" of RCUK funding in areas described as being of key economic potential is hardly unexpected. In addition to siphoning funds from investigator-driven, blue-sky research projects, RCUK's drive to demonstrate to the Treasury the economic-impact of the research it funds means that researchers must now include an "economic impact plan" with each grant proposal that they submit.

In the case of the Engineering and Physical Sciences Research Council (EPSRC) and the Science and Technology Facilities Council (STFC), this requirement was introduced in April and involves researchers having to submit a two-page plan describing how the proposed research will, among other criteria, foster "global economic performance, and specifically the economic competitiveness of the United Kingdom".

David Delpy, EPSRC's chief executive, has been keen to point out that there was a comprehensive consultation with the academic sector in late 2006 on peer review, including the imposition of economic-impact criteria in the process. In that consultation, however, many universities were highly critical of the criteria, describing them as "patently silly", "worryingly naive" and "flying in the face of the purpose of research". Moreover, Phil Willis, chair of the Innovation, Universities, Skills and Science select committee, argued last year that a move towards "command economy science" of the type being put in place by DIUS and the research councils would "sound the death knell for British research". This was therefore consultation in the best political sense of the term: the research councils asked for advice; they got it; they ignored it.

It would be remarkably naive, of course, to expect the research councils not to be heavily influenced by government policy. Indeed, many would consider Denham's pronouncement, made just before the budget settlement, that funding mechanisms will be modified so as to align university activities with government priorities as representing the final nail in the coffin of the Haldane principle. This principle, on which the councils were founded, dictates that research-council decisions should be made at arm's length from government (otherwise, as Haldane predicted, science will be driven by political expediency). The bottom line, however, is that RCUK answers to DIUS, and DIUS, like every government department, answers to the Treasury. Feedback on economic impact from the academic sector will be sifted and filtered accordingly and – unsettlingly for scientists – political ideology may well outweigh evidence and statistics. In the past we have relied on the research councils to make the appropriate economic arguments to government. They no longer fulfil this role.

Many academics will argue that scientists should simply pragmatically continue to "play the game", i.e. to write whatever is required in order to secure funding. But each time we do so, we tacitly send out a message to the research councils that their flawed funding policies are acceptable, workable and represent an appropriate strategy to maximize return on public funding. As was pointed out in an editorial in *Nature* in April (**452** 503), inflated claims of research project relevance/impact are intellectually dishonest and erode the public's trust in academic scientists if we do not deliver on our promises.

RCUK representatives will argue that blue-sky research will not be disadvantaged by the new economic-impact peer-review criteria. But why would, for example, EPSRC and the STFC further burden an already overburdened peer-review system with a new two-page impact statement if not to tilt the balance of funding towards work with demonstrable short-term impact?

Indeed, the STFC advises applicants that they should have "explored potential activities considered to be knowledge exchange [sic] with your Technology Transfer Office or equivalent". This focus on short-term market impact is of particular concern in the context of the STFC, given that it, of all the research councils, should have the strongest commitment to fundamental research (as it funds, for example, particle physics and astronomy facilities). It also provides an interesting insight into RCUK's repeated claims that it is broad societal impact, rather than narrow economic impact, that it wishes to identify. John Armitt, EPSRC's chairman, stated in an open meeting last year that "one man's economic impact is another man's societal impact". This is as good a description as any of RCUK's strategic priorities and has the advantage of being well aligned with DIUS and Treasury expectations.

Change of culture

So, what should RCUK do differently? First, it should put aside any ideological drive to impose a "culture change" in UK academia. This drive will be immensely counter-productive and will force excellent researchers out of the UK. The cosmologist Neil Turok, now director of the Perimeter Institute for Theoretical Physics in Canada, left the UK last year because, as he put it, "British science has become very project-oriented. You have to say 'in the next three years, I am going to hit milestones one, two, and three'." Instead, RCUK should identify those researchers who have a keen interest in moving their science from laboratory to market and provide appropriate training/support in intellectual-property issues, patenting, attracting investors, etc.

Second, RCUK should admit that potential economic impact can only be judged after a research project is over – and even then only with large error bars. Scientific excellence and near-term impact are, unfortunately, almost always mutually exclusive. If research is near-market, then the government should provide incentives to UK industry and entrepreneurs to aid commercialization – do not force all academic scientists to consider near-market applications of their work if those opportunities do not exist and/or the researcher has no interest in commercialization. This will clearly lead to cynical, opportunistic and disingenuous research proposals.

The drive towards short-term economic impact may make researchers think twice about pursuing fundamental research in the UK

Third, it should recognize, and communicate to government, the difference between university "push" and industry/market "pull", and accept that even in the US, spin-out and start-up companies, patenting and licensing of academic research make a relatively small contribution to gross domestic product.

Fourth, RCUK should not misrepresent the concerns of academics to government and the media. It is insulting, particularly for those with a keen interest in public engagement and outreach, to be told that an unwillingness to accept fundamentally flawed economic-impact criteria is due only to a failure to move with the times, an outdated "ivory tower" mentality and a lack of consideration of taxpayers' interests.

Finally, it should appreciate that many physicists do not take up an academic career in order to develop an entrepreneurial skills base. The drive towards demonstration of short-term economic impact may well make many young and talented researchers think twice about pursuing fundamental research in the UK.

A decade ago, would I have recommended an academic career in the UK to PhD students and postdocs interested in doing innovative, challenging and exciting blue-sky research? Yes, with only minor reservations. Now? Unless RCUK's economic impact agenda is reconsidered, I am not so sure.

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