

SPECIAL REPORT

Payback time

The UK government has invested heavily in science. Now it's looking for a return, and some worry that the research councils are being pressured to deliver, possibly at the expense of 'blue skies' research. **Geoff Brumfiel** looks at the changing landscape of science funding in Britain.

British scientists have had it pretty good this past decade. Since 1998, government funding for the nation's seven research councils has nearly doubled in real terms to around £3 billion (US\$5.9 billion) this year. The boost has helped make the United Kingdom an attractive country for science.

But there is growing concern in the research community that the increases are coming with a cost. Some believe that the Treasury is using its influence to erode the independence of the research councils, which fund the majority of basic science in the United Kingdom. Critics point to the latest round of council documents, which are littered with Treasury catchphrases such as "economic competitiveness" and "social impacts".

Some councils have begun favouring government initiatives over investigator-motivated projects, and at one in particular, the Science and Technology Facilities Council (STFC), deep cuts have been made to fundamental fields, in part to protect more commercially appealing programmes.

The signs all point to one thing, says Philip Moriarty, a nanotechnology researcher at the University of Nottingham: the government is using its money to push the country's scientific enterprise towards commercial profitability. "Blue-skies investigator-driven research is getting squeezed out," he says.

It's a bleak view that not everyone shares. "In most respects, I think we're in a fairly healthy situation," says astronomer Martin Rees,

president of the Royal Society, the UK's national academy of science. Some strategic changes have been made, he adds, but given the government's heavy investment in research "one should not be surprised". Overall, the councils have continued to maintain independence in their daily operations.

Regardless of their opinion on the issue, UK researchers agree that change is afoot. "I think that the Treasury is increasingly questioning the return on its investment in R&D," says neurobiologist Colin Blakemore, who led the Medical Research Council (MRC) from 2003 to 2007. "The issue is what role the research councils should play in research and innovation."

Ancient principles

Britain's research councils pride themselves on their autonomy. Under a 1918 recommendation known as the 'Haldane principle', governments have abstained from interfering in day-to-day operations. This informal rule has allowed funding to be distributed by a system of independent peer review that is widely credited with making Britain a European leader in research.

In recent years, a steady flow of funding has helped to further strengthen the UK's position. The increases began under Prime Minister Tony Blair, but were driven in large part by the current prime minister, Gordon Brown, when he headed the Treasury as Chancellor of the Exchequer. Brown made investment in science a top priority of the Labour government. A 2004 government policy paper co-authored



by Brown outlined his long-term ambitions for scientific investment: research and innovation is "key to improving the country's future wealth-creation prospects," the report said. It called for increased funding for research, but argued that more attention needed to be paid to ensuring that basic science translates into financial benefit for the nation.

The paper's assertions have been echoed by a series of policy briefings and independent studies sponsored by the government. A 2006 report for the government by David Cooksey, a former director of the Bank of England and former governor of the Wellcome Trust, recommended that the MRC increase its investment in translational medicine, the medical application of basic scientific work. In 2007, a second, broader, review by David Sainsbury, a former government science minister, recommended building stronger ties between research and industry.

In October of last year, similar recommendations appeared in the government's comprehensive spending review, which set spending levels from 2008 to 2011. Most strikingly, the Treasury awarded the MRC a £160 million boost to its existing £540 million budget. Most of the increase, £130 million, will go towards translational medicine.

Many viewed the new money for translational work in a positive light. "I think it's completely fine," says Harpal Kumar, the chief executive of Cancer Research UK, Britain's largest



Prime Minister Gordon Brown advocates research that can be translated into societal benefits.



The UK Treasury's influence may be reducing the amount of fundamental research done in the country.

cancer charity. "I don't think it would get done if the government didn't push in that direction." But this translational push is uncontroversial because it comes from new money, not basic research funds.

At other councils, where increases keep pace with inflation, the leadership is choosing programmes that align with Treasury priorities. The Natural Environment Research Council (NERC) is emphasizing a new, government-led climate-change initiative, while requiring researchers seeking undirected funding to explain the wider, societal benefit of their studies. The Engineering and Physical Sciences Research Council, which oversees the majority of materials science and physics grants, has cut back its funding for investigator-motivated grants by 15% to pay for several government initiatives. In addition, all councils are pledging a portion of their funding to a newly elevated Technology Strategy Board, which will seek to build industry-academia partnerships.

Again, some dispute whether the changes are significant. For example, NERC already had a heavy interest in climate change, says Alan Thorpe, the council's chief executive. The government's climate-change initiative "doesn't stop us from addressing frontier challenges," he says.

But critics worry that change is happening without public debate. The redirection of the councils comes mostly from chief executives,

without much public engagement, says Phil Willis, head of the House of Commons select committee on innovation, universities and skills, which scrutinizes the councils. "I think it is happening by stealth," he warns. "These are worrying trends that need to be addressed."

The one council where subtlety is lacking — and where the Treasury's influence may be most damaging — is the STFC, which oversees large-facility physics and astronomy. Faced with a shortfall in its roughly £573 million budget, the council announced last year that it would cut by a quarter grants for high-energy physics and astronomy. In addition, it has withdrawn from the International Linear Collider, the world's only next-generation particle accelerator project. The cuts have helped to pay for new X-ray and neutron sources which can be used for both academic and commercial purposes. Those facilities are integral to creating the council's new Harwell Science and Innovation Campus in Oxfordshire, according to planning documents.

Shortly after the announcement, Keith Mason, the chief executive of the council, told researchers working in the more fundamental fields funded by STFC that they needed to work harder to prove their economic worth.

This message left many physicists angry and

disappointed. The societal payback from fundamental physics comes mainly from well-educated graduates for the workforce, says Brian Cox, a high-energy physicist at the University of Manchester. "The government has damaged what to me is our core business as a research council," he says. Moriarty goes further: "The cynical point of view is that it's part-and-parcel of New Labour's ethos to transfer as much money to industry as possible," he says. The goal, he says, is to make university researchers "contract workers for industry".

Free to choose

Those accusations are categorically denied by John Denham, the secretary of state for innovation, universities and skills, who oversees the councils. "We've not sent instructions to the research councils to say that you choose your funding according to whom can show economic return," he says. In fact, the government has announced a full review of STFC management in response to the outcry. Nevertheless, the councils have been "encouraged" to show where they have created an economic benefit, he says. Such returns will "strengthen my argument with the Treasury to get more money".

It is also true, Denham adds, that the government has asked the councils to direct funding towards certain specific areas such as ageing and climate change. "There are some strategic, massive problems that we as a society face. We want to be sure that part of the research efforts maximizes our chances of dealing with those problems."

Blakemore agrees that the government and the Treasury are not forcing changes through the councils. He believes that much of what's happening is driven by council leadership, who make changes in hopes of winning more funding. "I think, frankly, the increase at the MRC was seen as an experiment really," he says. And as long as funding increases accompany the changes at other councils, he adds. "I think it's likely to be win-win."

But others are sceptical. The councils are most valuable as backers of fundamental science and should be kept free from commercial interests, says Moriarty. "The government should be funding research that the markets won't"

Ultimately, in the current difficult economic environment, Willis believes that continued pressure will cause funding for investigator-driven fundamental projects to shrink. "The worst-case scenario is that you go to what I would call a command economy science," he says. "I think that would spell the death-knell of British research."

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