Science and the Budget

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The 2011 Budget brought good news for UK science with the Chancellor announcing £100 million of capital investment in science[1]. While widely welcomed by the scientific community, this news is set against a backdrop of the 43% reduction in capital spending at Department of Business, Innovation and Skills (BIS) over 4 years as set out under the terms of the Comprehensive Spending Review[2], and arrives amid what has been a challenging start to 2011 for the life sciences sector.

On 1 February 2011, Pfizer announced that it was to close its research and development (R&D) facility in Sandwich, Kent. This announcement follows the decision by Pfizer in 2007 to close its manufacturing operations in Sandwich. Although it was hinted that recent changes in Pfizer's global strategy which include significant cuts in R&D (US$9.1–9.6 billion in 2010, falling to US$8–8.5 billion by 2012[3]) may have such an impact, the decision to close the site, which employs 2400 people still surprised many. It has since been announced that they hope to expand their operation in Cambridge, transferring 150 employees from Sandwich[4]; however, in the face of 2400 redundancies, this does little to offset the effect this decision will have on the majority of Pfizer's staff. Pfizer's decision to close this site follows a global trend by major pharmaceutical companies, many of whom are shifting to a 'centres of excellence' model. Some of these decisions are being made as the result of loss of patents on blockbuster drugs. In the case of Pfizer, Lipitor (the biggest selling drug of all time) will come off patent on 30 November 2011, and thus face generic competition. This is predicted to result in a US$10 billion decrease a year in revenue for Pfizer[5].

Despite the knowledge of changes in Pfizer's global strategy, reduction in R&D budgets and protestations from Pfizer to the contrary, the decision has left many questioning both Britain's reputation as a good place to do science and the Government's belief that the private sector will be able to compensate for public sector cuts. John Denham, Labour's shadow business secretary, has called the news a "deeply worrying development", adding, "we cannot afford to lose global industries as easily as this."

The UK's pharmaceutical sector received another blow on 16 March 2011 with Novartis announcing that they would be closing its manufacturing site and therefore reducing the workforce at its Horsham site in West Sussex from 950 to 550. In response, the Rt Hon David Willetts MP, Minister for Universities and Science, said, "this announcement from Novartis is disappointing news, which arises from their global restructuring. The life sciences sector is key to our future economic growth."[6] The decisions of Novartis and Pfizer to downsize their UK operations present two key challenges. The first relates to staff and the other to the future use of the sites, particularly in the case of Pfizer and the Sandwich site. David Willetts has visited the site and said the Government would "try to ensure a really valuable and prosperous future for all the activities on this site". Although both the previous and current Governments have shown a commitment to addressing skills gaps and increasing and retaining STEM (science, technology, engineering and mathematics) graduates, ensuring that the highly qualified and experienced scientists now facing unemployment are not lost from the sector must be a priority.

The Budget and the Plan for Growth

Alongside the Budget, the Government published 'The Plan for Growth' (henceforth referred to as the Growth Plan) which they termed "an urgent call for action". This document opens with some stark facts. Britain has fallen from 4th (1998) to 12th (2010) in the World Economic Forum's Global Competitiveness Index. In the OECD (Organisation for Economic Co-operation and Development)'s PISA (Programme for International Student Assessment) international rankings of excellence in maths between 2000 and 2009, Britain has fallen from 8th to 28th and, in science, from 4th to 16th[7]. Despite these figures, the Growth Plan reiterates the oft-made point that, "The UK has a world-class research base, with more top-ranking universities, and more Nobel prize-winners, than any country except the US. If these are other strengths are harnessed, more successful British companies

can compete in global markets, develop innovative products and services; and so create new jobs and rising prosperity."

The Growth Plan outlines four broad ambitions:

- to create the most competitive tax system in the G20
- to make the UK one of the best places in Europe to start, finance and grow a business
- to encourage investment and exports as a route to a more balanced economy
- to create a more educated workforce that is the most flexible in Europe

Within these broad ambitions, the document contains a stated focus on the scientific sector, including the need to increase the level of UK R&D being commercialized. In this aim, specific measures in the Growth Plan to make business investment innovation easier in this area include:

- The introduction of a Patent Box in 2013, which will give a reduced corporation tax (10%) on profits from patents. It is hoped this will encourage companies to locate the high-value jobs and activity associated with the development, manufacture and exploitation of patents in the UK.
- The Higher Education Innovation Fund (HEIF) for university collaboration with the private sector has been maintained and reformed.
- SME R&D tax relief will be increased to 200% in 2011 and 225% in 2010 (subject to state approval)
- The additional £100m in 2011–2012 in science capital development[7] consisting of £80 million to develop the national research campuses at Daresbury Norwich and the Babraham Institute at Cambridge, £10 million for three further testing facilities at the ISIS neutron source in Harwell, and £10 million to start a National Space Technology Programme to be match-funded by industry

The Growth Plan provided information about how the money allocated to the national research campuses would be spent, with the £10 million investment at Daresbury will build on existing expertise in accelerator, detector and imaging technologies. The £26 million Norwich allocation will be used for infrastructure, incubator space, provision of facilities for an anchor tenant (a relatively substantial company that intends to be on the park for some years, employing significant numbers of staff). Finally, the £44 million Babraham allocation will be used for developing a building for an anchor tenant and variety of incubator spaces and buildings, provision of 'researchers' residences' and further infrastructure improvements.

Following the announcement of this additional £100 million for science capital development, David Willetts said, "this new investment recognizes the value of our excellent research base and proves the UK science industry is very much open for business. The extra spending will help drive innovation and growth and reflects our commitment to cutting-edge research."

Imran Khan, Director of the Campaign for Science and Engineering welcomed the announcement, but warned that this boost to the capital expenditure "comes in the wake of a £1.4 billion cut in capital spending and 2 weeks after China's new budget confirmed that funding for their equivalent of the Research Councils will have doubled in the 2 years since 2009."[8] He added that "George Osborne must build on today's good news by working with academia and industry to develop a clear, well-financed, and long-term strategy to put science and engineering at the heart of this Government's growth agenda."

While perhaps not quite at the heart of the growth agenda, life sciences

do appear central to the Government's Growth Plan, placed alongside healthcare as a key sector for growth. In the Growth Plan, the Government has outlined what it considers to be the barriers preventing UK science delivering to its full potential and measures to remove those barriers. Last year's Comprehensive Spending Review protected the science budget in cash terms over the next 4 years (excluding capital expenditure), and the Growth Plan builds on from that point by putting in place measures it feels will ensure the effective exploitation of UK science.

Three key aims and initiatives directly related to the UK life science sector can be identified within the Growth Plan:

1. Increasing the skills base

The Government's Growth Plan recognizes that an effective skills base will be needed to underpin its aims for the science sector. The plan states that "businesses regularly report difficulties in recruiting graduates with suitable skills", then with a reference to the recommendations of the Browne review goes on to say that "reform is necessary to make the system more responsive to students and employers that it is financially sustainable in the long term"[7]. In the life sciences, despite some 30 000 graduates in 2008–2009 (almost 10% of all first degree graduates), life sciences employers are still reliant on workers from overseas "with a third of the sector's workforce sourced from abroad". The explanation offered for this level of overseas recruitment is that, in part, UK graduates are inadequately skilled and this is coupled with shortages in critical areas such as *in vivo* subjects. In addition, the Growth Plan states that, "employers have consistently reported that the poor practical and numerical ability of UK bioscience graduates reduces employability"[7].

In addressing these skills shortfalls in the life sciences, the Government is bringing together employers through Cogent (the UK's industry skills body for chemicals, pharmaceuticals, nuclear, oil and gas, petroleum and polymer businesses) to indentify and shape the skills agenda, with initiatives such as the Society of Biology's new accreditation scheme to ensure that one feeds into the other. In directly addressing the shortages in *in vivo* skills, this has been singled out as one of two key areas that the accreditation scheme will focus on, the other being biochemistry.

2. Promoting STEM careers

With direct reference to the STEM sector, the Government plans to strengthen its strategy for promoting STEM skills. It is hoped that by sup-

porting the Careers Profession Alliance, the provision of careers advice will be improved. The quality of STEM-related careers advice is often discussed, with a clear need for career advisors to have a greater understanding of the wide breadth of careers available to STEM graduates in addition to a sound understanding of the scientific career pipeline.

In addition to improved careers advice, the Government has recognized the need for early action at the school level in order to improve STEM teaching and promote careers in STEM. There is the aim to increase the number of industry-school visits, e.g., by Apprenticeship Ambassadors and remove the "excessive bureaucracy and other barriers to these visits". It is hoped that by raising the quality of new entrants to the teaching profession, the teaching of STEM skills will be improved. Although the bursaries for trainee teachers of science and maths will be protected, the 'golden hello' scheme which saw science and maths teachers receive a one-off payment of £5000 when they began teaching is to be scrapped[9]. STEMNET is singled out as a mechanism for promoting STEM through its range of activities between business and schools, including a STEM Ambassadors programme.

3. Facilitating innovation

The Growth Plan announced the launch of a competition to form a TIC (Technology and Innovation Centre) focusing on cell therapies and advanced therapeutics. This is the second TIC to be announced by the Government, and follows information released less than a fortnight previously about how the High Value Manufacturing TIC was to be structured. TICs, based loosely on the successful German Fraunhofer model, aim to accelerate the commercialization of UK research by forming networks between academia and industry. The new Cell Therapy TIC is seen as the next step in the Government's goal to help the UK's healthcare and life sciences industry fulfil its potential by exploiting promising discoveries and supporting their development.

The Cell Therapy TIC, "will support the development and commercialization of therapeutics as well as the underpinning technologies for manufacturing, quality control and addressing safety and efficacy challenges for these new treatments."[7] If the Cell Therapy TIC is be formed in a similar model to the High Value Manufacturing TIC, then a hub and spoke model in which a 'centre of excellence' is formally networked to a number of other research and technology facilities from across the UK can be expected.

There is some scepticism around the potential effectiveness of TICs as part of the Government's wider innovation strategy. Although based broadly on the German Fraunhofer model, the comparable funds available to each organization in each Centre are likely to be very small; surely this will limit their impact? This multi-organization model is in direct contrast with the German model in which there is a single Fraunhofer Institute in each area. With no funds available for new buildings, there are concerns that how the funds allocated to developing TICs will be used. The perceived disconnect between universities and businesses is seen as a key barrier to increasing the commercial exploitation of UK R&D; are TICs the best model to rectify this? Although the Fraunhofer model has seen significant success, this is a model which has been in place in its current form for over 20 years and therefore expectations of UK TICs to deliver need to be placed in an appropriate timeframe.

Challenges for the sector

The Government's challenge remains for UK science to deliver on the claims made in the run up to the Comprehensive Spending Review, which is that an investment in science equates to an investment in a country's long-term economic and social wellbeing. It is clear that the Government sees an important role for itself in this aim and that it is hoped the measures outlined in the Growth Plan will help UK science to deliver on its claims. ■

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