RS Policy Document
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THE ROYAL SOCIETY
CELEBRATING 350 YEARS

UK science and innovation strategy

Key Points

1. The decisions taken in the approach to the mid-point of the 10–year Investment Framework for Science and Innovation will set the tone for the next phase of the strategy. The Government must see through to completion a number of important projects (by implementing the recommendations of the Sainsbury Review), but must also look beyond these issues and identify the other outstanding barriers to the building of a world class knowledge base and the establishment of the UK as a location of choice for innovation activity. It is important, therefore, to position this strategy within an appropriately international context, in acknowledgement of the international (often global) nature of innovation and science, and increasing global competition for the most talented individuals, the most ambitious firms and leadership in the most important markets.

2. The Government's science and innovation strategy may be aided by a more sophisticated approach to studying innovation, and in particular the relationship between knowledge creation and economic impact. If innovation policy is to mirror and pre-empt innovation practice, it is important for Government to respond to changing innovation models. But unless policymakers understand these developing models and practices fully there will be a risk that the contribution of science and research is under-valued.

3. The renewed science and innovation strategy must give greater coverage to those parts of the economy which have thus far been neglected.
    a. We strongly encourage the Government to focus on public sector innovation. Specifically;
        - We urge Government to persevere with a more enlightened approach to public procurement, especially at the operational level where the required culture change will take time.
        - Government should explore the merits of developing or extending existing knowledge transfer schemes to the public sector.
        - We also highlight the importance of recognising and rewarding research which is aimed at policy makers within the context of research assessment and funding.
    b. We stress the need to apply a high level of sophisticated thinking to the challenge of developing innovation policies for the services sectors. The Royal Society is undertaking a major policy study to explore the role of science in innovation in the services sector.

4. We agree with the emphasis placed on skilled and innovative people. However, we caution against an approach which reduces the discussion to a prescribed list of skills – there is no specific skill set for innovation. With regard to Higher Education in the UK we believe that;
    - There is global competition to attract the best students onto masters and doctoral courses. At present, the UK competes successfully. Non-UK students contribute hugely to the quality of the UK HE experience, and constitute a remarkable opportunity for long-lived UK influence.
    - T o remain attractive in this market, the UK must align itself more closely to the Bologna vision. That means increasing the period of study from the start of first degree to completion of PhD from the current 6 or (more commonly) 7+ years to 8 years.

- In order to avoid serious shortages of vital science and engineering skills, we urge universities and central Government to encourage study in core STEM subjects at all levels, for example by the introduction of bursaries or reduced fees for students undertaking these courses and by promoting wider awareness of the career options that such courses open up.
- Greater emphasis must be placed on developing collaborative approaches to learning between universities and industry, including employer engagement with curriculum development, matching the emphasis that has already been placed on knowledge transfer and commercialising research.

This document contains the following sections:

1 Introduction

The Royal Society is a strong supporter of the ambitions laid out in the 10–year Investment Framework for Science and Innovation and we welcome the opportunity to contribute to the development of the Government's strategy. The decisions taken now, as we approach the mid-point of the 10–year Framework, will set the tone for the next phase of the strategy.

We believe that the success of the UK Government's future innovation strategy will depend in large part on a broadening of its perspectives. In this regard, Lord Sainsbury made two vital contributions in his recent progress report. Firstly, he highlighted the need for an intelligent, evidence-based approach to innovation in the services sector and, secondly, he drew attention to the importance of demand-side factors in innovation. In doing so, he succeeded in capturing the breadth of the current debate.

However, we believe that the Government's attention to the supply of knowledge and skills —and particularly the role of science—should not slip off the innovation agenda.

The Royal Society looks forward to playing an active role in the further development of the UK's science and innovation strategy.

2 The role of Government

The Government's role in creating favourable conditions for innovation is multifaceted and is not restricted to those activities or instruments which fall within the direct influence of the Department for Innovation, Universities and Skills. Innovation policy must be placed in its proper context - it should not be considered in isolation. The advantages offered by innovation specific policies will be minimal unless they are supported by other complementary, policies and infrastructure, for example, a high quality education system, a tax regime that is attractive to innovators and policies which demand and support innovation in areas such as energy, healthcare, transport, environment etc.

Equally important is the requirement for Government to be innovative itself. As a procurer of goods and services the public sector can demand and drive innovation in supply chains. By taking risks as an early adopter of innovative products and services the Government can stimulate and support new and emerging markets. And as a policy maker and service provider the Government has the ability to draw on and exploit scientific advice and research to improve its offerings.

3 The research base and innovation

The science base has benefited from a substantial growth in funding under the ten-year investment framework for science and innovation. At the same time Government has sought to address issues such as the funding of research in higher education, the encouragement of high-risk, innovative research and the integration of the 'third stream mission' alongside universities' teaching and research missions. The Royal Society recognises the fundamental importance of these issues and supports the efforts to bring the research base more fully into the 'innovation ecosystem' described by Lord Sainsbury in his 2007 review.

However this work is now firmly in hand and, though it is essential to see it through to completion (principally by implementing the recommendations of the Sainsbury Review), there is a need to look beyond these issues and identify the other outstanding barriers to the building of a world class knowledge base and the establishment of the UK as a location of choice for innovation activity.

We believe the Government may be aided by a more sophisticated approach to studying innovation, and in particular the relationship between knowledge creation and economic impact. (A Royal Society project on metrics and indicators for innovation, scheduled for later this year, may help to shed some light on this matter.) A more realistic appreciation of the innovation process (and of appropriate policy interventions) requires a broad, sophisticated understanding of the relationship between the science base, knowledge creation and innovation and should not consider research in isolation from other activities.

The Government's approach continues to reflect an innovation or exploitation process which is essentially linear and which is easily tracked and influenced (the 2006 Warry Report is a good example of this). Other perspectives on innovation describe a far more complex process or processes.

3.1 Science and research in non-linear innovation models

The latest thinking from leading innovation theorists and practitioners describes innovation models which are increasingly distributed, more 'open'[1] and often international or global in nature. In these models innovation involves many players (e.g. suppliers, customers, users, regulators and competitors) and is characterised by expanded and more complex value chains.

Innovation can occur at many places in the value chain, often several steps removed from the most visible point. In other cases, the principal innovation can be a change in business model by the most visible link in the chain enabled by one or more science-driven innovations elsewhere in the chain. Future generations of innovation model may emphasise to an even greater extent the development of new business models, based on the convergence of transformative technologies.

If innovation policy is to mirror and pre-empt innovation practice, it is important for Government to respond to these evolving trends. But unless policymakers understand these models and practices fully there will be a risk that the contribution of science and research is under-valued. In these evolving models innovation can seem to depend very little on the science base because the complexity of the relationships may conceal the impact of science or research in the value chain. As these models involve multiple feedback loops and iterations, the visible contribution of original research may be obscured further still.

To put it simply, it is necessary to expand on the linear model of innovation. However, the further we move from the linear model the harder we have to look in order to see and understand the role of the science base in the process. The challenge then is to understand the dynamics which drive these complex models, to properly understand the role of the science base in relation to the full range of inputs and to develop policies which reflect and support these changing practices.

It is also important to note that the linear model is not entirely irrelevant or redundant – but it must be understood as one approach among many.

3.2 Implications of changing innovation models

The emergence of more sophisticated innovation models also requires research communities to revise their thinking and approach to innovation. For example universities which elect to pursue innovation-related missions must work out how to interact with value chains in established or emerging industries. Researchers

[1] For example: The Management of Technological Innovation, Dodgson, Gann & Salter, OUP, 2008 or Open Innovation, Henry Chesborough, Harvard Business School Press, 2003

will need to position themselves within networks of innovators and spot the most likely, valuable collaborators (not always the lead or most visible innovator). Researchers and funders must also become better at spotting opportunities for research to support and develop underpinning capabilities within these chains. This will necessitate extensive market research and the development of a functioning theoretical framework for innovation processes. Knowledge transfer mechanisms should recognise and support these needs.

4 Public sector innovation

We strongly encourage the Government to focus on public sector innovation. To date the 10-year Investment Framework has sought to strengthen the UK's innovation performance by boosting science spending and encouraging growth in private sector R&D expenditure. By comparison, the innovation performance of the public sector has been spared serious attention.

4.1 Public Procurement

More recently, however, Government has signaled its intent to tackle this area by reforming public procurement practices and by supporting the 'Innovation Platform' approach taken by the Technology Strategy Board. The use of Innovation Platforms to bring Government, business and other stakeholders together to generate innovative solutions to major policy and social challenges is an approach we support and one which may warrant further extension if the early projects prove themselves worthwhile.

Nevertheless, significant additional efforts are required to create a more innovative culture in the public sector. A 2006 National Audit Office (NAO) report[2] criticised public sector approaches to innovation for being "overly top-down and dominated by senior management". The report concluded that the Government could take a more systematic approach to innovation, could learn lessons from the private sector and recommended that Government "should continue to promote the idea that allowing for innovative procurement solutions can improve value for money."

The Royal Society's response to the 2006 'Next Steps' consultation[3] on the development of the 10-year Investment Framework recommended a detailed review of public procurement. Since this time the NAO, the Office of Government Commerce and central government have registered the need to reform public procurement at the strategic and operational level[4]. In effect many of the elements of a full-scale review have been undertaken and a strategic framework for innovative procurement has been developed – in part at least. Nevertheless we urge Government to persevere with a more enlightened approach to public procurement, especially at the operational level where the required culture change will take time.

4.2 Knowledge transfer and the public sector

We believe that a parallel exercise promoting higher levels of knowledge transfer (KT) between the research base and the public sector may be beneficial. Although there are some well established KT mechanisms in operation between the research and business communities there are few such mechanisms in the space

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[2] 'Achieving Innovation in Central Government', NAO, July 2006 http://www.nao.org.uk/publications/nao_reports/05-06/05061447i.pdf

[3] Response to the Next steps consultation on maximising the impact of science on innovation, Royal Society, November 2006 http://royalsociety.org/displaypagedoc.asp?id=22675

[4] See 'Transforming Government Procurement', HM Treasury, January 2007 http://www.hm-treasury.gov.uk/media/4EA/89/government_procurement_pu147.pdf.

between the research base and the public sector[5]. Instruments based on collaboration, networking and placements allow the circulation of talented individuals between communities, expose organisations to new ways of working and enable the constant refreshment of knowledge and ideas.

We suggest that Government should explore the merits of developing or extending existing KT schemes to the public sector. For example, it may be possible to establish a form of the successful Knowledge Transfer Partnership scheme for central government departments or agencies. Existing Knowledge Transfer Networks may also benefit from further involvement of regulators, procurers or policymakers (in the same way that they participate in TSB Innovation Platforms). There may even be some merit in exploring a form of R&D credit for government spenders as a way to encourage better or smarter use of R&D budgets.

One important aspect of knowledge transfer from the research base to the public sector relates to the use of research and scientific advice by public policymakers, a process supported by the Royal Society's policy section which synthesises basic research and scientific advice and communicates it to policymakers and other communities.

The Society's recent response to HEFCE's consultation on the assessment and funding of higher education research[6] highlighted the importance of recognising and rewarding research which is primarily 'user-focused' including that which is aimed at policy makers. The response called for parity in the treatment of all researchers including those who produce fewer research papers, but who provide excellent evidence and advice to policymakers. The Society agrees with John Denham who recently said that the proper recognition of researcher engagement in policy-related activities is an area that requires further consideration.

5 Innovative people

We agree with the emphasis placed on skilled and innovative people in DIUS' recent electronic consultation. There are some generic attributes common to successful innovators including strong management and leadership skills, an appreciation of risk (and how to manage it) and entrepreneurial skills. However, we caution against an approach which reduces the discussion to a prescribed list of skills – there is no specific skill set for innovation. Indeed, innovation is often spurred by the coming together of individuals at the margins and intersections of disciplines and skill sets. We therefore emphasise the importance of diversity in skills and knowledge and stress that core scientific competences remain important in many innovation environments.

Many of the innovation skills possessed by young scientists are acquired whilst undertaking fundamental research, and as such the laboratory should not be overlooked as a training ground for young innovators. Publicly funded research also enables the UK to maintain a capacity to keep in touch with and understand developments occurring elsewhere in the world (see section 6 on international aspects of the strategy).

It is also important that policymakers and individual institutions ensure that the administrative requirements placed on academic staff are not overly burdensome. In particular, efforts must be made to ensure that the

[5] One example of a successful scheme is the Royal Society's own MP/scientist pairing scheme. In addition to this scheme the Society piloted a civil servant/scientist pairing scheme in 2007.

[6] Response to HEFCE's consultation on the assessment and funding of higher education research post-2008, Royal Society, February 2008 See: http://royalsociety.org/displaypagedoc.asp?id=29044

measurement systems which are intended to support innovation and exploitation do so and do not stifle innovative potential, or even discourage talented individuals from entering academic settings.

5.1 The future supply and demand for science, technology and mathematics graduates

The following is a summary from a recently published Royal Society report considering the future supply and demand of STEM graduates[7].

The Higher Education (HE) system underpins the UK's ability to do well as a nation. In the context of an increasingly competitive and inter-connected global economy, this means that HE must equip students individually with the knowledge, skills and aptitudes to hold their own with the best in the world. At the same time HE must provide the basis for a skilled workforce that meets the UK's needs quantitatively and qualitatively. This report highlights important recent trends in the teaching and research training functions of HE and steps we must take, urgently, to ensure that it delivers these requirements over the next decade.

Students are mobile, especially at graduate level. There is global competition to attract the best students onto masters and doctoral courses. The UK competes successfully: numbers of non-UK masters students at UK universities have nearly quadrupled in the last ten years and now account for over half of all masters students, while numbers of non-UK doctoral students have more than doubled. These non-UK students contribute hugely to the quality of the UK HE experience, and constitute a remarkable opportunity for long-lived UK influence.

In order to remain attractive in this market, the UK must align itself more closely to the Bologna vision, to which 46 European countries (including the UK) have now subscribed. Bologna sets an internationally recognised benchmark for HE qualifications. The UK cannot be perceived as offering something less. That means increasing the period of study from the start of first degree to completion of PhD from the current 6 or (more commonly) 7+ years to 8 years. This extended period is much needed also because of changes in standards at undergraduate entry and the increasing breadth required of successful PhDs.

For the 8-year approach to work, three things are vital. First, it must be implemented with sufficient flexibility to retain the advantages of the wide variety of degrees that we currently have at each level. Second, there must be an effective strategy at national level for funding the additional year or years. Third, the intermediate steps must meet the needs of the large majority of students who leave HE after an undergraduate or masters degree without proceeding to the doctorate.

Our detailed analysis of the statistics confirms a decline in numbers of UK students taking core science and engineering subjects at postgraduate levels. In order to avoid serious shortages of these vital skills, we urge both individual universities and central Government to encourage study in core STEM subjects at all levels, for example by the introduction of bursaries or reduced fees for students undertaking these courses and by promoting wider awareness of the career options that such courses open up.

5.2 Teaching and the 'third stream'

Evidence shows that firms depend primarily on workforce skills to gain a competitive advantage and improve business performance[8]. Accepting that the primary role of universities is to educate and not simply to equip

[7] A Higher Degree of Concern, Royal Society, 2008 (http://royalsociety.org/displaypagedoc.asp?id=28988)

students with skills for business or innovation, there is an important role for universities to play in meeting these challenges, as acknowledged by many commentators and reports (such as the Lambert and Leitch reviews, and the science and innovation investment framework).

Lord Leitch's 2006 report addressed the importance of improved skills (at all levels) in the pursuit of future economic prosperity and improved productivity. In particular, he emphasised the need for a demand-led approach to skills, calling for growth in levels of employer investment in higher level qualifications including apprenticeships, degree and postgraduate levels as well as more workplace training.

HE–BCI data for 2005–06 showed that universities earned over £400m from businesses and other external sources for CPD and training – compared with less than £130m in 2002–03. But this increase belies an uncomfortable reality. The CBI estimated that the total spending in this area was £23.5bn in 2004. So while businesses are turning more and more to universities to assist with workforce development and education, there is clearly a significant market that universities could tap into.

Since the Lambert Report was published in 2003 considerable emphasis has been placed on encouraging businesses and universities to work together – developing universities' 'third stream' mission. But most of this effort has concentrated on optimising the benefits of universities' research output by engaging users and investing in knowledge transfer. In the context of the 'third stream' less attention has been paid to the engagement of employers in universities' other core mission of teaching and learning.

We believe that greater emphasis must be placed on developing collaborative approaches to learning between universities and industry, including employer engagement with curriculum development, matching the emphasis that has already been placed on knowledge transfer and commercialising research.

Furthermore, we believe that if knowledge transfer (or more accurately knowledge exchange) is to impact on innovation cultures within universities and positively influence the UK's future competitiveness it must become a central activity alongside teaching and research and lose its 'third stream' status. As long as it is referred to as such it will be considered a peripheral activity.

6 A 'whole economy' approach

Until recently, the UK's approach to innovation policy could best be described as patchy. Indeed, Lord Sainsbury described the provision of innovation support as 'fragmented'. It has been characterised by the co-existence of different, sector-specific technology and/or innovation strategies. For example, the National Aerospace Technology Strategy, the Technology Strategy Board's Technology Programme, various Regional Innovation Strategies and numerous instruments to increase research activity and knowledge transfer.

Worse still, in some cases we have lacked a structured approach entirely. For example large parts of the economy have been neglected e.g. the services sectors. Services account for approximately 70 per cent of the UK economy and include some of our most innovative and highest performing sectors—financial services, business support services, retail and the creative industries among them. Yet, it is widely accepted that traditional innovation models and policies tend to focus on a narrow conception of innovation (mainly the

[8] "Our surveys show that employers value workforce and management skills as being the most important factors in gaining competitive advantage." CBI Response to Leitch Review of Skills, 2005.

support of R&D in manufacturing industries) and that other approaches may be required to support innovation in services.

One of the most significant points made by the Sainsbury Review was the acknowledged need to understand better how innovation occurs in the UK's service sectors so that policy interventions can be better targeted and more effective.

The need to shift the locus of innovation policy to reflect better the composition of the modern UK economy has been widely discussed and there have been many calls for an expansion of policy initiatives to match the breadth and diversity of sectors and to support innovation across the whole economy. Lord Sainsbury accepted these points but was also correct in saying that the first step must be a learning exercise and not an immediate redrafting of policy.

One major gap in our knowledge relates to the contribution of science to innovation in the services sectors. The available evidence strongly suggests that innovation in services owes relatively little to direct relationships between organisations in the services sector and universities, such as collaborative R&D, contract research and internships.

But to focus only on the direct links with the science base risks misunderstanding and undervaluing the importance of the science base's contribution (as discussed earlier in relation to innovation models). Indirect links, such as the flow of skilled science graduates and the diffusion and distillation of knowledge and technology via intermediaries such as suppliers, research and technology organisations and consultants, are also important. Restricting focus to direct links also risks encouraging acceptance of the 'pipeline' model of innovation, a process that is essentially linear and that is easily tracked and influenced. The reality is, of course, far more complex.

The Royal Society is therefore undertaking a major policy study to explore the role of science in innovation in the services sector. The study will analyse the nature and extent of science base interactions with services organisations (both direct and indirect) and explore the role of these engagements in innovation processes. The study will culminate in a series of policy recommendations to Government on ways to enhance the contribution of the UK's science base to services innovation.

There are indications that the Government is taking these issues seriously. The Department for Business Enterprise and Regulatory Reform's 'Sector Innovation Action Groups' should provide a useful platform for the Government to consider how best to stimulate and support innovation in the service sectors. In addition, the new leadership role for the Technology Strategy Board should lend some greater cohesion to the overall strategy. The extension of its remit to cover services sectors is also very encouraging.

However, we stress again the need to apply a high level of sophisticated thinking to these challenges. And, as outlined above, the renewed science and innovation strategy must explicitly address innovation and the exploitation of science in the public sector.

7 The international dimension

Many of the large scale social and policy challenges requiring innovative solutions are inherently long-term and global in nature. In many cases the policy instruments which address them will fall outside of the scope of science and innovation strategies, requiring instead innovative approaches in areas such as energy policy,

environmental policy, healthcare provision and education. It is important, therefore, that the Government seeks to ingrain an innovation culture throughout its departments and agencies.

No less important, is the need to position this strategy within an appropriately international context, in acknowledgement of the international (often global) nature of innovation and science. While Lord Sainsbury's 'innovation ecosystem' suggests a more enlightened approach than the 'national innovation system' we believe that the global or international dimension of the strategy requires more serious consideration.

Clearly the effective reach of government policy is confined to the UK, and to some extent Europe. There are, in addition, some examples of bilateral or multilateral collaborative research agreements or instruments which facilitate knowledge exchange and innovation across national boundaries but these are few in number. Nevertheless, the global nature of the most significant social and policy challenges, the fact that UK universities and researchers are already plugged into global knowledge networks and the evermore global nature of business innovation means that it is a dimension which should be very prominent in the UK's science and innovation strategy.

Science Policy, February 2008

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Royal Society support for innovation

Within a modern, knowledge driven economy, innovation is about transferring ideas, research results and skills between the science base, business and the wider community to enable pioneering new products and services to be developed.

From its very inception, the Royal Society has worked to:

- **advance** scientific knowledge
- **apply** scientific knowledge
- **engage** with science internationally

The Royal Society has also long been a funder of world-class research, receiving its first government grant in 1850 to "assist scientists in their research and to buy equipment." Today, the Royal Society remains committed to supporting and recognising innovative science through a range of funding schemes, awards, public outreach programmes and policy initiatives (detailed below).

Fellows of the Royal Society have an outstanding track record in innovation: current Fellows include Sir Harry Kroto (discoverer of the Carbon60 'Buckyball'), Sir Tim Berners-Lee (developer of the World-Wide Web), and Sir Alec Jeffreys (inventor of genetic fingerprinting), to name but a few.

Supporting excellent individuals is at the core of the Society's work and more than 75% of our annual operating budget is devoted to grants and fellowship schemes. These schemes provide scientific researchers with the opportunity to build world-class research careers, and the Royal Society is keen to make the most of its investment in science, engineering and technology by promoting the transfer of knowledge from Research Fellows to the UK economy.

The Royal Society is committed to supporting excellence in science and encouraging the transfer of knowledge from the science base into business. The Society has a number of initiatives supporting innovation.

The Brian Mercer Awards

Established in 2001 by a generous bequest from the late Brian Mercer OBE FRS, the Brian Mercer Awards aim to emulate Dr Mercer's enthusiasm and entrepreneurship and encourage these qualities in the next generation. The projects and initiatives funded by this bequest are a cornerstone of the Royal Society's support and encouragement of innovation in science and technology.

The Brian Mercer Feasibility Awards allow researchers to investigate the technical and economical feasibility of commercialising an aspect of their scientific research. The Brian Mercer Awards for Innovation provide funding for researchers to develop an already proven concept or prototype through to the creation of a near-market product for commercial exploitation.

Royal Society Industry Fellowship scheme

The Society's Industry Fellowship scheme directly supports knowledge transfer between the science base and industry. The scheme is funded by the Royal Society, the Engineering and Physical Sciences Research Council, the Biotechnology and Biological Sciences Research Council, the Natural Environment Research Council, and a number of private companies including Rolls-Royce plc and AstraZeneca. It provides the opportunity for an academic scientist to work on a collaborative project with industry, or vice versa.

Influencing policymaking with the best scientific advice
The Royal Society provides input to a range of innovation policy issues, and will soon be launching a study to explore the role of science in service sector innovation. This study is intended to provide a clear analysis of the nature and extent of science base interactions with services organisations. One of these issues is how best to measure innovation in service sectors: it is widely acknowledged that the most commonly used indicators for such innovation do not adequately reflect the reality. The project will explore suitable indicators, which will feed into another forthcoming Royal Society study on metrics and indicators for innovation. A study of this kind is necessarily wide ranging so we will be inviting inputs and evidence from a broad range of stakeholders to help us shed some light on the critical issues.

Royal Society Enterprise Fund
The Royal Society Enterprise Fund will invest in early-stage research with clear commercial opportunities, with financial gains returned to the fund to ensure sustainability. The Fund will serve as a bridge between the scientific and business community whilst supporting a culture of innovation in British science.

Royal Society Innovation Panel
In 2006 the first Royal Society Innovation Panel was established to take responsibility for shaping the Society's role with respect to innovation and knowledge transfer. The Panel is chaired by Professor John Burland FRS, and its key responsibilities include taking decisions on innovation awards and prizes (such as the Brian Mercer Awards and Mullard Award) and advising the Society's Council on innovation strategies and knowledge transfer.

Innovation Course
The Royal Society (in partnership with the Tanaka Business School) has introduced a professional development course entitled *"Leading in Science: Innovation and the Business of Science,"* where Research Fellows attend modules on science and the economy, the business of science, and entrepreneurship. This equips them with the skills needed to communicate and negotiate effectively, to better understand the innovation process, and to create value from their research.

The Mullard Award
The Mullard Award is presented every two years to an academically outstanding individual whose work is making or has the potential to make a contribution to the UK's prosperity. The 2006 award went to Professor Chris Freeman of the School of Biological Sciences at the University of Wales, Bangor, whose research focuses on the 'enzymic latch' mechanism, in which pollutants absorbed by plants (including carbon dioxide and dissolved chemicals) become trapped, thus preventing their re-release into the atmosphere. This natural filter mechanism has enormous implications for the water industry, and Professor Freeman is currently working with Welsh Water to identify catchment scale management techniques to improve water quality.