

# Science and the Regions

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## Introduction and Background

The RDA role in supporting science and innovation came to general notice through the House of Lords Inquiry “SETting the regional agenda” in 2003. This report highlighted the RDA role in funding science and innovation, at £240m pa, and stimulated closer engagement with government departments and the research councils. The 2004 Spending Review, following the 10-year investment framework for science and innovation, recognised the importance of increasing knowledge transfer and set RDAs a mandatory target to increase university-business collaboration. We exceeded this target, creating more than 7,000 new collaborations a year, and have increased our investment in science and innovation by 50%. To increase high level advisory capacity from business leaders, vice-chancellors and research councils, we developed Science and Industry Councils in every region.

The regions work with government departments through a lead role system: we share the lead role with DIUS, with the North West Development Agency who lead on skills. As the strategic and operational lead for innovation science and technology, SEEDA co-chairs the **Regional Innovation, Science and Technology (RIST)** Group with DIUS, to become an established mechanism for sharing best practice between innovation groups across the RDAs and devolved administrations, and facilitate engagement with government.

The RDAs are uniquely placed to provide a focus for SME involvement

and investment, and, based on an understanding of the strengths of regional businesses and the knowledge base, we can catalyse and co-ordinate partnership working and collaboration. The main challenge for the UK to be globally competitive is to increase the pace of innovation. The Chinese proverb “A peasant must stand a long time on a hillside with his mouth open before a roast duck flies in” reminds us that to make things happen we need to encourage a chain of innovative developments. The public sector has a role in creating the conditions in which innovation can flourish. In our input to the 2007 Comprehensive Spending Review, we developed the evidence base on regional innovation support, and realised that although we might be using different descriptions, the RDAs were doing very much the same things to promote innovation – commercialisation, networks, knowledge transfer, innovation guidance, and skills – and we are beginning to understand the most effective levers and mechanisms for creating wealth from our investment into the excellent UK knowledge base (Figure 1).

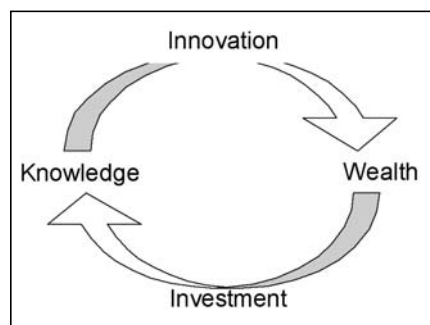


Figure 1

We are using this understanding to address the cluttered and confusing landscape through business support



simplification, to develop a few products recognisable by businesses across the UK but delivered according to regional needs and priorities. One of the most important innovation products is “Innovation collaborations” (Figure 2):

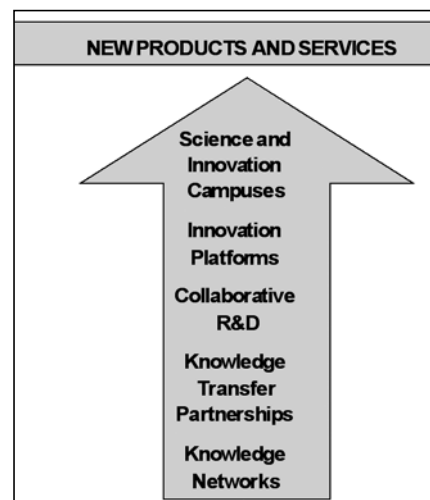


Figure 2 Innovation Collaborations

This product provides help for companies to work together with the science and research base. Innovation rarely happens through a single individual, it requires people with complementary skills and knowledge, and developing a single product may involve many businesses. The rate-limiting factor in the rate of innovation is often the growth of trust between partners, including businesses and universities or other knowledge base

institutions. We can accelerate this growth of trust through firstly engineering serendipity – increasing the frequency of productive contacts through **knowledge networks**, such as the London Technology Network which trains university business fellows to act as a conduit for increased business responsiveness, and facilitates collaborative projects of some £15m pa with businesses through highly structured networking events.

The relationships can be encouraged and deepened through **knowledge transfer partnerships**, in which an academic, research student and business work together. RDAs support the national KTP scheme, and several run shorter “mini-KTPs” up to a year for small businesses. We will integrate these into a flexible KTP product to address the needs of a wide range of businesses.

RDAs support deeper multi-partner **collaborative R&D programmes**, including substantial pan-regional programmes. The ASTRAEA programme funded by £11.2m from 5 regions, £5m from government, and £16.2m from businesses can create a UK lead in the potential \$10bn market for unmanned airborne vehicles.

RDAs have shown strong interest in the creation of challenge-led Innovation Platforms which can lead to substantial global business opportunities across the supply chain. Working together across government, the research councils and the RDAs, we can focus on substantial investment programmes to create early market leads. SEEDA as a partner in the Intelligent Transport Systems and Services platform managed the very first Innovation Platform call – funded projects include a wireless services demonstrator in Reading.

We also need places where collaboration can take place with academics and business researchers working together on a common problem as well as providing shared facilities to help businesses develop and grow. Science and Innovation campuses in the support product “**Shared Business Support Environments**” are being developed

by regions to address this need, building on experience such as Yorkshire Forward’s Centres of Industrial Collaboration. The strategy has succeeded beyond expectation. In three years 12 CIC centres collaborated on 1700 projects with business, creating or safeguarding 1300 jobs and generating £40m of income in the region and business success stories across all industry sectors. In addition to supporting the Harwell Science and Innovation campus (alongside NWDA support for Daresbury) SEEDA will support the development of at least two new campuses, advised by our science and industry council in line with regional priorities, including the Kent Thameside Institute for Sustainability in the Thames Gateway as part of an international network, including the LDA and EEDA, giving access to world class knowledge in sustainability. This centre of excellence will enable collaborative working and research to develop, test and demonstrate solutions for **Integrated Resource Management for Communities and Districts**, and will provide a test bed for integrating current best practice technologies into large and complex systems.

“**Access to business expertise**” has three strands to help business product, process and service innovation. The *Manufacturing Advisory Service* (MAS) addresses the needs of UK manufacturers, particularly SMEs, by providing practical hands-on assistance from experts to enable them to adapt continuously to new methods and technologies. The *Innovation Advisory Service* (IAS) helps businesses kick-start the innovation process. The key components are low bureaucracy and a team of highly competent advisors who have worked at director level in the private sector and have specific technology experience. The advice focuses on customer needs, based on a wider understanding of innovation than R&D. *Designing Demand* supports roll out of the Design Council programmes since businesses using design perform better – in one survey 75% of businesses reporting growth said design contributed to their sales growth, while most companies that hadn’t grown could not see a role for design.

Looking ahead, the RDAs have already taken on board most of the Sainsbury report recommendations, and will respond positively to the DIUS science and innovation strategy. We have learnt from our experience with the micro/nanotechnologies and national composites networks that knowledge exchange transcends regional and national boundaries and regions need to **collaborate to compete** globally. Pan-RDA collaboration focusing on regional priorities will achieve an effective **partnership between the regions and the Technology Strategy Board** (TSB). Over three years, the RDAs have committed to align at least £180m funding with £720m TSB funding and £120m from the Research Councils. With business match funding this will create a £2bn programme to create a step change in support for innovation. The regional partnership with the TSB will be overseen through a Strategic Advisory Group, by the chairs from the regional Science and Industry Councils and their devolved administration equivalents. Supported by an Operational Advisory Group, regional Prospectuses will be used to align regional and national Technology Strategy priorities, with significant investment on a small number of **Innovation Platforms** which show excellent potential for bringing together the power of the public sector across government departments, research councils and RDAs to address major societal challenges and create early stage global business leads.

At the same time we will increase the **clarity and coherence** of innovation support regionally and locally, through the Science Cities being developed in six regions, and through sub-regions with a critical mass of creative and connected people (eg South Hampshire). An integrated approach will provide the business support needed, whether for skills, globalisation, enterprise, procurement, sustainability or innovation. And we will continue to explore how best we can support businesses, from open innovation pilots to develop an intellectual property market, to innovation vouchers for small businesses to use with universities.

# The Northwest Regional Development Agency

*Dr George Baxter*

*Director of Science and Innovation,  
Northwest Regional Development Agency*

The Northwest Regional Development Agency (NWDA) leads the economic development and regeneration of England's Northwest. As a business-led organisation, the NWDA provides a crucial link between the needs of business and Government policies. As such, a major responsibility for the Agency is to help create an environment in which businesses in the region can flourish through offering business support, encouraging new start-ups, matching skills provision to employer needs and bringing business investment into the region.

England's Northwest is a fast growing, vibrant region, combining a dynamic business base, cosmopolitan urban centres, breathtaking landscapes and an internationally recognised creative and cultural scene.

It boasts Manchester, the largest media hub outside of London; Liverpool, one of the world's most famous waterfronts; Cheshire, home to AstraZeneca's largest global Research & Development premises; Lancashire, a world class centre of excellence in advanced manufacturing and engineering; and one of Europe's leading national parks, the Lake District.

With almost seven million inhabitants and 230,000 companies, the Northwest is a thriving economy. It is worth a remarkable £106 billion – a tenth of the overall UK GDP. It is the UK's largest regional economy, larger than several European countries, including Denmark and Finland, and it is one of only three regions to contribute positively to the UK's balance of trade.

And it's not just excellent for business. A huge 29% of the region is designated as National Park or area of outstanding beauty. The Northwest boasts the largest lakes and mountains in England, not to mention the longest stretch of undeveloped coastline.

These rich natural assets are part of the reason why England's Northwest has been voted the top location for quality of life in the Reward Group's cost of living survey for two years on the run, while a poll by Ipsos MORI in 2006 rated the region highly on areas of outstanding beauty, culture and nightlife.

Our vision for the Northwest is a dynamic, sustainable, international economy which competes on the basis of knowledge, advanced technology and an excellent quality of life for all.

Projects and schemes supported and funded by the NWDA are largely delivered by public and private sector partners, at a sub-regional and local level. Once a project has been developed and has secured Agency investment, a team of specialists will work closely with partners to deliver the scheme.

The Agency works with a wide range of local and regional delivery partners, including local authorities, community and voluntary groups and the private sector. However, perhaps the most significant partners are Urban Regeneration Companies (URCs).

The Agency has been instrumental in establishing URCs in key towns and cities across the Northwest:

- New East Manchester
- West Lakes Renaissance (Furness and Cumbria)
- ReBlackpool



- Central Salford
- Liverpool Vision (the first URC in the UK)

Acting as champions for their local areas, URCs aim to co-ordinate focused plans for the regeneration and future development of their towns and cities, and to stimulate new investment.

To ensure local solutions to local problems, the Agency has formed five Sub-Regional Partnerships, which bring together business, the public sector and voluntary and community groups. They are responsible for leading economic development within their sub-regions and identifying economic priorities which will deliver the Regional Economic Strategy (RES).

The five Sub-Regional Partnerships are:

- Cheshire and Warrington Economic Alliance
- Cumbria Vision
- Greater Manchester Forum
- Lancashire Economic Partnership
- The Mersey Partnership

In 2006, the Agency was one of the first regional development agencies (RDAs) to be assessed by the National Audit Office (NAO). In the NAO's Independent Performance Assessment, or IPA, the Agency was awarded a "Performing Strongly" rating, the highest ranking available.

RDAs have a very high profile role in economic regeneration but we are very interested in Science and Innovation as

drivers of productivity and hence GVA growth, which is the key economic target for RDAs. There is no need to repeat arguments here about our inability to compete as a low cost economy – these are well understood by all partners in the UK. What is critical on a Regional level to achieve this is a thorough understanding of what the real strengths and opportunities of the Region are. Similar Regional strategy documents worldwide often contain the same, similar sector objectives – nanotechnology, biotechnology, IT etc with no real understanding of the core abilities in these areas which lie in the Region. So, we ask ourselves – would an independent observer recognise the Northwest from a description contained in our strategy documents? We hope so, and it is probably more important to note what is not included in those documents as well as what is included.

In the North West, as well as major strengths, we have specific issues to face in our economy – a lower number of businesses than the UK average, lower start-up rates, concentration of innovation in a few large science-based companies, and the “export” of some of our best people to other Regions, especially to London and the South-East. Hence, our interventions as an RDA are targeted towards these issues, within the guidance of the Government’s Business Simplification Support Project. These interventions arise out of a policy framework, led by

NWDA, but developed in partnership with public and private partners. In particular, the North West Science Council (NWSC) acts to provide advice and guidance on science policy and interventions to the RDA Board. The NWSC was the first Science Council to be formed in the UK (in 2001) and has published 2 Regional Science Strategies since then. It is a partnership of private sector (eg AstraZeneca, Rolls-Royce, Unilever, BAES, CBI) and public sector and Universities, at senior level. As well as developing Regional Science Strategy, it proofs major science-related projects in the Region and also Regional cluster organisation strategies.

It is possibly easier to illustrate the typical role of NWDA in Science by reference to some specific points.

### **National Biomanufacturing Centre (NBC)**

The North West is a vibrant centre for the pharma/biotech industry – more than 200 companies employ over 20,000 staff and NW Universities produce over 25,000 life-science graduates every year. With the growth in the numbers of new start-up companies, the ability to develop and manufacture a wide variety of novel biopharmaceutical medicines for early phase clinical trials is crucial. However, investment by any one small company in such a facility (costing tens of millions of pounds) is prohibitive. The NBC funded by

NWDA, ERDF and DTI provides this service on a commercial basis to enable these companies to more rapidly commercialise their products. The aim is that the Centre will become self-sustaining after a few years.

### **Knowledge to Innovation (K2I)**

Research on the reasons why SMEs fail to innovate shows that one of the main reasons is a lack of knowledge of key managerial staff in how to innovate ie the process of ideas generation through to implementation. K2I will work with more than 400 SMEs to provide practical advice and guidance on this process, using real examples, leaving more than 1,000 senior staff with an enhanced ability to innovate and operates across all sectors of industry from financial services through to Advanced Materials.

These are only two examples of the type of work which NWDA is driving to improve our Innovation capacity. They illustrate two of the key principles of intervention by the public sector in this field – the ability to tackle market failure by aggregating SME demand in sectors of strong growth and the ability to reach large numbers of companies in a concerted fashion. The Regions and RDAs are crucial to this, in our ability to work in areas large enough to have critical mass in a world-scale, but small enough to comfortably reach the key decision makers.

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## **SCIENCE IN THE REGIONS**

# **A Key Regional Partner Perspective**

*Professor Colin Whitehouse FREng*

*Deputy Chief Executive & Director of Campus Strategy,  
Science and Technology Facilities Council*

**T**he last several years have seen very significant improvements in the UK’s regional economies, driven hard and very productively by the English RDAs and the devolved administrations. However, on occasion, these developments have led

to inter-regional competition, several claims of duplicated world-class capabilities and hence sub-critical mass activities when compared with that of the UK’s leading international knowledge economy competitors. The present article therefore builds on the

author’s very considerable experience of science and technology working in and with several of the UK’s regions, to seek to convince the reader that really key opportunities now exist for these different regions to be even more focused and realistic regarding their



respective genuine present or future world-class capabilities and “unique selling points”, and then use these analyses to identify key value-adding collaborative opportunities with other regions. That mechanism can then be used to develop much-strengthened added-value critical mass activities at the UK-level which can then become genuinely competitive with even the strongest knowledge-based economies elsewhere. It is the author’s view that this realisation has already started to gather significant speed in the UK but more can be done and progress can undoubtedly accelerate.

This article is written against a background of the author’s many years of experience working in semiconductor and nanoscience/nanotechnology-related research and senior management in UK industry, Universities and Government Laboratories, and career-long efforts always seeking to optimise UK added-value inter-working between these different sectors. The experience has included close working with many RDAs, devolved administrations and other key regional organisations, along with several years of experience gained in seeking to generate genuine international-class critical mass multi-partner interactions, particularly during the years when the author sponsored major collaborative research programmes via RSRE (now Qinetiq)

Malvern and also later when he chaired the White Rose Research Group which brought together the research of the Universities of Leeds, Sheffield and York, a new UK collaborative model which continues to go from strength to strength even to this day.

During the earlier years of these interactions with the RDAs, it became rapidly clear to the author that many of the RDAs and devolved administrations had identified claimed regional “clusters” of specialisms and expertise, which were often numerous but, even more importantly, duplicated the claimed specialist “clusters” of several/most of the other UK regions. This lack of more detailed and critical self-analysis then inevitably generated inter-regional competition, much of which was sub-critical mass in a really genuine international knowledge economy context.

Despite significant improvements and ever-developing realism over the subsequent years, the author still believes that yet more progress can be made in this area and that even more detailed self-analysis can take place within the regions. Thus the RDAs and devolved administrations can show yet more real **leadership** in identifying genuine potential world-class competitive activities (however small in number), then provide major **influence** by focusing regional effort much more significantly in those areas, and then, very importantly, encourage and **catalyse** new internationally-competitive inter-regional critical mass via **collaboration**. These should be the major value-add regional activities and much more economic benefits and international competitiveness should then be attainable via the generation of a yet further tier of added-value via yet more effective inter-regional strategic interactions and critical mass collaboration.

Against that background and long-held philosophy, the author has trialled various added-value critical mass inter-working mechanisms during his career, often involving very

effective and highly interactive virtual networking between the University, Government and industrial sectors. That experience has shown that given shared visions and key leadership personalities, such virtual networks can make very important progress and impact. However, they can often be somewhat fragile as changes in those leadership personalities and approaches inevitably occur over time.

Since mid-2004, the author has therefore been working closely with Government and specific RDAs (predominantly with NWDA and SEEDA to date, but also involving related discussions with SWRDA, Yorkshire Forward and the Scottish Executive) to develop and trial a totally new UK approach which operates on the basis of critical-mass generation via mixed-economy (Universities, Government Laboratories, Industry) co-location and new “open innovation”<sup>(1)</sup> approaches. This new approach led directly to the March 2006 Treasury-led Budget announcement of the formation of two new National Science and Innovation Campuses in England at Daresbury (DSIC) and Harwell (HSIC), based on the long-term campus sustainability then provided by the “embedded science” capabilities at the two major STFC laboratory sites.

At Daresbury very close, regular and productive STFC (previously CCLRC) high-level **strategic** interactions with the NWDA have led to extremely positive co-working and have allowed key components of the new campus vision to already be tested and proved to be successful. **Catalytic** funding from the NWDA has already assisted in the UK’s first example of significant co-location of leading academics, PDRAs and PhD students from several different leading research-led Universities (Manchester, Liverpool and Lancaster) on the “neutral” Daresbury campus, physically co-located alongside STFC’s significant team of its own scientists to form a new Cockcroft Institute National Accelerator Science Centre. Already this “critical mass” approach has

(1) “Open Business Models : How to Thrive in the New Innovation Landscape”, Henry Chesbrough, Harvard Business School Press (2006).

generated well in excess of £20m of funding over the past two years, has achieved an exceptionally high success rate with peer-reviewed blue-chip grant applications and has also yet further strengthened critical mass by successfully attracting leading international scientists. The critical mass model is no longer just UK-based therefore but, very importantly, is also now working at the highest international level. Hence this new University co-location model is attracting ever-increasing attention and much consideration is now being given to actively rolling out a number of other similar critical mass “Technology Gateway Centres”, as described in the recent STFC Delivery Plan.

Another very important component of the new campus model which has already been very successfully proven at Daresbury, again with much NWDA strategic involvement, has been the very effective use of this newly-generated STFC/multi-University knowledge base critical mass to then attract ultra-high technology companies seeking to use open innovation processes to gain much further two-way value from co-location. The new Daresbury Innovation Centre has already attracted 63 such ultra-high technology companies and the very real benefits of catalysing “open innovation” interaction mechanisms has meant that not only are the very high majority of these existing companies in significant growth (the average growth is currently 30% per annum) and expansion, but also very exciting new companies have already been generated as a direct result of “open innovation” interactions between the campus partners. As a result of all of this success, the Minister for Science and Innovation, Ian Pearson MP, announced a very important £25m next phase of private sector investment in major new innovation buildings at Daresbury very recently. Hence the initial **catalytic** support of NWDA has now fully proven the private sector viability of the campus model, and further major announcements regarding ongoing significant private sector investment at

Daresbury are now expected. With this success, the Campus Board and NWDA are now making very firm plans for the site to be home to 10,000 staff in ten years.

Another really exciting developmental aspect at Daresbury has been the catalysation and testing of the very important new “open innovation” processes which have been facilitated by mixed-economy co-location. Indeed the author has never previously experienced the rate at which new innovation and company progress can occur other than in this co-location model. Indeed, such are the marked differences in innovation mechanisms and progress that several key leading University Business Schools are now seeking to perform major research programmes to study and monitor these very productive and stimulating new working processes at the Campus.

Since January 2006 therefore, this now-proven campus model is also being progressively introduced at Harwell in Oxfordshire, this time in very close collaboration with SEEDA and UKAEA, but again building on STFC’s large-scale science facilities and major research activities at the Rutherford Appleton Laboratory. As at Daresbury, very considerable progress has also been made now at Harwell, and the coming weeks and months

will see major announcements regarding the formation of a new public-private sector joint venture company to provide major further campus investment there also.

As effort has therefore been focused on the development of these two new national campuses, other English and UK regions have shown a very close interest (and, very interestingly, sometimes a very real competitive concern) regarding these campus developments. However, it is the author’s view that these now significantly proven co-location critical mass open-innovation approaches at the two national campuses, can also be introduced very effectively at the regional level (alongside highly effective virtual networks if regionally appropriate), but only if each region identifies and uses co-location to build on their **genuine** international-class regional strengths. In that way, and instead of diluting regional investments by spreading support across numerous, sub-critical and often non-collaborating activities, the critical mass model can act as the catalyst for yet further major regional economic advances and also as a major magnet for serious inward-investing R&D activities..

One final comment. Now as a member of staff at one of the UK’s Research Councils, it is the author’s continuing



*The New Daresbury Innovation Centre, already home to 63 ultra-high technology companies*

strong and now yet further strengthened personal belief that the RDAs and devolved agencies should definitely not seek to be additional Research Councils, but instead should concentrate on working with key regional partners to continue to drive forward the very important skills agenda which is vital to sustain the UK's future knowledge economy. Another vitally important component of their ongoing activities is their

continuing catalytic support and funding in the gap which still exists in the UK between the point at which extremely high quality potentially commercialisable research has been performed and the point at which significant venture capital support can then be attracted. It is the author's view that pure research should only be supported by the regions if there is a very clear and robust exploitation plan, which, for whatever reason,

cannot be triggered by initial conventional Research Council support.

All in all therefore, truly excellent progress has been made in the UK regions, but yet more really important added-value strategic regional inter-working critical mass opportunities now exist. These opportunities should be pursued with vigour.

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In discussion the following points were made:

Each RDA is phenomenally different from that of other Regions and sub-Regions also. There is an awesome resource in SEEDA, for example, when compared with the North West which is quite sparse by comparison. R&D is usually developed locally in relation to the available skills base. Where this is lacking there is a danger that multinational companies will depart.

The most important route for communication is the business link and cluster for small to medium sized companies. Large companies can and do go anywhere they wish to locate and the availability of the local skills base is the key factor in retaining their presence locally. There is no easy solution to the provision of S&T training as 25% of secondary schools have no physics teacher. There is therefore an essential need to share any existing inspirational teaching between schools to enable children to have access to this vital component in their S&T education. The establishment of specialist science schools creates new problems for students in view of the practical problems related to access and proximity of such schools to those wishing to attend them as they may have too far to travel on a daily basis. The system works well in the West Midlands and also in the North East, however, where chemical engineering flourishes and there is a Science Innovation Campus with 1600 technically qualified people on hand. In the South East there is no current need for the RDA to catalyse innovation and skills.

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