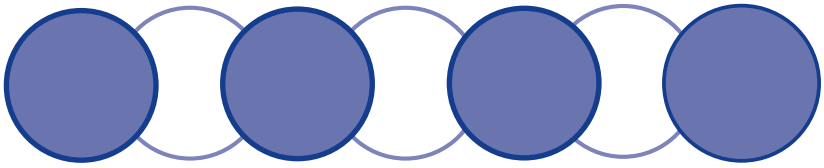

LOCAL WORK: *VOICE*

The term "knowledge economy" is used to describe an information-driven society, in which Big science and technology are the main drivers, and economic success is based upon the effective use of knowledge and skills. This Local Work: *Voice* offers real examples of how science has synergy with, and impact on, economies at the regional and local level, thus also assisting regeneration.

Away from the public eye

Modern science is massive. That's why it's often referred to as Big Science. The costs (usually Billions of pounds), and sometimes the rewards, the numbers of people involved, the management and resource levels and the skills required - all are very high. And yet to most of us, science remains effectively invisible. This invisibility is curious; and arises from a number of different factors:

o Big Science is paid for by money from high up the funding chain. Decisions on funding are made at the national (and international) level by people of whom almost no-one outside their particular sphere of influence has heard. We rarely encounter Big Science directly in our daily lives - Big Science is almost always off limits for the public at large - it is often located within universities or on special campuses. It therefore remains largely hidden.

o Most of us know very little about what science is 'for' and how it works. The numbers of school children studying science in their later, elective years is still falling, as are numbers of degree students. We are not therefore conscious of the ways in which science gives rise to things with which we are familiar, from shampoo to plastics to the latest mobile phone.

o Whilst information technology and health are of interest to many people, they do not see these matters as 'scientific'.

o Science and science-related practitioners do not usually focus on the wider worlds of public involvement and politics. There may be issues arising from science and technology (which I shall refer to from now on as SciTech) for others to address around economics or ethics, but what happens in the labs is the concern of practitioners - and this is not in the public eye.

o Science is not a vote-catcher. Eco-issues apart, it is unusual for the electorate to invest much time and energy pursuing scientific matters; which means that in general neither the media nor politicians spend much time considering them either.

Does Big Science need to be visible?

But why should invisibility matter? In general we do not see the vaccine research laboratories, the synchrotrons (circular accelerators which use electromagnetism to accelerate sub-atomic particles), or the materials science analysts at work and we may well not think about science very much, but every region of the United Kingdom has its own science parks, where scientists and technologists rub shoulders with business and commercial people. Does it really matter if it is not visible? Answers to this question can be given at a number of levels; but in all cases the answer is Yes, invisibility does indeed matter - the laboratories, and scientists in them, may not be in our thoughts a great deal but they create jobs and inward investment, and are often key drivers of regeneration.

The invisibility of Big Science reduces:

o Public interest and involvement;
o The number of young people interested in SciTech as a career;
o Engagement with industry and business;
o Influence in matters of planning and infrastructure;
o Opportunities to procure regeneration, at both

Knowledge Economies and Big Science: A challenge for governance

No. 68 February 2006

Local Work: *Voice* is a guest author's perspective on regeneration and local economic development. If you would like to share your thoughts in a *Voice* or to comment on someone else's, please email victoriabradford@cles.org.uk

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practical and strategic levels.

Some of the follow on repercussions of this invisibility are obvious; others are less so. Likewise, the consequences are different in different areas. The 'hothouse' of the Golden Triangle (roughly, that area covering London, Oxbridge and the M4 / 5 corridors) is probably less directly vulnerable than, say, a Science Park in Northern England. However that is still not to say that it is totally visable, just perhaps slightly more so.

Indeed, every part of the high level Knowledge Economy is disadvantaged by the uneven distribution of 'hothouse' locations and more isolated facilities. The former are becoming stressed because of over-heated local economies, and the latter are needing more support and development of capacity.

The Triple Helix of innovation

It is now accepted that it is the synthesis of Universities, Industry and Government - the 'Triple Helix' - which brings about serious SciTech innovation. This Triple Helix, as we shall see, is in effect the Holy Grail to a vibrant knowledge-led twenty first century economy.

The world wide web may keep researchers and others in touch, but to secure scientific progress in a given location there is nothing like direct involvement from the big investment players and strategic government. In other words, ad hoc development of SciTech facilities will take a local economy so far. Only strategic planning on a grand scale, the involvement of people at the highest levels of decision-making and all parties working together, will produce the sort of results which make a significant difference.

A corollary of this scenario is that people at all points on the decision-making 'chain' need to be aware of the complexities of SciTech. Again, this is more likely to be the case in the Golden Triangle, than in the Northern Science Park. When a lot of local people are employed in SciTech jobs at the highest levels, as in the Golden Triangle, awareness of science and technology will be far greater than when this is not the case.

Daresbury - A Case Study

A case in point is the Daresbury Laboratory near Warrington, in the North West of England. This establishment, much of the work of which is world leading in the field of high energy physics, had been in existence for some decades, and regularly collaborated with several higher education and research laboratories.

By the mid 1990s, however, Daresbury had become something of an island, still conducting worthy international research but effectively disconnected from its locality, the local business/industrial base, and, critically, the political and administrative decision-making process. The result of this disconnection was that the dangers were not anticipated when the Rutherford Appleton Laboratory, based in the Golden Triangle, decided to bid against Daresbury to the CCLRC (Central Council of the Laboratories of the Research Councils) to construct and operate DIAMOND, the planned third generation synchrotron - an intense light source which propels sub-atomic particles at extraordinary speeds for academic research and industrial / medical purposes. By the approach of the Millennium it was becoming clear that Daresbury's initial understanding about where the new light source would be placed were at best optimistic - even though by then numbers of local and national politicians and others had also become involved in Daresbury's attempt to secure the research funds which it had assumed were coming to the North West.

Similarly, the North West Regional Development Agency recognised that this was not simply a matter of ruffled feathers in academia, but rather a matter of serious consequence for the whole of the region. Conferences were held, industrial and business liaisons established, plans proposed for collaboration with a number of the North West's leading universities and hospitals. However, it was too late to secure DIAMOND - the draw of the golden triangle was perhaps too great - and the contract went to the Rutherford Appleton Laboratory, taking with it highly skilled technicians and other synchrotron construction staff.

A Growing appreciation of Big Science.

It slowly transpired, however, that all was not lost when Daresbury had to concede DIAMOND (and thus much of its future funding) to Rutherford Appleton. The North West campaign to retain support for the Laboratory had by then gained considerable momentum. Regeneration and strategic planners across the region had begun to realise that here was a facility which no-one could afford to see as an ivory tower. The science and technology might be extremely complex, but it was not simply a toy for boffins; it was potentially an enormous asset to the North West region and beyond. And besides, for many local people, the campaign had by then become a matter of civic pride.

Interestingly, the collapse of Daresbury's expectations at this time also proved to be a watershed for national governmental understandings of the interaction between Big Science and the economy, nationally and regionally. The political model in use at the time of the DIAMOND decision was essentially that of straightforward competition. It had hitherto been accepted that the physical location of Big Science facilities should be brokered only on the basis of the preferences of direct partners and funders (the Wellcome Foundation, a massive funding body, was emphatic about supporting only Rutherford Appleton - already, through long-standing

connections between key Oxbridge players, a Wellcome partner in numbers of activities).

The North West campaign and subsequential media outcry about losing DIAMOND thus coincided with the beginnings of a repositioning nationally about how Big Science was to be taken forward. It was slowly dawning on national decision-makers that, whilst the quality of the science itself had to be (by a long way) the lead criterion for the allocation of funding at this level, the project evaluation playing field was nonetheless not entirely even.

For instance, whilst it might be valid to suggest that more immediate business and industrial benefit might accrue from investment in the South East, the ultimate benefit of funding to the North West might be greater in terms of its impact on the regional economy.

Similarly, whilst scientists of the very highest order might in general have been found in greater numbers in the Golden Triangle, this was not an excuse for failing to invest in research and development in the universities of the North West. As is widely recognised, top scientists are willing in significant numbers to stay with, and follow, the most challenging science, wherever it is located - especially if the costs of housing etc are lower, as well.

And so we come to the present day story of Daresbury Laboratory. Daresbury has attracted a number of new and very senior staff to support outstanding colleagues already based in North West universities; it has connected with business, industrial, strategic and political interests throughout the region; and it has established a fast-growing SciTech park led by major NW companies. And the science developments are growing apace - as demonstrated by the Manchester: Knowledge Capital initiative and by the Cockcroft Institute[1].

Subsequently, Daresbury gained the critically important Fourth Generation Light Source (4GLS) programme, which makes Daresbury the world leader in this field. And having a rapidly expanding world-class science facility, with all that it brings, has raised the stakes in the North of England.

The lessons of Daresbury

The Daresbury saga is salutary, and ultimately encouraging, in a number of respects:

o It demonstrates the increasingly competitive nature of SciTech in modern economies.
o It shows that all parts of the Triple Helix - collaboration between universities, industries and the state - are essential in order to secure the sort of funding required for present day Big Science programmes.
o It illustrates very well the need for scientists, politicians and other public and private sector decision-makers at regional, sub-regional and local levels to remain alert, if they are to ensure adequate funding and other strategic support for prestigious SciTech enterprises, which also have an impact upon regeneration intiatives in that area.

Regionalism and New Localism

One of the most defining aspects of Big Science is its internationalism. In the U.K. almost all Big Science projects will have a European aspect, probably under one of the European Union Frameworks for Science[2]; and most projects will also be attached in some respects to laboratories in the United States. This huge span of expertise and personnel arises largely organically in the first instance. Most scientists and technologists barely recognise national boundaries in their academic and applied work and venture capital and the very high level knowledge economy alike have an operational relationship all of their own.

These facts of scientific life put notions of New Localism and of City Regions in a different light. Whilst New Localism focuses on devolving power and resources away from central control and towards front-line managers, local democratic structures and local communities, and City Regions acknowledge that a city's economic, cultural and demographic reach extends beyond the political boundaries of the city itself, it is important to note that smaller areas, even with devolved powers, are too small as areas and populations on their own to be realistic players in the battle for Big Science.

Given that the annual budget of connected major Big Science programmes can approach that of the government of a small European country it is obviously not possible to operate at the city regional level. They require massive financial backing in terms of regional infrastructural support and require equally massive buy-in from business, industry and other research institutions.

No non-capital town or city on its own is likely to be able to provide the levels of support required to secure significant Big Science on its patch. The North West Development Agency and/or the Northern Way and the Core Cities, collectively, for instance, can take full part as lead players. Individual sub-regional cities, however otherwise important, can only be bit players on the Big Science stage.

The Challenge for New Localism and the politics of Big Science

The message of Big Science is not entirely encouraging for those who eschew regionalism and seek pre-eminence for city regions - not least because most major cities simply don't have the physical space, let alone the budget, to secure Big Science for themselves alone. However, a shared approach does offer some promise.

This shared approach must involve the Core Cities, the Northern Way regions and RDAs working together to secure the space and budget for Big Science. It also means that if Big Science growth is to occur outside the Golden Triangle, the Holy Grail of the Triple Helix must be pursued by everyone, regardless of inter-city or inter-university rivalries or of otherwise competing interests between industries and businesses.

National Government can, as is now acknowledged, help here; but it is generally unlikely to intervene in a positive way unless there is evidence of a genuine willingness on the part of all parts of the triple helix to collaborate seriously at the appropriate levels. New Localists and City Region enthusiasts must recognise that inter-locality and inter-city collaboration is imperative for progress, and also must enthuse others as to necessity of this collaboration.

The challenge for the UK's sub-regions is therefore to ensure that local people know about, and understand, the opportunities which Big Science can bring. It is in one sense a required public duty of local politicians and decision-makers to keep themselves informed of the state of SciTech in their patch, so that businesses and other entrepreneurial interests can be fully involved at the appropriate points.

The engendering of a state of constant local political and business awareness cannot however be a one-way operation. For SciTech, and especially Big Science, to flourish, it is not enough that local leaders make themselves aware of what is happening and what may in future arise. It is equally important that those who hitherto were perceived (rightly or wrongly) as inhabiting the ivory tower make it very clear that they are not aloof from their wider contexts. For Big Science to flourish in a (sub-) regional location, with all that it brings to the home economy, the Triple Helix of Universities, Industry and Government must operate and cooperate at all levels (from national to local). It is no longer an option to refuse to 'see' SciTech and Big Science.

1.The Cockcroft Institute is the UK's national centre for accelerator science, which will be based at Daresbury. It is a joint venture launched in Spring 2006 between several leading NW universities and national science and regeneration agencies.

2. We are currently on our 6th European Union Framework for Science, and the 7th is under negotiation. http://europa.eu.int/comm/research/index_en.cfm

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