



**OECD Reviews of Regional
Innovation**

NORTH OF ENGLAND, UK



OECD Reviews of Regional Innovation

North of England, UK



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Foreword

The importance of the regional environment in supporting innovation is widely recognised. Strong dynamics of innovation generation in regions are crucial for achieving national innovation policy objectives. In addition, innovation performance can contribute to improving the overall economic competitiveness of individual regions. Policy recommendations are therefore being sought by both science and technology and regional policy actors at the national level, as well as the regions themselves.

OECD countries and regions are nevertheless struggling with how to best promote regional innovation. How should national innovation policies take into account this regional dimension (or more generally the importance of “place”)? How can regional actors support innovation that is relevant for their specific regional context? This role sharing for promoting innovation in a multi-level governance context is a relatively new area for OECD countries.

The OECD launched in 2007 the series *OECD Reviews of Regional Innovation* to address this demand by national and regional governments for greater clarity on how to strengthen the innovation capacity of regions. These reviews are part of a wider project on competitive and innovative regions under the auspices of the OECD Territorial Development Policy Committee and contribute to the OECD-wide Innovation Strategy. The series includes both thematic reports and reviews of specific regions.

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Assessment and Recommendations

Introduction

OECD countries increasingly recognise the spatial dimension of innovation and are working to develop coherent policies to promote regional innovation

Regional innovation systems are important because: 1) strong dynamics of innovation generation in regions are crucial for achieving national innovation policy objectives; and 2) innovation performance can contribute to improving the overall economic competitiveness of individual regions by increasing the productivity of firms. As such, the goals of regional innovation policy are relevant to policy makers from both the regional development and science and technology fields. This policy relevance appears to be increasing, not only in federal or regionalised countries such as Germany and Italy, where innovation policy has a strong regional focus, but also in countries with a more centralised policymaking tradition such as France and Japan.

OECD countries are nevertheless struggling with: 1) how national policies to support innovation should take into account the regional dimension (*i.e.*, as part of a wider consideration of the importance of “place”); and 2) how “regional” actors can take actions to support innovation that are relevant for their specific regional context. The place-based dimension of innovation has been documented in the literature to operate and produce benefits that can occur at many levels, such as a cluster, metropolitan area or region, and this variable geometry is not easy to address. The distinction between national and regional (sub-national) roles should therefore be based on which factors that support innovation are most susceptible to influence at which level within the governance context – a kind of subsidiarity exercise applied to innovation policy.

National-level investment in innovation-related activities often tends to reinforce the concentration of innovation activity in the nation's existing innovation hubs, potentially conflicting with regional policy objectives. How to manage this balance is an open debate in OECD countries. Support for innovation is often still focused more on science-led research and development (R&D), and the flow of funds for this aspatial policy takes a spatial dimension. The policy levers available to support innovation in regions that are not innovation hubs are less straightforward. Such regions may be relatively less abundant in inputs of human capital, innovation infrastructure and firm competencies that lead to a lower absorptive capacity for innovation. However, a range of strategies have been used in OECD countries to help increase absorptive capacity, such as specialised network building support programmes (InnoRegio in Germany) or even R&D institutional capacity support for under-performing regions (EPSCoR and IDEa programmes in the US).

Nonetheless, innovation is now a core objective for most if not all regions irrespective of their economic profile and is therefore integral to strengthening competitiveness and regional development. Supporting innovation does not necessarily imply that the goal is economic convergence, but rather that it should be used to build on the strengths in different regions for long-term competitiveness. The question is how to address the different kinds of innovation needs and capacities with both national and sub-national action. The review focuses on the specific challenges faced by the North of England, but many of these findings are also relevant for other regions in the UK and other OECD countries.

The UK has taken steps to support a spatial dimension to innovation policy at both central and regional levels, albeit later than many other OECD countries

This review of innovation policy for the North of England highlights the progress that has been made in the UK towards introducing a spatial component to national innovation policy. This evolution is partly due to central government departments taking regional innovation more seriously as a policy domain. It is also partly a result of the efforts of sub-national actors, mainly the Regional Development Agencies, but also some local authorities and other bodies such as the Northern Way. Although innovation at the regional level has been addressed before (for example, by regional offices of central government), the current shift suggests both more commitment from the centre and more institutional capacity in the regions.

Unlike in some other OECD countries where constitutional arrangements provide a clear and permanent framework for policy development across levels of government, the UK has a less codified and more fluid system. As such, working arrangements between actors at different levels fluctuate over time. This review has found that there is interest at national, regional and local levels to support regional innovation policy and some mechanisms are in place to support this, although several are new and still being worked through. While a broadly favourable context exists, specific elements in some relevant policies may still not be fully conducive to fostering regional innovation further.

A principal message of this review is that the progress that has been made by both central departments and by regional and local bodies to support innovation should be recognised and built upon. The different actors involved in delivering innovation policy will need time and resources to achieve innovation strategy milestones and long-term economic transformation goals. Additional resources to support efforts in the North could be obtained in part by better alignment of resources across levels of government, greater leverage of private sector resources and reduction of transactions costs in current programmes.

How is innovation important for the North of England?

Given the scale and diversity in the North of England, this area doesn't constitute a single regional innovation system, rather there exist a number of different hot and cold spots in terms of economic and innovation activity. The North – composed of three administrative units (North West, North East and Yorkshire and the Humber) – accounts for a little more than 20% of the UK economy (GBP 232 billion) and 24% of the UK population (14.5 million people). Furthermore, there is a complex economic geography with eight city-regions that cover approximately 90% of the North's economy and population. The hierarchy of city-regions and other cities has been characterised as: 1) two major Northern centres: Manchester and Leeds; 2) three key sub-regional centres: Newcastle, Sheffield and Liverpool; 3) buoyant smaller centres (for example, York, Chester and Preston); and 4) less prosperous sub-regional centres (for example, Hull and Middlesbrough), along with areas of industrial restructuring and the rural periphery. There are few documented truly pan-Northern economic linkages; rather different parts of the North share some common challenges with respect to economic development and innovation.

Regional GVA (gross value added) growth in the North has historically lagged behind the rest of England. As well as trying to achieve regional growth, the other focus of regional policy has been to try to reduce the gap in growth rates between the six regions that are below the national average (including the three in the North) and the Greater South East (three regions). This trend is explained by a range of factors, including comparatively lower educational attainment and skills, out-migration of young people and graduates, lower employment rates and an industrial composition more weighted towards lower productivity sectors. These factors lead to a generally lower value added per workforce job in the UK context. Innovation is seen by both national and regional levels as one of the keys to improving the productivity of the region and contributing to closing the growth gap.

At the same time, the region has a long and illustrious industrial tradition. The North was, after all, at the heart of the Industrial Revolution and a historic centre for world-changing innovation in transport, computing and in vitro fertilisation. The North continues to have above average rates of manufacturing employment, with strong concentrations in some research-intensive industries that continue to be major employers in OECD countries, such as pharmaceuticals, fine chemicals, nuclear technology and advanced materials and precision engineering. Many of these industries have grown out of existing regional specialisations in “heavy” industries such as steelmaking and bulk chemicals, illustrating both the accumulated skill base in the region and also the capacity to adapt and to innovate. There are also important modern scientific breakthroughs that have come out of the North, such as in stem cell research. In addition to these strengths in some R&D-driven industries, the North has also developed concentrations in some high-value-added service industries. Examples include business and financial service clusters in both Manchester and Leeds, as well as emerging creative and media industries in many of the North’s major cities, which have found niches complementary to the larger clusters around London.

Performance on traditional innovation indicators generally below UK averages and in some cases below OECD averages

With respect to basic innovation input and output indicators, the North appears to have lower levels within the UK and compared with many regions in peer countries (see Figure 0.1). These indicators are focused on the “narrow” definition of innovation given the lack of a broader set of internationally comparable statistics at the regional level across OECD countries. The typologies of regional innovation systems based on

performance of the North illustrate commonalities with several German and French regions, along with strong industrial Italian and Spanish regions. Despite a much higher than average rate of tertiary student enrolment, the population with tertiary education is only slightly above OECD averages. In terms of R&D expenditure (outside of the North West, which contains a few multi-nationals in R&D intensive sectors), business expenditure is low, higher education expenditure is average or above average, and government-performed R&D is very low due to the nature of the UK innovation system. Lower than OECD average levels of patenting are observed across all three regions, in part explained by the highly skewed pattern of patenting in OECD regions. However, an analysis of the relationship between these innovation variables and patenting reveals that regions in the North, and the UK more generally, patent more than would be expected compared with other OECD regions. From UK studies, firm behaviour differences with respect to innovation are mainly explained by industrial composition, and there are different firm innovation profiles that are more or less likely to be present in the North of England.

Figure 0.1. **Innovation indicator summary: North of England**

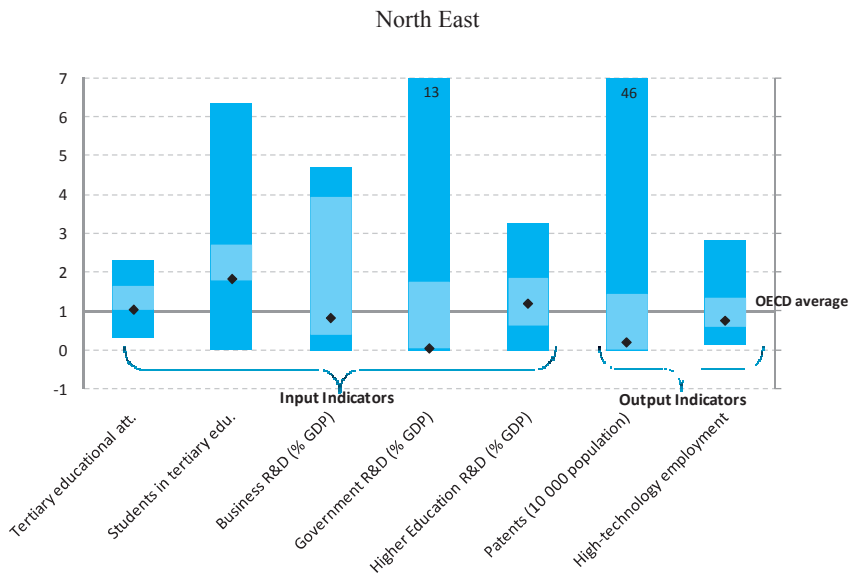
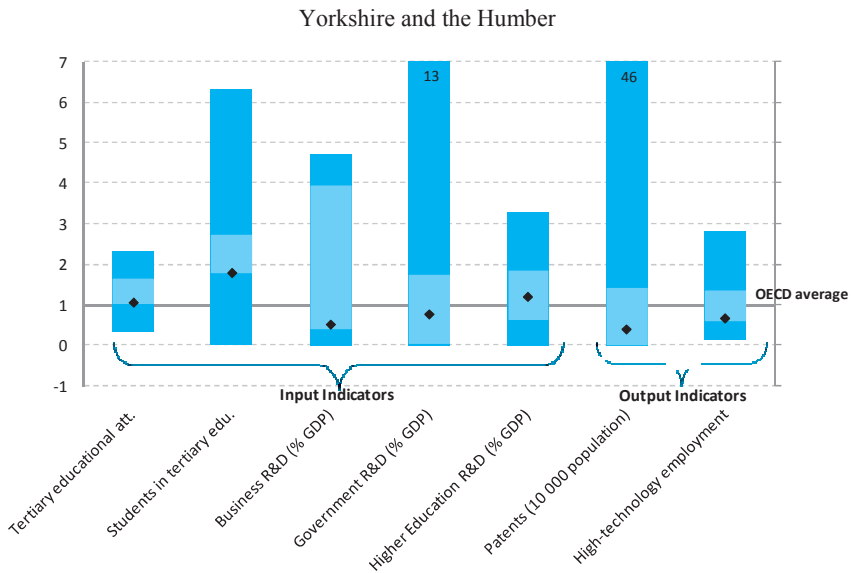
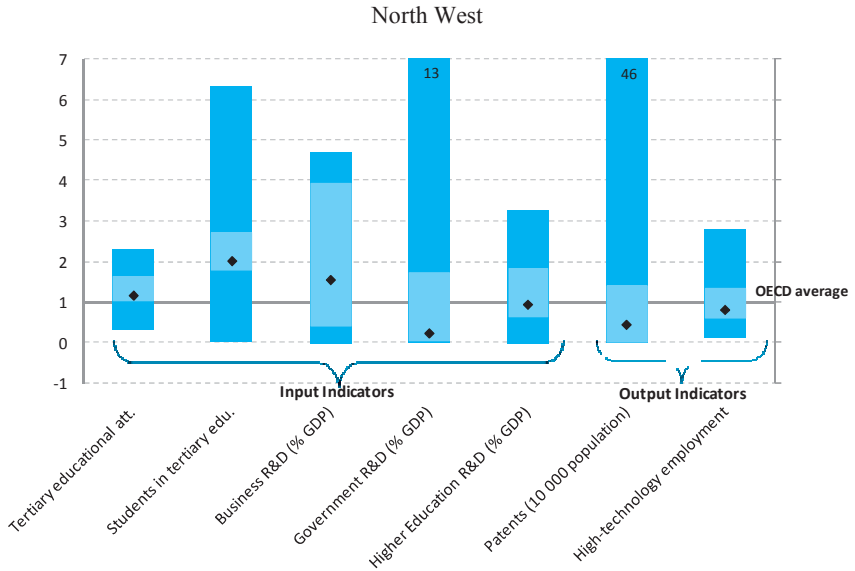


Figure 0.1. Innovation indicator summary: North of England (cont.)



Notes: Inner band represents the range of values for UK regions and the outer band represents the range of values for OECD regions. Information on all OECD regions is not available for each indicator. Please refer to endnote six of Chapter 1 for notes on these graphics.

Source: OECD Regional Database 2008.

The North is a diverse area that has clear assets but, like other parts of the UK and regions within other OECD countries, the region lacks critical mass in “world-class” attributes. There are, for example, relatively fewer large firms, and far fewer headquarters of large firms in most parts of the North. Overall, the university system is strong in a range of disciplines but individually - apart from Manchester - the region’s universities attract much less research money than Oxford, Cambridge or London. These weaknesses in the economic and innovation infrastructure in the North relative to the South place the region at a competitive disadvantage. Economic actors in the North (firms, entrepreneurs, researchers, etc.) therefore need to be more innovative than counterparts in other parts of the country in the ways they do business, access knowledge and networks, attract staff and investment, and so on. Rather than compete on cost sensitive volume production, the North needs to focus on its potential as a location for innovation, building on its advanced manufacturing capability, but also supporting the growth of new sectors that could include digital, renewable energy and personalised healthcare. Against this background, innovation policy stands out as a crucial issue for the North of England.

National policies to support innovation in regions

UK regional policy focuses in part on enhancing productivity as a tool to promote economic growth and reduce the regional gap in economic growth rates

Interest in regional innovation as a component of national economic management in the UK has been driven by a series of reports since 2001 that attempted to ground a new approach to regional policy in stronger macroeconomic rationales. These reports – coming from HM Treasury – developed the argument that UK economic performance was being held back by under-performing regions (under-utilisation of labour and capital, a low return on public investment in education and training, etc.). Interest in the functioning of regional labour and capital markets has shifted the focus of regional policy away from attracting investment into target regions towards an emphasis on productivity growth, including a stronger focus on innovation performance and the ability of all regions to face the challenges of globalisation.

This concern over regional productivity was accompanied by a strong institutional move to strengthen the region level, leading to the Regional Development Agencies (RDAs) Act of 1998. These new agencies were charged, through statute, with improving the economic performance of their regions, and over time have taken responsibility for a wider range of policy

instruments, generally devolved from central government. The purpose of this review is not to assess regional policy in the UK; however, innovation policy at the regional level is largely channelled through these RDAs.

The recently launched government-funded Spatial Economics Research Centre and the regional observatories could play a lead role in building evidence on the new rationales for Government's regional policy, notably the ability of regions to adapt to globalisation.

Concern over the effectiveness of innovation inputs has led to a new policy interest in regional innovation in the context of a historically centralised approach

In comparison with several OECD countries that are centralised or have weak regional layers, the UK has few spatial aspects to its national innovation policy. The UK's innovation system has been strongly centralised and it is only now that, from the national innovation policy perspective, regions are increasingly prominent in policy thinking. The *Innovation Nation* White Paper published in March 2008 clearly acknowledges that there is a spatial dimension that should be recognised in innovation policy. It expands upon related statements made by central government in other recent reviews (*Lambert Review*, *Sainsbury Review* and the *Sub-National Review of Economic Development and Regeneration* (SNR), for example). Furthermore, it promotes, along with other statements at Ministerial level, a broader definition of innovation to include objectives outside the business innovation sphere that relate to environmental and societal challenges (climate change, aging, etc.). Policy research and demonstration projects sponsored by the National Endowment for Science, Technology and the Arts (NESTA) have played an important role in expanding the definition of innovation in the UK and supporting the concept of place in innovation.

OECD science and technology indicators suggest that the UK's scientific output does not fully translate to firm innovation or productivity growth. As in other OECD countries where the commercial output of scientific research is considered to be lower than expected – Sweden and Germany, for example – there has been a general increase in interest among science and technology policy makers in regional innovation systems as one means by which resources may be better targeted.

The support for the spatial dimension of innovation in the Innovation Nation White Paper – the strongest recognition by central government to date – should be followed up with practical steps to enhance support for innovation policy and delivery in the regions.

In France and Germany, among other OECD countries, competitive innovation-related programmes with a spatial dimension have served to generate new ideas, build capacity and local dynamism, and reduce the transaction costs associated with more ad hoc project funding. The UK could consider such examples.

Co-ordinating between regional and “region-neutral” agencies is complicated by the frequent institutional and policy changes with respect to responsibilities of different central government departments and sub-national actors

Recently there has been considerable change in policies and institutions on two dimensions important for regional innovation, creating uncertainty and additional challenges for co-ordination. First, there have been a number of key reviews and institutional changes over the last year regarding the management and focus of science and technology, as well as innovation policy more generally. Second, sub-national actors and, in particular, the Regional Development Agencies continue to work within a fluctuating institutional context.

A challenge for developing a coherent regional innovation policy is the number of non-governmental or departmental bodies and agencies involved in innovation and regional policy. Among these, the newly created (2007) Department for Universities, Innovation and Skills (DIUS) takes the lead for innovation in the UK and is responsible for the innovation strategy, monitoring of innovation performance and oversight of innovation-related agencies. The most prominent of these related organisations are the recently expanded Technology Strategy Board (that supports and invests in technology research, development and commercialisation), the Higher Education Funding Council for England (that finances universities) and the Research Councils (that finance different areas of research). DIUS also oversees the skills-related agencies. At the same time, the department for Business, Enterprise and Regulatory Reform (BERR) – which has taken over many of the functions of the former Department of Trade and Industry – sponsors the Regional Development Agencies and is jointly responsible for UK Trade and Investment (UKTI) along with the Foreign and Commonwealth Office. In addition, the Department of Communities and Local Government (CLG) sets policy mainly for local government, housing, urban regeneration and planning. The co-ordination across such departments and agencies is particularly important for regional innovation because there is potential for tension between agencies with a regional vocation and those that are essentially region-neutral but that manage large budgets.

The *Sub-National Review of Economic Development and Regeneration* (July 2007) has clarified some key areas regarding the future of the regional agenda. Its main proposals include the strengthening of the capacity of local government to implement (individually and collectively in sub-regional groupings) economic development, while RDAs are to take on a more strategic role with greater involvement of local government in influencing, scrutinising and implementing regional economic strategies. The role of sub-national entities being in greater flux over time than in other OECD countries, co-ordination across levels of government is even more difficult as it is not clear who the right sub-national partner should be and whether or not this will change, including with respect to innovation. As a result, there is a disincentive and fatigue at times for investing in these co-ordination relationships between national and sub-national actors, despite the common innovation-related goals as set out in performance agreements.

It will be important to reinforce cross-departmental approaches (DIUS, BERR, CLG and the related agencies) to ensure integrated decision-making on policies impacting on the innovation performance of regions and city-regions.

There are insufficient mechanisms in the UK for recognising regional assets...

There are few formal mechanisms for recognising regional innovation-related assets as national or international assets. Regional assets include not only university R&D expertise but also areas of industrial competence/cluster niches (firm assets, skilled labour, etc.), key innovation sites (incubators, science parks, public or private R&D facilities, etc.), important partnerships/networks or associations, effective education and training institutions, and an investor community, among others. Regional assets are not necessarily promoted by the national level to the same degree as is done by many programmes across OECD countries that provide labels, additional financial support or use other tools. DIUS and BERR do not have programmes to recognise excellence in innovation-related capacity more broadly. The only significant national-level system is the Research Assessment Exercise, which focuses on university research excellence. While the regions work with UKTI to promote their regional assets on an international scale, there are no mappings or labels to distinguish across regions. UKTI nevertheless does support this effort through systematic collection of data from regions, regional trade development presence and specialists with in-depth knowledge of R&D undertaken in the different regions.

The RDAs also need to generate robust, convincing proposals that illustrate how their assets are national in terms of economic impact and serve to complement other competencies in the UK. The RDAs should thus be encouraged to use the Technology Strategy Board’s horizon scanning activities (e.g., Innovation Platforms and Knowledge Transfer Networks) to help orient regional actions towards key industries and technology opportunities. And, *vice versa*, the work of the Technology Strategy Board can be strongly influenced by input from the RDAs and the regional Science and Industry Councils that will support the recognition of what the regions have to offer for national goals.

Greater clarity with respect to national priorities and criteria for recognition of “world-class” excellence with respect to innovation assets (outside of academic research) would allow regions in the North to better compete for national recognition. The Technology Strategy Board is developing a clear investment programme over the next couple of years that is one vehicle for recognising excellence beyond universities.

...as well as aligning national and regional resources. The new initiative with the Technology Strategy Board is a first experience that has shown promising initial results

The mechanisms to align resources in support of these regional assets of national significance are under-developed in the UK. As a result, there may be insufficient resources for promising regional investments and missed opportunities at the national level for better meeting its objectives, including competence in particular areas of innovation as well as improved productivity in the under-performing regions. In other OECD countries, including those with a more centralised governance framework, there are several mechanisms used to better recognise regional assets and align resources beyond university research excellence. These mechanisms may take the form of: 1) a more explicit spatial dimension to the national innovation policy framework (such as the *Key Innovation Areas* in the Netherlands which cover themes but that have regional links); 2) greater delegation to regions (numerous regional innovation-related initiatives in Denmark at the same time as regionalisation changes); or 3) a national system of innovation support in conjunction with regions (such as VINNVAXT in Sweden and many other Scandinavian programmes requiring 50% regional matching funds).

The recently assigned broader mandate for the Technology Strategy Board includes a role for co-ordination and alignment. Many of the key

innovation assets of the North could be better exploited to contribute to achieving national objectives. The wider Innovation Strategy as well as the Technology Strategy and the Technology Strategy Board should be seeking to build on existing strengths in the North. They will work with the Technology Strategy Board's national goals, the RDA-supported projects and programmes, and the allocations of the Research Councils. This mechanism serves as one vehicle for multi-level governance co-ordination of innovation. Great strides have been made over the last several months with this new role, and RDA participation on the board of the Technology Strategy Board is an important step in building confidence and communication. The process is now being tested and requires the development of trust and efficient information sharing mechanisms to improve alignment and address asymmetric information across the different partners.

Establish a process by which the alignment of funding between the Technology Strategy Board, the Research Councils and the RDAs is evaluated at an early stage and modified if the process is not working well. An evaluation at the end of the current corporate plan period could focus on how the alignment process has functioned.

Flexibility in other funding streams to support common national–regional goals could be considered. For example, the Higher Education Innovation Fund was a successful addition to the landscape of higher education funding that also supported projects of sub-national priority and that could be readily accessed by actors in the North, even if the programme did not have a spatial focus.

Regional strategies

RDAs lead the efforts to support innovation in regions with many successes since they were created less than ten years ago

Since their inception in 1998, the RDAs have taken on a lead (and increasing) role in supporting innovation-related programmes in the regions. They have picked up and expanded upon the work previously done by Government Offices and EU-sponsored initiatives. They have served not only as the principal delivery agents at the sub-national level for innovation support in terms of business services, but have also designed strategies and investments that seek to transform their economies. RDAs have supported innovation generally and for prioritised sectors/clusters, encouraged the interaction of the science base with the private sector, offered innovation advisory services and incubation facilities, and developed different forms of centres of excellence, among other achievements.

RDA efforts should not be underestimated, in particular given a particularly challenging operating environment. In the division of labour in a centralised country context, the burden is greater on the national government than in other countries. Where there are gaps in the division of responsibilities, it is therefore harder for the regions to compensate. Compared to other OECD regions, the North of England experiences both gaps in national innovation policy to support regions (in terms of policies, resource alignment, etc.) and limited fiscal autonomy at the sub-national level (among the lowest in the OECD for localities, e.g., no revenue raising capacity for regions). Therefore, for regions that are under-performing relative to the national average, there is a gap in innovation support to improve their ability to better compete in excellence-based resource allocation. Limited regional funds are not easily able to compensate for this gap.

RDA should continue to build on these successes and perhaps acknowledge more explicitly innovation-related assets that are not directly involved in RDA-funded projects, supplementing analysis of individual projects with a better understanding of the wider innovation system context.

Goal for radical transformation appears difficult to achieve without: greater concentration of RDA resources and greater leveraging of non-RDA resources; performance output measures for RDA spending also limit the types of investments for long-term transformation outcomes

The allocations to the RDAs must cover a very broad mandate for regional development (from regeneration and transport to innovation) and only a small amount of the public funding that is related to a Regional Economic Strategy (RES) is under RDA control. For the North East, North West and Yorkshire and the Humber, RDA allocations as a percentage of regional GDP in the last planning period were approximately 0.75%, 0.35% and 0.37%, respectively. An RDA may have direct control over as little as 3.5% of the core public resources for economic development and regeneration spent in the region. In theory, a RES helps to steer the work of all public sector actors within the region towards its goals. In practice, however, the degree of traction of a RES over central government agencies is limited. It seems unlikely that the RDAs alone can be agents of transformational economic change (an explicit goal for regions in the North) despite their numerous efforts and different areas of success without greater mobilisation of or direction over national and private resources. The nature

of spending is also constrained by the time frame of intervention and hence the reporting to Government on performance indicators, as many of the investments in innovation require a longer timeframe to have economic and employment outcomes. This is in part why EU funding has a seven-year timeframe.

Given the resulting spatial distribution of resources from key Government programmes for innovation (with a concentration in the Greater South East), RDAs in the North face a high barrier to overcome the path dependency of their regions. The amounts spent on innovation by Northern RDAs represent a much more significant share of overall public spending in the region to support innovation compared with other English regions. Of RDA budgets in the three Northern regions, approximately 12% to 19% – depending on the region – are targeted specifically for innovation programmes (albeit spending in other areas can support innovation). When those sums are combined with regionally allocable national spending on science and technology (which excludes large sums for basic research), the RDA funding share is 40% (North East), 25% (North West) and 20% (Yorkshire and the Humber). In comparison, figures for London and the South East are approximately 7%, in part due to smaller RDA allocations but due largely to greater national-level science and technology investment per capita. While not all regions need be the locus of investment for knowledge generation, as it may be more efficient to access knowledge through linkages with other regions, the order of magnitude difference is important to consider for the long-term competitiveness of regions in a knowledge-based economy.

RDA funds are relatively flexible funding streams that can serve several roles: as a catalyst, a signal to other levels of government or a gap-filling role not addressed by other funding streams. There are examples where RDA funds are used strategically as a signal to Government of priority projects for the region. The problem, as discussed above, is that there are few mechanisms for regions to align with national funding.

Accessing EU Framework funds is another area where the Northern regions could seek to achieve greater success rates to support their research base.

Innovation is only one part of a broad RDA mandate that continues to expand and become more strategic

RDA-managed Regional Economic Strategies must address a wide range of issues typically associated with regional development, among which innovation is just one, albeit of increasing importance. The RDA

mandate requires that the strategy cover regeneration, skills, social inclusion, enterprise support, transport, infrastructure, etc. By 2010, subject to legislation, it is expected that the strategy will be expanded to include spatial planning, to create one Regional Strategy that would provide a more convincing vision for the region by linking economic development with major infrastructure and housing investment, two high profile and politically sensitive policy areas. Overall, this suggests a more prominent role for RDAs in taking decisions that affect major regional investments. Regional partnerships involving the RDAs, local authorities and other actors could give a strong lead on region-level strategic investment. Innovation should retain a key place in this framework. RDAs are important partners for central government because of their role in co-ordinating actions that strengthen the regional environment for innovation as well as in delivering key innovation-related programmes.

This broad RDA mandate is rather unique in an OECD context for a regional development agency structure in terms of innovation support, in part because the agencies could be viewed as a substitute for a regional layer in the governance landscape. There are advantages to the fact that innovation is to a certain degree integrated into the broader economic strategy, now with greater opportunities to align spatial planning and innovation systems. The disadvantages concern the relative lack of visibility of innovation within the RDAs and the regions more generally, compared with more specialised agencies generally found in OECD regions.

Innovation should be reinforced as an area of competency within RDAs. Otherwise, the Regional Innovation Strategies could become disconnected from the main strategic orientations of the new Regional Strategy.

The DIUS annual Innovation Report could be used as a vehicle for tracking sub-national progress in innovation projects and performance as well as the linkages with the national level to reinforce the RDAs' key partnership role with central government and localities.

All three regions are in the implementation phase of their innovation “journey”, albeit cultivating private sector leadership to support the strategies is difficult

All three regions in the North have identified a need for change, developed a strategy and are implementing that strategy. The Government decision to not locate a major science investment in the region was a highly catalytic event for the North West to rally around the science base. In the North East, the ineffectiveness of the prior foreign direct investment-based

strategies of attracting branch plants (which came but later closed) led to the development of an entirely new approach to regional economic development with a science focus to support the transition to a knowledge-based economy. In Yorkshire and the Humber, the strategy (framework) is now the basis for action but the nature of the problem as stated is a generally lower level of innovation inputs and a need to transition the traditional sectors facing increased global competition. Lessons learned from prior innovation strategies in the Northern regions include a need to be more targeted in terms of priority areas and interventions, insufficient effort on helping stimulate demand from firms, and a need to place a greater focus on firms more generally.

The development of Regional Innovation Strategies is managed by the RDAs with strategic guidance from the regional Science and Industry Councils. The planning process makes it difficult to cultivate innovation leaders or bring in a range of business voices outside of the consultation process or the Council. The innovation policy planning can be perceived by firms outside the process as having a dominant public sector-driven approach, and thus such firms do not necessarily see positive payoffs from involvement in the strategy process.

The current strategy development process is comprehensive with attempts to align innovation across different aspects of the Regional Economic Strategies. However, alternative mechanisms are required beyond the current structures to bring in more firm perspectives and to cultivate innovation leaders (both public and private).

“Narrow” science-focused definition of innovation used in regional strategies reflects the historical national approach; opportunities for a “broad” approach to innovation in regional strategies and institutions (like the Science and Industry Councils), including service sectors

While the RDAs have begun to shift their emphasis towards broader definitions of innovation, the focus continues to reflect an emphasis on the application of science. This “narrow” definition of innovation in the regions is based in part on the national level’s historically science-focused innovation approach which is reinforced by policies, funding streams and the lesser weight given to policy intervention beyond traditional market failures (rationales such as systemic failures, which are even more likely in the North). The recent UK shift to a “broader” definition of innovation could offer opportunities to regions. In Catalonia (Spain), the regional government

has opted to develop a broad society-wide innovation charter, since current innovation policy is seen as being too distant from citizens and not sufficiently responsive to general challenges facing the region. Awareness raising on science and innovation more generally would widen both the definition and the support base for regional action. The Newcastle Science City, for example, has been very active in communications with the public, albeit with a more science than innovation focus.

The Science and Industry Councils are advisory bodies created in regions between 2001 and 2004 to give a sub-national voice with regard to science and technology policy. They are composed of representatives of firms and higher education institutions with the technical secretariat role assumed by the RDAs. The creation of the first Council was in response to a central government decision not to place a major research facility in the North West, and since then these bodies have been developed in all regions. They support RDAs by providing guidance on the science and/or innovation strategy. They also serve a lobbying role on behalf of the regions to Government. They are now being asked to play a key role in liaising with the Technology Strategy Board to align national and regional agendas in supporting science and technology projects. However, the lack of diversity in the composition of the Councils with respect to perspectives on innovation and the current understanding of their mandate both pose challenges for supporting innovation more broadly.

Policy actors in the North would like to identify opportunities to support innovation in the service sector; however, support for innovation in services is not addressed in the Regional Innovation Strategies (although often discussed in the Regional Economic Strategies). Strengths in some areas of the North include creative/media and financial/business services, and the vast majority of employment and output is in the tertiary sector. The challenge is to identify the appropriate instruments and programmes to support the needs of different sub-sectors of service firms. The absence of a service sector focus can be explained in part by the lack of clear areas of public intervention where there is a policy rationale, such as addressing market failures, to support different sectors that could be characterised as services. Nor are service-related industries typically involved in key bodies such as Science and Industry Councils, in part due to the emphasis on science as opposed to innovation. Additionally, many areas of the North are characterised by a high percentage of employment in public services, a theme which is not addressed in the Regional Innovation Strategies and is dependent on direction from central government.

The national-level definition of innovation is expanding, leaving some room for RDAs to take bolder steps in terms of innovation. Expanding the innovation focus, however, is an understandably difficult task at the

sub-national level given the less obvious nature of the possible policy levers, less easily measured results and few funding streams open to support this broader definition.

Regional and local action can increase public awareness about not only science but also innovation and the Northern regions' offer for innovation support. This could also serve the goals of increasing the Northern regions' lower rates of entrepreneurship.

The proposed nationally designated Innovation Partnerships are likely to focus on public sector partnerships and could offer interesting demonstration projects for innovation in the public sector, of great relevance in the North.

There may be opportunities to move beyond the current science-focused approach of the Science and Industry Councils without diluting their role as a sub-national voice for supporting science. Creative ways of incorporating new firm perspectives, either within or outside of the Council, could be considered.

Innovation strategies based on “pillars”; need for sufficient multi-disciplinary links, clarity on areas of competency and global positioning

Cluster/sector strategies offer a pragmatic solution for organising support, distinguishing the region and understanding where to target public intervention. NWDA and One Northeast are clear in their innovation strategies with regard to the “pillars” that they will support. Yorkshire Forward’s innovation framework is very broad in scope but does also seek to support the priority sectors in the region. There is also an attempt in the three strategies to refocus somewhat from sectors to technologies, but that cross-sectoral approach is nascent.

The distinctiveness of the North in its priority sectors and their niche in global markets merits further clarification. For example, out of the nine English regions, eight have prioritised biotechnology or health sciences in the context of their Regional Economic Strategies, which the Regional Innovation Strategies seek to support. The regions are largely focused on niches within these broad sectors, though this focus has not always been communicated effectively, giving the impression of a lack of regional differentiation. Another aspect that is less straightforward is the analysis of global trends for the sectors being supported and how the innovation strategy supports firms in the region in this global context. The process to develop the Regional Innovation Strategies and the comparisons are often very UK focused. Perhaps the new role of the Technology Strategy Board

on horizon scanning could complement existing RDA efforts to understand the impact of global trends on regional assets.

The RDAs should continue to strengthen the multi-disciplinary links in their strategies given the nature of innovation in the fields where they have strengths. Several Scandinavian countries offer examples in this area.

The RDAs individually or on a pan-Northern basis will need to communicate more clearly to national and international stakeholders on their niches of success. This could be achieved through more national-level mechanisms for recognition, as described above, or through other regional vehicles.

Strategic over-reliance on higher education resources for increasing private sector R&D investment reflects: the national science excellence focus of innovation; the stability of these institutions; and the lack of other kinds of institutions in the innovation landscape

The strength of higher education institutions (HEIs) in the North is clearly an innovation asset, especially with the lack of diversity of other kinds of institutions to support innovation. Given the general science focus of national innovation support, albeit there is increasing focus on firms through the Technology Strategy Board and business support products, much of the effort by the regions has been to strengthen HEIs in the hope of attracting more research resources from central government. The more prominent institutions in the North already have their own relationships, lobbies and self-interest to obtain research funds. There is also a pragmatic dimension of the support for HEIs. These are actors that are well embedded in the region and therefore easy to identify and interface with in terms of public initiatives. They play a leading role in key committees and councils, reinforcing the higher education focus. As many of these institutions are already convinced of the importance of trying to work with firms, their active engagement is in part already assured.

However, there may be a strategic over-emphasis on these institutions for increasing innovation activity and private R&D investment. In the past, approximately half of RDA business support budgets were channelled through business–university collaboration projects relevant for science and innovation. Data from the UK and other OECD countries suggest that while the links between HEIs and firms are increasing, HEIs remain a small element in the innovation activities of most firms. Furthermore, in the development of the Regional Innovation Strategies or related plans, there are

few studies on the demand by firms for the centres, advisory services and collaborations with universities. The challenge is to assess this demand and then to find a legitimate policy rationale for support that is acceptable and useful to firms.

The over-emphasis on HEIs generally does not preclude focusing on specific actions involving HEIs. Rather, it implies that the RDAs take care to consider the different roles of HEIs (educating the future labour force, continuing education, generation of research knowledge, technology transfer to firms) and to appreciate the differentiation in these roles by types of HEI that would best support these different roles. For example, some “business-facing” departments in certain kinds of universities are perhaps better placed to work with firms while reinforcing the critical mass of research excellence in a particular field may be achieved by more research-intensive HEIs. And in some cases those “business-facing” universities may best serve firms through teaching and training. Individual HEIs need to make their own choices as to whether they are interested in defining a more comprehensive client-oriented marketing strategy to firms. More generally, all HEIs need to consider how they might evolve to fulfil an appropriate role in supporting the North’s economic development.

To better serve firm needs, a greater focus on the demand side for services to firms, as opposed to the supply side of HEI knowledge, is warranted. Both at the national and regional level, greater emphasis could be placed on translational and exploitation activities.

While RDAs are increasingly known to the business community, they need to continue to improve their reputation with firms. The RDA management of Business Link, an established national gateway that has visibility among firms, could help to strengthen the RDAs’ work in reaching firms.

Another area for consideration is the diversification of institutions to support innovation outside of HEIs, as was done with the Centres of Excellence in the North East that address a significant gap in closer-to-market, translational, scale-up and demonstration facilities.

Skills strategy and rural issues managed separately from the innovation agenda; opportunities to better orient to innovation system needs

One of the most prominent factors associated with a region’s capacity to absorb innovation is its human capital, and the relevance of skills for firm needs. The North faces challenges both in terms of adapting its lower-skilled labour pool to economic restructuring as well as the higher end of the skills

spectrum for the generation of knowledge, technology transfer and commercialisation, the latter requiring strong business skills. The skills agenda for the UK is another area undergoing policy strategy and delivery change. The skills and education funding streams are focused on addressing skills deficiencies up to Level 3 (*i.e.*, before higher education) for public good arguments and that funding is mainly beyond the spending control of RDAs. Nevertheless, the Regional Economic Strategies seek to co-ordinate as much as possible with other skills actors. For the service sector industries, the need for advanced management skills is one of the top issues for innovation.

Some of the lessons regarding innovation and rural areas are of relevance to the North. In a recent report to the Prime Minister by the Rural Advocate, *England's rural areas: steps to release their economic potential*, innovation is highlighted as one of the four themes for boosting rural economies, many of which are found in the North. The analysis of the challenges is based on the five drivers of productivity and some of the findings have parallels to challenges for the North more generally, in terms of investment in innovation, weaker infrastructure and drivers, and a lack of specialised service providers. The recommendations of the report offer some lessons for the Regional Innovation Strategies, including efforts to address innovation in sparse or remote areas such as through a proposed Rural Innovation Initiative or partnership as well as the identification of strategies for innovation-related programmes, like Knowledge Transfer Networks, to engage more effectively in rural areas.

RDAs can support integration of skills and innovation policy approaches at a regional level through their influence over national skills agencies as well as by helping to attract high-skilled talent in support of their innovation goals.

RDAs may consider the lessons learned from research on innovation that supports rural areas given its relevance to many places in the North.

Some of the leading initiatives in the North thought to support economic transformation are unlikely to reach the ambitions in their current form, such as the N8 Research Consortium...

The N8 research partnership, launched three years ago, is a grouping of eight of the North's leading research universities targeted to enhance research capabilities, university–industry links and innovation in the North of England. There is notable symbolic value to the N8 concept as a way to

counter-balance the universities located in the Greater South East (around London) known as “the Golden Triangle” along with strategic potential to address long-run innovation opportunities. The N8 clearly supports interesting collaborations across the member universities. These collaborations can add value in terms of institutional arrangements and awareness raising, the expected interfacing with firms and the cross-disciplinary aspects of some centres. Observations concerning its progress are the low level of financing, the lack of public visibility of the research centres supported by the collaboration and a focus on organising pre-existing research centres.

The N8 is in its very early stages and therefore an evaluation is not possible at this time; however, in its current form the collaboration does not appear likely to support economic transformation in the North. The research centres do not have the scale or strategy necessary to: add significant value to the research landscape through increased critical mass or higher levels of research excellence, increase capabilities to attract additional world-class researchers, alter the incentives for commercialisation, or attract new R&D funding (albeit the latter in the long term should help increase the probability of success in attracting national R&D funds). Looking internationally, the Georgia Research Alliance in the US state of Georgia, created in 1990, is a similar effort to boost innovation in a “lagging” region that has interesting lessons for the N8 as they move forward. They have been notably successful in leveraging greater national-level resources as well as private funding given the Alliance’s higher annual state-level funding, stronger co-operation across universities and aggressive recruitment of new research talent to the region.

There are several possible scenarios for future development of the N8 that include continuing on the current path but with modified expectations, focusing more on attracting new researchers (individually and collectively) or increasing the scale of research with additional support.

... and neither, without further mobilisation of resources, and despite their positive achievements, do the three Science Cities in the North

The UK Government has designated three Science Cities in the North (Manchester, Newcastle and York) and three in other regions in England outside of the Greater South East. These Science Cities aim to use their strong research base to drive city-regional growth through strengthening linkages between business, the public sector and the science community,

accelerating the process through which ideas and discoveries are commercialised, and increasing the visibility of these cities to attract talent and investment. The designation process was not a competition with stated criteria nor was it supported by additional central level resources, therefore the relative success of each city has been based on its ability to mobilise local and regional partners. This is the first national programme to link science, innovation and urban regeneration with a lead role for the local level and no explicit role for the national level. Compared to many similar initiatives internationally, the UK concept stands out in several respects: a focus on brown-field development, clear regional development goals, the lack of a strong national role, much more modest levels of investment and a public science education element.

The initiative is refreshing in its experimental and flexible nature allowing adaptation to local circumstances, but the lack of a national-level departmental sponsor and the low level of funding constrain its effectiveness. The label effect alone has proven effective (albeit varying across examples) in harnessing local energy and collaboration which provides valuable learning for place-based innovation support. The Science City designation has appeared to have the most catalytic impact in Newcastle, particularly in the area of regeneration. In Manchester, the designation has been incorporated into the existing reputation and programmes of Manchester Knowledge Capital, therefore the value added has been to refresh the strategy and strengthen links with Government. The Science City in York was already in existence many years prior to the designation therefore the impact appears to be one of co-ordinating a number of initiatives in bioscience and ICT around a common brand, and as a result mobilising additional commitment and resources from partners.

Possible scenarios for future development of Science Cities include expanding the lessons to other cities, sub-national initiatives for multi-year funding or (to achieve the scale of other international models) additional new national investment to complement regional/local and private investment.

Instruments focused on innovation advisory, knowledge transfer and innovation facilities; some of the major innovation sites play an emblematic role in the regions' attempts to redefine their image

Innovation advisory services are or will be supported by all three regions. Yorkshire and the Humber has an innovation advisory service available to firms on an individual basis. The North East has delivered these

advisory services more in the context of broadly-based programmes such as the North East Productivity Alliance. The North West is in the process of launching an individual firm service that will be referred through Business Link, the national (but regionally administered) gateway to business support. The three regions all use instruments to support knowledge transfer support from universities to firms, often in conjunction with the regional educational associations: Knowledge House (NE), KnowledgeRICH (Y&H) and KnowledgeNorthWest (the latter ended in 2006).

Two of the three regions have used a label and extra support for specific knowledge transfer programmes in some form of centre of excellence that are a core part of the innovation strategies. As discussed above, the lack of national labels makes marketing these internationally more difficult. The Centres for Industrial Collaboration in Yorkshire and the Humber are one example. The North East has developed five Centres of Excellence outside of universities, with three remaining a core part of the region's innovation and economic development strategy. The North West supports a range of areas of excellence but does not have a specific programme offering an excellence label.

Innovation-related facilities are supported across the three regions and have successfully built on existing areas of competency and infrastructure. RDAs have also helped to create new institutions along with the sites. Compared with other English regions, in the last planning period the Northern RDAs spent a higher percentage of their innovation budget on innovation facilities. Some of these major innovation sites serve a key role in the region for redefining its identity and in concentrating resources from different public and private sources. There are several challenges for effective infrastructure investments in such sites, including effective economic development linkages with the region, the international competitiveness of the resources and hence the ability to sustain private sector investment.

There are a range of programmes to support innovation in the North, but the funding levels do not always match the ambitions. There are also significant information and transactions costs involved that should be accounted for in the choice and number of instruments and programmes. This dispersion of resources across programmes is likely to reduce the probability that the funded actions will have a transformational impact.

The nation-wide Business Support Simplification Process should streamline business-related innovation support programmes offered across levels of government via the Business Link Gateway to support a one-stop shop approach that could reduce transaction costs and programme clutter.

To achieve the transformational impacts desired, greater concentration of resources and reduction of the transactions costs associated with many other programmes could be helpful.

With evolving responsibilities at regional and local levels and the challenges for public action to support innovation in firms, capacity building is insufficiently addressed

The role of RDAs continues to evolve, and it will be important to retain and promote expertise on innovation within the regions. The gradual transition from a delivery vehicle for national programmes in different administrative regions to strategy development bodies with spatial planning responsibilities completely changes the types of skills required. In addition, innovation is a relatively new field for regional policy actors across OECD regions generally. While some effort has been made to share experience across regions via the national Regional Innovation, Science and Technology Group, and specific initiatives such as Yorkshire and the Humber's work tapping into EU networks and resources, there is a demand for greater innovation support training at the regional and sub-regional levels.

RDAs and local partners should consider a programme to develop capacity and capability on innovation policy and support, and to learn from best-practice internationally.

While city-regions may be the locus of innovation activity, the best role for UK sub-regional entities in supporting innovation is not yet clear; they can play a role in identifying and supporting projects, creating “spaces” for innovation actors to interact, and if capacity exists, in delivery

Given the economic geography of the North, the scale of regions is often much larger than the functional areas where innovation-related contacts are made. Therefore the metropolitan, or city-region, level because of their agglomeration economies (for many matters, including human capital, research facilities and private investment) is an important unit of analysis in terms of innovation activity and will increasingly be a focal point for action. City-regions are perhaps a more appropriate level to support the metaphorical spaces for interaction of actors, the so-called innovation “cocktail party”. Examples of success in this area include the Daresbury Innovation Centre and the York Science City where local actors facilitate

the interactions and regional actors have supported other related investments.

In the context of the SNR, municipalities and wider city-regions are to play a more prominent role in the development and scrutiny of Regional Economic Strategies. The challenge for cities, as noted in the *State of the Cities* report, is that most of the strategic decisions that have an impact on the economic component of competitiveness are decided above the city level by central government departments or RDAs with respect to innovation, economic diversity and skills. This may be why recent studies, such as that by the COMPETE network, noted that English cities in particular have been successful in the regeneration agenda (for which they receive considerable Government funds), but compared to European peers they do not necessarily master the other key mechanisms for supporting competitiveness. The Core Cities group (of which five out of the total of eight are in the North) also includes innovation as one of its platforms.

As a policy trend, some sub-national entities are starting to include the concept of innovation as a priority area for action. In large metropolitan areas, such as Manchester, there may be the capacity, scale and resources to support innovation. In perhaps smaller scale locations but with a very clear focus (and historically EU funding) such as Tees Valley, there are also opportunities for the local level to fully rally behind key initiatives. These examples illustrate both local success and complementarity with RDA action. The challenge is to recreate these kinds of successes in other areas across the North when there is no label effect (as with the Science City) and no additional funding to help spur local action in areas without a pre-existing history of multi-area collaboration or strong local leadership.

At a minimum, as part of this new process the RDAs can serve a strategic resource alignment role with city-regions, and for those city-regions with capacity, sub-contracting delivery when appropriate.

Local authorities can play a leading role in promoting “spaces” for innovation actors to interact.

Investment in common strategy building is a necessary precursor for city-region action (as has been supported by the RDAs’ sub-regional partnerships and the Northern Way with city-regions). While multi-area agreements are a new vehicle for collaboration across local government and may touch on issues relevant to the broader definition of innovation, their ability to operate successfully for innovation is not likely in the short term.

There are several possible pan-Northern priorities for action. Given its unique position, the Northern Way can influence national policy and attempt bold experiments

The RDAs and the Northern Way are trying to identify opportunities to offer support for innovation in a pan-Northern way. In the past, the Northern Way has actively supported the N8 Research Consortium and the Science Cities as a core part of their efforts. As the Northern Way shifts from a programme delivery to a strategy role, the range of options must fit this new organisational model. The goals for pan-regional collaboration to support innovation are most likely to be successful if they address a clear rationale to justify collaboration (critical mass, common problem, increasing specialisation, administrative barriers not mapping to functional boundaries, etc.). Examples of pan-regional co-ordination to support technology and innovation exist across the OECD to respond to these different rationales, such as the Southern Technology Council in the US.

Priorities for action in the Northern Way could include: joint economic and policy research that offers new approaches for analysis, lobbying, image and capacity building, experimentation with demonstration projects, support of targeted investments of benefit for pan-Northern competencies, and cultivating innovation entrepreneurs. The actions on a pan-Northern basis need to complement but not substitute for RDA efforts.

Annex 0.A1

This Review was commissioned by the then UK Department of Trade and Industry and the three Northern Regional Development Agencies via the Northern Way. Both central government and the regions are seeking opportunities to better support innovation in the North in their efforts to promote regional economic growth and reduce the output and productivity gap between the North and the rest of England.

In addition to the desk review and data analysis, the Review involved extensive contacts with actors in the United Kingdom at national, regional and local levels. The desk review covers a wide range of Government reports, academic articles and statistical data among other sources. In November 2007, a delegation of OECD representatives, peer reviewers from the Netherlands and New Zealand and an external consultant spent one week in the United Kingdom. The mission included meetings in London and the regions and visits to several major innovation-related sites. Two follow-up missions were held in March 2008 with a smaller delegation. In addition, the OECD team attended meetings of all three of the region's Science and Industry Councils as well as the Northern Way Summit. The OECD team spoke with many other academics and public officials not listed below in meetings either in person or via telephone.

Level	Organisations	
Central government / national	<ul style="list-style-type: none"> • Department for Business, Enterprise and Regulatory Reform • Department for Innovation, Universities and Skills • Department of Communities and Local Government • Technology Strategy Board • National Endowment for Science, Technology and the Arts • Government Office representatives • Office for National Statistics 	
Regional and local level	<ul style="list-style-type: none"> • Three RDAs (innovation staff primarily) • Northern Way • Three Regional Higher Education Associations • Representatives from the three Science Cities • Representatives from Local Skills Councils • Manchester Enterprise/Manchester Knowledge Capital • Creative Sheffield/ Sheffield City Region • Leeds City Region • Mersey Partnership • Tees Valley Partnership • Tyne Wear Partnership 	<ul style="list-style-type: none"> • Attendance/presentations at quarterly meetings of all three Science and Industry Councils • Attendance/presentation at Northern Way Summit • Attendance at Innovation in Industry Steering Group and RDA Work Groups (Northern Way) • Attendance at Yorkshire and the Humber Innovation Awards ceremony
Cluster and site specific meetings (includes firms)	<ul style="list-style-type: none"> • Creative and media industries • Leeds financial cluster • Advanced Manufacturing Park (Y&H) • Daresbury Science and Innovation Campus (NW) • Manchester Science Park (NW) 	<ul style="list-style-type: none"> • York Science City • Centre for Life (Newcastle) • NaREC (Newcastle) • CPI/Wilton Centre (Teesside)

Regional Innovation in OECD Countries: Key Issues and Framework

Innovation has a spatial dimension. This is clear from extensive research into how firms innovate. Yet does this mean that innovation policy necessarily needs a spatial dimension? The aim of this introduction is to clarify some of the main issues relating to regional innovation.

- First, from the theoretical perspective, why are places considered to be important for the generation of innovation?
- Second, how do the aims and instruments of policies to support innovation in regions differ from those normally undertaken at the national level, and what is the articulation between the two?
- Third, are the policy needs of regions the same, or can we distinguish among regions in terms of their policy needs?

Innovation and its regional dimension

OECD countries agree that innovation performance is a crucial determinant of competitiveness and national progress. Recent discussions at ministerial level concluded that investment in knowledge and intellectual assets is key to value creation. Globalisation and rapid advances in new technologies, notably information and communications technology (ICT), have spurred competition and opened new markets for the creation and delivery of innovative products and services. Globalisation has also increased the pressure on OECD countries to move up the value chain and engage in a continuous process of adjustment and innovation. By strengthening innovation, countries, regions, cities and firms can become more competitive and thus better prepared to face the challenges of globalisation.

Increasing global competition encourages innovation, and innovation in turn helps to drive competition – a virtuous cycle that leads to more efficient use of human and physical resources. The process, however, poses challenges for firms and for public policy that supports the activities of

firms. First, innovation involves a high degree of uncertainty, though with potentially high returns. Second, innovation improves the competitive position of firms that innovate successfully, but those that do not lose out. Promoting innovation is therefore about encouraging change and adaptation, which can also mean accelerated processes of creative destruction in a world economy that is already characterised by unsettling volatility.

Box 0.1. OECD definition of innovation

As defined in the OECD *Frascati Manual*: “basic research is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts *without any particular application in view*” (emphasis added). Innovation is distinctive because of its economic and commercial imperatives. The OECD *Oslo Manual* identifies four types of innovation:

- *Product innovations* involve significant changes in the capabilities of goods or services. Both entirely new goods and services and significant improvements to existing products are included.
- *Process innovations* represent significant changes in production and delivery methods.
- *Organisational innovations* refer to the implementation of new organisational methods. These can be changes in business practices, in workplace organisation or in the firm’s external relations.
- *Marketing innovations* involve the implementation of new marketing methods. These can include changes in product design and packaging, in product promotion and placement, and in methods for pricing goods and services.

Source: OECD (2002), *Frascati Manual: Proposed Standard Practice for Surveys on Research and Experimental Development*, OECD Publications, Paris; OECD and the European Commission (2005), *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*, 3rd Edition, OECD Publications, Paris.

With innovation high on the policy agenda, decision-makers are interested in the main factors that propel innovation and the levers that are available to public policy. In general, most countries emphasise that innovation is a market-driven process and that firms themselves will be encouraged to innovate as long as the fruits of that innovation process are

captured by the firm that makes the investment. This means that for the most part, governments emphasise the enabling environment for innovation. This enabling environment includes regulatory frameworks, which should protect the intellectual property that flows from investment in research and development (R&D) or other investments in innovation. The competition regime should allow free access to markets thereby avoiding monopoly positions that tend to inhibit investment in innovation by other firms.

The level of innovation in a country is also influenced by the generation and diffusion of new technology and knowledge. Factors that influence this include the investment in basic and applied R&D, the technology transfer effort made by the government and the success of the education system in producing science and engineering graduates. The absorptive capacity of firms is also crucial for innovative ideas to be translated into productivity gains by firms that are not themselves technology generators. Absorptive capacity, in turn, is closely linked to the level of technical and general education in the workforce, as well as cultural traits relating to entrepreneurship and inter-firm collaboration.

Technology and innovation are not usually created in isolated organisations but, rather, where competent organisations and skilled individuals interact in a constructive and complementary way. First, innovation depends on the scientific capacity of actors and institutions (their acquisition of existing knowledge and concepts, their openness to new knowledge and their ability to assimilate this information). But the technological and entrepreneurial capacity of actors (their capacity to perceive the usefulness and applicability of knowledge) is also important. And, finally, industrial capacity plays a role (the capacity of actors to transform concepts and ideas into useful, commercially viable products). The focus of policy makers on the concept of innovation “systems” is an example of how the issue of spillovers and inter-linkages is now central to understanding how innovation is generated. The application of concepts of social capital to innovation is another example.

In this context, the importance of place (innovation’s spatial dimension) becomes clear. The idea that productivity gains are generated on the back of region-level interaction is supported by a large body of literature. Research into the sources of productivity advantage in successful regions has focused principally on the circulation of people and knowledge, the generation of innovative ideas and the development of new products and technologies. In the past, academic work considered knowledge as a public good and technological progress as an exogenous factor to the economic system that affects all companies, regions and countries in the same way. However, more recent “evolutionary” theories have challenged this basic view, recognising that the generation, adoption and diffusion of new technologies

is a complex process and therefore endogenous to growth models (Romer, 1990). This change in thinking is visible in the range of public policies in the science and technology field that have developed a strong geographical and relation-building focus into policy strategies.

The emphasis on effective institutional management of the resources that generate innovation focuses attention on where these interactions take place – the spatial origin of information and technology used by firms to increase their productivity. Does innovation derive from spillovers and diffusion processes that are national in scope, international or even virtual? Or does it arise from processes that are localised in regions or cities? There is strong evidence that the latter is often decisive, though obviously all spatial dimensions contribute. Firms derive added value from their regional environment. The question is how, and if the processes that generate innovation in firms can be strengthened or, where they are inadequate, “created” or replicated.

Regional innovation in a global economy

Globalisation is changing the way firms innovate and where this happens. Given that most OECD regions emphasise innovation as a priority and see innovation-related assets as among their key advantages, the movement of innovation activity to new places constitutes a threat, and a motivating challenge for OECD countries to make sure that their policies are effective and relevant for firms.

There is abundant evidence that R&D has been internationalised within the OECD area. Global corporations source R&D internationally for three main reasons: 1) the cost and complexity of technology development means that skilled partners have to be sourced from a wider area; 2) there are innovation hot-spots related to particular new technologies that are very location specific, and to be involved firms need a local presence; and 3) national R&D and innovation systems can be limited in scope and present “lock in” characteristics (OECD, 2008a). As a result, global corporations are increasingly relying on innovation offshoring through global innovation networks, in OECD and non-OECD countries. These networks are both global in reach but also tap into very local assets (Ernst, 2006).

Until recently, this internationalisation involved relatively few countries, almost entirely within the OECD. However, a 2005 survey of the world’s largest R&D spenders found that China was identified as the most attractive location for future R&D. The leading global corporations that participated in the survey agreed that they intend to increase their offshore outsourcing of R&D to Asia. The R&D offshoring process is not limited to Asia. Eastern European countries and some other non-OECD countries have been targeted

for investment in R&D and product development facilities both to help develop expanding markets in those countries/regions, and also as lower cost sites for design and development of products targeted to OECD countries. For example, many ICT companies are establishing software development centres in other emerging market economies in close proximity to clients. This move is often referred to as near-shoring and includes development centres in Eastern Europe to service the Western European market and Latin American countries to service the United States, Spain and Portugal.

In addition, firms from Korea, Taiwan, China, India and Singapore are also beginning to establish their own global innovation networks. Thus far, these Asian-based innovation networks are still at an early stage of their development, but their expansion seems to be gathering momentum. This trend has added a new dimension to Asia's network integration which is now moving beyond manufacturing to include research and product development, with strong implications for OECD regions.

Firm-level innovation processes

Against this background, the way that firms, multi-national enterprises (MNEs) and others, organise innovation and where they innovate is crucial. This is the focus of a large body of new research concerning: 1) the reorganisation of production and the link between global networks and local innovation hubs, and 2) the local-level interaction between large and small firms regarding (open) innovation and new product development.

Large firms are under pressure to innovate their products and develop and assimilate new technologies rapidly. Firms in dynamic, research-intensive fields like ICT or biopharmaceuticals cannot do this effectively through their traditional internal innovation structures and have seen the productivity of in-house R&D decline. Large firms in R&D-intensive industries are looking for ways to improve output and share risk, such as by cost sharing with SMEs instead of having to internalise product development (OECD, 2007e).

At the same time, small firms are often more aware of niches or emerging markets and may find solutions to new legal or regulatory requirements. In some cases, the downsizing of large firms has released entrepreneurial talent and led to new start ups that have since gone on to become key technology developers in the regions. Furthermore, the most important innovations in manufacturing in a particular industry are often brought in from other industries. In some cases, this demand for expertise is met by large companies such as Microsoft, which works extensively with carmakers, but it is also an opportunity for SMEs who can often be more

agile in adapting existing technologies. More open innovation systems, in which innovation occurs outside the normal boundaries of individual firms, is becoming an important tool by which both large and small firms can share the risk of generating new products.

The pressure to innovate and develop new products is intense. Firms have a range of business strategies to capture market segments, such as:

- ***Stretching***: extend the brand range and increase the number of different products to capture more specific market segments;
- ***Acquisition***: purchase an existing brand in order to capture market share;
- ***Collapsing***: close an existing brand and focus on core products;
- ***Revival***: revive a moribund brand or product to generate new market niches (“retro” styles, etc.); and
- ***Innovation***: create a new brand or product line to capture new markets.

These strategies result in an increased turnover of products, including more brands and models as well as shorter life cycles per model, among other results. From an innovation perspective, these strategies put a premium on the ability of firms to innovate rapidly and in different ways. They do this in very different ways, not all are interested in collaboration and prefer to trust in-house or closed innovation generation mechanisms. Others, by contrast, prefer to “fish” for ideas and either develop them in co-operation with the inventors or buy the technology once it is at a more advanced stage of development.

While R&D-driven innovation is prominent in innovation policy thinking, the ability of firms to access, adapt and apply existing knowledge and technology is also crucial. The linked concepts of absorptive capacity and knowledge spillovers have been developed to explain the flows of knowledge into firms and among firms, how different firms use these flows in different ways, and why some firms are better at exploiting available knowledge and technology than others. This body of research has focused on the firm level and across sectors within countries (see, for example, Narula and Dunning, 2000). The concept of absorptive capacity is important in helping to understand how firms access information, particularly those (the large majority) that are not involved in direct R&D driven innovation activities. As an illustration, three possible types of absorption capacity include:

- ***Intra-industry knowledge*** (necessary to capture knowledge from sources within the firm’s industry) and strongly related to clusters;

- **Inter-industry knowledge** (for knowledge originating in other industries) and related to large diverse metro-type regions; and
- **Scientific knowledge** (for knowledge related to co-operation with universities and public research institutes) and related to availability of technical staff in the workforce (Abreu *et al*, 2008a).

In practice, absorptive capacity focuses attention on the material incentives that firms have to innovate and on mechanisms that help firms access the knowledge they need. Issues include how firms overcome imperfect knowledge of new research or how they access technology from outside their sector, and so on. This leads to another dimension of innovation that is relevant for understanding innovation’s regional dimension – the innovation “space”. Engineers and managers can optimise the design of a product once they understand what the product would be or do. But they are not usually the ones generating the original idea for the product. The idea emerges through a process of discussion that is slightly separate from the commercialisation of innovation, both within and, increasingly, external to a firm (Lester and Piore, 2004).

This research underlines the importance of accessing knowledge through different channels, many of which seem to operate at a regional or local scale. The challenge for public policy is how best to support these knowledge flows that are at the core of the innovation process and are not insular but integrated into the emerging global production system. But this does not make them necessarily susceptible to policy influence. One assumption from the literature is that region-level actors are better placed to tap into these networks and provide relevant support.

Targeting the regional innovation system

The problem in many countries is that innovation policy at the national level is relatively new and still involves ongoing reorganisation of institutions and programmes in order to move from a narrow focus on science and technology (S&T) to an innovation policy that is more broadly based. In addition, the policy constituencies that lead policymaking in this field often have little experience of collaborative policymaking with the sub-national level. As such, the system by which innovation is managed across levels of government is not defined. Evidence from across OECD countries suggests that the respective roles of national and regional policies can be described, very broadly, as follows:

- National policy sets a generalised and “anonymous” framework of regulations and institutions that is designed to shape the policies and

initiatives of a wide range of actors towards some general economic and specific S&T related objectives.

- Regional policies focus more on supporting collaboration among identifiable actors and implementation of policy in specific places to achieve specific targets. The role of regional authorities is to offer services and other mechanisms that augment the inter-linkages between all these actors.

This distinction between national and regional roles should be based on which factors that support innovation are most susceptible to influence at the sub-national level – a kind of subsidiarity exercise applied to innovation policy. This seems quite basic, but as noted above, policy experience so far is limited and is not grounded in a clear model of what regional innovation policy should look like (see Table 0.1.).

Table 0.1. Factors that support innovation and their openness to regional influence

Key factor	Spatial variation or strong regional characteristics?	Possibility for regional impact?
Level of development, economic performance	Strongly regional	Yes, by enhancing investment in productive factors
Regulatory framework	Usually no spatial dimension	No
Competition regime	Usually no spatial dimension	No
Access to finance	Some regional variation (linked to market size and demand)	Yes, provision of grants and loans; problem is to stimulate local capital markets
Capacity to absorb and exploit knowledge and technology	Strong regional variation (linked to HR and sector)	Yes, needs-driven training, technology transfer and demonstration projects, etc.
Customers	Some regional variation (firms in non-core regions less exposed to demanding customers)	No, limited
Sources of new technological knowledge	Some regional variation (linked to quality of HEI and bridging/intermediation institutions)	Yes, knowledge transfer institutions, other bridging mechanisms
Networks, collaboration and social capital	Strongly regional or local	Yes, wide range of actions to support local associations and joint projects

Notes: 1) HR=human resources; 2) HEI=Higher Education Institution.

The concept of national and regional “systems of innovation” has emerged to help improve understanding of how public policy is organised to support innovation – thereby bringing greater clarity to the schema introduced above. The concept was widely embraced across the OECD and policy makers have seen the value of the systems of innovation literature and used it to explore regional systems of innovation (Cooke, 2004). Although it should not be seen as a normative or rigid framework, it does help to clarify the trends in the way innovation happens. It shows – schematically rather than concretely – how firms assemble the various technical, educational, commercial and financial resources they need in order to innovate, in the context of a region-specific enabling environment and a nationally or regionally-defined policy environment.

A typical regional system of innovation is organised around two interacting groups of actors:

- A knowledge application and exploitation sub-system composed of firms linked to their customers and contractors. These firms have relationships with one another that can be both competitive and collaborative and that are probably as important in stimulating innovation as those they have with knowledge generators;
- A knowledge generation and diffusion sub-system composed of public research organisations, technology and knowledge transfer agents, educational and skills development organisations.

Bridging the gap between knowledge generation and application are a wide range of innovation support organisations that play a role in the acquisition and diffusion of technological ideas, solutions and know-how throughout the innovation system. These may include: skills agencies, technology centres, technology brokers, business innovation centres, organisations in the higher education sector and mechanisms for financing innovation.

One of the assumptions of the regional innovation systems approach is that many innovative firms operate within regional networks, co-operating and interacting not only with other firms such as suppliers, clients and competitors, but also with research and technology resource organisations, innovation support agencies, venture capital funds, and local and regional government bodies. Innovation benefits from the proximity of organisations that can trigger this process.

What the literature has trouble addressing is: does a well functioning national innovation framework depend on strong regional sub-systems? Is a good national policy to support innovation a pre-requisite for regional innovation systems to flourish?

The content of regional innovation policies

How is region-level policy action justified?

Whatever the objectives of national and/or regional strategies to promote innovation, they are strongly influenced by the rationale or economic justification for policy action. In general, public policy to support innovation has been grounded in the assumption that there are significant market failures that lead to under-investment in R&D across the economy (because of, for example, the public good character of scientific discovery and, in some cases, imperfect protection of intellectual property rights (IPR)). The idea that market failure leads to under-investment in research has been the principal rationale for state funding of R&D since the early 1960s. This rationale, on the science side, and concepts of liberalisation of markets and free and fair competition, on the enterprise side, underpin the main pillars of national innovation policy.

At the regional level, other “failures” impede the operation of the innovation system and can constitute crucial obstacles to growth and development (OECD, 2005c). As a result, the exclusive use of market failure arguments to justify public intervention has given way to a perspective that recognises other sources of sub-optimal outcomes:

- **Capability issues:** lack of awareness by potential innovators of opportunities;
- **Institutional rigidities:** failure to (re)configure institutions so that they work effectively within the innovation system;
- **Network and co-ordination problems:** problems in the interactions among actors in the innovation system;
- **Framework inadequacies:** failure to adapt frameworks that help to regulate economic activity to changing circumstances; and
- **“Lock-in”:** where accepted (locked-in) practices and behaviours inhibit the adoption of new methods.

These elements are used to justify government intervention in the field of innovation that goes beyond the market failure arguments underpinning funding for blue sky (basic) research (OECD, 2005c). Looking across OECD countries, it also seems that the integration of innovation into regional economic development strategies has led to intervention being justified on more general economic development grounds as part of an investment strategy, with very tenuous links to market failure. Often, the

arguments in favour of promoting innovation in specific regions focus more on seizing economic opportunities. Sometimes, the term “systemic failure” is used to describe more generalised problems that impede the activities of firms in lagging or remote regions.

The risk is high that region-level intervention substitutes for what the market would otherwise do anyway (deadweight and substitution arguments) precisely because region-level interventions should, according to the categorisation developed above, be closer to market and therefore more prone to interfering with market mechanisms. The other issue with respect to region-level action is whether it is designed simply to remove obstacles for the existing market or trying to effect a more radical systemic change.

What types of innovation are targeted?

A starting point in discussing regional innovation is to understand the range of types of innovation that take place and how this affects public policy (see Table 0.2.). The spectrum of economic activity in which innovation occurs covers traditional sectors, such as agro-food production, as well as services, such as financial services, in addition to ICT and others. This fact stands in sharp contrast with the typical approach to supporting innovation that focuses mainly on high-technology sectors and those that have a strong R&D component in the mainstream business model.

Table 0.2. **Different types of innovation**

Nature of the innovation	Description	Examples by type of innovation		
		Product	Process	Organisational
Radical	A totally new product that creates a new market	Computer	Pasteurisation	On-line insurance
Disruptive	A new product that replaces another and makes other products obsolete	Personal Computer	Radiation	Budget airline
Recombinant	A new packaging of a technology so that it has application to a new market	Smart Card	Special Purpose Vehicle	Lean management
Sustaining	A technology that it developed in order to support the productivity of an industry	High Definition TV	CAD-CAM design technology	Customisation and customer-defined specification
Incremental	A more step-by-step process of innovation, most often associated with SMEs	3G cell phone	Wind turbine energy	Call centres

Source: Adapted from Philip Cooke, personal communications.

Different types of innovation have different economic and spatial impacts. And they also imply different approaches to supporting innovation. Disruptive or radical innovations can render existing technologies and industries obsolete and thus trigger dramatic growth in economies, creating demand for new skills and competencies and reducing the value of traditional skills. At the same time, such innovations are relatively rare and could require significant, long-term investment. Recombinant innovation suggests a very agile and pragmatic approach to innovation, with the accent on entrepreneurial adaptation of existing technologies. Sustaining innovation involves a conscious move up-market to escape competition; this is perhaps the most common situation for OECD regions, with firms using innovation to gain short-term market advantage. Finally, incremental innovation tends to offer more quality at less cost for a pre-existing process or product, though with the risk that this process can lead to “lock-in” around these existing products and processes.

Who are the innovators?

Equally important in the process of understanding innovation policy at the regional level is determining what actors are the targets for policy (see Table 0.3.). The answer depends to some extent on the characteristics of the regional economy – the role of large firms, entrepreneurial drive and the presence of innovative small firms, etc. It also depends on the overall objective of policy – whether it is intended to transform regional structures, by targeting breakthrough innovations in new sectors, or simply to support firms where their capacity to innovate is restricted by imperfect information or poor access to the inputs they need to help them innovate. In theory all firms are concerned by innovation, but in practice policies tend to be targeted at particular categories of firms, or even particular firms.

Table 0.3. Who are the innovators: potential policy targets

Target group	Innovation objective
Large firms	Providing a competitive and secure environment for R&D, linking large firms with large-scale R&D projects, supporting R&D in emerging technologies, ensuring supply of graduates, etc.
Small and medium sized supply chain firms	Broadening the customer base of specialised firms; reducing their dependence on MNEs, helping them to reach global markets by strengthening their capacity to innovate or absorb new technologies
Innovative or high growth SMEs	Supporting small firms with technical facilities, linking them to venture capital and other finance for innovation-related projects, helping to create networks among small firms

Table 0.3. **Who are the innovators: potential policy targets** (*cont.*)

Target group	Innovation objective
Firms in specific sectors or clusters	Helping firms with common interests to develop joint R&D projects or providing them with collective supports both physical (testing facilities etc.) and advisory
Foreign investors	Targeting inward investors that can contribute to the regional innovation system, either directly through links with other local firms and the research community or indirectly by promoting demand for higher quality, innovative goods and service from local firms
Research groups or researchers	Promoting linkages between researchers and possible funders or entrepreneurs, strengthening the applied research dimension of public R&D facilities, supporting open innovation mechanisms
Entrepreneurs	Providing incubator support for entrepreneurs, providing mentoring and other business advisory and financial support
Public service delivery agents	Looking at ways that public agencies can support innovation by generating demand for innovative solutions or guiding research efforts

Yet, even within such categories, firms adopt very different strategies in order to maximise the impact of their innovation activities. The categorisation developed by Lambert and Frenz (2008) into four categories (in-house innovators, process innovators, wider innovators and market-driven innovators) implies different policy approaches even for a given firm type. Depending on their innovation strategy, firms will be more or less interested in the offer of public support. Those that concentrate on in-house innovation will tend to have limited contact with public policy. Many regions note that they have trouble engaging with large firms because the firms have little need or incentive to participate. Firms involved in process modernising are likely to be more interested in collaboration with the local research community or using testing and other facilities. Firms that are looking to modernise business processes will also be interested in making use of any technological advances that can support these efforts and therefore are likely to be users of applied research. Firms that are in industries where markets are more volatile could tend to find public support too slow and unresponsive.

What are the key instruments used at the regional level?

There are a range of choices about how innovation policy should be organised. There are possible variations in objectives, targets, actors, and the types of innovation that they are most likely to be involved in, among others. These choices are necessary to identify the types of programmes adapted to regional needs (see Table 0.4.).

Table 0.4. **Regional actions to support innovation, main categories**

Category of action	National and regional dimensions	Examples of specific regional programmes	Main issues
“Technology push”	National governments have technology transfer programmes; regions can complement with measures targeted at specific HEIs or specific sectors	Instruments to spin technology out from university R&D	Depends on regulation of HEI, funding systems for HEI, risk taking or risk aversion of researchers, and links between research and entrepreneurs and investors
Technological R&D	National government sets framework and funds most basic R&D, plus provide tax credits for business-led R&D; regions	Support for close-to-market R&D projects	Depends on region having adequate resources and having mechanisms to identify projects with commercial applications
Attraction of FDI with innovation component	National government often first contact for investors via national investment agency; more recently regions becoming more autonomous and pro-active	Initiatives to embed large firms in local settings by supporting quality management by potential suppliers, adapting training courses to ensure that labour demand can be met	Problems for all OECD countries in attracting new investment, particularly in targeting investment with high innovation component; New FDI from China and India have also forced shift in approach
Large scale science parks	Typically a central government matter – technopole programmes have gone out of fashion, but national governments still try to generate spillovers around their prestigious scientific facilities	Regions have tended to develop watered-down versions of the original model, lacking resources to select tenant companies; Lessons learned have led to more emphasis on facilitation/animation where funds permit	Still some scepticism about how to replicate well-known success stories; Trend towards open innovation could give new lease of life to the model; National – scale science facilities or world-class universities still seem necessary for the model to work
Business incubators	Usually a regional or local level initiative	Range of models to support start up, sometimes located on or near universities to promote spin offs	Possibly the most widely used innovation instrument at the sub-national level; Allows convergence between innovation / enterprise policy and real estate-related initiatives, an area over which local authorities have significant control; Politically valued and high profile, though usually small with limited economy-wide impact

Table 0.4. **Regional actions to support innovation, main categories** (*cont.*)

Category of action	National and regional dimensions	Examples of specific regional programmes	Main issues
Firm-level innovation and absorption capacity building	National programmes focus on providing tax advantages for firms that innovate and financing advisory services for firms; regions also involved in implementing business support programmes and have an increasing role in skills training	Business mentoring programmes and one-stop advice centres for firms	Area of clear joint interest between national and regional levels; most countries, however, have seen support schemes multiply as several different bodies offer similar services, creating confusion among users
Cross-over technology and new applications	Increasingly key issue for national S&T policy as it moves away from thinking in terms of sectors and more in terms of technologies and commercial applications; Studies on “converging” technologies suggest that regions are also becoming more active in this field	Use of regional platforms to help transfer technologies from core sector to new applications (e.g., mix of ICT and biotechnology in bioinformatics; use of ICT in road sensing, intelligent textiles, etc.)	Seen as an important means by which to move away from over-dependence on single industries and to make better use of accumulated skills
Service sector innovation support	New priority for many OECD countries	Few examples of good practice	One of the hard-to-reach types of innovation that is now becoming increasingly prominent; problem remains how or whether public policy can be effective; demand side is unclear
Public sector-driven innovation	New priority for many OECD countries; role of sub-national authorities in many countries less clear	Some examples of procurement-driven innovation in health care and in traffic management	

Notes: 1) HEI=Higher Education Institution; 2) R&D=research and development; 3) ICT=information and communications technology; 4) S&T=Science and Technology.

The problem with an analysis of both national and regional systems of innovation is that in both cases there are examples of success that seem to rely on very different combinations and arrangements of institutions and policies. And examples of efficient regional innovation systems do not necessarily only develop where the national innovation system functions well.

Governance of multi-level innovation policy – who does what?

Co-ordinating across different policy areas at the national level

Policies to support innovation with a regional perspective appear to be at the intersection of several different policy families which helps to explain

the increased policy interest (see Table 0.5.). These policy families include: regional policy, science and technology (S&T) or innovation policy, higher education policy and industrial/enterprise policy. The orientation of the policy family (in other words, which Ministry is funding the programme, or which sectoral “plan” it is part of) serves to frame the objectives, targets and scope of the policy.

Table 0.5. Policy trends supporting clusters and regional innovation systems

Policy stream	Old approach	New approach	Innovation focus
Regional policy	Redistribution from leading to lagging regions	Building competitive regions by bringing local actors and assets together	<ul style="list-style-type: none"> • Target or often include lagging regions • Focus on smaller firms as opposed to larger firms, if not explicitly than de facto • Broad approach to sector and innovation targets • Emphasis on engagement of actors
Science and technology policy	Financing of individual, single-sector projects in basic research	Financing of collaborative research involving networks with industry and links with commercialisation	<ul style="list-style-type: none"> • Usually high technology focus • Both take advantage of and reinforce the spatial impacts of R&D investment • Promote collaborative R&D instruments to support commercialisation • Include both large and small firms; can emphasise support for spin-off start ups
Higher education policy	Focus on teaching role of HEI and on basic research	Promoting closer links with industry and joint research; more specialisation among HEI	<ul style="list-style-type: none"> • Usually high-tech focus (following research budgets) • Increasing emphasis on commercialisation (e.g., support for spin offs in some HEI) • Most joint work with large firms; increasing HEI-SME links is a new goal • Regional HEI are increasingly core partners for regional policy-led innovation programmes
Industrial and enterprise policy	Subsidies to firms; national champions	Supporting common needs of firm groups and technology absorption (especially SMEs)	<p><i>Programmes often adopt one of the following approaches:</i></p> <ul style="list-style-type: none"> • Target the drivers of national growth • Support industries undergoing transition and thus shedding jobs • Help small firms overcome obstacles to technology absorption and growth • Create competitive advantages to attract inward investment and brand for exports

Source: OECD (2007), Competitive Regional Clusters: National Policy Approaches, OECD Publications, Paris, with modifications.

These policy shifts imply greater fluidity across what used to be more segmented sectoral ministry boundaries. The overlapping of objectives requires new ways of managing cross-sectoral (horizontal) governance arrangements. Clarity and co-ordination at the central level serves to prevent the problems resulting from the classic “silos” of individual sectoral policies. At the regional level, it is typically easier to join-up across these policy streams when the central level has already begun to do so.

The reorientation of regional policy in many countries has led to a more sophisticated awareness of regional innovation systems and their components. The new approach to regional policy in mature economies is now mainly focused on making domestic firms more competitive, emphasising innovation and better use of knowledge and technology in the region. At the same time, science and technology policy makers are taking increasing account of the importance of region-specific factors, in particular the role of proximity, in the innovation process. Despite this convergence of interest, the perennial issue of co-ordinating across government departments and other agencies and bodies remains.

Distributing roles across levels of government

Even where the constitutional framework suggests one model or another, there are choices to be made about what the role of the region is within the governance arrangement. The different ways of perceiving the role of the region can be summarised in the following way (adapted from Perry, 2007):

More “passive” roles for regions, e.g.:

- ***Regions as stages:*** Within nationally-defined policy frameworks, regions are seen as appropriate scales of action, as “containers” of innovation or “stages” on which policy is enacted. It is important to note that policy may be defined or organised within regional units yet regional authorities or agencies are not seen as participants in that process.
- ***Regions as implementers:*** Regional authorities and agencies have a role in the implementation of nationally defined and funded policy initiatives. Regions provide not only stages for policy delivery but are also agents for delivery according to centrally conceived priorities and targets.

More “active” roles for regions, e.g.:

- ***Regions as partners:*** Regional authorities and bodies have increasing influence in shaping national priorities for science and innovation in a more co-determined model of policy formulation. Regions may, for

instance, co-fund scientific infrastructure located in their region but which is of national importance.

- **Regions as independent policy makers:** Regional authorities and bodies devote their own finance and resources to fund regionally significant scientific investments or projects without *a priori* links with national S&T targets. This can involve independent agenda-setting, institutional creation and new governance arrangements.

For most countries the question of the role of regions in policy development and implementation lies within more general debates over the allocation of competences across levels of government and is therefore outside the scope of innovation policy itself. At the same time, all governance systems strive for an efficient organisation of functions: is there is an optimal distribution of responsibilities across levels of government with regard to innovation?

There are currently some clearly different approaches to organising and managing innovation policy, largely dependent on more general institutional and constitutional frameworks. These differ across types of innovation-related policy – from funding R&D to building science parks or providing business advice to firms. However, there are some general patterns (see Tables 0.6. and 0.7.).

Table 0.6. National-regional responsibility sharing

	Federal, decentralised	Centralised	Small country or single region countries
Innovation environment	↔	↑	↑
Innovation poles, clusters and science parks	↓	↔	↔
R&D, pure research/applied	↔	↑	↑
Enterprise support for innovative firms	↓	↔	↔

Notes:

↔ = both central and regional levels involved

↓ = essentially a regional responsibility

↑ = essentially a national responsibility

Source: Adapted from Technopolis *et al.* (2006), *Strategic Evaluation on Innovation and the Knowledge Based Economy in Relation to the Structural and Cohesion Funds, for the Programming Period 2007-2013: Synthesis Report*, A report to the European Commission, Directorate General Regional Policy, Evaluation and Additionality, 23 October 2006.

Table 0.7. **Different ways of delivering key policies and programmes**

Key innovation policy tasks	Option 1: centralised	Option 2: decentralised	Option 3: joint
Determining the overall S&T strategy	Establish regional agencies or branches that represent and implement national policy	Devolve responsibility to the regional level	Devolve responsibility to the regional level but guide strategies and monitor results closely
Defining priorities for basic scientific research	Allocate funding on the basis of projects or field to research institutions and HEIs across the country	Allocate portions of the science budget to region-level authorities and let them allocate according to a locally defined science plan	Develop a framework by which regions contribute to the elaboration of science policy and develop instruments that allow regions to bid for discretionary funds.
Providing business support that overcomes market failures	Focus on generalised instruments (e.g., R&D tax credits for small firms, R&D vouchers, etc.).	Devolve responsibility for enterprise support to the sub-national level	Share responsibility with regions implementing some national programmes, while ensuring that there is no duplication of public offer

Ultimately, many public and private actors are involved in innovation in regions. A principal aim of region-level policy is to draw on this collective knowledge. Therefore, the ability to validate regional action with those who will benefit or help implement it is as crucial as the formal administrative structure. In particular, the networking and consensus building process within a region – the so-called innovation journey – serves to ensure that policy reflects real needs.

Chapter 1

North of England and Innovation

Introduction

This chapter provides an overview of the North of England from a demographic, economic and innovation perspective. The first question it raises is whether the North is an appropriate unit of analysis as one regional innovation system. While there are several common challenges across different parts of the North, it does not constitute one system. There are considerable intra-regional variations in performance, including across the eight city-regions and between urban centres and more rural areas. The chapter then considers the industrial history of the region and the changes in industrial composition that explain in part productivity differences with other UK regions. The analysis of industrial composition also sets the stage for interpreting innovation indicators and needs. In some cases the variation in results across regions can be explained in part by industrial composition differences (R&D investment, patenting) and in other areas (propensity for firms to innovate) these regional differences are less obvious. The position of the three regions of the North of England with respect to different innovation indicators and regional innovation system typologies is assessed, including comparisons with other regions of similar characteristics. The chapter concludes with a discussion of the strengths and opportunities for the North going forward that national and regional policies and strategies could support.

What is the North of England?

Political and economic position in the UK

The North of England is simply a term used to describe the three northernmost administrative English regions. These regions (North East, North West and Yorkshire and the Humber) correspond to Government

Office regions and Regional Development Agency (RDA) areas (see Figure 1.1.). The administrative level immediately below includes counties (which are subdivided into districts) and unitary authorities (see Table 1.A1. in Annex). Politically, there is no strong pan-northern political tradition. When viewed from outside the region, the North is considered to have a common identity, in contrast to other parts of England (Maconie, 2008). However, this image obscures a more complex political, cultural and economic reality. Residents of the North are more likely to identify with a city or county than with an RDA region or the North more generally.

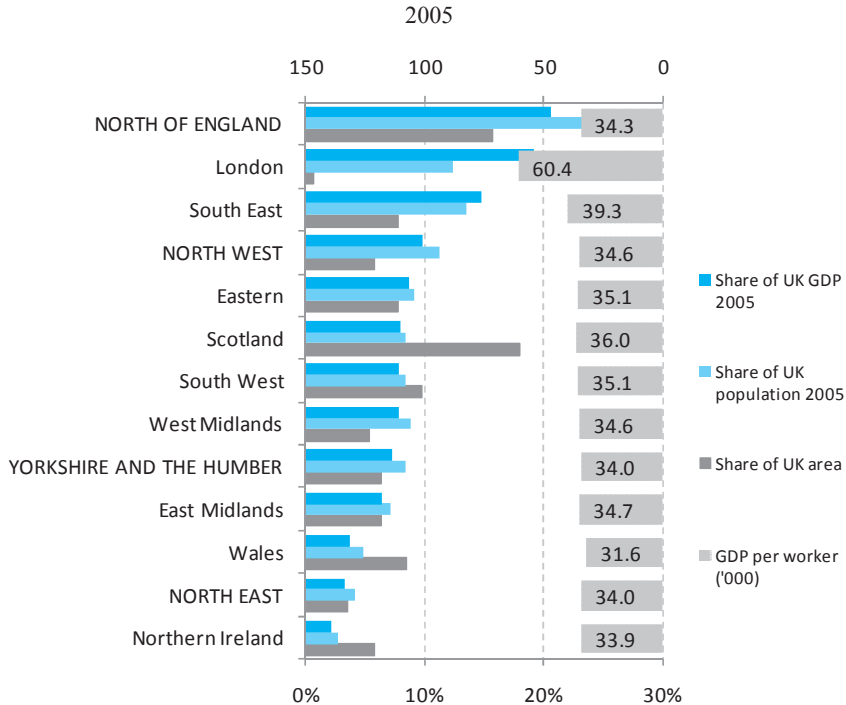
Figure 1.1. **Map of the United Kingdom**



The North as a whole is larger than several European countries with a population of approximately 14.5 million and an economy of GBP 232 billion. The North makes an important contribution to the UK, as it covers around 16% of the territory, contains 24% of the total population and contributes just over 20% of its GDP (see Figure 1.2.). Within the North, about half of the population (11.3% nationally, 6.9 million) lives in the North West. The region contains a vast rural area, Cumbria, but the southern

part includes major cities such as Manchester and Liverpool where there is high population density.¹ Another 35% of the North resides in Yorkshire and the Humber (8.4% nationally, 5.1 million), while the remaining 18% lives in the North East (4.2% nationally, 2.6 million).

Figure 1.2. **North's contribution to the United Kingdom**



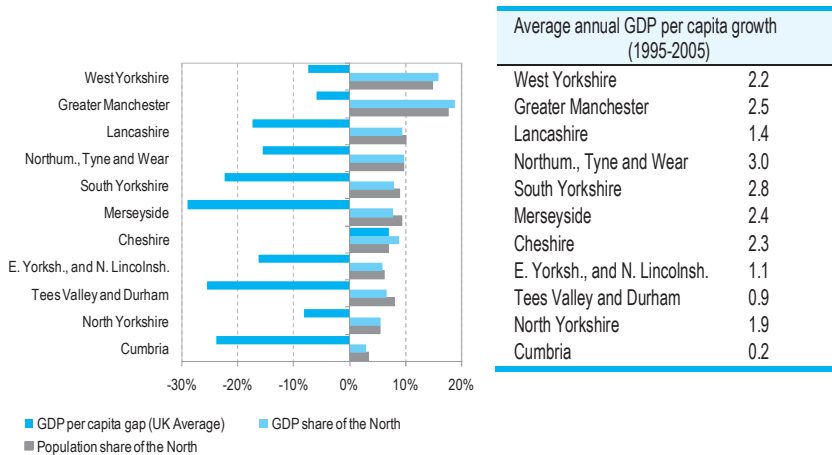
Source: OECD Regional Database 2008.

Economic geography within the North of England

The North of England contains eight city-regions that account for 90% of the North's population and over 90% of its economy. The general geography of the city-regions is illustrated in Figure 1.3., which shows a highly populated corridor from Liverpool through Cheshire to Manchester and on to Leeds (approximately a two-hour train journey from one end to the other). Manchester also has a high level of international accessibility with its airport. Looking at data for 11 sub-regions (NUTS 2 level² which does not correspond exactly to the city-region configuration), there are very

Figure 1.4. Sub-regional contributions to the North

2005



Source: Eurostat Regional Statistics.

In summary, there is a clear hierarchy of city-regions in the North, in terms of scale, economic growth, accessibility and other indicators. The hierarchy of city-regions and other cities has been characterised as: 1) two major Northern centres: Manchester and Leeds; 2) three key sub-regional centres: Newcastle, Sheffield, Liverpool; 3) buoyant smaller centres (for example, York, Chester and Preston); and 4) less prosperous sub-regional centres (such as Hull and Middlesbrough) along with areas of industrial restructuring and the rural periphery (CUPS *et al.*, 2008).

The North's industrial tradition

A strong linking theme across much of the North is its long and illustrious industrial tradition that helped to establish an urban system that had many common economic and social traits. The North of England was at the heart of the Industrial Revolution in the late eighteenth century, the result of a series of technological innovations that led to the replacement of manual labour by machines in the textile industry. The cotton textile industry grew rapidly in what were then small towns in Lancashire. These towns continued to grow during the nineteenth century, with Manchester becoming the world's first truly industrial city. In parallel, Liverpool's importance for bringing in raw materials and exporting finished goods made it the most important port in the world. Elsewhere in the region, industrial

woollen textile production expanded in other parts of Lancashire and Yorkshire. The discovery of iron ore in the North East also led to the growth of an iron smelting and steelmaking industry that exported through the ports of Newcastle, Sunderland and Middlesbrough where shipbuilding and related metal industries then developed. A major chemicals industry also evolved around salt and bauxite deposits in both the North East and North West.

Over the last decades of the twentieth century, many of the traditional industries that had become closely linked to the region declined sharply and the major heavy industries all but disappeared. Some of these industries include shipbuilding, steelmaking and textiles. At the same time, the industrial legacy remains strong. Some features that distinguish the North of England from other regions – such as relatively lower levels of entrepreneurship or high worklessness in older working age cohorts – are often seen as the after-effects of an economy dominated by large industrial complexes.

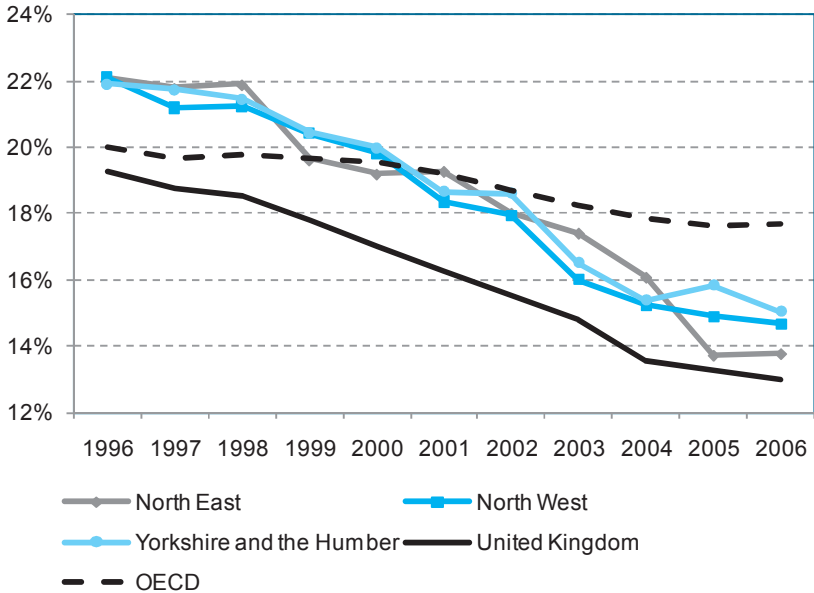
Even in the last decade, the loss of manufacturing employment was very strong across all regions, as was the decline in the manufacturing share in Gross Value Added (GVA). The share of manufacturing employment in Northern regions is higher than the UK average but with the gap closing somewhat (see Figure 1.5.). In 1996, approximately 22% of employment in the three regions was in manufacturing, versus between 14-15% in 2006 as compared to a UK average of 13%. The decline in the share of manufacturing employment was much higher than for OECD regions overall. To give a sense of scale, in absolute terms this has meant manufacturing job losses between 1996 and 2006 totalling approximately 80 000 in the North East, 200 000 in Yorkshire and the Humber and 1.4 million in the North West (see Table 1A.3.). The trends in terms of GVA are similar (see Figure 1.6.). The Northern regions have followed the same general pattern with manufacturing GVA being between 29-31% of total GVA in 1996 down to 18-19% in 2006. The gap with the UK average is also closing slightly from 6-8 percentage points down to 5-6 percentage points.

While no subsectors of manufacturing (three digit industry code level) experienced employment growth over the last several years, several subsectors had an increasing share of manufacturing employment (see Figures 1.7. and 1A.1. in Annex). In the North East, they include food and beverages, wood products, pulp and paper, non-metallic mineral products and transport equipment. In the North West, they are wood and wood products and other manufacturing. In the North East, those sectors are pulp and paper, rubber and plastic products, and non-metallic mineral products.

The specialisation in manufacturing is on the decline (see Figure 1.8.) for the North East and the North West. Yorkshire and the Humber is somewhat increasingly specialised in manufacturing but decreasingly specialised in high-tech manufacturing within the UK between 1996 and 2006. The North East has become much less specialised in manufacturing while showing only a slight decline in its relative specialisation in high-tech manufacturing. The South East especially but also the South West show higher rates of specialisation in high-tech manufacturing than regions in the North.

Figure 1.5. Decline in manufacturing employment within total employment

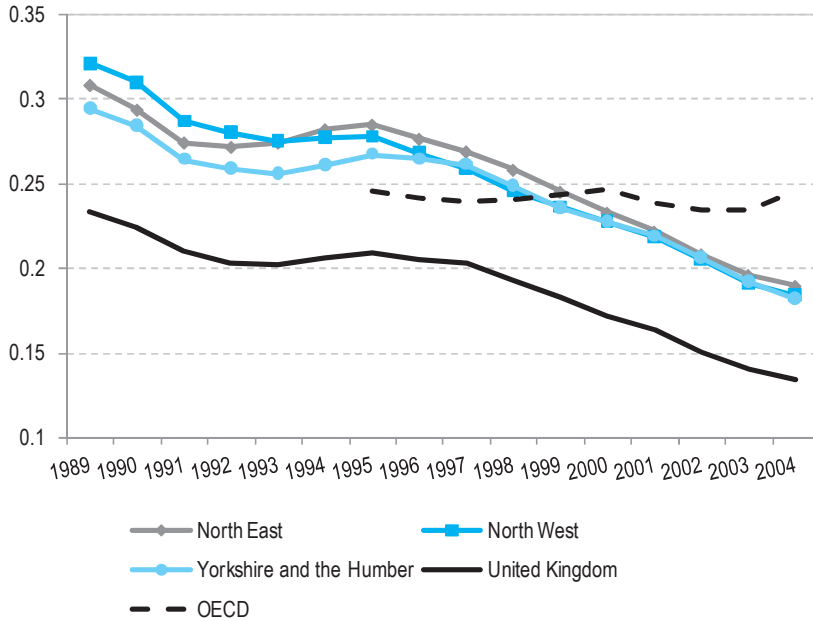
1996-2006



Note: The OECD average does not include: Austria, France, Hungary, Japan, Poland, Sweden and Turkey.

Source: OECD Regional Database 2008 and OECD.Stat Labour Statistics.

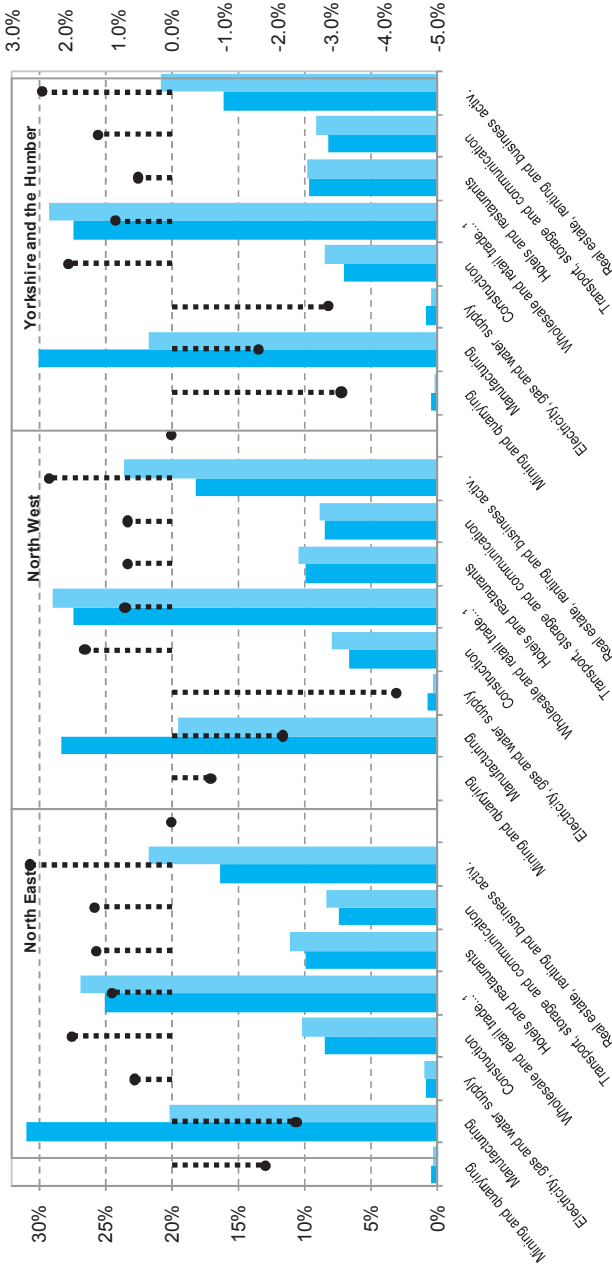
Figure 1.6. Share of GVA in manufacturing



Note: The OECD average does not include France, Greece, Iceland and Spain.

Source: Office for National Statistics (United Kingdom) and OECD.Stat National Accounts.

Figure 1.7. Employment share and growth by sector in the North



Notes: 1) The full title of the category is: "Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods".

Source: Eurostat Business Survey.

Table 1.1. **Employment changes by sector**

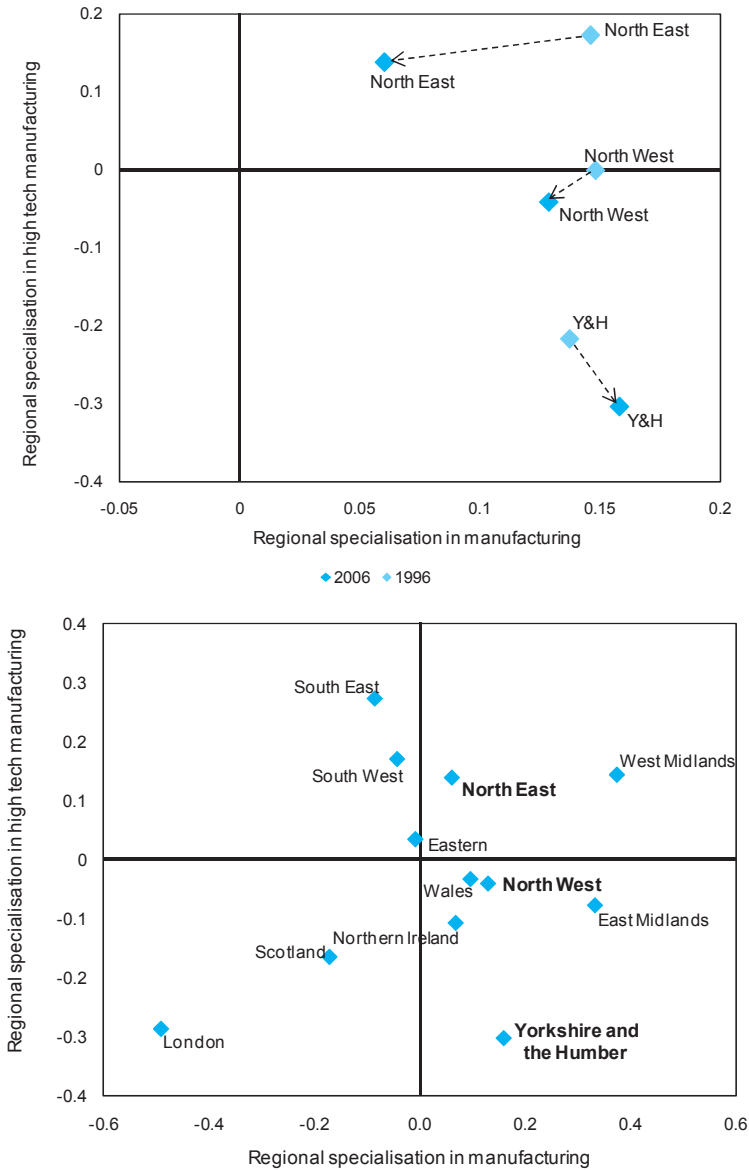
% of total employment in 1996 and 2006

	North East		North West		Yorkshire and the Humber		UK	
	1996	2006	1996	2006	1996	2006	1996	2006
Manufacturing sector	22.1	13.8	22.1	14.7	21.9	15.0	19.2	13.0
High-technology manufacturing sector	1.2	1.1	1.2	1.0	0.9	0.6	1.7	1.0
Medium-high-technology manufacturing sector	9.4	5.8	7.8	5.0	6.1	3.9	6.2	4.5
Medium-low technology manufacturing sector	5.0	3.5	5.0	3.8	5.4	4.0	4.3	2.9
Low-technology manufacturing sector	6.5	3.6	8.1	4.9	9.5	6.6	7.1	4.6
Service sector	67.3	74.7	68.2	76.0	67.0	73.7	70.3	76.5
Knowledge-intensive high-technology services	2.6	3.7	3.0	3.3	2.2	3.1	3.4	4.2
Knowledge-intensive financial services	2.5	2.4	3.4	4.0	3.5	3.8	4.3	4.3
Knowledge-intensive market services	6.0	8.0	6.6	9.6	7.1	7.6	8.3	9.6
Other knowledge-intensive services	22.7	25.2	21.0	24.7	22.2	25.7	21.2	24.9
Less-knowledge-intensive market services	24.8	23.0	25.4	24.4	24.2	24.3	23.9	23.3
Other less-knowledge-intensive services	8.7	12.3	8.9	10.1	7.8	9.3	9.2	10.2
Primary sector + mining and quarrying	2.11	1.18	1.6	0.83	2.23	1.37	2.32	1.64
Electricity, gas, water supply and construction	7.8	9.8	7.6	8.2	8.5	9.6	7.68	8.63

Notes: Please see Table 1A.3. for extensive notes on these categories.

Source: Eurostat, High-technology manufacturing and knowledge-intensive services sectors: Economic, Science and Technology and Employment statistics.

Figure 1.8. Specialisation by technology level of manufacturing



Notes: 1) High-tech manufacturing includes both high and medium-high technology manufacturing; 2) specialisation is measured according to the Balassa-Hoover index, which measures the ratio between the weight of an industry in a region and the weight of the same industry in the country. Please refer to endnote three of Chapter 1 for more information.³

Source: OECD Regional Database 2008.

The North has important concentrations in several research-intensive industries, such as pharmaceuticals, fine chemicals, nuclear technology, advanced materials and precision engineering. Many of these industries have grown out of existing regional specialisations in heavy industries such as steelmaking and bulk chemicals. The transition process in these industries has been difficult and protracted – large numbers of highly skilled engineers left the region during the period – but the sectors have nonetheless survived and are even prospering. This success attests to the accumulated skill base in the region and also the capacity to adapt and to innovate.

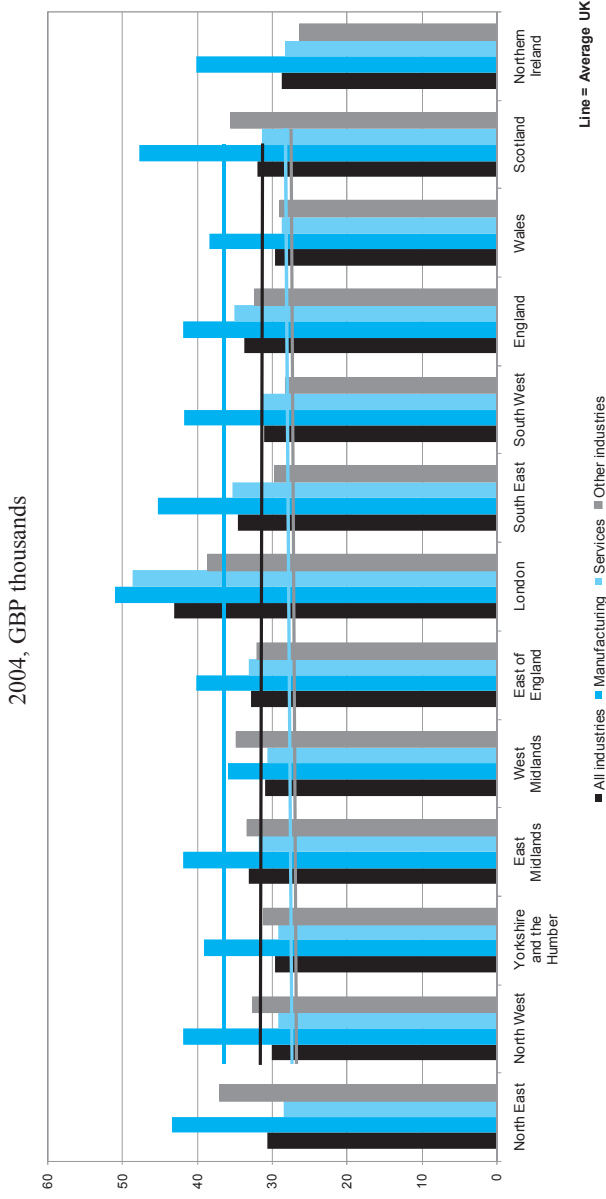
The North has developed sizeable concentrations of high-value-added service industries as well during this period of manufacturing job loss (see Tables 1.1. and 1A.3 in Annex). Examples include business and financial service clusters in both Manchester and Leeds. These clusters are not regional centres *per se*, but rather niches that are in many ways subordinated to London. Nevertheless, between 1996 and 2006, approximately 38% of the increase in the number of UK knowledge-intensive financial services jobs came from the North (mainly the North West and Yorkshire and the Humber). There are also creative and media industry clusters. A decision to relocate parts of the BBC to Greater Manchester will only strengthen these clusters. The North East and Yorkshire and the Humber experienced a higher percentage increase in knowledge-intensive high-technology services than the national figure. However, in the North East there was also a notable increase in the number of jobs in less-knowledge-intensive services.

Despite these strengths, the region's long period of economic transition has left its mark. The North has clear assets but, like other parts of the UK and regions within other OECD countries, the region lacks critical mass in "world-class" attributes. There are, for example, relatively fewer large firms, and far fewer headquarters of large firms. The university system overall is strong in a range of disciplines but, apart from Manchester, the region's universities attract much less research money than universities in the South East. These weaknesses in the economic infrastructure in the North relative to the South, some quantifiable and others more intangible, support a perception that the region is at a competitive disadvantage. Economic actors in the North (firms, entrepreneurs, researchers, etc.) therefore need to be more innovative than counterparts in other parts of the country in order to compete.

Growth and productivity: How different is the North?

Within the UK, the North of England overall is viewed as a region lagging behind the rest of England. It is often argued that the gap in per capita wealth and productivity between the North and South is unlikely to disappear because of structural features between the two parts of the country. These features include different industrial structures, the path dependency of growth based on that sectoral structure, and the geography and distance to markets. In fact, GVA per head growth rates, in terms of the size of regional differentials and the relative ranking of regions, has shown little change between 1971 and 2001 (HM Treasury *et al.*, 2007). The traditional explanation for this has been that the North is specialised in sunset or mature manufacturing industries with relatively low productivity. In fact, most of the difference in productivity is driven by the very low GVA per worker of the North's service industries (see Figure 1.9.). The Northern regions perform below all other English regions in GVA per workforce job in services. This lower productivity is in part due to a greater concentration of service sector employment in less-knowledge-intensive services (see prior Table 1.1.) as well as lower productivity in the same service sector categories.

Figure 1.9. Value added per workforce job by industry

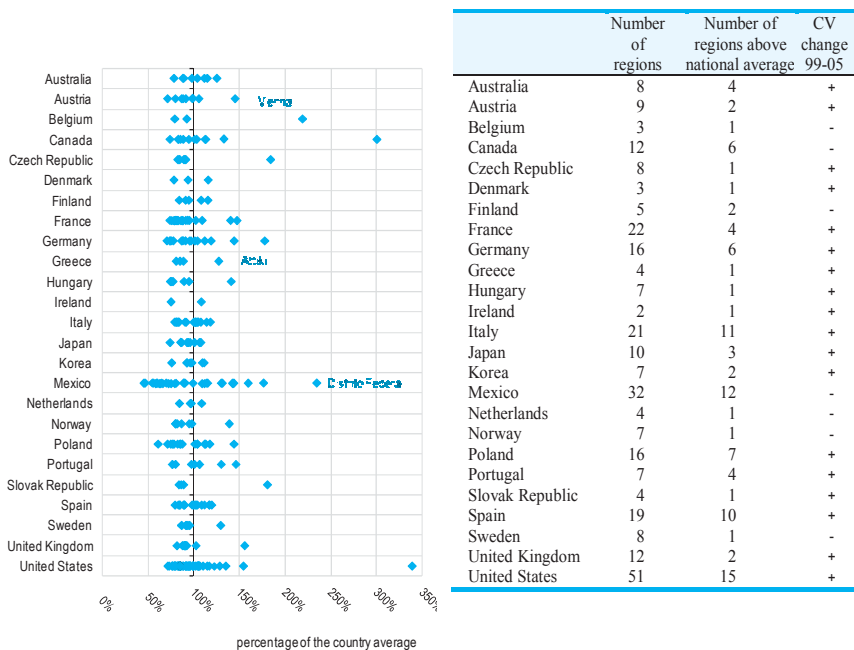


Source: Office for National Statistics and Department of Enterprise, Trade and Investment, Northern Ireland (United Kingdom).

While there are disparities in regional productivity across the OECD, for peer countries to the UK it is somewhat unusual to have as small a share of regions above the average. The closest measure of productivity tracked for regions at the OECD is GDP per worker (see Figure 1.10.). Peer countries to the UK (such as Germany, Italy, Spain, the US, Canada, etc.) generally have a higher share of their regions above the average and are less subject to a “super-region” effect. There are nevertheless a number of countries (with a minimum number of regions) where only one or two regions in the country are above the national average. They include Austria, the Czech Republic, Hungary, Norway and Sweden. Between 1999 and 2005, the variation in regional values of GDP per worker relative to the national average has slightly widened across the OECD countries with data, but with some countries nevertheless illustrating reduction in disparities.⁴

Figure 1.10. Regional dispersion in GDP per worker

2005

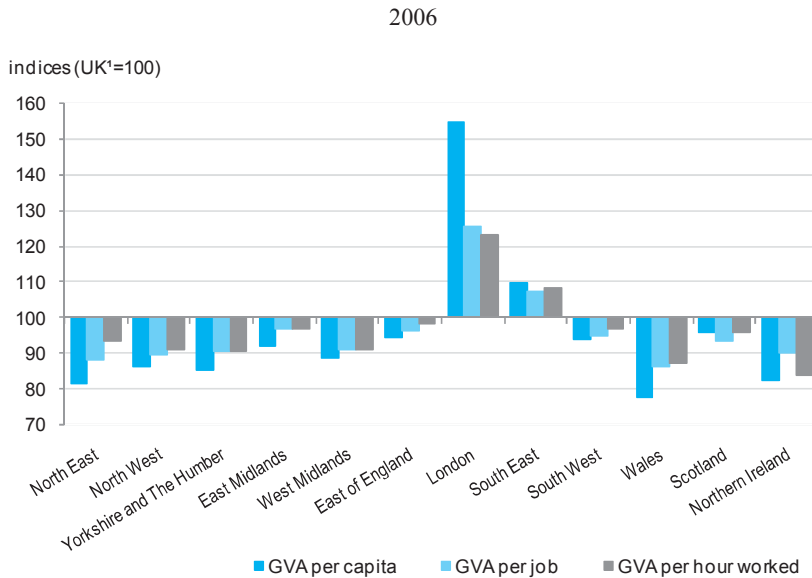


Note: The coefficient of variation (CV) is the ratio of the standard deviation to the mean. It indicates a high or low degree of variability in relation to the mean value. The higher the coefficient, the higher is the dispersion of the variable under analysis. For the year 1999, data for Mexico refer to 1998. For the year 2005 data for Mexico refer to 2004; Na=not available.

Source: OECD Regional Database 2008.

Analysis of regional growth in the UK underlines the economic weight and greater productivity of the Greater South East region and the difficulty that other regions have in matching their growth rates. On measures of GVA per capita, GVA per job and GVA per hour worked, only London/South East are actually above the national average (see Figure 1.11.). The challenge for the North (and a few other regions in the UK) is to improve labour productivity. The gap in labour productivity between London and the South East compared to other parts of the country has continued to widen considerably since 1980 (Abreu *et al.*, 2007). GVA per hour worked increasingly explains the gap in GVA per head across UK regions as the share attributable to employment and activity rates declines (see Figure 1.12.).

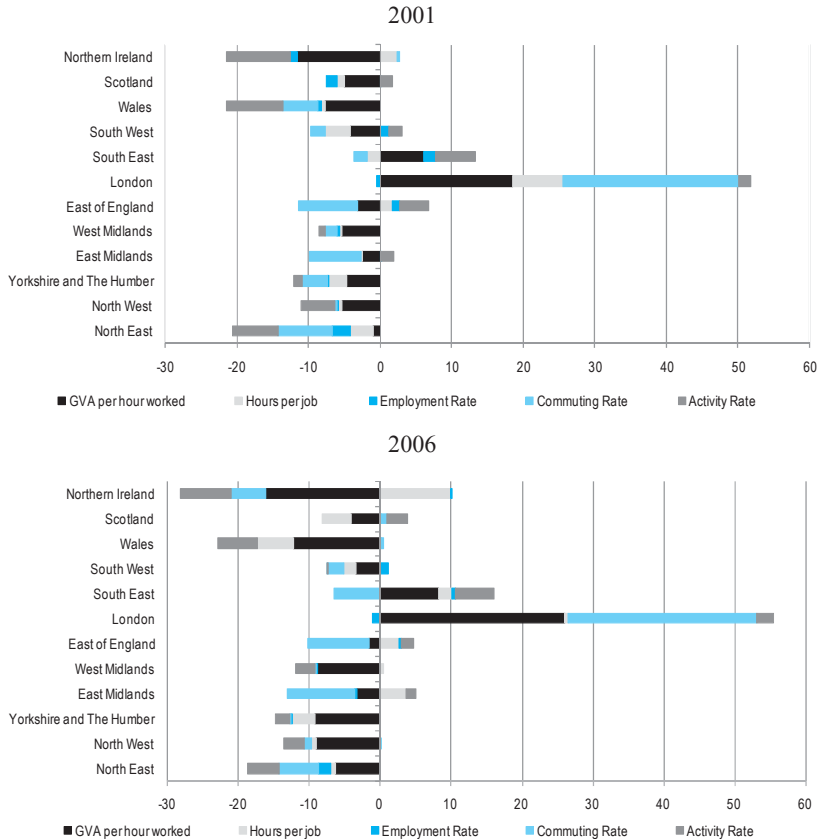
Figure 1.11. The different "gaps" across regions



Note: 1) UK less extra-regio and statistical discrepancy.

Source: Wosnitza, Birgit and Martin Walker New (2008), "Regional economic indicators May 2008, with a focus on differences in sub-regional economic performance" *Economic & Labour Market Review*, Vol. 2, No. 5, May 2008, Office for National Statistics.

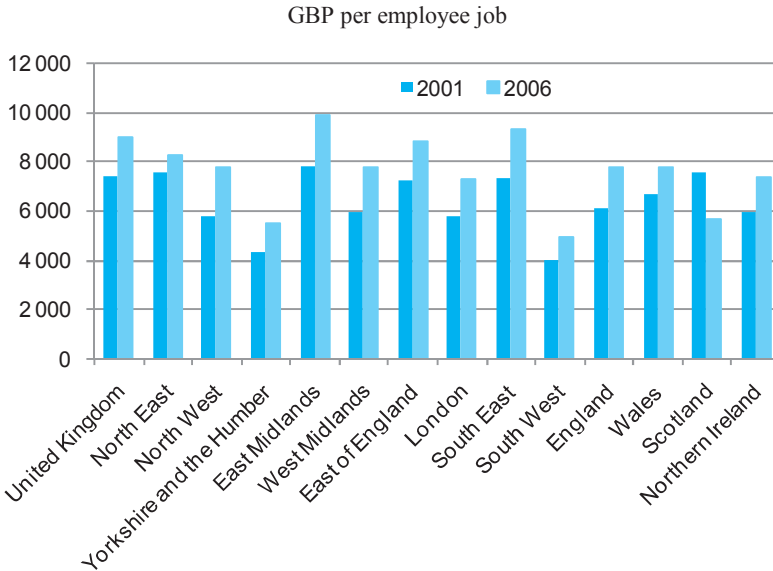
Figure 1.12. Factors contributing to differences in regional GVA per head from the UK average



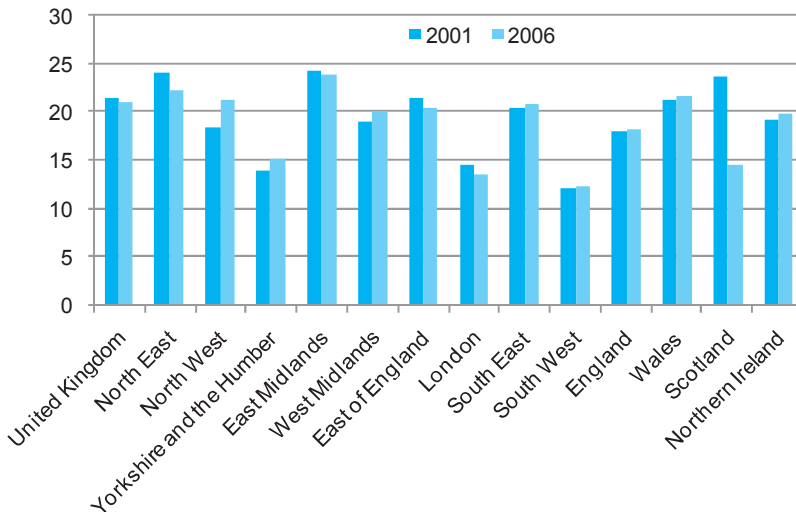
Source: Office for National Statistics (United Kingdom).

While the productivity differentials may be due in part to the relative distance of the North from key markets, industries in the North are active globally. Interviews suggested that small businesses started by Northerners may find relocating to the South a logical step in order to be close to major customers and tap in to a large skilled labour pool, though for other reasons, such as quality of life, they might nonetheless remain in the North. More generally levels of inward investment and exports tend to suggest that the North is as linked to global markets as other parts of the UK. Industry structure means that the North East, which has some strong manufacturing industries, exports more than the UK average, while the North West exports around the UK average, with a strong pharmaceuticals component, and Yorkshire and the Humber exports slightly below average because of a relatively smaller export manufacturing sector (see Figure 1.13.).

Figure 1.13. Value of export of goods 2001 and 2006



Value of exports of goods as a percentage of headline regional GVA



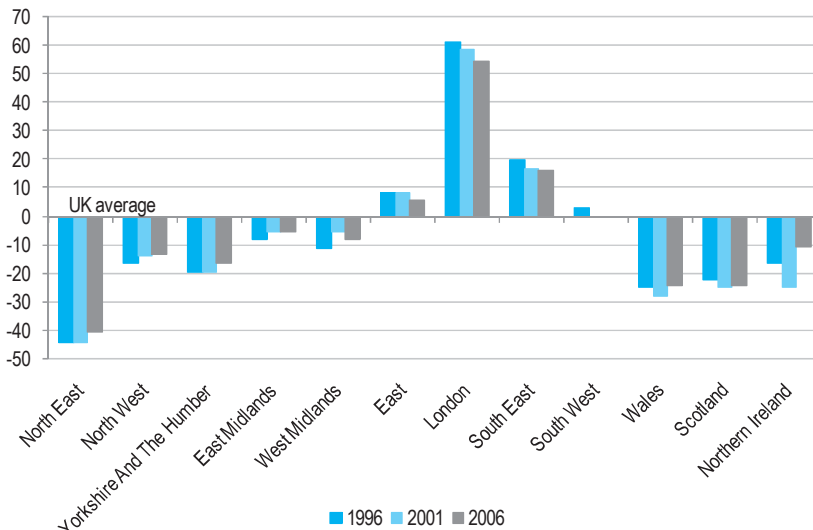
Notes: 1) The headline regional GVA series has been calculated using a five-period moving average. 2) Estimates of workplace-based GVA allocate income to the region in which commuters work.

Source: Department of Trade and Industry analysis of information provided by the Statistics and Analysis of Trade Unit, HM Revenue and Customs and Short Term Employment Survey, Office for National Statistics (United Kingdom).

The rate of business start-ups is a highly monitored indicator for regions in the UK. While the vast majority of these firms are not necessarily actively innovating, the indicator does capture a spirit of entrepreneurship that can be positively associated with an innovative region. The propensity for firm start-ups, as expressed in terms of population, are all lower in the North than in other English regions (see Figure 1.14.). The North East, which underperforms generally relative to other UK regions on measures of enterprise, is particularly weak with less than 60% of the national average in terms of firm start-ups. One explanation sometimes advanced for this is the tradition of major, heavy industry in the North that has left a continuing legacy of lower levels of entrepreneurial activity at all age cohorts. The lack of a business culture in the region is a notable constraint to economic growth (OECD, 2006f). The North West and Yorkshire and the Humber are a bit more than 80% of that average. Firm demographic statistics illustrate a smaller share of small firms in the economy, with the North having a lower percentage of firms and firm turnover in the 0-4 employee category and a greater share of firm units in the larger firm size categories (see Tables 1A.4. and 1A.5. in Annex).

Figure 1.14. **Propensity to start a firm**

VAT registrations per 10 000 population (index UK=0)



Note: Values for the South West in 2001 and 2006 are at the average and therefore are not visible in this graph.

Source: Data from the Small Business Service, Department of Trade and Industry (United Kingdom).

But once firms have been established, there is no evidence in innovation surveys of purely regional effects on the propensity of firms to innovate. Looking at innovation practices, various analyses of the data in the UK reveal that, while there are regional differences, it is the industry effects that are large and statistically significant while the regional effects are not significant (Abreau *et al.*, 2008). However, as sectoral composition is based on the long-term history of the region and is path dependent, the North cannot simply transform its sectoral composition to achieve the same performance as economically stronger regions in the South with the same set of policy instruments.

Some of the general findings in the UK note positive associations for innovation activity with a range of key factors. They include: a larger share of R&D employees (especially for manufactured goods), new management techniques, and collaboration (national level most relevant for service innovation, national and international for products). In terms of sectors, specialised suppliers and science-based sectors were observed to have the highest rates of goods innovation, while the information-intensive and knowledge-intensive business services had the highest rates of service innovation (Carpenter and Chadwick, 2007). Another study shows that innovation is positively associated with firm size and firm growth and is higher in high-technology sectors (Abreau *et al.* 2008).

The likelihood of Northern firms to innovate varies by innovation survey, perhaps due to firm size sampling differences. The most notable survey is the Fourth Community Innovation Survey. Firms in the North are slightly less likely to innovate relative to most other English regions outside London and the South East, where firms are more likely to innovate by at least 3 percentage points (see Table 1.2.). Innovating firms in the Midlands are somewhat more likely to have a goods innovation than other regions. The most striking difference is in service innovation, where innovating firms in London and the South East are more likely to do so by several percentage points compared to other regions. Among city-regions within the UK, Northern city-regions showed both best and worst performance on some categories. Warrington had the strongest percentage of firms with marketing change (32%) and Middlesbrough the least (15%). Leeds, which is one of the leading economic areas, had the weakest performance with only 13% firms reporting new processes (Carpenter and Chadwick, 2007). Looking at the SME Business Survey, the trends observed are very different (see Table 1.2.). In fact, firms in Yorkshire and the Humber and the North East were more likely to innovate than in most other regions, with Yorkshire having the highest rate in the UK at 57.2%.

In a cluster analysis of firms based on their innovative practices, there are some notable differences in the presence of different types of firms by region (see Table 1.3.). This research suggests four broad groupings of firms that describe the different strategies that firms adopt to innovate (Lambert and Frenz, 2008):

- ***In-house/IPR innovators:*** Enterprises that engage in in-house/IPR innovating, and at the same time are below average in terms of wider innovating;
- ***Process modernisers:*** Enterprises that are above average in process modernising, and that are low with respect to in-house/IPR innovating and wider innovating;
- ***Business modernisers:*** Enterprises that carry out process modernising and wider innovating, involving managerial, organisational and marketing innovations; and
- ***Market-driven innovators:*** Enterprises that engage in marketing-driven innovation modes.

The Northern regions are less likely to have the “in-house/IPR innovators”, which are the firms most likely to develop own-technology and protect those innovations. The North is also less likely to have firms that are “market-driven innovators” (especially the North East), those firms that have innovation outputs in products (but less so in processes) and marketing expenditures. Although the research does not explore policy implications, depending on their innovation strategy, firms will be more or less interested in the offer of public support. Those that concentrate on in-house innovation will tend to have less contact with active policy initiatives. Many regions note that they have trouble engaging with large firms because the firms have little need or incentive to participate. Firms involved in process modernising are likely to be more interested by collaboration with the local research community or more interested in using testing and other facilities. Firms that are looking to modernise business processes will also be interested in making use of any technological advances that can support these efforts. As such, they are likely to be users of applied research. Firms that are in industries where markets are more volatile could tend to find public support too slow and unresponsive.

Table 1.2. Firm innovation by region

Region	Fourth UK Community Innovation Survey (2005)					SME Business Survey (2004)				
	Total firms	% Innov. firms	% Goods innovation	% Service innovation	% Process innovation	Total firms	% Innov. firms	% Goods innovation	% Service innovation	% Process innovation
London	1 394	33.0	14.5	22.4	16.1	290	52.2	24.6	30.1	34.0
Eastern	1 615	30.0	16.4	15.5	15.9	257	52.9	27.9	32.5	43.3
South East	1 906	33.4	15.9	19.8	16.7	344	44.4	26.5	22.6	28.5
South West	1 376	29.2	15.5	15.5	15.3	181	56.9	31.1	30.4	42.0
West Midlands	1 515	30.7	17.4	13.8	16.4	185	50.7	28.9	19.9	35.4
East Midlands	1 155	31.8	18.4	15.4	16.3	139	53.1	26.4	18.8	41.5
Yorkshire	1 573	29.3	15.8	16.4	14.8	177	57.2	29.1	31.8	47.8
North West	1 589	28.9	15.8	15.5	15.2	203	46.2	25.9	23.9	26.6
North East	813	30.0	16.1	17.7	16.3	51	56.4	36.2	26.3	21.3
Wales	955	26.9	15.7	13.4	15.2	68	46.3	30.7	26.8	27.0
Scotland	1 238	27.0	12.6	14.5	15.8	111	56.9	35.1	38.9	34.0
Northern Ireland	1 304	30.6	13.2	13.6	19.6	n.a.	n.a.	n.a.	n.a.	n.a.
Total	16 433	30.1	15.6	16.1	16.1	n.a.	n.a.	n.a.	n.a.	n.a.

Note: The first column indicates the percent of firms reporting an innovation. The subsequent columns indicate that, of the firms reporting an innovation, the percent reporting an innovation in goods, services or processes. The same firm may report more than one type of innovation.

Source: Abreau, Maria, Vadim Grinevich, Michael Kitson and Maria Savona (2008), *Absorptive Capacity and Regional Patterns of Innovation*. Department for Innovation, Universities and Skills.

Table 1.3. **Innovative firm types (clusters) by region**

Region	Obs.	Cluster 1	Cluster 2	Cluster 3	Cluster 4
		In-house / IPR innovators	Process modernisers	Business modernisers	Market- driven innovators
% of national average					
North East	264	97	117	104	76
North West	465	94	93	124	90
Yorkshire & the Humber	422	100	103	104	90
East Midlands	439	90	110	83	117
West Midlands	490	94	105	101	99
Eastern Region	467	112	95	83	113
London	511	89	89	113	114
South East	614	112	88	97	105
South West	413	106	96	91	109
Wales	340	120	102	91	84
Scotland	367	100	105	96	97
Northern Ireland	411	85	113	110	88
All enterprises	5 203	100	100	100	100

Source: Lambert, Ray and Marion Frenz (2008), *Innovation Modes and productivity in the UK*, Department for Innovation, Universities and Skills.

In summary, on some indicators the North appears very similar to other UK regions, although the North East still lags on most indicators. Differences among the three regions are often more significant than those between the three Northern regions and the rest of the country. In this case, the image of the North as being structurally different from the rest of the UK on all indicators is not universally true – rather there is heterogeneity across UK regions generally.

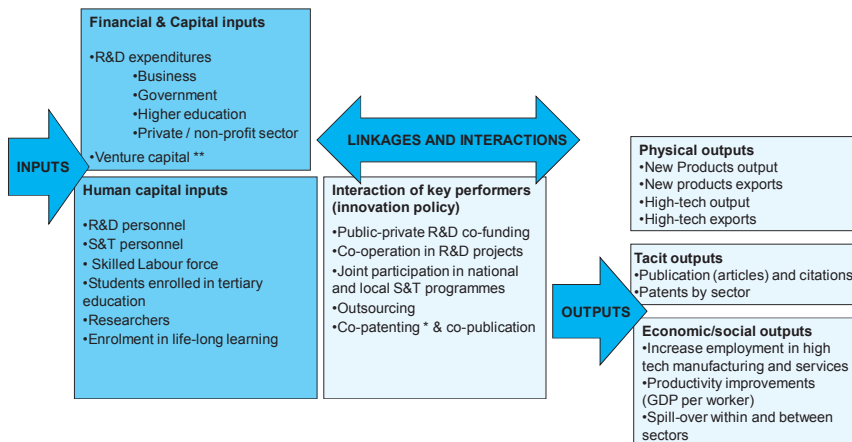
Innovation performance of the North

What are the relevant indicators?

Key innovation indicators can be divided into three main categories (see Figure 1.15.). First, however, there is the importance of **context** indicators for setting the stage for the innovation indicators, notably the general economic performance and structure of the economy, including technology use of key industries. In terms of the general model, there are **input**

indicators (the resources, both human and financial, available in the region), **linkage** indicators (that measure the interaction among actors in a regional innovation system) and **output** indicators (the likelihood of an innovation and its impact of new knowledge and innovation on the economy). There exist a number of caveats with respect to the indicators commonly used.⁵ The set of indicators in Figure 1.15. tend to focus on a narrower definition of innovation. This is due to the lack of clear and available internationally comparable regional level indicators that might be helpful for measuring a broader definition of innovation, including what has been called hidden innovation.

Figure 1.15. **Innovation indicators**



Note: *Available for most OECD countries at the regional level, ** Not available for most OECD countries at the regional level.

The most obvious overall output indicators would relate to more general objectives such as growth or employment creation. The main problem relates to uncertain causality and time lag effects. Given the theoretical assumption that innovation policy is designed to promote regional growth, it is clearly essential to explore further growth dynamics that can be traced back to improvements in innovation-related indicators. Nevertheless, looking at some of the relationships among these key indicators, some very strong correlations are evident such as GDP per capita and high-tech

employment with Business R&D expenditure as a percentage of GDP (see Figures 1A.2. and 1A.3. in Annex).

Innovation performance of the Northern regions

Given the generally limited range of innovation-related indicators available at the regional level, particularly for cross-national comparison, the list of indicators that are relevant and feasible is quite short. Most national and international assessments of innovation performance using these indicators produce the same league tables, rankings and maps. The OECD is expanding its regional database to include these indicators beyond European regions, although not all indicators are reported by all OECD countries at regional level. As is clear from the three innovation “snapshots” (Figure 1.16.), the range of values for UK regions on these indicators do not include the highest-ranking regions in the OECD.

Figure 1.16. Innovation performance summary for Northern regions

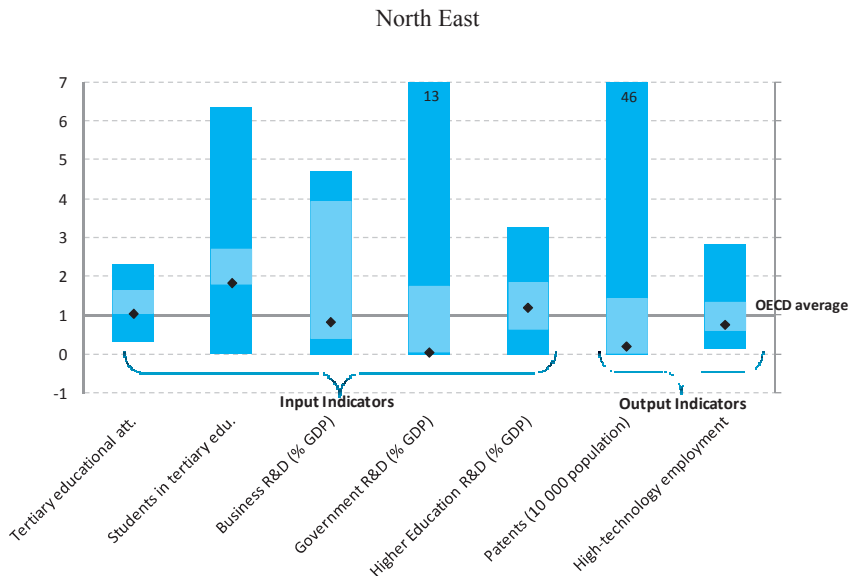
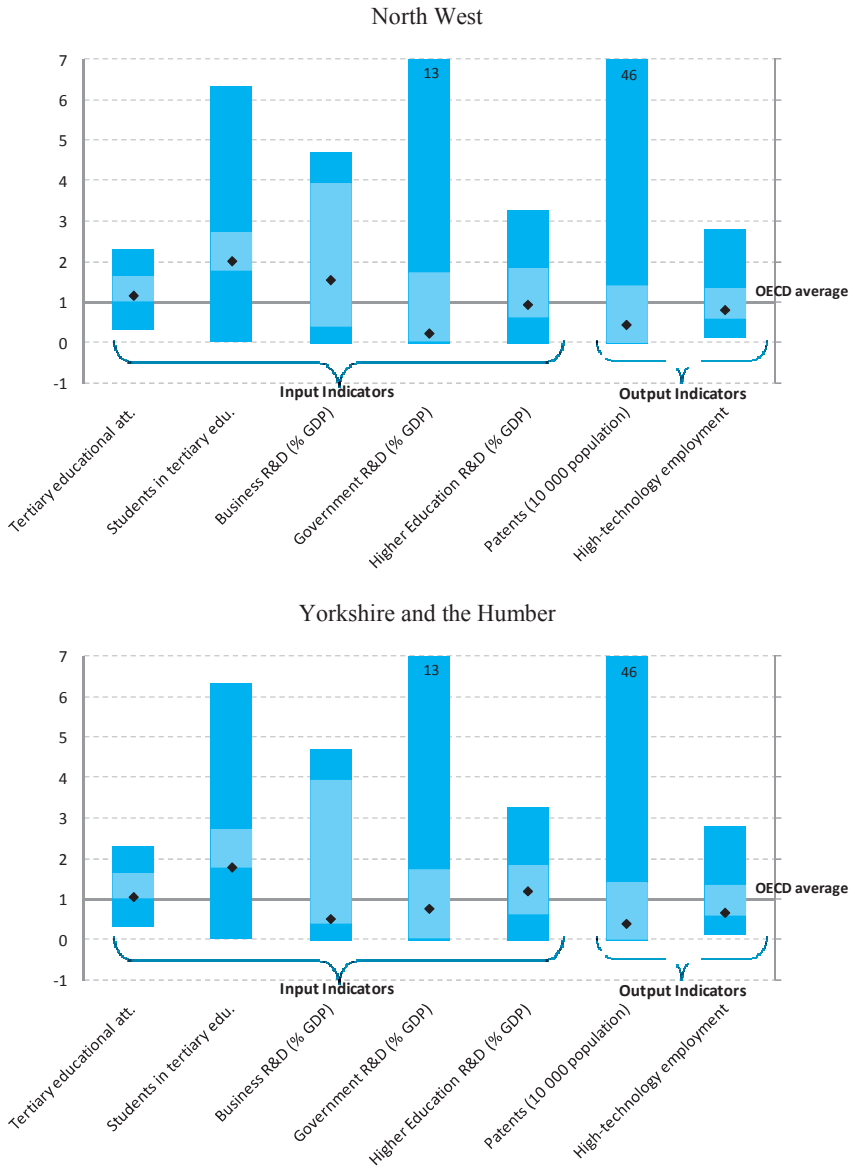


Figure 1.16. Innovation performance summary for Northern regions (cont.)



Note: The inner band represents the range of values for UK regions and the outer band represents the range of values for OECD regions. The values of each variable were normalised to the OECD region average for that variable. Information on all OECD regions is not available for each indicator. Please refer to endnote six for details.⁶

Source: OECD Regional Database 2008.

Input indicators

Human capital

The stock of quality human capital is one of the most important variables for innovation in firms and economic development more generally. The UK has a lower educational attainment than its peer countries within the OECD, and in the North these problems are exacerbated. The percentage of the adult population (25-64) with tertiary education is approximately 25% in the North East and Yorkshire and the Humber, and almost 28% in the North West. These rates are higher than the OECD average and in line with many peer Western European regions, albeit lower than many US and Canadian regions. The percentage of students in tertiary education is almost double the OECD average, in part due to the number of universities in the North; however, graduate retention is a challenge given the migration of graduates to other parts of the UK with larger labour markets. The North also has a high rate of school leavers within the UK context.

The net result of these different trends is that the North has both a higher proportion of low-skilled workers and a lower proportion of high-skilled workers than other UK regions (see Table 1.4.) and other OECD peer regions. Skills levels generally, however, do not reveal whether or not those skills are adapted and appropriate for firms in the region. According to the National Employer Skills Survey 2005, firms in the North are more likely to report skills gaps in their regions (23% of firms in the North East and 21% in Yorkshire and the Humber, albeit in the North West that figure is only 16%, which is more in line with the other English regions). In terms of the percentage of staff with skill gaps, firms in the North are similar to other firms in England, albeit Yorkshire reports the highest rate of staff with skill gaps, 8% versus generally 5-6% across other English regions.

R&D employment, a more specific measure of human capital engaged in scientific and technical research, is highly concentrated in certain UK regions (see Table 1.5.). In terms of R&D employment in government, only 6.2% is located in the North, the remainder being in other regions. In contrast, London-South East-East contains over 59% of the national total. In terms of R&D employment in business, the figures are somewhat less concentrated. They are 16.3% of the national total in the North (mainly the North West at 10.9%) and 49.7% in London-South East-East. Within those employment counts, it should be noted that in the North, the share of employees in business R&D is more skewed towards the lower levels of qualifications (approximately 50-57% versus 62-69% for the other English regions).

Table 1.4. **Working age population by highest qualification**As a percentage (2nd quarter 2007)

	Degree or equivalent ²	Higher education qualifications ³	GCE A level or equivalent ⁴	GCSE grades A*-C or equivalent ⁵	Other qualifications at NVQ level or below ⁶	No qualifications
United Kingdom	19.6	8.6	23.0	22.6	12.7	13.5
North East	14.4	8.4	26.0	24.8	12.2	14.1
North West	16.9	9.0	23.3	25.4	11.0	14.6
Yorkshire and the Humber	15.7	7.6	23.6	24.3	13.5	15.3
East Midlands	16.5	8.7	22.6	24.4	13.6	14.2
West Midlands	16.7	8.8	20.8	25.7	11.3	16.7
East	18.4	7.8	22.2	24.8	14.4	12.4
London	30.5	6.3	16.6	15.3	17.5	13.9
South East	21.4	8.8	24.5	23.4	12.2	9.6
South West	19.1	9.5	25.6	23.7	12.4	9.7
England	19.9	8.2	22.4	23.0	13.3	13.2
Wales	17.2	7.7	24.0	23.8	11.5	15.8
Scotland	18.5	13.4	27.7	18.1	9.3	12.9
Northern Ireland	17.5	7.3	24.0	22.4	7.1	21.7

Notes: 1) Working age males aged 16 to 64 and females aged 16 to 59. 2) Degree or equivalent: includes higher and first degrees, NVQ level 5 and other degree level qualifications such as graduate membership of a professional institute. 3) Below degree level. Includes NVQ level 4, higher-level BTEC/SCOTVEC, HNC/HND, RSA Higher diploma and nursing and teaching qualifications. 4) Includes NVQ level 3, GNVQ advanced, BTEC/SCOTVEC National Certificate, RSA Advanced diploma, City and Guilds advanced craft, A/AS levels or equivalent, Scottish Highers, Scottish certificate of Sixth Year Studies and trade apprenticeships. 5) Includes NVQ level 2, GNVQ intermediate, RSA diploma, City and Guilds craft, BTEC/SCOTVEC First or general diploma, GCSE grades A*-C or equivalent, O level and CSE Grade 1. 6) Includes GNVQ, GSVO foundation level, GCSE grade D-G, CSE below grade 1, BTEC/SCOTVEC First or general certificate, other RSA and City and Guilds qualifications, Youth Training certificate and any other professional, vocational or foreign qualifications for which the level is unknown.

Source: Labour Force Survey, Office for National Statistics (United Kingdom).

Table 1.5. R&D employment in UK regions

	Government R&D FY 04-05		Business R&D 2005				
	Total number	% national total	Total number (000s)	% national total	Scientist and engineers (000s)	Technicians, lab assistants & draughtsmen (000s)	Admin. clerical industrial & other staff (000s)
North East	25	0.1	2	1.4	1	1	-
North West	810	3.9	16	10.9	9	4	3
Yorkshire and the Humber	465	2.2	6	4.1	4	2	1
East Midlands	765	3.7	11	7.5	7	2	2
West Midlands	435	2.1	12	8.2	8	2	3
East of England	3 630	17.4	29	19.7	19	5	5
London	2 835	13.6	8	5.4	5	2	1
South East	5 860	28.1	36	24.5	24	5	7
South West	2 535	12.2	13	8.8	9	2	2
Wales	485	2.3	3	2.0	2	1	-
Scotland	2 770	13.3	7	4.8	4	1	2
Northern Ireland	205	1.0	3	2.0	2	-	-
Total UK	20 820	100.0	147	100.0	95	26	27

Source: Government Research and Development (GoveRD) and Business Enterprise Research and Development (BERD), Office for National Statistics (United Kingdom).

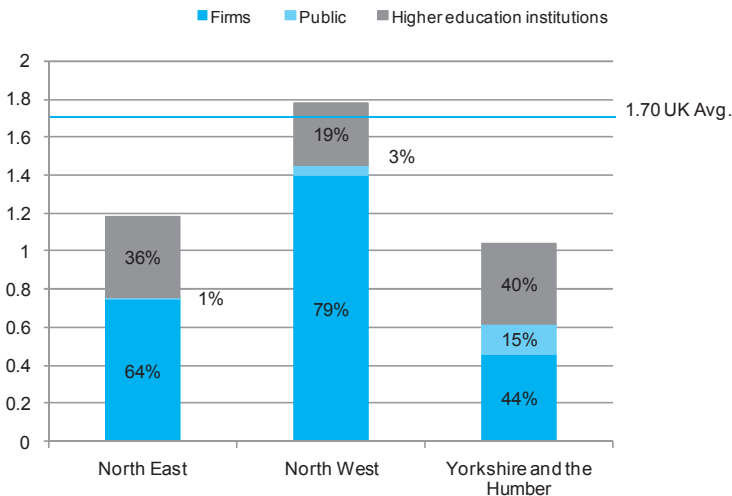
R&D

Looking at the levels and composition of R&D expenditure, the North West has a very different profile from the other two regions (see Figure 1.17.). These figures are of course dependent in part on the sectoral composition of the industrial structure. The region stands out for the higher levels and weight of business expenditure in R&D (BERD) in its total R&D spending, attributable in great part to the presence of several large multi-nationals. In another comparison of R&D, using a multi-scalar analysis (which compares the performance of a region against the average of its neighbours rather than against a national or OECD average), the uniqueness of the North West's BERD relative to its neighbouring regions stands out clearly. The BERD in the North East and Yorkshire and the Humber are lower than in almost all regions in France, Austria, Germany, the US, Finland, Sweden and the Netherlands (see Figure 1.18.).

Higher education institutions (HEIs) have a more prominent role in R&D investment in the North East and Yorkshire and the Humber versus the North West. This difference implies a different regional innovation system typology. Given the national innovation system in the UK, the amount of research conducted by public entities in the UK is overall very low 0.18%, with the EU 15 regions at 0.24% and the US at 0.33%. Those investments are virtually absent in the North East and the North West, and are at 0.16% of GDP in Yorkshire and the Humber, due mainly to one national research facility.

Figure 1.17. R&D as a % of GDP by actor

2003



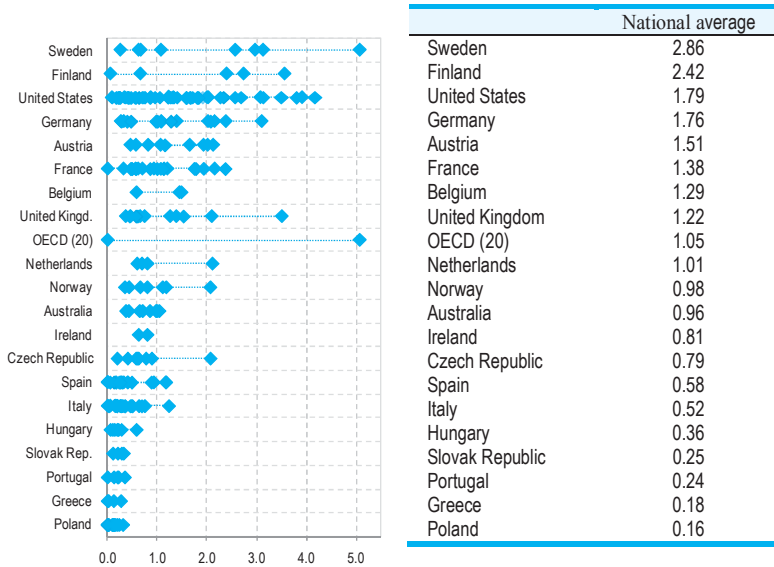
Source: OECD Regional Database 2008.

Finance

Access to finance is often cited as a barrier to innovation across OECD regions. Venture capital is one form of finance particularly important for firms that have a proven idea but are seeking to grow. In many countries, access to venture capital is more or less difficult depending on the region, although often it is reported by different actors in the North that the problem is not a lack of supply of venture capital but the lack of “investment-ready”

Figure 1.18. Business R&D investment in OECD regions

Percentage of GDP, 2004



Source: OECD Regional Database 2008.

firms to fund. The North-South divide continues with an increasing share of venture capital going to London-South East (60% of the UK total in 2006 *versus* 44% in 2005), in part due to the fact that larger companies are more likely to be registered in London (see Table 1.6.). However, there has been increased dynamism in the North which received approximately its share of the economy in venture capital funds at 20% in 2004 and 2006. The North West had the most activity beyond London-Southeast with 11% of companies and 6% of the investment in 2006 (illustrating the relatively smaller transaction size in the region relative to London). The investment in Yorkshire and the Humber jumped from 4% (2005) to 12% (2006) of the UK total due to several very large transactions, mainly in the category of “oil & gas, basic materials & industrials” followed by the “health care & consumer services” category.

Table 1.6. **Venture capital by region**

Region	Number of companies		Amount invested (GBP million)			% of amount invested		
	2006	2006	2006	2005	2004	2006	2005	2004
South East	224	17	1 835	578	1 552	18	9	29
London	330	25	4 297	2 417	1 423	42	35	27
South East &	554	42	6 132	2 995	2 975	60	44	56
South West	98	7	532	448	265	5	7	5
East of England	95	7	639	636	232	6	9	4
West Midlands	90	7	276	271	335	3	4	6
East Midlands	59	4	401	1 122	111	4	16	2
Yorkshire & the Humber	83	6	1 201	243	314	12	4	6
North West	146	11	614	426	654	6	6	12
North East	28	2	184	85	90	2	1	2
Scotland	78	6	174	114	176	2	2	3
Wales	59	4	61	461	99	1	7	2
Northern Ireland	28	2	13	12	85	-	-	2
Total	1 318	100	10 227	6 813	5 336	100	100	100

Source: British Venture Capital Association (2007) *Report on Investment Activity 2006*.

Linkages indicators

Given the increasing importance of interaction among different actors for the innovation process, there is significant literature on the relations of such actors in a regional innovation system. Such interactions could be among multiple firms or between firms with universities and research institutions, etc. There are different measures to assess the degree of such linkages. One potential indicator is the source of information for innovation. Another is the level and rate of co-patenting and co-publication. Collaboration in joint R&D projects and outsourcing of research to others are further measures often used. Nevertheless, it is difficult to find indicators of linkages among innovation actors at the sub-national level that are comparable across countries.

In terms of the practices of co-operative enterprises, there are very few patterns that distinguish the North from other UK regions per the Fourth Community Innovation Survey. The regions in the North of England are generally less likely than other regions (particularly London and the South West) to co-operate with government or public research institutes. This is likely to be due to a lack of proximity to such institutions in the North. The North East also stands out with a significantly higher rate of co-operation

with universities and other higher education institutions (HEIs), 53%, which is up to 15-20 percentage points greater than for most other regions (DTI, 2006).

The sources of information for innovation used by firms also reveal few areas of regional variation within the UK (see Table 1.7.). The regions in the North reported slightly lower percentages of firms with sources of information coming from competitors, perhaps an indication of a lesser critical mass of competitor firms in the regions. The North East, along with the East Midlands, also reports a higher percentage of innovation active firms that source innovation from higher education institutions (by 5 to 6 percentage points). Northern regions are also less likely to get their information from scientific, trade and technical publications as compared to firms in other regions (by approximately 3 to 5 percentage points).

Table 1.7. Sources of information for innovation by region

	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East	London	South East	South West
Within your enterprise or enterprise group	80	80	82	81	80	82	84	82	81
Suppliers	86	86	86	88	84	88	84	87	87
Clients or customers	84	84	88	87	86	86	87	87	89
Competitors	76	75	80	78	76	76	79	80	81
Consultants or private labs, private R&D institutes	47	45	47	49	48	47	55	49	46
Universities or other HEIs	34	28	27	33	28	26	28	28	26
Govt or public research institutes	31	28	29	30	29	27	31	31	28
Conferences, trade fairs, exhibitions	57	62	65	66	61	66	67	67	63
Scientific, trade & technical publications	59	60	61	67	64	65	64	64	65
Professional and industry associations	62	65	65	66	63	65	69	68	72
Technical, industry or service standards	61	64	63	66	64	65	63	65	67

Source: UK Department of Trade and Industry (2006), *Innovation in the UK: Indicators and Insights*, Occasional Paper No. 6, July 2006, based on data from the Fourth Community Innovation Survey.

Other indicators of linkages between HEIs and firms include collaborative research, contract research and consulting work with firms. According to the Higher Education-Business and Community Interaction

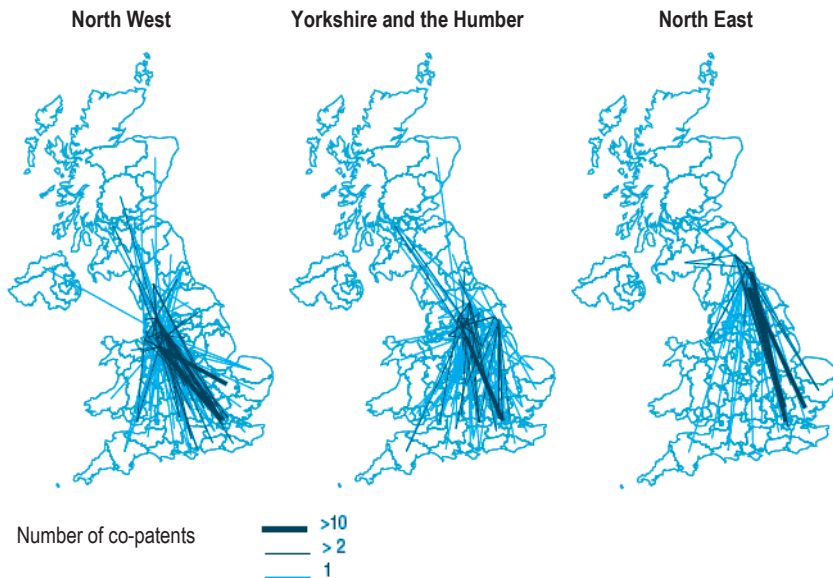
Survey (HE-BCI), the North's collaboration activity is stable or progressing, as is the rest of the country. In some areas the North's relative performance is improving. For example, in terms of the share of funding flows for public-private research collaborations, the North has slightly increased its share of the UK total from 23% in 2001-02 to 26% in 2005-06 (see Table 1A.6.). This is due in part to the increased receipt of Research Council funding that supports collaborative public-private research (most notable increases in the North East) and to increases in EU funds for the same purpose (most notable increases in the North West and North East). In terms of contract research, the North accounts for approximately 20% of the reported UK total (see Table 1A.7.). Between 8% and 10% of those contracts are going to SMEs, a somewhat lower rate than other UK regions. For consultancy services, the total income is between 21% and 23% of the UK total, albeit the number of contracts is over 45% of the total given unusually large numbers reported in the North East.

Co-patenting serves as another measure of collaboration for innovation. There are several notable trends in the patent applications in UK regions since 1977 (see Table 1A.8.). Overall, UK regions have fewer applications with only one inventor and a much greater share with three or more inventors (the latter jumping from 16% to 32% in the last time period) reflecting the more collaborative approach to patenting over time. In the Northern regions, the percentage of patents filed for one inventor is notably higher than the average for other UK regions, and the percentage of patents applied for by three or more inventors is considerably lower. In terms of applicants (not inventors) the same trend is observed with Northern regions being overrepresented by several percentage points of the proportion with only one applicant versus two or more applicants. These results indicate that actors in the North are less likely to be engaged in co-patenting collaborations.

A more detailed analysis of co-patenting in the three Northern regions reveals that the co-patenting links are more frequent with entities outside of the North, rather than within (see Figure 1.18.). This begs the question as to whether or not collaboration across the North is the best strategy for policy support, if many of the established relationships appear to be with partners elsewhere. This could be suggestive of a stronger complementarity between actors in the North and those in the South East and London than amongst actors within the North. Similar data for France show equally strong region-Paris co-patenting relationships and relatively little inter-regional linkage beyond these bilateral links with the capital region. This could be simply a function of the dominance of the capital regions in the two countries.

Figure 1.19. Co-patenting: Northern regions

2004 co-patenting applications (by inventor)



Source: OECD Regionalised Patent Database.

Cluster/sector specialisations

The primary regional innovation asset is the set of firms and their staff competencies. One of the ways to identify at least a potential strength is by an agglomeration of these firms with inter-linkages in a particular location. The on-going debates about what constitutes a cluster notwithstanding, there is still value in identifying the different firm groupings and using any assessments of their niche in international markets. Furthermore, it highlights where the innovation needs could have a major impact on the overall economy. For example, an innovation that leads to productivity gains in a lower-value-added industry that is in a traded (*i.e.*, export) sector but has a large share of the economy is important and often neglected in a science-focused innovation approach.

The results of the 2001 UK cluster mapping based on employment (see Table 1A.10.) offer at least a national overview of where there are strengths or unique competencies (DTI, 2001). In terms of clusters deemed to be of international significance in the North, they included: North East (none), Yorkshire and the Humber (leisure software), and in the North West (aerospace, automotive, leisure software and nuclear fuel processing). In

terms of unique competencies within the UK, the only one identified in the North was the North West's nuclear fuel processing. What is interesting to note from this mapping based on data from 10 years ago is that there is renewed dynamism in some sectors that had been classified as declining due to employment losses, such as the chemicals industry in the Tees Valley.

In a recent EU cluster mapping initiative, also based on employment, the North of England had several clusters that ranked high on an EU level. While they may not all have been high in terms of the sheer number of employees in a sector, they did rank high in their degree of specialisation as a region in the particular industry relative to the EU and some neighbouring countries (31 countries in total). Some of the high-ranked regions included: Lancashire for aerospace, Greater Manchester for several sectors (business services, distribution services, education and knowledge services), Cheshire for chemical products, Cumbria for hospitality and tourism, and West Yorkshire for publishing (EU Cluster Observatory, 2008).

Each of the regional economic strategies of the regions has prioritised particular sectors. A full listing of those sectors, as well as the sectors of focus in the regional innovation strategies, are described in Chapter 3.

Higher Education and Research Institutions

A number of strong higher education institutions in the North serve as core regional assets to support innovation. They do so in their roles of training the future labour force (albeit many students leave the region) and generating knowledge potentially useful for firms to innovate. They are important for their size and their areas of research excellence, as recognised in the Research Assessment Exercise (RAE).⁷ The RAE has a strong role in determining the allocation of research funding. While most regions highlight their strengths in science-based fields, there are a number of other fields that can play an important role in supporting innovation in a particular region (either already or has the potential to do so). These could include, for example, strong business schools for management and marketing expertise or strong creative sector fields.

Unlike several other OECD countries with a large public research infrastructure, the UK national innovation system does not have this feature. Rather, public funds for research are channelled through higher education institutions. One of the national services that does have research links in the North is the National Health Service. It is already a partner in several Northern initiatives for centres of excellence or research. In its recommendations to Government to support innovation, the North has actively advocated public health research facilities in the region to reinforce several areas of existing competence in the health fields. The research

infrastructure associated with the Daresbury site, another asset, is discussed more in Chapter 3.

Output indicators

Patents

While subject to caveats for interpretation, patent data remains one of the most commonly used benchmarks for innovation outputs.⁸ Overall, as illustrated above in Figure 1.16., the Northern UK regions have a lower propensity to patent than the average in the UK and the average for OECD regions with data, albeit this latter average is skewed by a few regions with very intense patenting activity. The North accounted for only 6.5% of UK patents (1.3% in the North East, 2.8% in the North West and 2.4% in Yorkshire and the Humber). Within the OECD, patenting activity in a given country is significantly more concentrated than the highly skilled population. While the percentage of patents by sector show that within the UK the North has the highest share of patents in fixed construction (Table 1.8.), it is in chemistry and metallurgy, areas of strength in the North, where the overall propensity to patent is highest in several sub-regions (Figure 1.20.). The regional variation in patenting activity is also notable among HEIs. The North accounted for 12.3% of the UK total of patents granted to HEIs in 2005-06, as reported by participating institutions in the HE-BCI surveys. In prior years those figures were much higher, driven by higher numbers in the North West (23% in 2004-05 and 42% in 2002-03) (see Table 1A.9. in Annex).

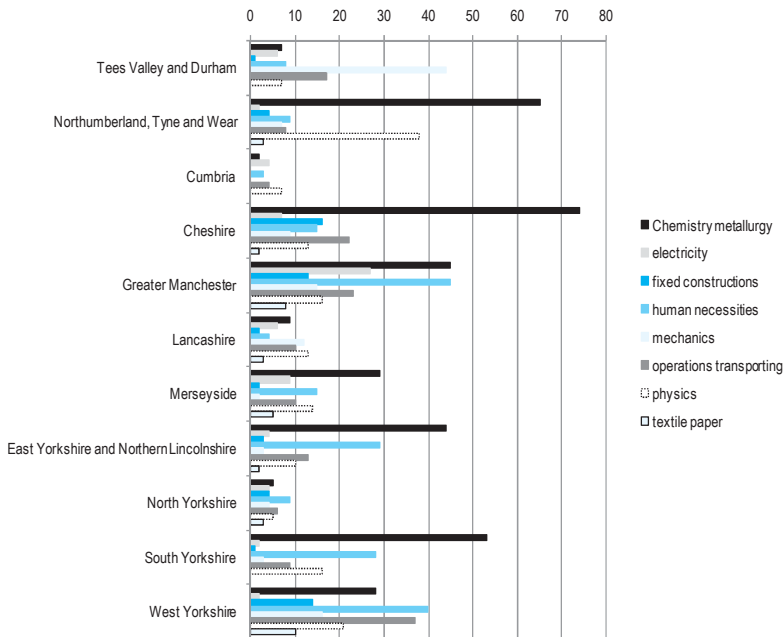
Table 1.8. **Patents by sector (inventor)**

2004

	Total	Chemistry metallurgy	Electricity	Fixed construc- tions	Human neces- sities	Mechanics	Operations transporting	Physics	Textile paper
Total UK patents	18 078	5 239	1 647	421	3 344	2 518	2 544	2 141	224
% of patents by sector	100.0	29.0	9.1	2.3	18.5	13.9	14.1	11.8	1.2
% of UK patents in sector by region									
North East	1.3	1.4	0.5	1.2	0.5	2.0	1.0	2.1	1.3
North West	2.8	3.0	3.2	7.8	2.5	1.5	2.7	2.9	8.0
Yorkshire and the Humber	2.4	2.5	0.7	5.2	3.2	1.0	2.6	2.4	6.7
East Midlands	3.2	2.6	2.6	3.6	4.6	1.5	4.9	2.0	10.7
West Midlands	2.4	0.7	4.7	4.8	1.2	2.3	6.4	2.1	0.0
Eastern	25.1	14.7	19.9	21.4	4.2	55.3	48.2	27.5	3.6
London	43.1	55.8	48.9	16.6	66.1	10.0	22.8	38.5	54.5
South East	13.5	12.6	14.0	15.2	10.3	24.5	7.1	15.5	4.9
South West	2.3	1.7	4.1	7.1	2.7	0.8	2.0	2.8	7.1
Wales	1.2	2.2	0.5	5.5	0.9	0.1	1.1	0.9	0.9
Scotland	2.3	2.7	0.9	11.6	3.1	0.7	1.1	2.4	2.2
Northern Ireland	0.3	0.3	0.1	0.0	0.7	0.2	0.1	0.8	0.0

Source: OECD Regionalised Patent Database.

Figure 1.20. **Patenting by sub-region and sector**
Patents per million inhabitants (2004)



Source: OECD Regionalised Patent Database.

Regional performance from an international perspective

Innovation-based comparisons

Understanding the relative performance of regions in terms of innovation on an international scale is increasingly valuable given globalisation trends. The EU Regional Innovation Scoreboard, for European Regions, uses seven indicators to assess regional innovation performance through a composite index.⁹ On that index, the UK regions do not score very high generally. The top 30 out of 208 regions are dominated by Germany and Scandinavia with one or two other regions from France and the Netherlands. The UK has only two regions in the top 30 (South East 12th and East 17th). The regions in the North of England are ranked 56th (North West), 72nd (Yorkshire and the Humber) and 78th (North East). The other English regions rank between 35th and 47th place.¹⁰ This gives a good

snapshot of the relative position of different regions, but as yet it is difficult to trace their evolution over time and make a robust link between the evolution of indicators and patterns of economic growth.

The regions in the North have different sets of peer groups based on cluster analyses of their innovation data. For example, regions in the North of England tend to have slightly higher levels of patents, manufacturing employment in high tech and overall employment rates than EU regions. However, they are slightly below average in terms of R&D investment by different actors and tertiary education levels. In fact, the lower level of educational attainment in the UK relative to other leading OECD countries is an overall challenge for the country, and within this UK context, the North has an over-representation of low-skilled workers and an under-representation of high-skilled workers as well as a reportedly higher skills gap from employers. Regions with a similar cluster of characteristics are found mainly elsewhere in the UK, France, Northern Italy and Germany.

In another cluster analysis of regional innovation among European regions, the Northern regions are not in the top category (global consolidation) but rather in the regions that need to sustain competitive advantages (Technopolis *et al.*, 2006). The North West and Yorkshire and the Humber are in the “learning” sub-category for their higher scores on education variables and low scores on unemployment but lower levels of business R&D investment than in many Nordic regions. The North East falls into a different sub-category (centro techno) given its average scores on many indicators but a high share of high-tech manufacturing (see Table 1A.11. in Annex).

Using another approach to identifying regions facing similar challenges reveals that the Northern regions seem to be part of a large group of regions in OECD countries that have a strong industrial heritage but only moderate innovation assets (see Box 1.1.). The economies of all of these regions have long been tied to the exploitation of raw materials and to traditional mass-production manufacturing industry. These sectors have experienced major job losses in recent decades, as productivity gains at home and the entry of low-cost producers elsewhere have forced local employers to downsize, or in some cases to close down their operations entirely. Largely because of industrial transition, these peer regions are growing more slowly than the national average (only the regions of Karnten, Saarland and Cantabria are growing faster). They generally have lower than average productivity per worker and lower growth in productivity over the past decade (see Table 1.9.).

Box 1.1. Methodological approach to identifying peer groups

International comparisons using peer groups to benchmark performance can help in two ways. First, it can help to identify regions that have similar profiles to regions in the North according to a set of criteria and then examine how those regions have performed and their policy choices. Second, it can also identify regions that are the top performers, even where their profiles are not necessarily identical but where they could have some lessons for other regions because of their success.

The selection of a peer group of regions can be made through a cluster analysis of regions (in this case 208 regions at the Territorial Level 2 from 20 OECD member countries). The groups of regions are isolated according to three variables to reflect elements of regional economic performance, structural composition and innovation effort. Specifically:

- GDP per capita;
- Ratio of employment in manufacturing over employment in services; and
- Total R&D expenditures as a percentage of GDP.

A further selection can then be made using, on one side, criteria of population growth (over the period 1995-2005) and population size/density and, on the other, qualitative research to identify regions with a similar recent economic history and structure.

For the Northern regions, this analysis located all three regions in the middle-rank cluster (*i.e.*, with GDP per capita, sectoral structure and R&D effort around the OECD average). The subsequent refinement according to demographic and economic structure led to eight regions being retained: Karnten (Carinthia, Austria), Bourgogne (France), Saarland (Germany), Liguria (Italy), Eastern Netherlands (Netherlands), Cantabria (Spain), Norra Mellan Sverige (North-Central Sweden, Sweden) and West Virginia (USA).

Note: Regions from OECD countries Australia, Canada, Denmark, Iceland, Japan, Korea, Mexico, New Zealand, Switzerland and Turkey were excluded from the analysis due to lack of information at the sub-national level for innovation-related indicators.

Looking at their innovation-related assets, it is clear that these regions tend to invest less than the national average in R&D overall. They have lower than average business sector R&D (except in certain cases where R&D intensive industries are present, such as with pharmaceuticals in the North West). Government R&D expenditures are also below the average, which suggests that these regions are not capital or core regions where the main government labs are located. The most significant growth in terms of innovation investment is in the HEI sector, where most of the regions have seen significant increases in the level of HEI-led R&D as a percentage of regional GDP.

Table 1.9. GDP per capita and productivity of the selected peer regions

	GDP per capita (USD, PPP) 2005		GDP per capita growth 1997-2005		Productivity (GDP per worker) growth 1999-2005	
	Regional	National	Regional (%)	National (%)	Regional (%)	National (%)
Karnten, Austria	29 030	34 095	1.29	1.20	0.29	0.42
Bourgogne, France	25 870	30 011	1.00	1.24	-0.21	0.18
Saarland, Germany	29 197	30 445	1.15	0.75	0.04	0.07
Liguria, Italy	28 498	27 750	0.28	0.54	-0.32	-0.07
Oost-Nederland, Netherlands	29 124	34 718	1.03	1.17	0.20	0.21
Cantabria, Spain	26 706	27 061	2.19	1.57	-0.38	-0.28
Norra Mellansverige, Sweden	29 081	32 767	1.45	1.87	0.87	0.61
North East, UK	25 528	31 575	1.57	1.62	0.44	0.64
North West, UK	27 581	31 575	1.44	1.62	0.37	0.64
Yorkshire and the Humber, UK	27 232	31 575	1.35	1.62	0.49	0.64
West Virginia, US	29 195	41 729	1.15	1.24	0.75	0.65

Source: OECD Regional Database 2008.

Efforts to strengthen these assets are prominent in the innovation strategies of each of these regions. Nonetheless, it is clear that their transition to a knowledge economy-based economic structure involves not only introduction of new activities but also efforts to transform existing strengths and specialisations to capture new markets. A list of actions to boost innovation that have been taken across all the regions selected can be summarised as follows:

- **Strengthening industrial specialisations:** innovation is targeted to particular sectors of the economy. There are two broad directions equally necessary for innovation-driven growth. One involves building on the existing industrial base (upgrade of products or processes or diversification into technologically related fields), the other involves the creation of new industries. In West Virginia, for instance, the choice was made to upgrade and diversify the energy industry cluster given the certainty of strong growth in the world-wide demand for fossil fuel-based energy systems and its related environmental services.
- **Encourage links between universities, research centres and enterprises (technology transfer):** In this respect the innovation strategies of most of the regions taken into consideration include: 1) the creation of intermediary agencies acting as facilitators in the development of networks among the above mentioned innovation actors (in Bourgogne and in Liguria respectively, the agencies *Bourgogne Innovation* and *Laboratorio di Impresa* were created); 2) efforts to

increase the number of university/enterprise joint projects; and 3) programmes for the exchange of personnel among universities, research centres and enterprises.

- ***Support to enterprise creation and development.*** In most of the regions selected, enterprise creation and development was supported by: 1) creation of agencies to assist the development of innovative enterprise creation (accompany entrepreneurs by giving support in managing their projects); 2) training for entrepreneurs on enterprise management innovation; and 3) training on enterprise creation for researchers.
- ***Sharing/co-ordinating of policy and projects*** with other regions, the central government, and international institutions, for example: 1) organisation of roundtables and workshops to present actions and results of a specific programme with the purpose of comparing good practice for regional policy oriented to innovation; and 2) participation of regions in international events to compare the emerging technological capabilities present in one region with those emerging in other regional contexts. It is also an occasion to present the results of scientific research and to create opportunities for enterprises and venture capitalists to meet.

Growing-lagging regions

Comparing patterns of regional growth in other OECD countries, it is apparent that there are numerous cases where regions that have been lagging behind have out-performed the national average over a sustained period. Looking at France and Spain, as examples of relevance to the North of England, different types of successful regions stand out – whether they grew faster than the national average or simply have been effective at transforming their economies even if they were at or above the national average. These examples can be divided into three main categories:

1. strong “second-city” regions that have grown relative to the national capital (*e.g.*, Catalonia, Rhone-Alpes);
2. reindustrialising regions that have seen a significant industrial decline followed by a recent renaissance (*e.g.*, Alsace, Pays Basque); and
3. regions with less of an industrial tradition that have emerged as high-technology hubs (*e.g.*, Midi-Pyrenees, Languedoc-Rousillon, Andalucia).

Even though the Ile-de-France region continues to play a predominant role both within the country and at the European level, the past few years

have seen a process of redeployment towards other regions, notably in the West and South of France. This observation holds true for the population, labour market, enterprise and innovation. Several major cities, the drivers of growth in these dynamic regions, have experienced faster growth than Paris over the past decade and are gaining significant weight in the economic development of the country. Between 1990 and 2001, GDP growth rates were higher in the south and the west than in Paris – Pays de la Loire, Brittany, Languedoc-Roussillon, Aquitaine, Midi-Pyrénées and Provence-Alpes-Côte d'Azur. Growth in Languedoc-Roussillon (centred on Montpellier) moved the region from 14th to 11th place in terms of its contribution to national GDP and Midi-Pyrénées (centred on Toulouse) from 10th to 8th place). In each case, GDP and population growth have been accompanied by the development of knowledge intensive industries and research strengths despite a relative weakness in terms of human resources and skills. An indication of the significant R&D efforts that have emerged in the regions Midi-Pyrenees, Rhone-Alpes and Languedoc-Roussillon is that they have all increased R&D expenditures to over 4%, 2.5% and 2.3% of GDP respectively over the past decade.

Spain has seen some similar processes of rebalancing among territories. The region of Catalonia has seen strong growth thanks in part to an industrial development strategy that has focused on strengthening research capacities in the region and aligning R&D with clear sectoral priorities spanning both more traditional industries such as automotive as well as more high-technology sectors. This strategy has been combined with strong support for design and other high-value services, again linked closely to existing industries. A somewhat similar approach has helped the revitalisation of the Pays Basque region, which has undergone an impressive industrial revival. As in Catalonia, an active, sector-driven industrial policy is seen as having been instrumental in helping existing industries to adapt. The strategy has focused mainly on 11 or so key sectors, with the development agency SPRI providing overall support for each industry cluster and Technalia providing technology transfer services that link all of the technology centres in the region under a unified system. The region of Valencia has also shown strong growth despite lagging behind the national average. The region again has a very active industrial policy based on the Valencia Scientific Research, Technological Development and Innovation Plan (PVIDI) with a strong support structure in IMPIVA. Of the non-traditional industrial regions that have seen strong growth, Andalucia stands out. From a relatively low base, the region has out-performed most other Spanish regions over the past decade and performed well on key innovation indicators.

Conclusion: areas of strength and opportunity

The analysis of the characteristics of the regions based on their innovation environment indicators is a very cursory overview of what the North has to offer. It highlights its relative performance on different variables that are more or less associated with wealth levels and growth in OECD regions. What it does not highlight are the areas of strength in the North or where there are opportunities.

Taking a broader and more qualitative view, the North's assets and weaknesses relate to a very broad set of social, economic and geographical attributes. The general strengths of the North can be summarised as follows:

- A tradition of innovation in manufacturing and a continuing concentration of strength in some advanced manufacturing fields in addition to several other strong clusters and leading multi-national firms;
- Research intensive universities with a large number of undergraduates and graduate students and world-class faculty in diverse fields;
- Several major innovation sites supported by the RDAs as well as the Daresbury campus (one of only two sites in England for major Government funding of scientific infrastructure);
- Strong lead city in Manchester and the Manchester-Leeds corridor; and
- Quality of life (low congestion, etc.) and some cost advantages such as lower rents / land values (in some places at least).

These and other strengths can be balanced against the obvious weaknesses of the North, which include:

- Low business R&D overall and few R&D intensive large firms;
- Modest number of corporate headquarters that limits service sector business model innovation;
- Very low public sector R&D expenditure;
- Low levels of angel and venture capital funding; and
- Relatively poor image in comparison to the South East as a business location.

On the basis of these basic observations, the focus of policy can be seen to revolve around building on some of the accumulated strengths of the region while also trying to develop new areas of opportunity. As the next chapter will discuss, there is a strong convergence of interest in innovation

as an agent of economic change. Looking at the main indications from the data analysed in this chapter, and bearing in mind these general strengths and weaknesses, the main areas for policy appear to be (among others):

- Focus on sectors and technology niches where the North has true competitive advantage in global markets;
- Support service sector innovation as a means to improve low productivity in the service sector in the North;
- Stimulate growth of major innovative firms by removing impediments, resolving planning issues, ensuring transport links, supporting quality research-oriented premises such as science parks and access to technical support, and cultivating the supply of skilled labour;
- Increase the number of entrepreneurs, by providing better targeted advice and help to entrepreneurs and small high-growth firms; and
- Build critical mass in research and promote research excellence to build on the region's strong higher education institutions.

The following chapter looks at how public policy from the central government supports innovation in regions and the link between these policies and efforts to support regional growth and close the regional productivity gap.

Notes

1. The North West is the most densely populated region of the North with a population density almost double the UK average excluding London (485 inhabitants per square km) followed by Yorkshire and the Humber (327) and the North East (296).
2. NUTS stands for the Nomenclature of Territorial Units for Statistics and is used in European countries to designate different territorial levels. The regions in the UK are NUTS 1 level, and the sub-regions are at NUTS 2 level.
3. Specialisation is measured according to the Balassa-Hoover index, which measures the ratio between the weight of an industry in a region and the weight of the same industry in the country:

$$BH_i = \frac{Y_{ij}/Y_j}{Y_i/Y}$$

where Y_{ij} is total employment of industry i in region j , Y_j is total employment in region j of all industries, Y_i is the national employment in industry i , and Y is the total national employment of all industries. An index value above 1 shows specialisation in an industry and a value below 1 shows a lack of specialisation. The average degree of specialisation in region j is measured by averaging the sum of the absolute deviations from 1 of the Balassa-Hoover indexes over all industries:

$$\sum_{i=1}^N |BH_i - 1|/N$$

where BH_i is the Balassa-Hoover index of industry i .

4. This time period is used due to data constraints across all OECD regions, however a longer timeframe for analysis would be more appropriate.
5. For example, R&D investment is one of the most commonly used measures of innovation inputs. However, R&D investment is very sensitive to the sectoral composition of the economy and much innovation activity is not captured by R&D, especially in the services sector. Patents, one of the common tacit output indicators, do present some international

comparability problems. Furthermore, there are many patents that are never commercially exploited, the technological or economic value of a patent can vary tremendously, many innovations are not patented and registered trademarks and copyrights are an alternative for certain types of innovation (OECD and EC, 2005). Furthermore, patent data is sensitive to the registration by headquarters of firms.

6. The summary graph of indicators includes the following notes: 1) Data for tertiary educational attainments are expressed as a percentage of the labour force and refer to the year 2005 or most recent available year. They include all OECD regions except for Iceland, Japan and Turkey. Two Canadian regions are also missing: Yukon and Northwest Territories plus Nunavut; 2) Data on students in tertiary education are expressed as a percentage of the total population and refer to the year 2004 or most recent available year. They include all OECD regions except for New Zealand and Switzerland. Two Portuguese regions are also missing: Açores and Madeira; 3) Data on patents are expressed as a percentage of the population and refer to the year 2004 or most recent available year. They include all OECD regions except for Denmark, Iceland, New Zealand and Switzerland. Also the Spanish regions of Ceuta and Melilla and the Portuguese regions of Algarve, Açores and Madeira, the Italian region Molise, and the Polish regions Lubelskie and Opolskie are missing. Some outliers have been excluded from the analysis: Kanto and Kinki for Japan and the Capital Region for Korea; 4) Data on Business R&D, Government R&D and HE R&D refer to the year 2003 or most recent available. They are expressed as a percentage of GDP (R&D intensity). They include all EU/OECD countries (except Denmark and Sweden), the United States and Australia. Data on R&D expenditures for Canada, Japan, Korea, Mexico, New Zealand, Switzerland and Turkey are not yet available at the regional level; 5) Data on high-technology employment refer to employment in high-tech manufacturing and knowledge-intensive high-technology services expressed as a percentage of total employment for the year 2005 or most recent available year. Data are available for all EU/OECD countries (except for Denmark and Sweden) and for the United States. Data for Canada, Japan, Korea, Mexico, New Zealand, Switzerland and Turkey are not yet available at the regional level.
7. The caveats concerning the Research Assessment Exercise are discussed in Chapter 2.
8. In addition to the importance of sectoral composition, there are headquarters effects due to the application of patents being linked to where the headquarters of the firm are located. Using data by inventor offers a clearer picture of the region that is the source of innovation activity. However, the location of the inventor reveals less clearly where commercial benefits to the use of the patent, if any, may accrue.

9. The Regional Innovation Scoreboard has been produced in 2002 (7 indicators), 2003 (13 indicators) and 2006 (7 indicators).
10. Those rankings are London 35th, South West 37th, West Midlands 42nd and East Midlands 47th.

Annex 1.A1

Table 1A.1. Counties and unitary authorities in the three Northern Government Office regions

North East England (19 Districts)	North West England (39 Districts)	Yorkshire and the Humber (16 Districts)
Durham County	Cheshire County	North Yorkshire County
Northumberland County	Cumbria County	South Yorkshire County
Darlington Unitary Authority	Greater Manchester County	West Yorkshire County
Hartlepool Unitary Authority	Lancashire County	East Riding of Yorkshire Unitary Authority
Redcar and Cleveland Unitary Authority	Merseyside County	Kingston upon Hull Unitary Authority
Stockton on Tees Unitary Authority	Blackburn with Darwen Unitary Authority	North-East Lincolnshire Unitary Authority
Middlesbrough Unitary Authority	Blackpool Unitary Authority	North Lincolnshire Unitary Authority
South Tyneside Metropolitan Borough	Halton Unitary Authority	York Unitary Authority
Gateshead Metropolitan Borough	Warrington Unitary Authority	
Newcastle City Metropolitan Borough		
Sunderland City Metropolitan Borough		

Table 1A.2. Sub-regional economic and demographic trends

RDA Region	Population 2005	Population share of the North 2005	Population growth 88-04	Youth (0-14 years) population growth 88-04	Elderly (65+ years) population growth 92-04	Population density growth 90-04	Activity rate 2005	Activity rate growth 99-05	Share of GDP of the North 2005	GDP per capita growth (2000 prices) 1995-2005	Percentage of the LF with tertiary educational attainment 2005	Growth in employment in high-tech manuf. and knowledge-intensive services 1996-2006
NE	1 153 886	8.0%	-0.3%	-11.0%	8.1%	0.8%	70.9	2.3%	6.7%	0.9%	28%	5%
NE	1 395 782	9.6%	-2.8%	-11.8%	1.9%	-2.4%	71.5	5.3%	9.9%	3.0%	28%	34%
NW	495 629	3.4%	0.9%	-13.9%	8.4%	1.1%	79.7	8.3%	3.0%	0.2%	28%	.
NW	996 881	6.9%	4.0%	-10.9%	12.2%	3.0%	76.1	1.6%	8.9%	2.3%	34%	-23%
NW	2 543 312	17.5%	-1.7%	-9.7%	-3.7%	-1.3%	73.3	1.0%	18.9%	2.5%	30%	22%
NW	1 446 556	10.0%	3.7%	-3.8%	0.3%	2.9%	73.6	-0.9%	9.5%	1.4%	31%	2%
NW	1 357 397	9.4%	-6.0%	-13.6%	-0.6%	-4.2%	69.9	7.0%	7.8%	2.4%	28%	-12%
Y&H	901 141	6.2%	4.3%	-8.0%	8.2%	7.9%	71.9	-1.1%	5.9%	1.1%	23%	6%
Y&H	776 997	5.4%	7.4%	-5.6%	9.2%	5.7%	78.6	1.3%	5.5%	1.9%	33%	-10%
Y&H	1 287 666	8.9%	-1.4%	-8.5%	-0.7%	-0.8%	72.3	1.0%	8.0%	2.8%	25%	64%
Y&H	2 141 697	14.8%	2.3%	-3.7%	0.3%	2.5%	75.5	2.3%	15.9%	2.2%	30%	12%

Notes: 1) NE= North East; 2) NW=North West; 3) Y&H=Yorkshire and the Humber; 4) LF=labour force.

Source: OECD Regional Database 2008.

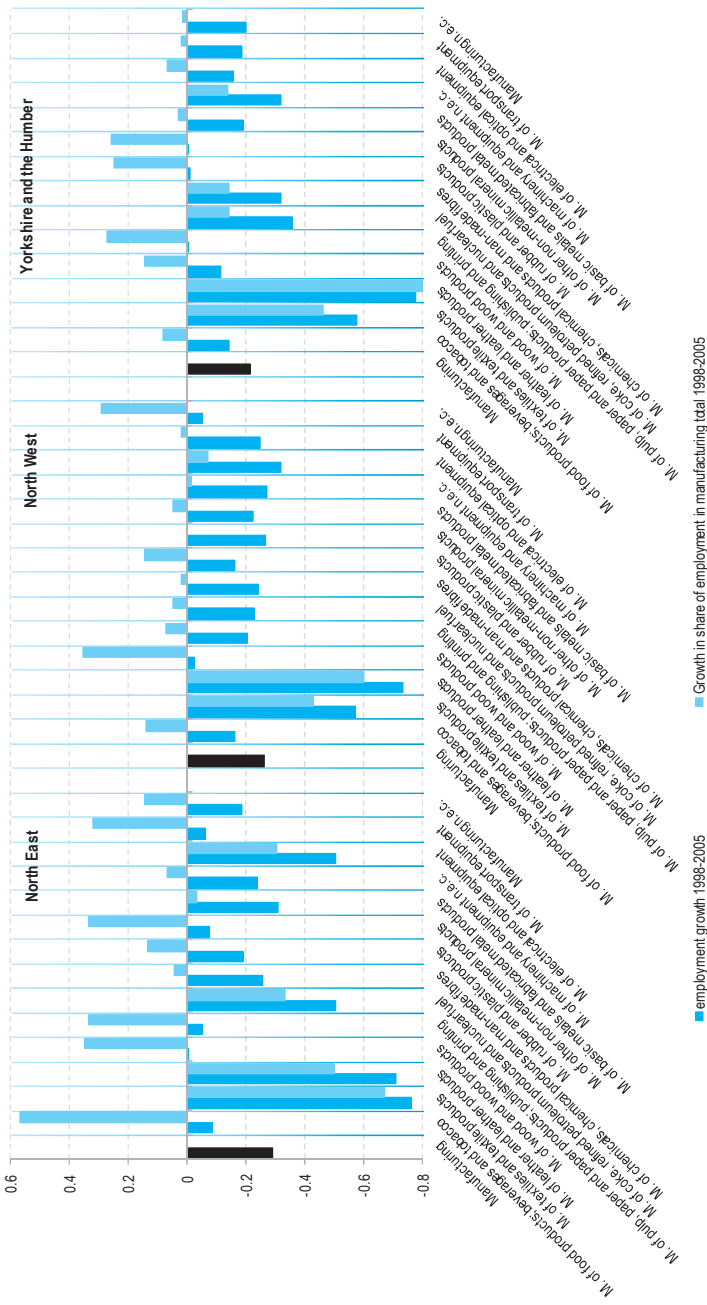
Table 1A.3. **Employment changes by sector**
 1996 and 2006, as % of total employment, % growth and change in employment (absolute numbers)

	North East			North West			Yorkshire and the Humber			UK						
	1996	2006	Change in employment	1996	2006	Change in employment	1996	2006	Change in employment	1996	2006	Change in employment				
Manufacturing sector	22.1	13.8	-80 155	-34%	22.1	14.7	-198 252	-30%	21.9	15.0	-135 085	-28%	19.2	13.0	-1 387 057	-27%
High-technology manufacturing sector	1.2	1.1	-720	-6%	1.2	1.0	-6 457	-18%	0.9	0.6	-6 751	-34%	1.7	1.0	-155 803	-35%
Medium-high-technology manufacturing sector	9.4	5.8	-34 365	-35%	7.8	5.0	-74 121	-32%	6.1	3.9	-44 466	-33%	6.2	4.5	-346 323	-21%
Medium-low-technology manufacturing sector	5.0	3.5	-13 894	-26%	5.0	3.8	-29 466	-20%	5.4	4.0	-26 585	-22%	4.3	2.9	-309 892	-28%
Low-technology manufacturing sector	6.5	3.6	-28 869	-42%	8.1	4.9	-88 208	-37%	9.5	6.6	-57 282	-27%	7.1	4.6	-575 040	-31%
Service sector	67.3	74.7	120 235	17%	68.2	76.0	339 492	17%	67.0	73.7	229 894	15%	70.3	76.5	3 125 200	17%
Knowledge-intensive high-technology services ¹	2.6	3.7	13 539	50%	3.0	3.3	15 366	18%	2.2	3.1	24 188	50%	3.4	4.2	298 896	34%
Knowledge-intensive financial services ²	2.5	2.4	858	3%	3.4	4.0	22 943	23%	3.5	3.8	9 091	12%	4.3	4.3	85 908	8%
Knowledge-intensive market services ²	6.0	8.0	26 334	42%	6.6	9.6	101 469	52%	7.1	7.6	17 705	11%	8.3	9.6	524 181	24%
Other knowledge-intensive services ⁴	22.7	25.2	40 824	17%	21.0	24.7	145 308	24%	22.2	25.7	105 239	21%	21.2	24.9	1 445 627	26%
Less-knowledge-intensive market services ⁵	24.8	23.0	-6 378	-2%	25.4	24.4	6 271	1%	24.2	24.3	29 682	6%	23.9	23.3	288 564	5%
Other less-knowledge-intensive services ⁶	8.7	12.3	45 058	49%	8.9	10.1	48 136	18%	7.8	9.3	43 989	26%	9.2	10.2	472 024	20%
Primary sector + Mining and quarrying	2.11	1.18	-9 164	-41%	1.6	0.83	-21 372	-45%	2.23	1.37	-17 456	-35%	2.32	1.64	-145 905	-24%
Electricity, gas, water supply and construction	7.8	9.8	25 829	31%	7.6	8.2	30 860	14%	8.5	9.6	35 775	19%	7.68	8.63	418 688	21%

Notes: Numbers might not sum up to 100 due to the unreliable (missing) data in the category "Unknown industry branch". 1) Includes: Post and telecommunications, Computer and related activities and Research and development; 2) Includes: Water transport, Air transport, Real estate activities, Renting of machinery and equipment without operator and of personal and household goods, other business activities; 3) Includes: Financial intermediation, Insurance and pension funding, activities auxiliary to financial intermediation; 4) Includes: Education, Health and social work, Recreational, cultural and sporting activities; 5) Includes: Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel, Wholesale trade and commission trade, Retail trade (except motor vehicles and motor cycles) and repair of household and household goods, Hotels and restaurant, Land transport; transport via pipelines, Supporting and auxiliary transport activities; activities of travel agency; 6) Includes: Public administration and defence; compulsory social security, Sewage and refuse disposal, sanitation and similar activities, Activities of membership organisations n.e.c., Other service activities, Activities of household as employers of domestic staff, Extraterritorial organisations and bodies.

Source: Eurostat, High-technology manufacturing and knowledge-intensive services sectors: Economic, Science & Technology and Employment statistics.

Figure IA.1. Employment in manufacturing by sector (percent)



Source: Eurostat Business Survey.

Table 1A.4. **Firms by employee size**

percent

	0-4	5-9	10-19	20-49	50-99	100-249	250-499	500-999	1 000+
United Kingdom	66.9	15.0	8.8	5.7	2.0	1.1	0.3	0.1	0
England	67.1	14.8	8.8	5.7	2.0	1.1	0.3	0.1	0
North East	58.5	18.0	11.1	7.5	2.7	1.5	0.5	0.2	0.1
North West	63.9	15.9	9.5	6.5	2.3	1.2	0.4	0.1	0
Yorkshire and the Humber	63.5	16.1	9.7	6.5	2.4	1.3	0.4	0.1	0
East Midlands	66.2	15.0	8.9	6.1	2.1	1.2	0.3	0.1	0
West Midlands	65.9	15.1	8.9	6.1	2.2	1.2	0.4	0.1	0.1
East	68.7	14.1	8.3	5.5	1.9	1.0	0.3	0.1	0
London	69.8	13.6	8.1	5.0	1.9	1.1	0.3	0.1	0.1
South East	69.4	14.0	8.2	5.2	1.8	1.0	0.3	0.1	0
South West	68.1	14.9	8.6	5.3	1.7	0.9	0.3	0.1	0
Wales	68.1	15.0	8.2	5.5	1.8	0.9	0.3	0.1	0
Scotland	62.7	17.0	9.9	6.6	2.2	1.2	0.3	0.1	0
Northern Ireland	69.8	15.2	8.2	4.4	1.4	0.7	0.1	0.1	0

Source: OECD calculations based on Office of National Statistics (2007), *UK Business: Activity, Size and Location – 2007*, September 2007.

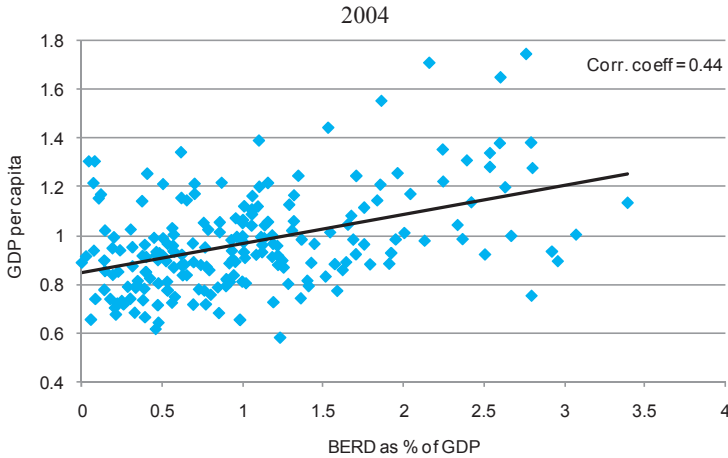
Table 1A.5. **Turnover of firms by firm size**

percent

	0-49	50-99	100-249	250-499	500-999	1 000-4 999	5 000+
United Kingdom	19.1	23.6	26.6	12.6	7.9	7.8	2.5
England	18.4	23.8	26.7	12.6	7.9	8.0	2.6
North East	15.9	23.4	27.9	13.9	8.2	8.0	2.7
North West	17.1	23.3	27.5	13.0	8.2	8.3	2.7
Yorkshire and the Humber	17.9	23.1	26.9	13.1	8.1	8.2	2.7
East Midlands	19.2	23.6	26.5	12.7	7.9	7.7	2.4
West Midlands	19.0	23.0	26.5	12.7	8.1	8.2	2.5
East	18.8	24.4	26.7	12.4	7.7	7.7	2.3
London	16.4	23.0	26.2	12.7	8.6	9.4	3.7
South East	18.7	24.9	26.5	12.2	7.6	7.6	2.4
South West	21.7	24.4	26.7	12.2	7.1	6.2	1.7
Wales	24.6	23.2	26.5	11.5	6.6	5.8	1.6
Scotland	19.1	22.9	27.2	13.3	7.8	7.4	2.3
Northern Ireland	29.4	19.8	22.7	10.9	7.4	7.7	2.1

Source: OECD calculations based on Office of National Statistics (2007), *UK Business: Activity, Size and Location – 2007*, September 2007.

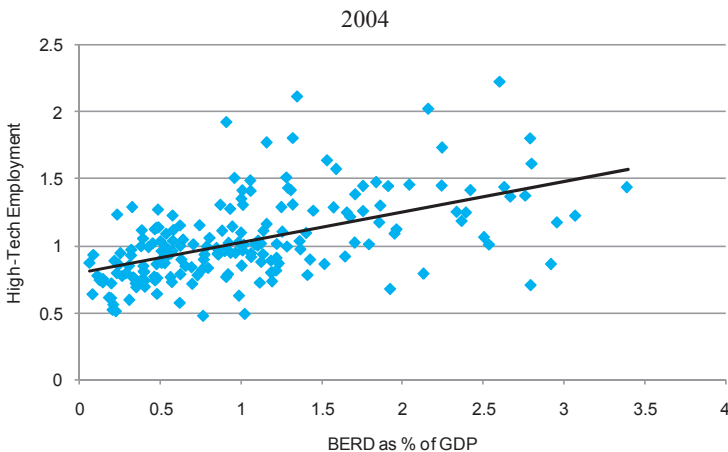
Figure 1A.2. GDP growth and business sector R&D, OECD regions



Notes: 1) For Europe data do not include Denmark, Sweden, Iceland, Turkey and Norway. Besides the OECD/EU countries the USA and Australia are included; 2) the regions of Washington D.C., Prague, London, Brussels, Hamburg and Bratislava have been removed from the sample.

Source: OECD Regional Database 2008.

Figure 1A.3. High-tech employment and business sector R&D



Notes: 1) High-tech employment is expressed as employment in high-tech manufacturing and knowledge-intensive high-technology services combined as a percentage of total employment; 2) for Europe data do not include Denmark, Netherlands, Iceland, Norway, Sweden, Switzerland and Turkey and in addition to the EU/OECD countries, the USA is included; 3) the regions of Lisbon, Madrid and Washington D.C. have been removed from the sample.

Source: OECD Regional Database 2008.

Table 1A.6. Volume of collaborative research with public and business funding

GBP thousands

Area	2005-06	2004-05	2002-03	2001-02	% of UK total 2005-06	% change 2001-02 to 2005-06
North East	50 953	48 271	39 928	38 771	8.6	31.4
North West	74 335	70 099	50 470	45 213	12.5	64.4
Yorkshire and the Humber	28 247	30 182	27 904	22 702	4.7	24.4
East Midlands	46 442	44 665	39 267	38 545	7.8	20.5
West Midlands	25 708	24 515	13 120	25 967	4.3	-1.0
East of England	49 546	47 489	58 322	40 065	8.3	23.7
London	72 808	61 358	70 808	55 789	12.2	30.5
South East	75 036	69 474	66 602	75 361	12.6	-0.4
South West	17 339	13 976	10 301	12 829	2.9	35.2
England	440 414	410 029	376 722	355 242	74.0	24.0
Scotland	78 388	70 737	27 711	23 765	13.2	229.8
Wales	65 232	37 498	43 643	52 017	11.0	25.4
Northern Ireland	11 003	12 218	49 103	38 330	1.8	-71.3
UK total	595 037	530 482	497 179	469 354	100.0	26.8

Notes: These totals are for the sample of universities participating in the survey and do not necessarily represent all universities. For further information on each survey see www.hefce.ac.uk/reachout/hebci/.

Source: Higher Education-Business Interaction Surveys.

Table 1A.7. Contract research and consultancy by HEIs

Region	Contract research					Consultancy				
	Contracts		Value of contracts (000s GBP)			Contracts		Value of contracts (000s GBP)		
	2005-06	% to SMEs 2005-06	2004-05	2005-06	2004-05	2005-06	% to SMEs 2005-06	2004-05	2005-06	2004-05
North East	576	10	547	27 573	24 849	19 058	3	18 990	21 688	22 197
North West	1 793	11	1 659	38 759	34 796	3 757	65	3 902	18 219	16 383
Yorkshire and the Humber	2 497	8	2 586	61 672	60 025	2 608	24	2 371	10 354	10 695
East Midlands	1 510	16	1 683	22 690	23 144	976	24	735	6 682	6 315
West Midlands	2 495	15	2 543	58 972	59 914	7 841	83	6 663	13 115	12 454
East of England	1 044	12	1 038	44 319	44 758	4 539	76	3 686	14 394	14 180
London	5 014	5	5 121	191 683	172 032	4 856	21	3 852	50 222	44 792
South East	2 868	22	2 896	74 460	74 048	4 779	26	4 391	39 002	40 016
South West	1 594	9	1 749	34 602	36 083	1 504	29	1 353	21 998	20 388
England	19 391	11	19 822	554 730	529 648	49 918	33	45 943	195 674	187 420
Scotland	2 655	9	2 511	64 174	55 643	2 491	33	1 882	25 843	16 500
Wales	1 130	10	1 136	23 585	23 273	3 126	37	3 540	12 682	13 858
Northern Ireland	734	36	666	8 555	8 628	722	65	825	1 532	1 218
UK total	23 910	12	24 135	651 044	617 192	56 257	34	52 190	235 731	218 996

Notes: These totals are for the sample of universities participating in the survey and do not necessarily represent all universities. For further information on each survey see www.hefce.ac.uk/reachout/hebci/.

Source: Higher Education-Business Interaction Surveys.

Table 1A.8. Patent applications by number of inventors/ applicants (%)

Number	Region of Inventor	1977-1986	1987-1991	1992-1996	1997-2001	2002-2005
Inventors						
1	All regions	55	50	45	42	41
	North East	56	55	43	48	55
	Yorkshire and the Humber	58	53	48	49	45
	North West	57	50	47	48	50
2	All regions	29	29	28	27	27
	North East	28	29	33	22	23
	Yorkshire and the Humber	27	29	29	27	30
	North West	34	34	35	30	29
3+	All regions	16	22	27	31	32
	North East	16	16	24	30	22
	Yorkshire and the Humber	14	18	23	23	24
	North West	9	16	19	22	21
Applicants						
1	All regions	91	88	88	89	90
	North East	87	89	92	91	95
	Yorkshire and the Humber	95	95	95	96	96
	North West	96	95	95	95	96
2+	All regions	9	12	12	11	10
	North East	13	11	8	9	5
	Yorkshire and the Humber	5	5	5	4	4
	North West	4	5	5	5	4

Source: Wainman, Gary, Keith Tyrell and Jenny Wood (2008), *Initial Analysis of the Regionalised OECD Patents Database*, Unpublished memo dated May 2008.

Table 1A.9. Patents granted to HEIs in UK by region

Area	% of UK total 2005-06	2005-06	2004-05	2002-03	2001-02
North East	1.0	6	4	5	5
North West	7.1	41	90	93	39
Yorkshire and the Humber	4.2	24	22	17	5
East Midlands	5.9	34	13	39	15
West Midlands	3.5	20	17	15	15
East of England	5.4	31	31	14	1
London	21.3	123	207	41	51
South East	13.7	79	113	58	11
South West	14.6	84	43	14	6
England	76.6	442	540	296	148
Scotland	13.2	76	125	2	5
Wales	2.6	15	19	69	42
Northern Ireland	7.6	44	27	4	4
UK total	100.0	577	711	371	199

Notes: These totals are for the sample of universities participating in the survey and do not necessarily represent all universities. For further information on each survey see www.hefce.ac.uk/reachout/hebci/.

Source: Higher Education-Business Interaction Surveys.

Table 1A.10. 2001 UK cluster mapping: regions in the North

Cluster	Stage	Depth	Employment	Significance
North East				
Agriculture/food (processing, beer)	Mature	Shallow	Growing	National
Automotive (assembly)	Established	Shallow	Growing	National
Chemicals (organic)	Established	Deep	Declining	National
Clothing	Mature	Shallow	Declining	National
Electrical industrial equipment	Mature	Unknown	Declining	National
Electronics	Established	Unknown	Growing	National
Furniture manufacture	Mature	Unknown	Declining	Regional
Metal processing ship repair & industrial equipment	Mature	Unknown	Declining	National
Plastics (primary, industrial products)	Mature	Shallow	Growing	National
North West				
Aerospace (military, airframe)	Established	Shallow	Declining	International
Agriculture/Food (processing)	Established	Unknown	Growing	National
Automotive (assembly)	Established	Shallow	Declining	International
Chemicals (inorganic, speciality)	Established	Deep	Declining	National
Environmental industries	Embryonic	Shallow	Growing	National
Furniture manufacture	Mature	Unknown	Growing	Regional
Household textiles and clothing	Established	Deep	Growing	National
Leisure software	Embryonic	Shallow	Growing	International
Nuclear fuel processing	Mature	Deep	Declining	International
Paper and paperboard	Mature	Unknown	Stable	National
Pharmaceuticals	Established	Unknown	Growing	National
Plastics (primary, products)	Established	Deep	Growing	National
Tourism	Established	Deep	Growing	National
Yorkshire and the Humber				
Agriculture/Food (processing)	Established	Deep	Growing	National
Chemicals (speciality)	Established	Deep	Growing	National
Construction & construction	Mature	Deep	Stable	National
Financial services (housing, corporate, consumer)	Established	Shallow	Growing	National
Furniture manufacture	Mature	Unknown	Declining	Regional
Leisure software	Embryonic	Shallow	Growing	International
Medical/surgical equipment	Established	Deep	Growing	National
Metals (steel processing & products)	Mature	Shallow	Stable	National
Web design/internet services	Embryonic	Shallow	Growing	Regional
Woollens	Mature	Shallow	Stable	National

Source: Department of Trade and Industry (2001), *Business Clusters in the UK - A First Assessment*, February 2001.

Table 1A.11. Regional innovation typology of EU regions

Broad category	Sub-category	Description and regions
Global consolidation	Nordic high-tech learning; Science and service centre	These regions are on the top rung of the ladder of European innovative regions and include: Copenhagen, Ile-de-France, London, Prague, Stockholm and Vienna, etc. These regions are clearly well above the average for all four factors as well as GDP/capita with the exception of the private technology factor where they are close to the EU average.
Sustaining competitive advantage	Overall description (3 sub-categories below)	Sustaining competitive advantage regions (strong industrial and learning Regions, e.g., Baden-Württemberg, Flanders, Ireland, Piemonte, Rhône-Alpes, Salzburg and Scotland, etc.) are relatively strong on private technology (reflecting the industrial tissue and heritage of these regions) and on learning families but much weaker in public knowledge and urban services (suggesting a difficulty to restructure towards more knowledge-based services).
	Learning	The Learning regions are first of all characterised by the high score on the factor Learning families, and the three main components of this factor: life-long-learning, youth and female activity rate. On the other factors the regions are close to the regional average. Unemployment is on average the lowest compared to the other EU regions. Employment in the government sector is limited. GDP per capita is rather high. The regions are located in Austria, Ireland, the Netherlands, Sweden and the UK. There are many similarities with the Nordic High-tech Learning regions, but the business sector in the Nordic version invests more in R&D.
	Centro techno	This is a rather large group of regions located mostly in Germany and France with close to average characteristics, but the share of High-tech manufacturing is rather high. The factor-scores as well as GDP-per head is slightly above the regional average, except for the Public knowledge factor which is slightly lower.
	High techno	The High Techno regions host many high-tech manufacturing industries. They are mostly located in Germany (e.g., Bayern and Baden-Wurtemberg), some in Italy (e.g., Lombardia and Veneto) and two French regions. This type is very strong in Private technology and has a high level of GDP per capita. The factors Public knowledge and especially the Learning family factor shows a relative weakness, e.g., in life-long learning. Growth in terms of GDP per capita has been low and unemployment did not improve much in the previous years.
Boosting entrepreneurial knowledge	Local science and services; Aging academia	This category includes second-tier capitals and regions with strong public research e.g., Athens, Berlin, Bratislava, Catalunya, Lisbon, Midi-Pyrénées, Warsaw, and Wallonia, etc. that are strong on public knowledge and relatively competitive in terms of urban services but need to boost private technology and in particular Learning family drivers of their knowledge economies.
Entering knowledge economy	Southern cohesion; Rural industries; Eastern cohesion; Low-tech government	The Entering knowledge economy regions (broadly similar to the Structural Fund convergence regions) lie on the southern and eastern rims of the EU. This group includes most of Greece, southern Spain, Poland except Warsaw, Estonia, Lithuania, Portugal except Lisbon, the Mezzogiorno, etc.). These regions are broadly speaking users rather than producers of technology.

Source: Adapted from Technopolis *et al.* (2006) *Strategic Evaluation on Innovation and the knowledge based economy in relation to the Structural and Cohesion Funds, for the programming period 2007-2013: Synthesis Report*. A report to the European Commission, Directorate General Regional Policy, Evaluation and Additionality, 23 October 2006.

Chapter 2

The National Approach to Innovation in English Regions

Introduction

The starting point for discussion of regional innovation in the UK can be from two angles: innovation as a component of regional policy, and innovation in regions as a component of national innovation policy. As discussed in the Introduction, there has been a general convergence of interest between these two policy domains in OECD countries, and the UK is no exception. In both cases, the issue is to what extent innovation can help achieve the principal objectives of these two policy streams. The supplementary question is to decide the role of the national and regional actors in a way that is efficient and provides relevant supports and services for firms, the main target of public policy in this field.

This chapter explores the link between regional policy and innovation policy in the UK. The first section looks at the goals for regional policy and the role of innovation in attaining these goals. It then discusses how the recent evolution of regional institutions has affected innovation policy at the regional level, in particular with respect to the clarity of roles and the articulation of policy between the centre and the regions. Finally, it looks in more detail at how national innovation policy is taking a more spatial orientation and examines the main mechanisms that are being introduced to co-ordinate innovation policy across levels of government.

Productivity growth and regional innovation policy

National concern with productivity

Policy interest in regional innovation is linked to the national policy objective of sustaining productivity growth. The emphasis on productivity at the national level has the same origin as that shared by most EU countries:

namely that the productivity gap with the US has grown, with UK productivity growth trailing that of the US by around 0.6% per annum since 2000. Compared with other EU countries, however, UK productivity has shown relatively solid growth and the productivity gap with France and Germany has narrowed. While overall performance has been good, a range of reports, including recent *OECD Economic Surveys* and reports from HM Treasury, have identified some weaknesses in UK productivity. For example, some of the UK's service industries – notably the retail sector – have low productivity growth relative to the US and this pulls down average productivity. Labour productivity is also strongly affected by skills. It is widely recognised that the UK lags its major competitors in terms of skill levels, and evidence on educational attainment and adult literacy has also caused serious concern. Inadequate investment in skills (or poor policy performance) is considered to be an important drag on productivity (OECD, 2007e).

With respect to the general business environment, the UK is usually assessed as having a business friendly regulatory framework. One exception noted in the recent *OECD Economic Survey* relates to the planning system, which from a purely economic point of view is thought to impose unnecessary restrictions on development, thereby inhibiting investment. The recent *Barker Review* of land use planning made a clear link between current planning laws and productivity, suggesting the need for streamlining of planning procedures for major infrastructure and investment projects. National productivity has also been linked to under-investment in transport infrastructure, which is related to the land use planning issue (Barker, 2006). The *Eddington Transport Study* proposed greater targeting of public investment to ensure that key economic growth areas in and between city-regions, as well as international gateways, are well served by transport infrastructure and that current congestion and bottlenecks are addressed as a priority (Eddington, 2006).

With respect to innovation, the UK performs well on several measures, particularly those relating to investment and skills attraction and scientific output. The UK has high levels of ICT investment and has strong net inflows of researchers. It also continues to attract high levels of foreign direct investment (FDI), including extremely high levels of foreign firms that undertake R&D in the UK. The UK's advanced business and financial service sectors are becoming increasingly export-oriented (OECD, 2007g). Moreover, levels of business-industry interaction are showing signs of growth. The main weaknesses in the UK's innovation performance, according to recent OECD analyses, relate to relatively low workforce skills and educational attainment, a complex business support landscape, moderate levels of output from publicly funded research and modest, though

increasing, business-industry linkages. These issues are high on Government's current agenda, as shown by the launch of high-profile policy strategy documents on innovation and on enterprise in 2008 (*Innovation Nation* (DIUS, 2008b), *Enterprise: Unlocking the UK's Talent* (HM Treasury and BERR, 2008)). The Business Support Simplification Programme (BSSP) is designed to cut red tape and streamline public programmes for business support (offered at all levels of government) and a review of regulation relating to innovation is planned. To address skills issues in key sectors, new skills academies will be established and a new skills strategy developed. And the increase in Higher Education Innovation Fund (HEIF) funding is intended to encourage "business-facing" universities to further engage with firms. These and other initiatives that are ongoing or planned underline the central importance that innovation has in the UK's overall economic growth strategy.

Beyond these specific issues, there is the more general question of the UK's (somewhat) unusual performance in terms of the main innovation indicators and whether this is a structural issue or reflects poor policy outcomes (OECD, 2007g). There is a perceived paradox between the strong public science position and the apparently lower levels of civil government and business R&D. However, when adjusted for the mix of sectors in the economy, business R&D investment is close to that of France and Germany. And recent growth and productivity performance also suggest that the UK may obtain a good return on its innovation investment.

The link between national productivity and regions

Interest in regional innovation as a component of national economic management in the UK has been driven by a series of reports since 2001 that attempt to ground a new approach to regional policy in stronger macroeconomic rationales. These reports – coming from HM Treasury – developed the argument that UK economic performance was being held back by under-performing regions (under-utilisation of labour and capital, a low return on public investment in education and training, etc.). The focus on regional output emerged against a background of concern over national productivity performance. This series of HM Treasury reports emphasised a number of drivers of productivity (skills, entrepreneurship, competition, innovation and investment) that, along with measures to expand effective labour supply, could help to improve the contributions of lagging regional economies (HM Treasury, 2001). Alongside these drivers, innovation was also identified as a key source of productivity growth.

This economic rationale is now the basis for the Regional Economic Performance (REP) Public Service Agreement (PSA), which sets the main

targets for UK regional policy (HM Treasury, 2007b). This is one of a number of PSAs that set the objectives for public service delivery across a wide range of policy domains in the UK. The REP PSA has two basic inter-related components. The first is to improve the growth performance of all English regions, measured in terms of the trend rate of growth in GVA per capita. The second component is to reduce the gap in growth rates between the regions – the gap between the average trend growth rate for the regions with above average GVA per head (London, South East and East England) and the average trend growth rate for the six regions with below average GVA per head (North East, North West, Yorkshire and the Humber, West Midlands, East Midlands and the South West). To be successful, the growth rate gap between the two groups of regions should be smaller over the period 2003-2008 than it was over the period 1990-2002. In 2007, the Government published interim results that suggested that the second PSA target – to reduce growth rate disparities – is achievable. Nominal GVA per head growth in 2005 was 3.4% for the bottom six regions compared to 3.0% for the top three regions. At the same time, the first target, to improve growth performance across all regions, seems more challenging.

The problem with the approach – and a problem common to other policy domains – is that it is difficult to show direct causality between levels of public investment and unit increases in regional growth. This means that it is difficult to evaluate the efficiency of the investment. Moreover, the REP PSA is only one of several PSA targets that departments are trying to achieve. It is not the single, unique objective of regional investment.

Another factor supporting policy interest in regional performance is that lagging regions represent additional costs and lower than optimal returns on public investment, both human and physical. HM Treasury's identifiable expenditures for UK regions give an indication of the additional expenditures incurred in some UK regions. What stands out is that public expenditure plays a very important role in the economy (this is particularly true in the North East). HM Treasury figures estimate public expenditures as a percentage of GVA at 52% for the North East, 48% for the North West, and 45% for Yorkshire and the Humber, against 36% for London and only 26% for the South East (HM Treasury, 2007a). Estimates of total public expenditure in regions vary according to the methodology used but they tend to show that aggregate expenditures per capita in the northern regions are higher (see Table 2.1.). At the same time, although expenditures are higher, this does not necessarily mean that there is much more money available to invest in long-term growth-oriented projects. About half the difference in regional spending is attributed to welfare benefits – more prevalent in the northern regions due to higher levels of non-employment and deprivation (HM Treasury *et al.*, 2005).

Table 2.1. Government expenditure relative to GVA, 2004-05

	Index (UK average=100)
North East	136
North West	112
Yorkshire and the Humber	107
East Midlands	95
West Midlands	102
East of England	91
Greater London	77
South East	84
South West	108

Source: Oxford Economics (2007), *Economic Outlook: Regional contributions to UK public finances*, January 2007, using calculations based on data from HM Treasury (2006), *Public Expenditure Statistical Analyses (PESA) 2006*.

Most major funding allocations to regions are “space neutral” with relatively uniform regional per capita allocations. The main exception is the economic development allocation, which is significantly higher for the North because of the deprivation-based formula that is used to allocate RDA funding. Allocations for other major expenditure items, such as education, transport and housing, also vary quite a lot from region to region but tend to be more closely aligned to population. These allocations are designed to support service delivery tailored to the specific needs of the region concerned, but are not intended to promote any re-balancing effect (see Table 2.2.).

Table 2.2. Total identifiable expenditures selected categories

	GBP per capita			
	Transport	Housing	Enterprise and economic development	Education and training
North East	226	141	232	1 113
North West	300	138	161	1 134
Yorkshire and the Humber	230	103	155	1 145
East Midlands	231	83	89	1 111
West Midlands	253	93	101	1 131
South West	219	70	70	991
South East	207	83	67	995
East of England	223	65	52	960

Source: HM Treasury (2007), *Public Expenditure Statistical Analyses (PESA) 2007*.

The challenge for regional policy is to address these imbalances in a cost effective way, and one that does not distort markets. One of the main constraints on the ability of regional policy to deliver the ambitious objectives set by the REP PSA is that the relative levels of funding and the pattern of allocation do not appear to have changed fundamentally over time. As a result, there are no significant additional resources through which to impact growth at the regional level across all regions and more particularly to address the gap in growth between the leading three and the lagging six regions. There is always room for better use of existing funds, such as through the reforms proposed in the *Review of sub-national economic development and regeneration* (SNR) but the levels are not expected to increase in the future (HM Treasury *et al.*, 2007). *The Eddington Transport Study*, for example, advocates investment in inter-city linkages and in improving access to transport hubs, accenting decongestion of over-crowded routes, but does not suggest that transport infrastructure resources should be used to spark additional growth in regions where productivity currently lags. This leads to a significant challenge – regions are being tasked to generate extra growth but with the same relative levels of funding as in previous years.

Regional Development Agency funding and regional policy

The RDA funding mechanism provides the most significant additional discretionary public resources for the North. RDAs also play a strategic role to guide public investment from other sources that far exceeds the RDA budgets by orders of magnitude, but this influence does have limits (see Chapter 3). The formula that determines RDA funding gives a significant premium to Northern RDAs. The RDA for the North East receives more than twice the average RDA allocation per capita and more than four times the per capita allocations of the East of England and South East (see Table 2.3.). As mentioned above, it is difficult to relate the extra investment with the scale of the task set for the regions. Much of the original funding for the RDAs came from existing programmes, mainly focusing on urban regeneration (the Single Regeneration Budget). So, in part, the level of funding was historically determined rather than being identified on the basis of an assessment of the investment needed to reach a particular growth target. Although the North receives more than other regions per capita to support economic development, the pertinent question is whether the amounts provided to the RDAs are adequate for the tasks set (see Table 2.4. for international comparisons). The problem is on what basis such an evaluation can be made. For example, how do the sums invested through the RDAs relate to the more general fiscal equalisation scheme, which represents a more significant amount of money per capita?

Table 2.3. **RDA allocations, 2007-08**

	Allocation (GBP millions)	Per capita allocation (GBP)
One Northeast	282	112
North West Development Agency	402	59
Yorkshire Forward	310	62
Advantage West Midlands	296	56
East of England Development Agency	139	25
East Midlands Development Agency	179	42
London Development Agency	374	52
South East England Development Agency	166	20
South West of England Development Agency	162	32
Total	2 310	47

Source: OECD calculations based on data from the Department for Business, Enterprise and Regulatory Reform (BERR).

Table 2.4. **Fiscal equalisation mechanisms, selected countries, 2005**

	As a percentage of GDP	Per capita (PPP adjusted)
Australia	0.5	95
Germany	2.0	489
Italy	3.0	729
Spain	3.0	660
Sweden	2.6	698
Switzerland	3.0	889
UK	1.7	455

Source: OECD (2007c), *Economic Survey of the Euro Area*, OECD Publications, Paris.

This is not to understate the RDAs' resources or capacity to develop and implement policy and improve the supply-side performance of their regions. They are well-resourced and have become embedded into the regional policy environment over time. Recent National Audit Office assessments of the capacity of the RDAs found them to be strong organisations with effective capacity to deliver. In an international context, the English RDAs are unique in many ways, as they serve not only an economic development role but in part substitute for the lack of other strong governance structures between the local and national level. There are no clearly similar bodies in other countries that command such large budgets and staff and have such a wide remit (see Table 2.5. and in Annex Table 2A.1.).

Table 2.5. **Funding for regional development agencies, selected examples**

	Employees	Budget EUR millions
One Northeast (UK)	250	400
SPRI – Basque Country (Spain)	92	53
Midi-Pyrénées Expansion (France)	27	3
NOM (Netherlands)	50	13
Barcelona ACTIVA (Spain)	80	16

Source: European Association of Development Agencies.

There are some clear benefits of the UK RDA structure. One is the size and regularity of funding streams, albeit subject to a three-year corporate planning cycle and indicator performance requirements. There is also a flexibility to be able to combine funds and projects for innovation with other related fields in the context of the Regional Economic Strategy (RES), such as has been done with regeneration funding. The greatest challenge for success in the RDA model relative to other agencies is the ability to have a focused innovation unit that has credibility and leadership within the business community as well as the ability to leverage private funding despite being a large, multi-sectoral agency dependent on national government.

The influence of national funding for R&D on regions

Looking more specifically at the issue of innovation and regional policy, some significant national funding flows tend to act against the general objectives of regional policy, *i.e.*, more funding proportionately to the South than to the North. This is not an intentional policy choice, but rather a consequence of the criteria set for these funding streams, which are not the same as those of regional policy. A constant source of tension in the UK regional policy debate is that these spatially neutral funding allocation schemes tend to disburse resources to higher GDP regions, thereby potentially offsetting some impact of the regional allocations that are designed to favour target regions. This effect is most obvious in the allocation of research funding which is based on a formula that rates universities in terms of the quality of their research. The UK's leading educational institutions located in the South East, London and the East of England tend to do best and attract the bulk of this research money (around half of Government funded R&D) (Perry, 2007). While the funding allocation system in the UK is particularly dedicated in its pursuit of excellence through its funding formulas, the resulting level of R&D concentration in one region (the Greater South East) is not an uncommon phenomenon. For example, the Ile-de-France region accounts for 44% of overall French R&D expenditure and over half of business sector R&D.

The research allocation exercise (RAE), on the basis of which the Higher Education Funding Council for England (HEFCE) allocates funding, is seen to have had a significant positive impact in driving a sustained improvement in the overall quality of the UK research base. It has highlighted research excellence and has provided incentives for HEIs to take a more rigorous approach in developing and implementing their own research strategies. At the same time, the exercise has been subject to some criticism because it has emphasised established disciplines and research methods, often in the same locations, while new, interdisciplinary and applied research have been more difficult to support. Moreover, the competitive format has been seen to have an influence on HEI research decisions, making them funding maximisers to the detriment, potentially, of their preferred research priorities and existing strengths.

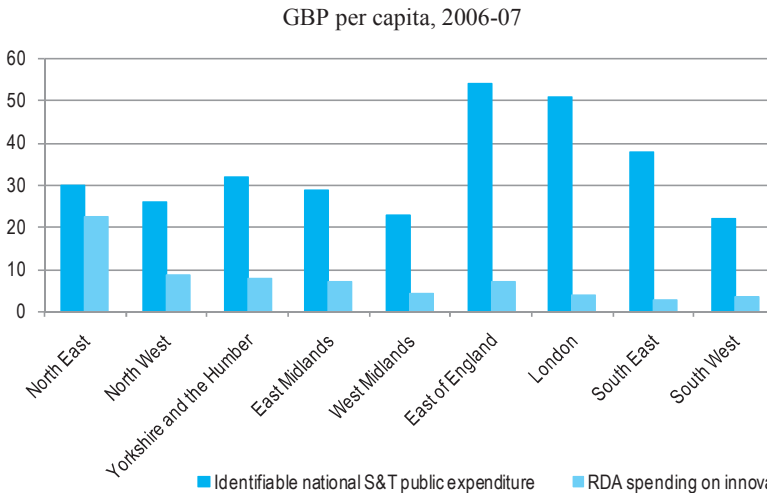
Identifiable funding on science and technology in the North has increased over the past six years. The northern regions in general, and the North East in particular, have come closer to the UK average per capita amount (see Table 2.6.). This funding is principally Research Council funding but excludes funding for basic research which is considered to be non-identifiable with respect to regions. What is perhaps most striking is the comparison of the relative importance of RDA investment in innovation compared with national government flows to the region (see Figure 2.1.). This indicates how significant RDA resources are for regions that attract less national research funding.

Table 2.6. **Identifiable expenditures on science and technology**

	Current expenditure GBP millions		Index UK average = 100	
	2001/2	2006/7	2001/2	2006/7
North East	27	61	54	81
North West	91	151	68	71
Yorkshire and the Humber	74	131	76	86
East Midlands	62	105	76	79
West Midlands	72	97	69	61
East of England	147	255	140	145
London	151	298	105	138
South East	179	252	118	102
South West	65	91	67	59
England	868	1 440	90	95
Scotland	202	252	195	172
Wales	36	55	64	64
Northern Ireland	49	52	164	108
Total UK	1 155	1 799	100	100

Source: HM Treasury (2007), *Public Expenditure Statistical Analyses (PESA) 2007*.

Figure 2.1. National S&T spending by region and RDA spending on innovation



Source: HM Treasury (2007), *Public Expenditure Statistical Analyses (PESA) 2007* and RDA figures.

This spatial concentration of public R&D should be viewed in combination with the concentration of private sector research. R&D investment by leading firms shows strong concentration in the same regions, with the Greater South East accounting for more than 60% of R&D investment and almost 75% of research publications by the country's 200 leading firms (see Table 2.7.). The Greater South East also accounts for major shares of contract income and research with universities.

Table 2.7. Concentration of university and firm research

% of UK total (2001)

	University research performance (from Higher Education Statistics Agency data)		Research by top 700 companies	
	Research grant and contract income	Industry contract research	Research expenditure	Publications on ISI database
London, East and South East	46.8	43.9	61.9	74.5
Rest of England	34.8	38.2	34.3	23.0
Scotland, Wales, N. Ireland	18.4	17.9	3.8	2.5

Source: Adams, Jonathan and David Smith (2004), *Research and regions: An overview of the distribution of research in UK regions, regional research capacity and links between strategic research partners*, Higher Education Policy Institute, March 2004.

In comparison, the funding streams to support business-HEI interaction, which could be relevant for many HEIs in the North that have lower research quality ratings, are relatively modest though increasing. For example, the Higher Education Innovation Fund (HEIF) resources that can be accessed by the less research intensive (“business-facing”) universities are less than 10% of overall public R&D allocations across the three main public funding streams. The HEIF fund is increasing and, along the lines proposed by the *Sainsbury Review*, the formula that is used to allocate funding will be weighted to take more account of the ability of the HEI institutions concerned to attract external funding with double weighting given to income generated from work with SMEs. The preferential scoring for work with SMEs seems particularly relevant for HEIs in the North, assuming that the transaction costs involved in accessing the funding do not generate disincentives for engaging in small-scale projects.

Addressing the issue of concentration versus dispersion of public R&D funding to optimise the societal return of the investment is a common challenge for OECD countries. First, one can argue that the best return on public research comes from allocating resources to the most capable HEIs and that the spillovers from this for society will trickle up to the other regions. From this perspective, knowledge transfer mechanisms are of vital importance. The other perspective is that this approach leads to “cumulative causation” processes, fixing research quality advantage in specific places and giving inadequate weight to the potential of less favoured institutions or researchers within these institutions to develop excellence in particular fields. The outcome of this debate is a compromise that maintains the excellence-based overall structure, while providing additional supports through targeted programmes to support other institutions in ways that are more adapted to their research strengths or aim to build their potential. RDAs play a leading role, with support from regional higher education associations, in supporting the knowledge and technology transfer to firms in their regions. There are examples nevertheless of national-level efforts in OECD countries that seek to trigger catch up in HEIs outside core regions, including in the US (see Box 2.1.).

Box 2.1 Supporting R&D in less advanced US states

The mission of EPSCoR (Experimental Program to Stimulate Competitive Research) is to assist the National Science Foundation (NSF) in its statutory function "to strengthen research and education in science and engineering throughout the United States and to avoid undue concentration of such research and education." The EPSCoR programme is directed at those jurisdictions that have historically received lesser amounts of NSF Research and Development (R&D) funding. Twenty-five states, the Commonwealth of Puerto Rico and the U.S. Virgin Islands currently participate. EPSCoR goals are: 1) to provide strategic programmes and opportunities for EPSCoR participants that stimulate sustainable improvements in their R&D capacity and competitiveness; and 2) to advance science and engineering capabilities in EPSCoR jurisdictions for discovery, innovation and overall knowledge-based prosperity.

Through this programme, NSF establishes partnerships with government, higher education and industry that are designed to effect lasting improvements in a state's or region's research infrastructure, R&D capacity and hence, its national R&D competitiveness. Eligible jurisdictions may seek such planning support to formulate a documented vision and implementation design for their research, education and innovation strategies. An expected outcome from any supported planning activity is the submission of regular NSF proposals that combine capacity building with capability enhancement for addressing bold opportunities characterised by regional relevance and national importance.

- **Research Infrastructure Improvement grants:** These grants run for 36 months and provide up to USD 9 million to support infrastructure improvements in science and technology (S&T) areas chosen by the applying jurisdiction's EPSCoR governing committee as being critical to future R&D competitiveness.
- **Co-funding Mechanism:** This effort enables more awards to be made to researchers in EPSCoR jurisdictions from the Foundation's ongoing research, education and special emphasis competitions, by providing partial support for those proposals that merit review places at or near the cut-off for funding by the reviewing programme. This mechanism operates internally within NSF and does not require any action on the part of the proposer.
- **EPSCoR Outreach:** This mechanism provides financial support for outreach visits by NSF staff to acquaint researchers in the EPSCoR jurisdictions with NSF priorities, programmes and policies. EPSCoR Outreach also serves to acquaint NSF staff more fully with the facilities, research activities and investigator expertise/potential within the EPSCoR jurisdictions.

Box 2.1 Supporting R&D in less advanced US states (*cont.*)

The **Institutional Development Award (IDeA)** programme broadens the geographic distribution of National Institute of Health funding for biomedical and behavioural research. The programme fosters health-related research and enhances the competitiveness of investigators at institutions located in states in which the aggregate success rate for applications to NIH has historically been low. The IDeA programme increases the competitiveness of investigators by supporting faculty development and research infrastructure enhancement at institutions in 23 states and Puerto Rico and has two main components:

- **Centers of Biomedical Research Excellence (COBRE)** augment and strengthen institutional biomedical research capabilities by expanding and developing biomedical faculty research capability through support of a multidisciplinary centre, led by a peer-reviewed, NIH-funded investigator with expertise central to the theme of the grant proposal.
- **IDeA Networks of Biomedical Research Excellence (INBRE)** enhance biomedical research capacity, expand and strengthen the research capabilities of biomedical faculty, and provide access to biomedical resources for promising undergraduate students throughout the eligible states. INBRE implements the IDeA approach at the state level by enhancing research infrastructure through support of a network of institutions with a multidisciplinary, thematic scientific focus. INBRE is the second phase of the Biomedical Research Infrastructure Networks (BRIN) programme, which began by providing planning grants in 2001.

Source: www.nsf.gov/od/oia/programs/epscor/statewebsites.jsp; www.ncrr.nih.gov/research_infrastructure/institutional_development_award/idea_networks_of_biomedical_research_excellence/.

Regional innovation as part of a new approach to regional policy

In practice, the transformational challenge set for regional economic development seems less about narrowing growth gaps (for which the level of investment might not be wholly appropriate) and more about restructuring and modernising. From this perspective, the interest in regional innovation as an agent for change in the economy is a persuasive argument for investment in innovation, particularly in the context of globalisation and recent observations by the Government that regions need to be helped to confront the challenges of globalisation.

UK regional policy has followed a similar evolution to that in other OECD countries – a shift away from redistribution and subsidies to more

“endogenous” ways of driving growth. The interest manifest by HM Treasury and other departments (notably DTI, now BERR) in the functioning of regional labour and capital markets has helped to shift the focus of regional policy. During the 1980s and early 1990s, many OECD governments attempted to attract FDI into target regions, with the primary objective being the creation of employment. There was also an assumption that spillovers would benefit local enterprises, principally increasing their technological and organisational capacity. The experience of Scotland’s so-called Silicon Glen is an example that has been debated intensively in the UK. By 1990, electronics manufacturing – led by industry leaders such as IBM, Hewlett Packard, Motorola, NEC and Compaq – accounted for 20% of all manufacturing and 42% of exports. This policy was supported through large-scale incentives with electronics manufacturers in Scotland receiving half of the available regional selective assistance grants over the period 1995-1999. However, locally sourced inputs were only a very small proportion of total inputs and tended to be mainly at the low-tech end – such as packaging, plastics, rubber and metal components. Although the balance was by no means all negative, policy thinking swung sharply away from this model during the early 1990s.

The first set of Regional Economic Strategies (RES) promoted incentive-based attraction of FDI. At the time, RDAs were new organisations and had a steep learning curve to climb. The first batch of RES, which were supposed to give a new orientation through a more bottom-up diagnosis of challenges and opportunities, tended to resemble one another across most English regions and emphasised inward investment and infrastructure (OECD, 2006f). Regional assets were defined more in terms of the absence of congestion, affordability of housing and availability of relatively cheap labour rather than on skills, entrepreneurship or technological know-how. The strategies emphasised the building of supply chains and local supplier networks around key firms in prestige developments.

However, as the FDI-led approach has become more contested and less effective, UK policy makers have adapted their strategies with an emphasis on building the knowledge economy and thus innovation-led growth. This change mirrors a trend across the OECD, where endogenous-growth-based regional policies, with strong innovation components, have been introduced (see Table 2.8.). Regional policy in the UK, as elsewhere, has also moved away from an infrastructure focus. The Northern Way is working to establish the case for North-South and East-West high-speed rail capacity, but with Government hesitant to support significant investment at this stage. Similarly, there are no “growth pole” type initiatives that show Government’s spatial development priorities, with the notable exception of

the considerable investment taking place around London in support of the Crossrail project, 2012 Olympics, the Thames Gateway and the Heathrow expansion. As a result, regional policy is largely focused on improving economic structures.

Table 2.8. **New regional policy frameworks and their innovation components**

Select OECD countries	
Denmark	<ul style="list-style-type: none"> • <i>Regional Growth Strategy White Paper, 2003</i> • <i>Business Development Act, 2005</i> <p>The 2005 Business Development Act follows a growth-oriented agenda. Two of the six priority areas related to innovation and ICT.</p>
Finland	<ul style="list-style-type: none"> • <i>Regional Development Acts, 2002, 2007</i> • <i>Government Decision, 2004</i> <p>Centre of Expertise programme is a key component of regional policy. More generally there is a strong emphasis on regional innovation within Finnish regional policy.</p>
France	<ul style="list-style-type: none"> • <i>Law on National Regional and Sustainable Development Policy, 1999</i> • <i>New Spatial Development Policy, DATAR, 2002</i> <p><i>Pôles de compétitivité</i> launched in 2005 are the main initiative to make French regions more competitive; closely linked to new regional development structures.</p>
Italy	<ul style="list-style-type: none"> • Community Support Framework (CSF) 2000-06 • Unitary regional policy under the National Strategic Reference Framework (NSRF) 2007-13 <p>The NSRF suggests that the role of innovation support within regional policy will increase. Current focus is on the innovation component of regional aid.</p>
Netherlands	<ul style="list-style-type: none"> • Spatial Policy Memorandum, 2000 • Peaks in the Delta Memorandum, 2004 <p>Peaks in the Delta has a strong innovation orientation. Four of the six Peak programmes focus on innovation as a regional strength.</p>
Norway	<ul style="list-style-type: none"> • Policy statement to parliament, 2002 • Regional Policy White Papers, 2005, 2006 <p>The 2005 White Paper had a strong innovation orientation, with a proposed new Centre of Expertise programme. Although the 2006 White Paper shifted the emphasis back towards traditional problem regions, the Centre of Expertise programme is now operational.</p>
Sweden	<ul style="list-style-type: none"> • <i>Government Bill: A Policy for Growth and Viability throughout Sweden, 2001 (Regional Growth Programmes)</i> <p>There is a strong innovation component to the Regional Growth Programmes.</p>

Source: Adapted from Yuill, Douglas (Editor) (2006) *Regional Policy Developments in the Member States and Norway: Country Reviews 2005-06*, EoRPA Paper 06/2 prepared for the 27th meeting of the EoRPA Consortium, Ross Priory.

Box 2.2. Innovation focused regional policy: The example of the Netherlands

The Dutch approach to regional policy has recently shifted from a focus on supporting the lagging Northern regions to supporting the economic strengths of regions that serve as national drivers of growth. In 2004 two key papers on regional policy were issued. The report *Peaks in the Delta* outlines a new strategy for taking advantage of region-specific opportunities of national significance and to make use of the regional potential to create an internationally competitive investment climate. The result is six regions in total (five new areas plus the previously existing programme for the Northern provinces). An interdepartmental review of the country's regional policy also noted that the justification for future national regional policy should be that it focuses on supporting regional strengths of national importance (Yuill, 2006).

The six regions are not a new layer of government but rather an area for spatial economic planning. These regions span administrative boundaries (12 provinces) that retain their existing functions. For these regions, a strategic planning body was created, a Programme Commission, to devise a coherent programme with priorities and results to be achieved in four years. Within this context, clusters for priority support were selected. The result has also been the development of joint central-regional programme teams between the national and sub-national (regional) level. As such, the region became the level at which the spatial economic policy within the Ministry of Economic Affairs is now organised (OECD, 2007f).

Source: OECD (2007), *Competitive Regional Clusters: National Policy Approaches*, OECD Publications, Paris.

Strengthening regional institutions

Innovation policy in OECD countries is increasingly linked with regional and local institutional structures and mechanisms for co-ordination of policy across levels of government. Innovation policy has not focused on multi-level governance in the past. Relations between key actors were directed from the centre with consultation and negotiation between central government departments and key actors such as universities and funding agencies. As was discussed in the Introduction, regional innovation policy is concerned with ensuring an efficient division of labour between the centre and regional and local actors to provide high-quality public goods that are relevant for firms in that locality. As such, the quality of sub-national institutions and their incentives for pursuing innovation policies are extremely important. (Please see Box 2.3. for a brief review of the evolution of regional institutions in the UK.)

Box 2.3. The evolution of regional institutions in the UK

In the 1970s and 1980s, Government largely dismantled the previous standard region and metropolitan government structures, making regions largely irrelevant in policy for around 20 years. During this period, local government was replaced by a more complex structure that used different agencies alongside local authorities to deliver public services. This fragmentation was seen as a way to generate competition and avoid local authority over-spending. The powers and responsibilities of local authorities were transferred to a variety of organisations operating at different spatial scales. These included central government agencies (appointed), non-departmental government bodies (appointed), local and sub-regional partnerships (elected and appointed), a range of partnership forums (both elected and appointed), local authorities (elected) and local stakeholders (appointed).

The Regional Development Agencies (RDAs) in the UK were created by legislation in 1998. The five statutory purposes of an RDA, applying to both rural and urban areas, are:

- to further the economic development and regeneration of its area;
- to promote business efficiency, investment and competitiveness in its area;
- to promote employment in its area;
- to enhance the development and application of skills relevant to employment in its area; and
- to contribute to the achievement of sustainable development in the United Kingdom where it is relevant to its area to do so.

An influential White Paper in 2002, *Your Region, Your Choice: Revitalising the English Regions* aimed both to consolidate and strengthen the powers and functions of the key institutions at regional level (Government Offices for the regions, RDAs and Regional Chambers/Assemblies), and, following approval by a public referendum, create elected Regional Assemblies. The electorate in the North East voted in a referendum held in 2004 not to have an elected Assembly. This has subsequently led to the decision being taken, pending legislation, to give the RDAs responsibilities for planning and transport strategy currently residing with Regional Assemblies. This move is expected to lead to the disappearance of Regional Assemblies altogether. This development has left the RDAs as the principal economic development agents at the regional level, working in partnership with a range of local and national bodies. The RDAs work to a ten-year Regional Economic Strategy and a three-year Corporate Plan. The Corporate Plans are produced annually on a rolling basis, and every second plan is submitted to the central government (DTI, now BERR).

Box 2.3. The evolution of regional institutions in the UK (cont.)

Although assigned limited powers and quite restricted budgets, the responsibilities of RDAs have been gradually increased, and they have been given greater flexibility over the use of their funding. In April 2005 they were granted new responsibilities, including the management of the Business Links Service, the development of Regional Skills Partnerships and an increased role in supporting business-university collaboration. Additional resources have also been given to RDAs to meet rural socio-economic objectives (which were previously the responsibility of the Countryside Agency), for inward investment and to manage European funding on behalf of their regions.

Source: Department for Business, Enterprise and Regulatory Reform; OECD (2006), *Territorial Review of Newcastle and the North East*, OECD Publications, Paris.

A key milestone in the evolution of the regional architecture was the 2007 *Review of Sub-national Economic Development and Regeneration* (usually referred to as the Sub-national Review, SNR) (HM Treasury *et al.*, 2007). The Review was undertaken as part of the Comprehensive Spending Review (CSR) process. The SNR was designed to clarify some uncertainties that had developed over the period since the RDAs and Regional Assemblies were established, and also to defuse some of the continuing rivalries among agencies and between agencies and elected authorities at the sub-national level. The commissioning of the SNR has been seen as a strong signal from Government that it wanted to develop a more coherent set of institutions for policymaking at the regional and local levels. The SNR has clarified a number of outstanding issues relating to sub-national economic development, including several that were highlighted in the OECD Review of Newcastle in the North East (OECD, 2006f). The SNR underscored the importance of the regional level in “developing strategy, identifying priorities and opportunities for growth” and recommended that “more policy and funding decisions should be devolved from the centre”. The recommendations of the SNR to strengthen the regional level include:

- move to a regional strategy that sets out the economic, social and environmental objectives for each region (*i.e.*, merging the existing Regional Economic Strategies (RES) and Regional Spatial Strategies (RSS)); and
- place on the Regional Development Agencies the executive responsibility, on behalf of the region, for developing the regional strategy, working closely with local authorities and other partners (which in practice means that the RDAs take responsibility for regional

spatial planning in addition to their existing responsibility for regional economic planning).

Subject to legislation, the creation of a new regional strategy (RS) that will build on and replace the existing RES and RSS is clearly a helpful initiative and will make the new regional strategy a more convincing vision for the region. It will link economic development with major infrastructure and housing investment (two high profile and politically sensitive policy areas). Over time, the RS is likely to develop into the key document to give a regional dimension to environmental concerns as well. This suggests a role for the RDAs that is clear and more strategic, but also potentially very broad, with some important politically sensitive decisions to take on public investment. Within this broader remit, the innovation issue risks losing some importance in comparison to these spatial development issues.

At the pan-Northern level, the Northern Way was established to provide additional support for the three Northern RDAs (see Chapter 3 for more details). The Northern Way has a small secretariat with funding combined from the three member RDAs. Although initially it had a focus on the delivery of projects, emphasis is now shifting towards a more strategic role in areas with a strong pan-regional dimension; particularly transport, private investment and innovation. The Northern Way also acts as a voice for the North in discussions with the central government on issues of general concern for the North's economy, and provides a mechanism to support co-operation between the RDAs and between the Northern city-regions. The Core Cities initiative has a somewhat similar role on behalf of the main urban centres in the UK (including, but not limited to, cities in the North).

Several high-profile reviews commissioned by Government have also highlighted the regional dimension of key policy areas such as skills and training, research-industry collaboration and so on. They include discussion of how the regions can play a more prominent role and how cross-agency and multi-level co-ordination could be improved. These reviews – *Sainsbury* and *Lambert* prominent among them – have often devoted a special chapter or section to how sectoral approaches could be supported by regional and local institutions. This may over time become a standard practice to include a regional chapter in strategic policy documents. It suggests a more spatial approach across Government departments. However there remains some ambiguity about whether the regional level is seen as a partner in policy development and implementation or simply an area of implementation for public policy designed from the centre and implemented through a mix of national-level quasi-governmental organisations and sub-national actors.

Finally, the evidence base for regional action has also been strengthened with respect to generation of more accurate regional statistics and extra

resources for analysis of regional needs. The *Allsopp Review* raised the need for regional information and statistics that has resulted in the creation by the Office of National Statistics and the RDAs of regional statistics offices in 2007 (Allsopp, 2004). The aim of these offices is to support the work of the RDAs, particularly with regard to measuring progress towards the PSA targets, including a commitment to develop reliable GVA (gross value added) statistics for regions. Another initiative that is intended to improve the evidence base for regional policy is the creation of the State of the Cities database, which holds some socio-economic data at the city and city-region or sub-regional level. The creation of the Spatial Economics Research Centre, which will have the explicit goal of exploring the issue of spatial disparities and identifying the role for Government in addressing these disparities, is another sign of the concern with strengthening the evidence base to support policies at sub-national level. An important task of the latter could be to examine the question posed above about the level of investment attached to regional policy and its relationship to specified objectives (and how the overall effectiveness of region-level investment can be measured in terms of both regional and national impact). At a national level, the new Innovation Research Centre, as announced in the *Innovation Nation White Paper*, should also help to inform the innovation policy community, including at the regional level (DIUS, 2008b).

Finding a more active role for local authorities

As part of the process of developing more comprehensive, strategic RDA-led regional strategies, local authority scrutiny of the activities of the RDAs will be strengthened. This is part of a general effort to enhance the involvement of the local level in policy formulation and implementation, including in fields relating to economic development and innovation. Local authorities are only now regaining some of the functions that they lost over the course of the 1980s, a period of significant local government reform and recentralisation of some powers. While the functional dimension of local authority administration is currently limited, there have been a number of initiatives to recreate functional areas through inter-municipal partnerships and partnerships that link local authorities with the range of service delivery agencies that have emerged over the past 20 years. These are not directly involved in innovation activities but have shown that they can be an important means for organising public policy delivery at a spatial scale that is clearly relevant for some activities. Given the emphasis on innovation dynamics at the city-region level, it is likely that sub-regional actions may also be well-suited to supporting innovation.

Local Strategic Partnerships (LSPs) have shown that cross-agency working can be beneficial and can bring coherence and critical mass to economic development action at local authority level. LSPs are non-statutory multi-agency partnerships that bring together local statutory, voluntary and private sector representatives. This model is to be extended as the Local Area Agreement process becomes operational over 2008. However, as a mechanism primarily focused within the boundaries of individual local authorities, they are likely to work well for localised regeneration and local public service delivery but seem less adapted to delivering innovation-related actions.

At a functional economic level, the introduction of multi-area agreements (MAA) is another way to bolster the capacity of local authorities to play a more active role in designing and implementing policy across a wide range of policy areas, potentially including innovation. They allow for co-operation across municipal boundaries on specified themes, such as transport provision or sanitation. They are similar to co-operation contracts used in other countries, notably in France, and have the potential to improve cross-jurisdictional co-operation. Some associations of local authorities have already established joint initiatives to promote economic development, including Manchester Enterprises, the Mersey Partnership and the Tees Valley Partnership.

MAAs are unlikely to be operational in the field of innovation in the near future, even if some areas may have an impact on areas covered by a broad definition of innovation. The first agreements will probably focus on issues of service delivery, where those services cross administrative boundaries and where a unified system would reduce costs, notably in transport services. Innovation is probably well down the list of likely candidates for MAAs in the short term at least. The creation of the Local Area Business Growth Incentive (LABGI) scheme was designed to allow local authorities to receive a proportion of increases in local business rate revenues to spend on their own priorities. While the programme created a long overdue financial incentive for municipalities to promote local business growth, its future is uncertain.

Cross-agency co-ordination

When the regional architecture was first established from 1998-99 onwards, the Government Office network played an important role in facilitating the work of the institutionally new RDAs in the regions. As the remit of the RDAs has grown and as local authorities have become the focus of decentralisation efforts, the role of the Government Offices is being scaled back. A review of the Government Office network took place in 2006 and as a result the Government Offices were asked to make significant

savings and cut staff by one-third. The aim seems to be for them to play a more hands-off strategic role, managing the relationship between central and local government, supporting the work of the RDAs and other agencies, and co-ordinating central government activities in regions. However, the distinction between this Government Office role and what BERR and DCLG do at the central level and what the RDAs do at the sub-national level is not very clear.

While co-ordination among agencies has certainly improved, the institutional system to support economic development is still extremely complex. The SNR makes a number of recommendations relating to the perceived problems of co-ordination but these seem less specific than its recommendations in other areas and could perpetuate the blurred division of responsibilities and *ad hoc* co-ordination mechanisms of the past. For example, the SNR recommends giving local authority leaders in the regions responsibility for developing and scrutinising the regional strategy with the RDAs, and for effective scrutiny of RDA performance. Both tasks are important in giving the new regional strategies legitimacy and buy-in, but how this can be achieved is less clear, particularly in cases where there is conflict between the vision expressed in the regional strategy and the expectations of specific local authorities. In a similar vein, the SNR states that Government should “ensure” that the work of agencies including the Highways Agency, the New Homes Agency, the Environment Agency, the Learning and Skills Council (LSC) and Jobcentre Plus informs, complements and contributes to the priorities agreed in the regional strategies. In principle this should also apply to innovation-related activities, including the work of the Technology Strategy Board. Co-ordination across agencies that report to different Government departments is notoriously difficult to manage and there does not appear to be a robust mechanism to ensure such co-ordination in practice. It should be noted, however, that Government is still carrying out a public consultation on the implementation of some of the review's key recommendations.

The business support system is a good example of the challenge of co-ordinating policy. It is not surprising that Government has made business support simplification a high priority. In early 2006 there were over 3 000 publicly funded schemes at the national, regional and local levels. In response to this, the Chancellor announced in Budget 2006 a target to reduce the number of business support products and services delivered at all levels of government to no more than 100 by 2010. BERR is mainly responsible for overseeing this reduction, but other Government departments also run business support programmes, while RDAs, local governments and even groups of local authorities, such as the Mersey Partnership or Manchester Enterprises all provide different types of support. In addition, access

channels for these various programmes are also unclear so that firms often do not know where to go for advice. Against this background, the role of the RDAs in business support does not seem to be fully understood within the business community. Business Link, the gateway and brokerage mechanism for business support schemes, is now managed through the RDAs and this could strengthen the presence and credibility of the RDAs within the small business community, as well as delivering a more simplified and demand-led system.

Overall, the regional framework has matured, but there are still elements of the framework that are either blurred or that seem less than optimal. The recommendations of the SNR will take some time to implement, the specifics of that implementation are being vetted through a consultation process. As will be discussed further below, remaining tensions within the regional institutional framework pose particular problems in the field of innovation policy, a field in which regions have little experience and where there has been no history of multi-level co-ordination on which to build (unlike other fields, such as urban regeneration or housing). For the same reason, implementation of the recommendations of the SNR could help to strengthen the framework in which innovation policy is implemented at the regional and local levels.

Regions in national innovation policy

A new innovation policy for the UK

The role of the regions in innovation has been promoted in several recent government reviews. This section looks at how well the national innovation policy framework supports this objective. The response of the regions is discussed in detail in Chapter 3.

Lying behind this interest in region-level innovation is a shift in thinking about the way science and technology policy is developed and implemented. Pressing issues such as globalisation, a more technology-driven economy, ageing of populations, environmental concerns, etc., are pushing governments across the OECD to change their approach to innovation and the systems that support innovation. The UK Government remains strongly committed to core science policy objectives, such as ensuring the flow of scientists and engineers. But the emphasis on commercialisation and on picking and developing emerging technologies with business application is clear. A principal recommendation of the recent *Sainsbury Review*, which is currently in its implementation phase, is that the aim should not be to increase R&D volumes across the board. Rather, strategy should target resources to what the UK does well, specifically:

- target key R&D-sensitive industries in which the UK has the potential to be a world leader;
- build the industrial potential of emerging technologies with wide industry application;
- seek out innovation needs in service industries; and
- strengthen the role of HEIs in the knowledge economy.

These objectives have been restated in the March 2008 White Paper *Innovation Nation* which will serve as the basis for a UK innovation strategy and for the implementation of the *Sainsbury Review*. *Innovation Nation* proposes a number of specific actions to be carried out by DIUS and other Government departments and specifically includes a chapter on innovative places (see Box 2.4.). Some elements of the White Paper address the traditional mainstays of S&T policy such as support for the science base and for science-related education. The White Paper also recognises that businesses need incentives to innovate and that government should streamline the regulatory framework in order to ensure that firms of all sizes see the advantages of investing in innovation, have access to useful public policy support and are not hindered by unnecessary administrative burdens or regulation.

Equally important, however, is the space that the White Paper devotes to developing policy that refers to a broad definition of innovation. For example, the White Paper gives considerable attention to the “hidden” or “hard to reach” types of innovation that make up a large portion of innovation activity in a modern service-driven, knowledge economy. Developing policies to support innovation in service sectors will be a priority, as will be developing more sensitive indicators to measure hidden innovation. Another key strand of government policy is the emphasis on the role of the public sector as a source of innovation itself and a driver of innovation in firms, through innovation-informed procurement planning. To achieve this objective, a Whitehall Hub and an internal government innovation network will be established, linked to a new public services innovation laboratory.

Another sign of this new approach is that the range of actors considered to be important for innovation is widening. One example is the focus on the role of Further Education (FE) institutions, which provide non-university, vocational and adult skills training. These colleges are seen as the key providers of vocational and adult education but have not been seen as part of the innovation system in the past. The involvement of an increasing number of FE colleges in the Knowledge Transfer Partnerships programme and engagement with local business through placements, specialised course

development and so on is recognised in the White Paper. To support this trend, a fund managed by the Local Skills Councils will be made available to FE colleges that wish to develop these activities further. This could respond to concerns expressed by the Local Skills Councils that they have no resources to support enhanced engagement by FE colleges.

Box 2.4. Innovative places and key policy proposals in *Innovation Nation*

Innovative Places chapter:

- ***Recognition of the importance of place.*** Innovation, and how a place can benefit from it, differs from place to place. As the production of new knowledge becomes globalised, different places in the UK will innovate in different ways. The drivers of innovation come together in places and can be urban, rural, regional, national and international in nature, often crossing administrative boundaries.
- ***The policy challenge.*** The challenge for policy-makers is to create a framework, at a national and sub-national level, where activities to support innovation are focused on co-operation between the different actors involved, are responsive to different places and spatial levels and work across administrative boundaries. This includes policies at a national or pan-regional scale and at a regional or sub-regional scale.
- ***The RDAs are presented prominently.*** RDAs provide the strategic framework for economic growth and regeneration in their regions. Science and innovation plays a prominent role in these. RDAs work with a diverse range of stakeholders and their Science and Industry Councils to translate national policy into solutions that address regional priorities.

The general policy proposals:

- Innovation procurement plans for each government department – setting out how the department can drive innovation through its procurement strategy;
- Refocusing of the Small Business Research Initiative to target technology-based research;
- Review of business regulation to identify how current regulatory frameworks promote or hinder innovation;
- Publication by DIUS of a Science and Society Strategy (autumn 2008);
- Five new technology platforms to be established by the Technology Strategy Board over the next three years;
- Introduction of an innovation “voucher” scheme to enable small business to work with HEIs;
- Development of a new Innovation Index by NESTA; and
- Publication of a cross-departmental Annual Innovation Report.

Source: Department for Innovation, Universities and Skills (2008), *Innovation Nation: White Paper*, March 2008.

There is a clear shift away from a narrow definition of innovation as something that is driven principally by R&D to an activity that occurs across all sectors of the economy, both private and public. At the same time, proposals in these new areas still emphasise “exploring the policy issues”. The report mentions a new Innovation Index, an Innovation Research Centre, further research into the innovation needs of the service sector, and other initiatives to improve government intelligence in this field. This suggests that many of these new areas are still relatively far from being clear policy targets.

Bringing a spatial dimension to innovation policy

The transition from a focus on science and technology to an emphasis on broadly based innovation and commercialisation of research is a common shift in OECD countries. The general change in orientation can be summarised as: 1) a shift from scientific to innovation goals (with evaluation based on strategic and structural criteria, as opposed to purely scientific criteria); 2) less funding of individual R&D projects run by specific institutions and more emphasis on joint projects and research themes; and 3) stronger marketing of linked competences (business, research, governance) (OECD, 2005c). All of these changes have promoted an approach to programme design that emphasises network building. Within this emphasis on networking, the issue of place in innovation has become more important as a way to support networks.

The *Innovation Nation* White Paper emphasises public policies to support “innovative places” – an explicit recognition that regions are important for generating innovation and that English regions are becoming more significant actors in innovation policy delivery. This is in line with similar evolutions elsewhere. In other OECD countries where the commercial output of scientific research is considered to be lower than expected – France, Germany and Sweden, for example – there has been a general increase in interest among S&T policy makers in the issue of the spatial dimension of innovation as a means by which to target resources and also as a way to organise collaborative projects. France, for example, has been reforming its industrial strategy and linking it more explicitly with innovation. This has led to greater recognition of a regional dimension in policy circles. Three key reports that influenced policy all pointed to such a strategy, leading directly to the launch of the *Pôles de compétitivité* programme.¹ In Sweden, a similar process led to the *VINNVAXT* and *Visanu* programmes, while in Germany, competence networks have been established to capture the innovation potential of specialised regions (see Box 2.5.).

Box 2.5. Competence Networks in Germany: Networking for Innovation

Promoted by the Federal Ministry of Economics and Technology, the Competence Network Germany programme supports innovative clusters. The networks are defined as regionally concentrated but are supra-regional action innovation networks. They are defined to have a focus on high technology and an ability to generate innovations with a high rate of added value, converting them to products ready for the market.

The initiative is designed to strengthen the international competitiveness of Germany as a hub for research and to help potential investors see the attractiveness of Germany as an innovation location. It is designed to be a league of the best innovation networks in the country and membership is a quality label reserved only for the best networks. The networks are also open for international co-operation.

The networks must be admitted to the programme based on an evaluation. Some of those requirements include: a thematic focus within a particular field of innovation, being concentrated and embedded in the region, being an organised network with an identity and potential for sustainability, collaborative technological development, and participants coming from different links in the value chain with innovative potential to add value. Ideally these networks would have actors from the communities of research institutes, education and training entities, developing and producing companies, and finally additional specialised services.

There are approximately 115 labelled networks, each with a profile. The initiatives are clustered in nine topics to represent the structure of the German economy. They include biotechnology, health and medical science, transportation and mobility, new materials and chemistry, production and engineering, aviation and space, energy and environment, information and communication, and micro-nano-optical technology. While there are 16 *Länder* (administrative regions), the programme groups them into eight meso-regions, each characterised by several economic similarities.

Source: www.kompetenznetze.de/, [www.sophia-antipolis.org/poles2competitivite/manifestations/2Forum-poles\(2006\)/presentations/16h00-18h00/Allemagne.pps](http://www.sophia-antipolis.org/poles2competitivite/manifestations/2Forum-poles(2006)/presentations/16h00-18h00/Allemagne.pps).

Policy thinking in OECD countries has passed through a focus on dynamic regional clusters and local productive systems and is now concentrated on innovation and regional innovation systems. These programmes described above tend to emphasise the practical advantages of supporting innovation in specific places. They seek to build relationships between knowledge users and researchers within the same region, facilitate interaction between entrepreneurs and investors, create innovation spaces

for open innovation, and offer mentoring and large firm-SME linkage programmes, among other techniques to strengthen interaction among actors. The ultimate aim is to support a regional innovation system that fixes channels for interaction within a place, making such interactions a standard part of business practices.

Leaving aside the theoretical distinctions, these approaches share some common, practical advantages. These include helping governments to: diagnose regional economic strengths from an innovation perspective, clarify market linkages among economic actors, dialogue with “systems” of public and private actors, and focus public resources on key sectors or projects. For example, the Basque Country uses its cluster programme very consciously to link key regional actors involved with innovation institutionally and ensure regular exchanges between these actors and civil servants. Danish policy has passed through a focus on clusters and is now more centred on instruments that bring out regional competence, specifically centres of expertise focusing on innovation in key sectors (see Box 2.6.). The main challenge with this area of policy is that the benefits are more difficult to measure.

Box 2.6. The evolution in Danish policy from clusters to regional innovation centres

Denmark has changed its strategy from using national policies that support the development of existing clusters to seeking to support better general framework conditions for entrepreneurs and to strengthen the regional development and co-operation around new business development and innovative networks. It was felt that this strategy would avoid challenges to the selection process which also include the risk of overlooking future growth opportunities in a changing global economy as well as the risk of paying for projects that would have been implemented anyway. Some of these programmes include:

Regional growth centres: In 2001, the Ministry of Science and Technology launched the regional growth centres initiative. As a result, 17 regional growth centres were established with the aim of strengthening and developing the framework for regional co-operation and knowledge sharing among companies, knowledge institutions and other relevant stakeholders.

Action Plan for Public-Private-Partnerships on Innovation: In September 2003, the Government launched this action plan with the overall goal of further strengthening co-operation between various players in research, trade and business and to facilitate access to knowledge for SMEs. The six areas of focus in the plan are: 1) Co-operation on research and innovation; 2) Access to competencies; 3) Commercial utilisation of public research; 4) New framework conditions for university interplay with society; 5) Focus and prioritising in public research; and 6) Access to qualified technological service and counselling.

Box 2.6. The evolution in Danish policy from clusters to regional innovation centres (*cont.*)

Action Plan for Regional High-tech Development: To further strengthen regional high-tech development, the Ministry of Science, Technology and Innovation launched this Action Plan in September 2004. It involves two new initiatives, Centres of Expertise (*regionale teknologisentre*) and so-called Regional Knowledge Pilots, as well as activities to further strengthen existing programmes such as Technology Incubators, Innovation Consortia and the Industrial PhD Initiative. With a focus on regional competencies, Centres of Expertise are intended to act as intermediaries between regional research and SMEs. The Regional Knowledge Pilots programme aims to improve the conditions for SMEs to hire academic staff.

Source: OECD (2007), *Competitive Regional Clusters: National Policy Approaches*, OECD Publications, Paris.

One of the typical obstacles to a spatial approach to policymaking is the concern that public policy should focus on market failures and that these failures are market-wide and not geographical in nature. However, with respect to regional innovation, there is increasing recognition that other types of “failures” beyond market failures can impede the functioning of an innovation system and result in sub-optimal outcomes. In the UK, these other failures are acknowledged but given the greater challenge of providing an evidence base for them, market failure arguments receive considerably more weight in national policy. As discussed in the Introduction, the most commonly cited are network and systemic failures, in addition to several others (OECD 2005c, OECD 2006c, van Cruysen and Hollanders, 2008). Market failure arguments concern the risk and uncertainty that lead to sub-optimal investments, while systemic failure arguments focus on the issue of interactions across actors in that system. EU policies have explicitly acknowledged systemic failure in the context of their policies to support innovation through Structural Funds and other programmes, as have several OECD countries. In regions where there are an insufficient number of actors, a lack of recognition of the value of those interactions, or impediments to interactions, broader policy interventions may be warranted. In the North of England, this is more likely to be the case than in the leading economic regions of the country.

Horizontal and vertical co-ordination

As previously discussed, part of a 2007 reorganisation of Government departments resulted in the responsibilities of the DTI being split between

two newly created departments (DIUS and BERR). The creation of DIUS puts, for the first time, innovation, research and skills in the same department. Bringing skills into the picture is clearly positive. At the same time, there is a risk that innovation remains more or less synonymous with science policy, driven by the science and higher education budget processes, with the business environment dimension being somewhat disconnected. As such, despite a desire among actors at the centre to work together, the institutional arrangements that determine objectives and funding streams are not easy to reconcile in practice.

This is a sign of the complexity of developing policy around innovation at the national level. While the commitment among OECD governments to support innovation is quite consistent – most see it as a cornerstone of policies to support growth – they go about it in very different ways. In Italy, the recent Government change has led to the reuniting of the Ministry of Universities and Research with the Ministry of Education, which were split by the previous Government. Yet, innovation and technology is a department in another Ministry, the Ministry for Public Administration and Innovation. Other countries take the various component policy fields – education, universities, research, science and technology, industry and enterprise – and split them up in different ways.

In the UK, S&T policy for the English regions is centralised and the S&T policy community has not had much experience of working systematically with the sub-national level. The debate over the re-siting of the DIAMOND facility, a major national scientific facility, away from Daresbury in the North West generated a bottom-up reaction from the region that seems to have been a watershed in this regard (Perry, 2007). Since that time, there have been a number of signs that the regional dimension has been accepted as an aspect of S&T policy. For example:

- The Science and Innovation framework 2004-2014 refers to the link between national science policy and the issue of reducing disparities, while also underlining the need to reduce tensions between regional policy and research excellence;
- The regional Science and Industry Councils, advisory bodies to the RDAs, are now seen as stable institutions with a positive influence on the work of the RDAs (though their actual impact is uneven, as is discussed later);
- There have been a number of recent reviews that underline the need for good co-operation between the RDAs and local authorities and national institutions such as the Research Councils; and

- The Technology Strategy Board, the lead agency for guiding national investment in technology fields, and the RDAs are expected to align portions of their funding to support common objectives. The current phase includes a target of at least GBP 180 million aligned funding over the next three years with Technology Strategy Board programmes, with those commitments to be included in RDA corporate plans and in Technology Strategy Board strategic plans.

These developments suggest that the principle, at least, has been integrated into S&T policy. The RDAs have become more common partners in science projects, particularly with respect to science infrastructure and science-related enterprise development facilities. Examples include the role of the RDA in the development of the Daresbury Campus and the merger of the University of Manchester with the University of Manchester Institute of Science and Technology. RDAs are involved in strategic thinking on plans such as the ten-year Science Plan and have ongoing links with the Higher Education Funding Council for England, the Research Councils, Technology Strategy Board and other actors to help give policy formulation a regional input. But this does not mean that innovation policy is now multi-level – rather it goes back to the issue of how the role of the regions is defined or if it is not defined, how it is understood by the key actors.

There are two clear perspectives on the role of regions, and specifically the RDAs, in promoting innovation. As the *Sainsbury Review* pointed out, regions are free to use their own funds to invest in the science base or to invest in activities that benefit from research activity in the region. But this is a decision taken by the RDA and from its own normal resources. Lord Sainsbury noted that RDAs should “tension” this use of funds against other uses that could have greater regional economic impact. This approach has merits, but does little to convince regions that they are core components of the national system. Instead it suggests a structure that is less a division of labour than two quite separate processes. From the perspective of the regions, their involvement in the field of innovation is a core element of their contribution to regional growth, but also represents an integral part of national innovation policy.

Evidence from other OECD countries suggests that co-ordination is difficult to achieve in practice where different definitions of innovation and the role of public policy have evolved over time within separate public bodies. As the OECD’s MONIT exercise demonstrated, co-ordination is closely linked to agenda setting. When governments can formulate strategic, long-term policies and visions that set a clear and legitimate direction for priority setting, co-ordination is more effective. When they do not, more co-ordination has to take place through discrete, lower-level activities such as communication tools, consultation and arbitration. A trend towards

“agencification” has developed in many countries as a direct response to this problem. Governments retain the basic policy-making structure while inducing decentralisation, accountability and flexibility at the agency level. However, the MONIT exercise also revealed the difficulties that are involved in adapting this strategy in a field as multi-disciplinary and recent as innovation (OECD, 2005c).

Box 2.7. Difficulties co-ordinating innovation policy – the OECD MONIT exercise

As governments attempt to respond to greater external and internal complexity and dynamism, policy co-ordination becomes the main means of achieving greater coherence. Common difficulties include:

- Co-ordination mechanisms may be static and short-term rather than dynamic, particularly when there is significant institutional fragmentation and short-term considerations dominate agenda setting. Co-ordination may simply concern annual budget-related decisions and be decentralised to implementing institutions. This does not lead to long-term or strategic policy priorities.
- Designing co-ordination mechanisms takes time and financial support. A sense of urgency is necessary if efforts to co-ordinate policy are to affect policy governance. Without a sense of urgency, co-ordinating arrangements may fail and the system may build up resistance against subsequent attempts.
- Co-ordination across policy domains: People are more decisive than structures but structures support people. Well-functioning co-ordinating activities require personal leadership and commitment, and policy makers should ensure supportive structures for co-ordination activities that rely on people.
- Because different mechanisms are typically needed at different levels, arrangements that function well at ministerial level may be less relevant for lower levels. The need for different mechanisms for different types of policy issues, brought out in the study of sustainable development, seems to substantiate this. Moreover, successful co-ordination on one level sometimes reduces the need for investing in co-ordination on another.

Source: OECD (2005), *Governance of Innovation Systems, Vol. 1: Synthesis Report*, OECD Publications, Paris.

The particular challenge of developing a coherent innovation policy in the UK is the number of non-departmental bodies and agencies that are

involved in innovation and that are responsible to different departments. Among these, DIUS is responsible for the Technology Strategy Board, the Learning and Skills Councils (LSCs) and the Higher Education Funding Council for England (HEFCE), while BERR is responsible for the RDAs and for UK Trade and Investment (UKTI), the latter jointly with the Foreign and Commonwealth Office. The interaction of these and other agencies is particularly important for regional innovation because there is potential for tension between agencies with a regional vocation (RDAs, LSCs) and those that are essentially region-neutral (Technology Strategy Board, HEFCE, Research Councils). This is all the more significant because these agencies manage relatively large budgets.

Building co-ordination around regional assets

In general, the regions contribute to national technology strategy in many different ways. First, regions may serve as a partner in strategy development; the exchanges between regional Science and Industry Council and Technology Strategy Board members being a vehicle for this partnership. These exchanges also serve to raise awareness at national level of regional technologies and sectors that should be supported. Regions could meet with national-level technology managers to discuss how to take technology support forward in a co-ordinated way, and determine the basis on which implementation could best be enabled. On a spatial basis, the region could help to develop links between technology strategy and other economic policy instruments as well as support the development of sector-specific ecosystems. Regions may also give local visibility to national policy thereby extending its reach and provide “after-sales” service to beneficiaries of national support, with additional financing at project end or demonstration or testing to support commercialisation of technology developed through technology programmes. These different synergies will need some time to become clear, but the ultimate objective should be to ensure that these and other advantages from regional input are fully harnessed by the national level, both line departments and agencies.

If the logic of a regional dimension for innovation policy is accepted, then the collaboration between the Technology Strategy Board, the Research Councils and the RDAs and local authorities could be extremely productive (see Box 2.8.). All these actors and other Government departments and agencies need to understand how technology drives competitive strategies in different industries so that they can target support effectively. The Technology Strategy Board is well-placed to play this co-ordination role at the national level because of its industry makeup and because of its mission to collect and monitor information on industry trends. From its strategic position, it can then work to co-ordinate R&D and innovation support

programmes and to prevent duplication. For example, the *Sainsbury Review* states that the Technology Strategy Board is expected to work with the Research Councils to “identify the complex, high-value-added production technologies that current and emerging industries require”.

Box 2.8. Framework for collaboration between RDAs and the Technology Strategy Board

The Technology Strategy Board is an executive non-departmental public body, established by Government to stimulate innovation in those areas which offer the greatest scope for boosting UK growth and productivity. Its initial purpose was to advise the Secretary of State for Trade and Industry on business research, technology and innovation priorities for the UK, the allocation of funding across priorities and the most appropriate ways to support them. In July 2007, the Technology Strategy Board was given a much more active policy development role and is now a key actor in setting priorities and allocating funding.

The Technology Strategy Board, Regional Development Agencies (RDAs) and Devolved Administrations (DAs) have developed mechanisms for joint working to:

- improve strategic planning, communication and feedback between the Technology Strategy Board, RDAs and DAs and ensure that regional strategies reflect the national strategy and priorities and that national policy reflects regional strengths and economic strategies;
- secure effective engagement and coherence between the Technology Strategy Board, RDA and DA planning, delivery and monitoring arrangements and streamline systems on both sides to make it easier and more attractive for RDAs/DAs to co-invest in Technology Strategy Board programmes and activities; and
- achieve the Comprehensive Spending Review commitment requiring RDAs to align GBP180 million in 2008-11.

A Strategic Advisory Group has been established, chaired by the Chief Executive of the Technology Strategy Board, composed of Chairs or senior figures from each of the Science and Industry Councils (or DA equivalent), together with representatives from other partner organisations. It will focus on shared strategic and long-term issues and take a strategic overview of Technology Strategy Board/regional collaboration.

An Operational Advisory Group comprises key operational staff in the Technology Strategy Board, the RDAs and DAs. The focus of this Group is agreeing, putting in place and overseeing mechanisms and processes, including regional prospectuses, to align Technology Strategy Board/RDA funding and delivery and to ensure an effective two-way channel of communication between the Technology Strategy Board and RDAs / DAs.

Source: Department for Innovation, Universities and Skills (2008), *Innovation Nation: White Paper*, March 2008.

At the same time, the regional strategy process led by the RDAs is designed to identify key regional strengths and emerging industries. The RDAs should thus be encouraged to use the Technology Strategy Board's horizon scanning activities to help orient regional actions towards key industries and technology opportunities. And, *vice versa*, the work of the Technology Strategy Board can be strongly influenced by input from the RDAs and the regional Science and Industry Councils. The key issue here is the ability of the RDAs to generate robust, convincing proposals that are national in terms of economic impact. RDA participation on the board of the Technology Strategy Board is obviously important in building confidence, but with respect to day-to-day co-operation, the role of BERR and DIUS as co-ordinating departments, for example, with respect to resource-sharing, is crucial. The current system, however, appears to lack specific incentives for the different parties to collaborate and take on the transaction costs involved in inter-agency co-ordination. This is not to say that this collaboration will not take place, but that there do not appear to be concrete incentives, either financial or institutional to promote collaboration in cases where collaboration involves commitment of additional resources.

The transaction cost model would suggest that alignment would flow through large visible projects only, thereby minimising the additional cost involved with numerous smaller projects. This might be an appropriate strategy from the perspective of the Technology Strategy Board, which has a fairly explicit brief to make things happen in big technology fields, but might be less advantageous for the RDAs, particularly if, as they currently feel, regional assets appear to be systematically under-valued. Regional assets include not only university R&D expertise but also areas of industrial competence/cluster niches (firm assets, skilled labour, etc.), key innovation sites (incubators, science parks, public or private R&D facilities, etc.), important partnerships/networks or associations, effective education and training institutions, the investor community, etc. This does not preclude smaller-scale projects and both the RDAs and the Technology Strategy Board recognise that projects involving diverse types of firms and of different scales are an important part of the collaboration. In practice, however, there might be disincentives to engage in less visible actions.

Many of the key innovation assets of the North could be better exploited to contribute to achieving the new objectives of a broadened innovation strategy. The national innovation strategy, with support from the Technology Strategy Board, should be seeking to identify those strengths in regions that can be the basis for nationally significant growth, whether this is based on particular sectors or new technologies. The issue for the central government, and its agencies such as the Technology Strategy Board, is how to promote these regional assets in a way that is consistent with a national

strategy. The lack of clear mechanisms for regions to know which of their regional assets are considered national assets (and why) is a barrier for this effective co-ordination. Existing strengths such as the renewable energy, health and age-related biotechnology, and process industries in the North East, financial and business services, biopharmaceuticals and nuclear sectors in the North West, and advanced materials and business services in Yorkshire and the Humber, are examples of regional assets that may be relevant in the context of national policy. At the moment, regions are the principal proponents of what are internationally competitive industries.

If the regions identify key targets for policy within those sectors or clusters, what happens then? The RDAs can invest resources, as can the local authorities concerned. But the central government does not appear to use this opportunity to target its own resources or instruments. In some other countries this approach has been used to develop “growth poles” – areas where national and regional resources are concentrated. In the UK, some of the steps involved in this approach are taken via the Regional Economic Strategies, but from then on it is assumed that the regions will implement them using the resources they have been given for economic development. This could be seen as leading to missed opportunities, where good ideas are inadequately followed through because resources are not channelled effectively. More established regional innovation strategies could, over time, have a strong positive impact on policymaking at the central level, feeding up intelligence about evolutions in business performance and needs.

In summary, the current situation could be described as: regional resources for regional priorities with regional benefits. In the ideal, the combination of national and regional innovation systems (NIS and RIS) enables national objectives to be pursued more effectively by harnessing the potential of regional innovation dynamics. There is clearly far more going on in this direction than was the case in the past, and much depends on how the national and regional actors develop the working relationships that have been established over the past couple of years. Again, it seems that the central government could take a stronger role through the tasking and evaluation mechanisms that it uses to guide the activities of public and semi-public agencies to ensure that disincentives to co-operation do not develop or that, where they are identified, they can be easily addressed.

A key problem is lack of experience in working across levels of government on innovation and a certain scepticism about the real merits of the model. This suggests the need for some space for experimentation and capacity building. Given this process of building confidence in the regional approach within key central level bodies, the role of the National Endowment for Science, Technology and the Arts (NESTA) could prove to be extremely valuable in generating evidence on the impact of place-based

approaches. NESTA's objective is to encourage new thinking and improve policymaking in the field of S&T and innovation. Reports on hidden innovation, social innovation, innovation in services and place-based innovation illustrate how NESTA can bring a new perspective to the innovation agenda. What makes NESTA somewhat unique is the mix of this policy-driven research think tank role with NESTA-funded demonstration projects that are designed to test our understanding of innovation-related processes and the relevance of policy. It is this capacity to experiment in the field of innovation policy that NESTA is well-placed to support because it is more difficult for a central government department to implement given administrative constraints on flexibility; however, there are some examples such as Science Cities of national-level inspired experimentation.

Conclusion

There are a number of conclusions that can be made about the regional innovation framework for the UK as a whole. First, the limited resources that regional actors have at hand to implement region-level innovation actions means that, in order to secure significant and measurable change, they need to have traction with the full range of public and private sector activities within the regions. From a more practical perspective, it also means that the key to RDA work is their ability to align resources strategically with other actors.

The problem is that mechanisms for alignment of resources towards common priorities are not strong, or rather many are new and the incentives for the different actors have not been fully tested. Some method for recognising regional assets as being important targets for alignment would probably help to clarify where funds should be aligned. The process of alignment of RDA funds with the Technology Strategy Board has shown promise in facilitating a greater recognition of these regional assets and the way they align with national priorities in the programmes managed by the Technology Strategy Board.

The continued flux in sub-national governance over time makes it difficult for national actors to know who to work with at the sub-national level (RDAs, sub-regional partnerships, city-regions, the Northern Way, etc.). The lack of a clear framework and procedures could eventually lead to disengagement where the time involved in working to build partnerships through informal mechanisms is too high in comparison with the outcome, particularly if national bodies are not directly evaluated on their level of engagement with the regions.

The broadened national approach to innovation beyond science is offering new opportunities to HEIs outside the top science research universities. In practice these alternative funding streams are increasing and the operating methods are being worked out. This is an area where national funding could be valuable in better supporting regional innovation systems in the North.

In order to fully exploit regional assets, it is important that there is a mechanism by which these assets are recognised and mobilised for national objectives where relevant. At the moment, regional funding is for regional projects and the regions are free to invest in whatever they want within the constraints of public funding requirements. But this also means that coherence between national and regional approaches is difficult. Initiatives to build this link – through strong targeted funding – would help to demonstrate that the central government is committed to what the regions are doing if it is of national interest, and also to help the regions to mobilise stakeholders around credible projects.

Notes

1. In 2004, the Inter-ministerial Regional Planning Agency DATAR (now DIACT) outlined key issues for the creation of the *Pôles de compétitivité* as an industrial policy with a strong innovation dimension and regional grounding. The subsequent 2004 Blanc report, *Ecosystems of growth*, promoted two key themes: 1) that France must move from an economy of planning and imitation to one of innovation; and 2) that this would best be done by regional actors who are most interested in inter-sectoral co-operation in a given territory.

Annex 2.A1

Table 2A.1. **International comparisons of regional development agencies**

Entity	Coverage	Description
Canada Regional Development Agencies	National- level network (each covers multiple provinces); broad economic development focus	<p>The federal government's regional development agencies provide programmes aimed at improving the economy of Canadian communities. Regional development agencies are headquartered in different areas (each covering multiple provinces and hence dozens of smaller scale regional development agencies).</p> <p>Examples of innovation programmes include:</p> <ul style="list-style-type: none"> • <i>Atlantic Canada Opportunities Agency</i>: Atlantic Innovation Fund (over CAD 512 million in five rounds to 191 projects with leverage ratio of 1 to 1). • <i>Western Economic Diversification Canada</i>: support to high-technology clusters and direct investments in research and technology development by funding technology commercialisation offices at universities and other research institutions and internships to create HQP (Highly Qualified Personnel) with expertise in technology commercialisation.
United States; state level	State-level, independent public agency; innovation and cluster- specific focus	<p>The Massachusetts Technology Collaborative (MTC) is an independent, non-partisan public agency chartered by the Commonwealth to promote new economic opportunity in Massachusetts. It operates at the intersection of government, industry, and academia. It brings together leaders and stakeholders to advance knowledge-based solutions that lead to economic growth, a cleaner environment, and improved healthcare. It works with state leaders to promote cluster growth in the formation, retention, and expansion of technology-related enterprises. It gets results through collaboration with local partners in every region of the Commonwealth.</p> <p>The John Adams Innovation Institute is the economic development division of the MTC entrusted with the management of two public purpose funds, making targeted, strategic investments to grow and strengthen industry clusters, support the research enterprise in Massachusetts, and grow the Commonwealth's knowledge-based Innovation Economy, region by region, sector by sector. Goals include:</p> <ol style="list-style-type: none"> 1) Support job creation and retention by the knowledge-based companies; 2) Provide accurate and reliable information, data and analysis (including the Innovation Index report); 3) Grow and strengthen industry clusters; 4) Secure the economic benefits of downstream production and employment; and 5) Support rigorous collaborative R&D partnerships.

Table 2A.1. **International comparisons of regional development agencies** (*cont.*)

Entity	Coverage	Description
Italy Emilia-Romagna	Regional government; specific R&D development agency	<p>Only two regions in Italy (Latium and Emilia-Romagna) have chosen to delegate all the planning and managing activities related to R&D to a development agency. In Emilia-Romagna, ASTER is the regional consortium for industrial research, technology transfer and innovation created among regional Government, Universities, National Research Centres, the Union of Chambers of Commerce and Industry and the regional Entrepreneurial Associations. The regional government share of the General Assembly is 19.5% and the Universities and Research Centres shares amount to 54.5%.</p> <p>Aster activities include: technical assistance on research and innovation to the regional government, services for innovation, research promotion and technology transfer, regional networking for knowledge, international activities, business creation, co-ordination and animation of the regional hi-tech network, and human capital development. They support a network of industrial research and innovation centres of excellence, the promotion of research-industry partnerships and support to the dissemination of research results and transfer of new technologies to regional businesses, both existing and in their start-up phase. It also provides technical support to the regional Authorities for the implementation and monitoring of the regional Law 7/2002 for innovation. ASTER is directly responsible for co-ordinating and fostering the activities of the Network of Industrial Research Laboratories, Innovation Centres and Parks, and for initiating and executing strategic projects to further develop the Network itself both locally and in collaboration with foreign European and non European partners. Finally, it plans and develops trans-national projects (often EU-funded). Aster manages the SPINNER projects for technology transfer and for business creation.</p>
Italy Latium	Regional government; specific R&D and innovation development agency	<p>FILAS is a development agency that manages tools related to innovation, new technologies and the net economy to support economic development and the adoption of new technologies by local firms. It supports SMEs in terms of growth and investment promotion. FILAS' main tasks include: providing financial assistance, managing special regional funds, promoting and supervising measures for the development of industrial areas and productive sectors, and implementing EU programmes. Major projects include the creation of new firms from innovative business ideas (Business Lab), assisting the region in the organisation of the Aerospace sector to maximise the positive effect of Project Galileo, promoting national and international cinematographic production and administering innovation governance tools. FILAS is the main provider of venture capital in the region, holding 50% of the market. FILAS participates in venture capital activities that target both new firms (venture capital) and existing firms (private equity).</p>

Table 2A.1. **International comparisons of regional development agencies** (*cont.*)

Entity	Coverage	Description
Italy Piedmont Region (Turin)	Regional government; business development agency	Finpiemonte is the region's business development finance agency that is also in charge of innovation and research promotion. Since its foundation in 1977, its function has been to support local firms. Finpiemonte's assets total over EUR 690 million. Finpiemonte gives support to regional policies in the following sectors: innovative finance, technological transfer, research and innovation, small and medium enterprises support, consulting and project financing, and the financial application of regional measures. Finpiemonte SpA manages the technology and science parks, the incubators and the technological districts. Finpiemonte SpA and Regione Piemonte have created an <i>ad hoc</i> working group on research and innovation, Re-think, that works on technical operational tools for research projects and plans, on development and promotion of research networks and on evaluation systems policies. In 2007, Finpiemonte SpA split into Finpiemonte SpA and Finpiemonte Partecipazioni, which is the regional investment holding company.
Spain Basque Country	Region-level independent public agency with affiliated companies	The <i>Sociedad para la Promoción y Reconversión Industrial</i> (SPRI) is the business development agency created in 1981 by the Basque Government to provide support and services to Basque industry. SPRI is the parent of a group of companies which provide a response to the requirements of a business project from conception to implementation of the project. SPRI also uses certain instruments which allow our small and medium-sized enterprises access to information technology, outward movements on overseas projects, location within business environments which are suited to the specific needs of each sector, and use of venture capital funds to finance innovative and strategic projects. SPRI is a company associated with the Basque Government's Department of Industry, Trade and Tourist Affairs. The four divisions include: Information Society Section; Business Development Section; Globalisation Section and Technological Strategy Unit Section. Companies forming part of the group include: <ul style="list-style-type: none"> • SPRI LUR, which provides suitable and industrial facilities • Technology Parks: three (one in each sub-region) • Sociedad de Capital Riesgo: which administers funds as minority and temporary stockholdings in business projects • Business Innovation Centres: at a number of locations

Chapter 3

Sub-National Efforts to Support Innovation in the North

Introduction

The role of sub-national efforts to support innovation is to both tailor strategies and instruments to the specific needs of the region and to fill any gaps in national policy based on the country-specific division of labour. Thus far, Regional Development Agencies (RDAs) have made great strides over the last ten years to support innovation in their regions through a number of instruments including innovation advisory services, centres of excellence, major innovation sites and helping firms access the local science base, among other instruments. However, given the nature of funding for innovation at the national level and limited sub-national fiscal autonomy, sub-national action to support innovation is rather limited in international comparison, resulting in a challenging environment within which RDAs and local authorities need to operate.

This chapter will explore the strategic planning for economic development generally and the innovation strategies in particular at the regional (RDA) level. It will then examine the instruments being used to achieve those strategic goals and the funding associated with those efforts. The role of sub-regional initiatives and their contribution to supporting innovation in the North, as well as pan-regional actions under the auspices of the Northern Way, are also discussed.

Regional Strategies

Regional economic strategies seek to orient public investment, innovation is one component

There are a range of strategies and plans that support regional economic development and innovation with different timeframes. Each RDA region has a ten-year Regional Economic Strategy (RES) within which priorities for innovation, enterprise support and other economic development issues are included. As discussed in Chapter 2, this planning process is expected to

change, subject to legislation, to integrate the spatial planning and economic planning into a Regional Strategy (RS). Local governments also produce economic and spatial plans. In fact, the integrated development (joined spatial and economic plan) has already occurred at lower levels of government, such as in the city of Sheffield. City-regions have also produced economic development strategies to support the Northern Way initiative and their strategies feed into the regional plans. In theory these plans all relate to one another but in practice it is very challenging to align so many plans, in particular with the different accountability measures set by the sponsoring departments.

While the economic and spatial strategies have a long-term perspective (five to ten years for the RESs and 15 to 20 for RSSs), the funding is based on a shorter-term three-year corporate plan cycle. Given that the regional level funding is entirely based on central government policy, there are obvious constraints of a limited time horizon and accountability via short-term reporting indicators for those spending priorities to different sectoral Government initiatives. Although RDAs have had a “single pot” of funds from Government since 2002, allowing much greater flexibility than in the past, there is nevertheless a need to satisfy the expectations of the range of Government departments contributing to the single pot.

The process for the development of a RES involves formal public consultation. The three-year corporate plans that specify the budget allocations are also subject to consultation. In the early RESs, there was concern that local consultation was less important than the guidance being provided from Government. In other words, that the RES responded more to what Government was expecting than to real local needs (Dundee/OVE Arup, 2000). Since then, the consultation process has become more important and gained visibility, not only among local authorities (which initially appeared to view the RES from the perspective of how much extra funding came to their locality) but also among non-government stakeholders.¹

Per the recent *Sub-National Review of Economic Development and Regeneration* (SNR), localities are being asked in the future to play an even greater role in scrutinising and influencing these regional strategies, but how this will occur in practice remains an open question. Each region is given the autonomy to determine the nature of this scrutiny process, within principles set by Government. It will be challenging to manage this process across regions with larger numbers of local authorities in a manner which facilitates effective strategies with the required degree of prioritisation, reinforcing the importance of an effective executive function for the RDAs. To assist in the co-ordination of this local involvement, local authority leaders are expected to organise themselves into forums.

The current set of RESs is underpinned by economic growth assumptions and targets at least as high as those applying nationally to address the long-standing gap in relative growth performance. A RES in theory helps to steer the work of all public sector actors within the region towards its goals. In practice, however, the degree of traction of a RES over Government agencies is limited. The RES must address regeneration, skills, social inclusion, enterprise support, transport, infrastructure, etc. (see Table 3.1.). Innovation is generally included as an integral part of the “business” categories of the plans.² The range of issues covered by the RES goes far beyond the public service agreement on which the RDAs are evaluated.

RDA budgets provide the primary lever for organising public support in the region – albeit covering only a small portion of the public funds that fall in the regions. As an illustration of the resource flows, NWDA has direct control over GBP 1.55 billion out of the GBP 45 billion in core resources for economic development and regeneration, or less than 3.5% of those resources over the last three-year corporate plan period (see Figure 3.1.). The ability of the RDA to leverage and influence local, national and EU level funding to achieve its goals is therefore vital. As discussed in Chapter 2, most resources allocated by the national level to support innovation, while in theory aspatial, in practice are disproportionately allocated to the South-Southeast of England where there is a greater existing concentration of innovation-related infrastructure.

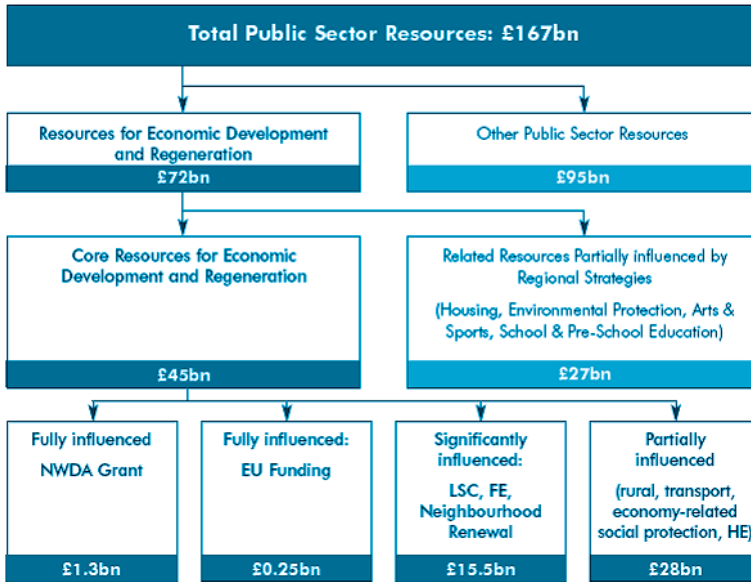
Table 3.1. **Objectives in Regional Economic Strategies**

Region	Objectives
North West (NW)	<ul style="list-style-type: none"> • Business enterprise (regional sectors, innovation, science/R&D, international competitiveness, ICT, sustainable consumption and production) • Skills and education (basic skills, sector skills, workforce development, workforce /leadership/ management skills, educational infrastructure for skills of future workforce) • People and jobs (job linkages, local employment, health, population change) • Infrastructure (transport, land use, housing, planning, energy, investment) • Quality of life (culture and image, community, environment)
Yorkshire and the Humber (Y&H)	<ul style="list-style-type: none"> • More businesses that last • Competitive businesses • Skilled people-benefiting business • Connecting people to good jobs • Stronger cities, towns and rural communities
North East (NE)	<ul style="list-style-type: none"> • Business (enterprise, business solutions, preparing for structural change) • People (skills, economic inclusion) • Place (strategic transformational regeneration; delivering a portfolio of high-quality business accommodation; enhancing the region’s transport and ICT connectivity; promoting, enhancing and protecting our natural, heritage and cultural assets)

Source: Latest Regional Economic Strategies of the three regions.

Figure 3.1. **Public resource funding flows in regions: Example NWDA**

Estimates for three fiscal years 2006/7 to 2008/9



Source: Northwest Regional Economic Strategy 2006-2016.

Innovation is only one of several RDA responsibilities and RDAs control only a modest share of the public funding to support innovation in the regions, albeit that share is greater in the North. As discussed in Chapter 2, the spending in regions on innovation is significantly less than the allocable science and technology (S&T) expenditures (mainly Research Council funding, but excludes considerable non-allocable expenses) that flow to the regions. In the North, the difference is smaller than in other regions of the country given the lower levels of national S&T expenditure in the region, the higher RDA budgets overall, and the choice of the RDAs in terms of the share of the budget that is chosen to allocate to innovation. With respect to the budgets under RDA control, the Northern region RDAs spent 14% (NW), 19% (NE) and 12% (Y&H) of their budgets on innovation, a higher share than four other English regions and less than two other regions (see Table 3.2.). Given that some areas of enterprise support are also supporting firm efforts to increase productivity, if you include the wider enterprise support figures the total budget allocations increase to 35% (NW), 44% (NE) and 33% (Y&H). On a per capita basis annually, that combined spending translates to GBP 22 (NW), 51 (NE) and 22 (Y&H). The

investments by RDAs in innovation are expected to contribute to increased productivity that will support economic growth and the share of RDA budgets for innovation is projected to increase over the next planning period.

Table 3.2. Average annual RDA spending on innovation and enterprise development

	(FYs 06, 07, 08)		
	NW	NE	Y&H
Innovation			
Total (GBP millions)	59	57	41
% of total budget	14	19	12
Per capita (GBP)	9	23	8
Enterprise			
Total (GBP millions)	92	73	72
% of total budget	21	25	21
Per capita (GBP)	14	29	15
Total RDA budget GBP (millions)	438	296	336
% in Innovation and Enterprise	35	44	33

Source: Lord Sainsbury of Turville (2007), *A Race to the Top: A Review of Government's Science and Innovation Policies*, HM Treasury, October 2007.

Innovation strategies: their origins

The process for developing a Regional Innovation Strategy and its importance for a region varies considerably across OECD countries. The attribution of responsibilities across levels of government, the articulation of national-regional responsibilities, and the spatial scale and economic configuration of the region all play a role. In federal countries like the US, Mexico, Germany, Switzerland and Canada, there are no national-level requirements for a specific innovation strategy.³ In countries that are more or less regionalised, there exists a range of requirements to develop a Regional Innovation Strategy. In Italy, for example, the Piedmont region has passed an innovation law that serves as a strategy. In France, the central government has been working with regions to support their development of these strategies given concerns from the European Commission that the strategies were too similar. The French central government is now working with regions to develop a guide to try to help regions define their specificities and measure progress. In Sweden, all regions develop a Regional Economic Strategy that includes areas of support for innovation, and national support for innovation and cluster projects is dependent on the prioritisation in these regional strategies. In the Netherlands, the regional

governments (provinces) are not required to develop a strategy, but in the context of the new Peaks in the Delta regional approach there is a need for prioritising actions on a wider spatial basis to support regional growth.

The UK Government officially encouraged RDAs to develop Regional Innovation Strategies around 2001. This does not mean that prior to this point there were not policies and programmes to support innovation in regions. The RDAs took over an innovation lead role that had previously been carried out through the Government Office network, where innovation projects were supported by EU funding. A Regional Innovation Fund was put in place to help finance the development of these strategies. All three Northern regions hired Arthur D. Little to provide an assessment of their research and science base to support the development of their strategies. The regions also used the support of a new institution, the Science and Industry Council, to help develop the strategy and its priorities (see Table 3.3.). The plans are presented to the overall RDA Board for approval but there is no other formal consultation with other stakeholders or reporting to Government required. Although the plans are clearly an important component of the overall activities of the RDAs, they are not required in the same way that a RES or corporate plan is.

Despite the prominence at the national level of addressing the productivity gap through innovation, the strategies of the RDAs themselves do not appear to be very high profile. The innovation strategies are available to anyone via the internet. They are embedded in the RES, thereby subject to the general consultation process for the overall strategy. There have been examples of some higher profile communications around the strategies. The North West Science Strategy, which itself had a separate consultation process, was launched with a leading national political figure and an audience of 250. The North East uses its innovation strategy as a vehicle to highlight its flagship initiatives such as the Newcastle Science City and the International Centre for Life, which houses teams from the National Health Service and Newcastle University. The Yorkshire Science Council has produced a lengthy video to explain the strategy, in part with a sample firm as it accesses the different services that are offered in the region as it grows from an idea for a product to its commercialisation, but it is not clear how widely this has been viewed.

Science and Industry (or Innovation?) Councils

Regional Science and Industry Councils (SIC) have a core role in the development of Regional Innovation Strategies. These advisory bodies, with no statutory powers, are the main source of S&T credibility for the Regional Innovation Strategies, mirroring similar bodies that exist at national level in

most OECD countries. They were created, on the one hand, to support policy formulation at the regional level and, on the other, to give a voice to regions with regard to national science policy decisions. The latter became an issue when the DIAMOND facility, a GBP 600 million investment opportunity, was located in the South, rather than the North's preferred location in the North West, triggering "bottom up" the development of the first SIC. The North East subsequently picked up this concept before the development of these councils became a nation-wide policy in England (Perry, 2007). In addition to an advisory role to the RDAs, they serve a clear lobbying role, by addressing letters to ministers or using their contacts to support regional initiatives. Table 3.3. outlines some of the basic facts about the three Northern SICs.

Table 3.3. **Science and Industry Councils**

	North West Science Council	Yorkshire Science	North East Science and Industry Council
Year founded	2001	2004	2002
Sub-groups/ Committees	By cluster <ul style="list-style-type: none"> • Nuclear • Biohealth • Aerospace • Chemicals 	None	By theme <ul style="list-style-type: none"> • Education and skills • Marketing and communications • Financing and access to funding • "Big ideas" Links to Leadership Councils <ul style="list-style-type: none"> • Process industries • Energy

Given the origins of these Councils and their composition involving a large number of HEI representatives, they have a strong science focus. In fact, the names of the councils are Northwest Science Council, Yorkshire Science, and Northeast Science and Industry Council. The science emphasis also mirrors the historical UK Government emphasis on science and research for innovation, an approach to innovation that has now broadened most notably via the *Innovation Nation* White Paper.

The institutional development of these Councils and engagement of their members is an ongoing challenge, with questioning regarding their role and mission still present. The Councils in the North have gone through different stages of development and learning, presumably as have the Councils elsewhere in England. The importance of having clear tasks to keep members motivated and engaged should not be underestimated. The use of Committee sub-groups, used by two of the three Councils, has served to

either bring in additional firm input (North West) or to allow them to become more comprehensive in their scope of topics through cross-cutting themes (North East). The role of the Councils is expanding. Not only does a SIC support the strategy of its own region, it is now asked to participate in the Northern Way's Innovation in Industry Steering Group and the new Technology Strategy Board Strategic Advisory Group.⁴ While these different bodies allow greater communication across regions, they also increase the workload for the Council.

The lack of diversity in the composition of the Councils poses challenges for supporting innovation more broadly. The problem is not as much diversity in the classic sense in terms of gender and ethnic background (albeit there is a lack of diversity on those dimensions), but rather in perspectives regarding innovation. The Councils are mainly composed of University Vice Chancellors or representatives of large firms. There is concern even among members of some SICs that HEIs play too large a role as a focus of actions and that firms need to be at the centre to reinforce a focus on innovation (which occurs in firms) rather than science. While members have a strong level of expertise of great value to the Regional Innovation Strategy, they are a limited sample of the kinds of actors involved in innovation in the regions. Incorporating SME and service sector perspectives is another major challenge in diversifying the approach taken by SICs. Given their current structure, there is no easy solution to incorporating these more difficult to capture perspectives.

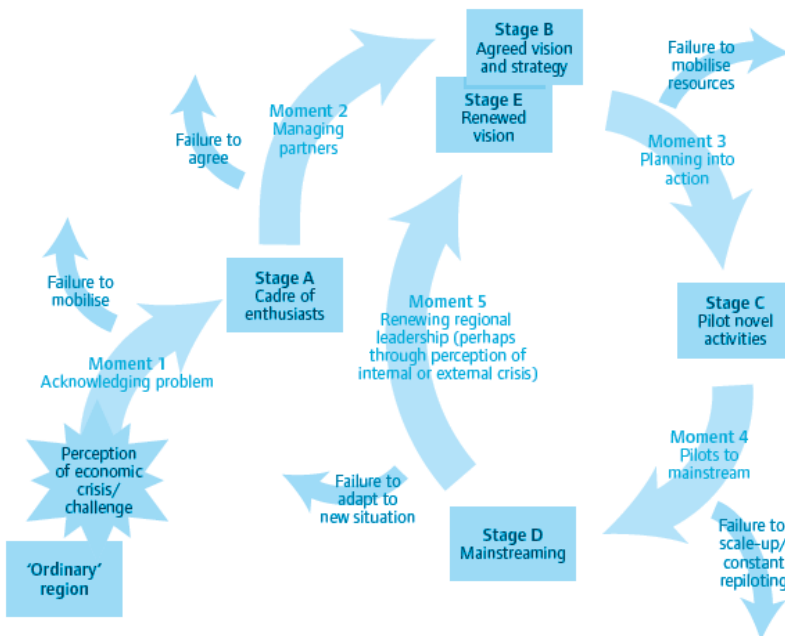
The innovation "journey": how the regions got here

Perhaps more important than the administrative dimension of region-level innovation policy is what they are trying to achieve. Innovation strategy is anchored in the broader evolution of regional economies, and interest in innovation is linked to perceptions of the challenges and opportunities that are present in the region. Each of the regions has undergone significant economic transformations that have influenced the way innovation is viewed by key economic actors. This evolution in policy thinking alongside evolution of regional economies has been termed the innovation journey of the region – a process that starts with a realisation of the need for change and passes through different stages during which key actors accept the need to use innovation to drive growth (Benneworth, 2007).

The innovation journey of regions, within and outside the UK, has been characterised as part of an innovation ecosystem but with a series of critical moments in the on-going process (see Figure 3.2.). The journey is a cycle whereby attempts to develop an innovation strategy influence the way

partners think about innovation. Furthermore, the degree of experience in planning and the success in delivering innovation support serves as a basis for future support (Boekholdt *et al.*, 1998). Once there is some form of recognition that a problem exists, a group forms to develop an agreed strategy or vision. That strategy or vision is put into action, often with pilot projects to test the strategy. Those pilot projects that are successful are then mainstreamed. The cycle may begin again if there is a new perceived crisis warranting a change in strategy. Along each step of the process, there is a possibility of failure that prevents movement from one step to the next. There are examples of lagging regions (in their national context) that don't entirely follow the crisis model, and under these circumstances it can be even harder to achieve this common vision regarding what the problem is and how it can be solved. In some southern US states, for example, the problem was not a crisis *per se* but a need to develop a new approach to growth that was not based on low-wage jobs, but rather one that addressed the quality of that growth.

Figure 3.2. Innovation journey: cycle



Source: Benneworth, Paul (2007) *Leading Innovation: Building Effective Regional Coalitions for Innovation*, NESTA Research Report, December 2007.

The trigger for developing a regional strategy emphasising innovation in several OECD region examples emanated from outside the region through an exogenous shock or a sector-specific crisis. The crises in the auto industry in the regions that include Turin (Italy), Gothenburg (Sweden) and Detroit/Southeast Michigan have led to initiatives that try to build a regional response based on reinventing the region's competitive advantages, in particular the innovativeness of local firms and labour force skills. The industrial restructuring of the Piedmont region (Turin) was forced by the reorganisation of the automotive industry and a sense that the region was entering a phase of decline that risked gathering momentum if the process was not stopped early on. When General Motors announced that the production of medium-sized cars would take place in existing plants either in Germany or in Sweden, the fact that lead actors were already co-operating in the Västtra Götaland region around Gothenburg enabled the region to reorient its investment strategy to build intellectual infrastructure and sophisticated R&D programmes as a rapid and visible response to this potential crisis. In other cases, the concern has been to revitalise or change the image of the region. In Ottawa, for example, the common goal of changing the city's image from one of a sleepy government town to a dynamic high-tech hub rallied local stakeholders. There was an agreed upon need to change the image of the city from a political capital to one with other economic strengths, especially in light of public sector job losses (OECD, 2007e).

For the regions in the North of England, there are examples of both catalytic events and more generalised economic decline. The situation of the North East, parts of Yorkshire and the Humber and parts of the North West exemplifies the transition away from heavy industry experienced by many OECD regions. By 2000, many of the traditional industries of the North such as shipbuilding, textiles, coal and steelmaking had largely or completely disappeared. Employment had already shifted into new or restructured manufacturing industries such as light engineering, electrical and electronic industries, chemicals and pharmaceuticals and consumer-oriented manufacturing, often within branch plants of UK- and US-owned firms. But recently these industries have also come under pressure, with significant off-shoring of less technologically-intensive manufacturing in some branches. This sense of ongoing transformation has been the overriding influence on public policy thinking in the regions for the past two decades. A key feature of political concern, also mirrored by concern among citizens, has been uncertainty about where the transition would take the regions. Nonetheless, even if the destination has not been clearly identified, the ongoing restructuring of the regions' economies has provided a focus for mobilising key actors.

The North West had a more specific catalytic event that provoked a sense of crisis and galvanised key actors in support of a regional approach to innovation. The Government decision in 2000 to not locate the DIAMOND light source in the region led to a strong reaction by the science and policy community in the North West. The Government is committed to excellent science and research, therefore the Research Council will fund the very best research and facilities wherever they are located in the country. The “crisis” raised awareness of the need for the region to take some control of strategic decisions where possible – this led to the creation of the first Science and Industry Council, later generalised throughout the country. The outcry from the region also led to a Government allocation of GBP 25 million to the region for science projects. In the North East, a turning point occurred in 1997, when the prior FDI successes that had in part a promise of R&D started to fail as major plants closed. In Yorkshire and the Humber, the current strategy is based on a response to general industrial decline combined with different policy pressures to develop regional innovation approaches (see Table 3.4.).

Table 3.4. **Innovation journey of Northern English regions**

	North West	Yorkshire and the Humber	North East
Nature of crisis	<ul style="list-style-type: none"> • Catalytic event around Government decision not to locate science facility in region 	<ul style="list-style-type: none"> • Industrial decline (slowly in some industries, rapidly in others) 	<ul style="list-style-type: none"> • Long-term industrial decline • Failure of FDI attraction policies in late 90s
Position in innovation journey	<ul style="list-style-type: none"> • Established sectors covered • Emerging sectors less well supported 	<ul style="list-style-type: none"> • Implementation phase 	<ul style="list-style-type: none"> • Implementation phase of strategy
Regional innovation leadership style	<ul style="list-style-type: none"> • Diverse innovation system • Small number of strong leaders 	<ul style="list-style-type: none"> • Dominated by Higher Education Institutions • Some grass-roots coalitions for specific actions (as opposed to strategy) • Rise and fall of successive special interests 	<ul style="list-style-type: none"> • Limited scope of strategy and actors involved • Maverick institutional entrepreneurs

Source: Benneworth (2007), *Leading Innovation: Building Effective Regional Coalitions for Innovation*, NESTA Research Report, December 2007.

In terms of stage in the innovation journey, all three are in an implementation phase. They have all come to respective agreements on the need to take action. In the North East and North West there is a sense of clarity with respect to the targets and actions among policy makers, although not necessarily the community at large. In Yorkshire and the Humber, due in

part both to a more recently constituted Science and Industry Council and a more broadly based strategy, the Regional Innovation Strategy is more of a framework than a plan. It has less of a sense of detail with respect to the region's innovation goals, expressed in the Regional Economic Strategy as a doubling of R&D spending to 1% of GVA, and to raise productivity (GVA per worker) by 25-30% by 2016. Some of the common challenges across the three regions in this phase are to cultivate new “voices” or perspectives on innovation, such as in the SME community, generally increasing the innovation activity of firms and preventing fatigue among those actors who have been involved for a while.

There is a need for more innovation champions in the process of strategy development and implementation for the RDAs in the North, in addition to the existing support from SIC members. The different mechanisms for plan development do not generally promote the more organic and creative forms of regional innovation dialogue, however there are examples of innovation champions outside of the RDAs.⁵ Within regions, there may be key City Council members that help drive some projects, but the need to balance the interests across an RDA territory diminishes the potential influence of individual local politicians. This kind of leadership is more likely to be effective at a city or city-region level.

Across the three regions, there is a diversity of regional innovation leadership styles but also a generalised problem of succession to find the next generation of leaders. In the North West, this leadership can be characterised as having a small number of strong leaders. Manchester is an example with long-term and stable leadership that has supported the innovation agenda, such as through Manchester Knowledge Capital (see later Box 3.4.). In Yorkshire and the Humber, over time there have been some different sets of actors involved in supporting innovation, in part from grass-roots efforts. While there is a prominence of HEIs in the innovation strategies and actions in the North, this is particularly notable in the innovation leadership in Y&H. In the North East, with a highly focused strategy and a more limited number of leaders (in firms, universities and the public sector), the innovation style is more restricted by the pool of available actors. For firm leadership, one of the challenges has been the fact that there are few headquarters in the region and the branch plant managers of the past had cycled through and are less committed to the North East.

UK regions are competing with some countries that have an advantage in terms of their ability to mobilise around an innovation strategy and support it financially. The benefit of the Science and Industry Councils is that they bring expert credibility to the strategy in the eyes of Government and the regions. However there are few political or other champions of the regional innovation strategies in the UK and the planning process tends to

discourage possible innovation entrepreneurs. There are few strong local political officials and no regional level political officials, with the exception of the Regional Ministers. Appointed for the first time in 2007, they have only a part-time regional responsibility and their role has yet to be developed. Thus far, none has played a specific role with respect to Regional Innovation Strategies. The relative lack of political engagement in planning development stands in contrast to some other regional examples, such as in the US where a governor or mayor can take very bold actions and even motivate the public behind those initiatives.

In addition to leadership, there are capacity challenges for sub-national actors to support innovation across OECD regions. In the UK, the rapidly changing roles of RDAs requires even further effort to support both innovation as a new field and how to do so in the changing sub-national context. There are some opportunities for learning exchanges among RDA staff in the North regarding innovation. At the national level the Regional Innovation, Science and Technology Group supports information exchange across all UK regions. Yorkshire Forward has been the most explicit about its desire to engage in different EU-related networks to learn from other regions on the policy side. Partly because of nationally-determined limits on their staff numbers, RDAs need to rely heavily on external expertise for both information and recommendations; however, the outsourcing doesn't facilitate the building up of analytic capacity within the RDAs which is an increasing part of their strategic role. To respond to the recommendations of the SNR, both RDAs and local authorities will need to support capacity building efforts. There are also different pockets of expertise in the North outside of the RDAs in the regions for supporting innovation that are not necessarily integrated into the overall innovation strategy approach.

Current strategies science-focused

The purpose of a Regional Innovation Strategy is simply to identify the problems in a systematic manner, determine how they can be addressed, and persuade others to work towards this common goal. The focus of the strategy therefore depends on how the region perceives the problem, its regional economic structure, its innovation ecosystem, and the possible solutions. These needs may be conceived of in terms of particular sectors or clusters that merit support for different reasons (weight in the economy, sector with potential for growth, uniqueness of niche in world markets, importance of technology for a range of sectors in the economy, etc.). The strategy may be a holistic perspective, focused on the general environment and flow of ideas in the region. It could also focus on particular innovation assets or sites around which the strategy seeks to catalyse action. The approaches in the three Northern regions are described in Table 3.5.

Table 3.5. Summary of regional science and innovation-related strategies

Region	Focus of strategy
North West	<p><i>Northwest Science Strategy 2007-2010</i></p> <ul style="list-style-type: none"> • Aims <ul style="list-style-type: none"> ○ Grow and maintain world-class infrastructure for the academic and industry base ○ Enhance the creation and exploitation of knowledge ○ Develop, attract and retain high quality people ○ Close the R&D funding gap between private and public sector ○ Promote the image of the Northwest as a vibrant hotbed of scientific endeavour • Foundations <ul style="list-style-type: none"> ○ Internationally excellent science base (region must retain and adapt science base already in place; alliances outside the region; centres of excellence; profile and perceptions of the Northwest science base must be raised) ○ Exploitation of science (business capability, physical infrastructure, knowledge transfer processes, enterprising people, flexible financing) ○ Skills (Regional Skills Partnership, Sector Skills Agreements, Sector Skills and Productivity Alliances, National Skills Academies, Foundation Degrees, Specialist schools—including Centres of Vocational Excellence) • Strategic pillars <ul style="list-style-type: none"> ○ Biohealth ○ Aerospace ○ Chemicals ○ Nuclear ○ Emerging opportunities ○ Strategic science sites
Yorkshire and the Humber	<p><i>Yorkshire Science: Regional Science and Innovation Strategy (Oct 06)</i></p> <ul style="list-style-type: none"> • Strategy of four key themes: <ul style="list-style-type: none"> ○ Growing the region's innovation culture ○ Developing a region-wide innovation environment ○ Targeted European engagement ○ Pan-Northern activity • Goals to achieve vision <ul style="list-style-type: none"> ○ create a culture for "open" innovation ○ promote innovation and stimulate enterprise ○ become a region of "innovation" good practice in the UK, across Europe and internationally ○ attract and retain people of the highest calibre to work in the region's universities, businesses and public authorities ○ create a region where the knowledge base, businesses and the political community work in enhanced harmony to deliver sustainable economic growth through innovation ○ to make social inclusion and environmental impact a priority • Examples of programmes include the national Manufacturing Advisory Service, the Centres of Industrial Collaboration, and the Science City of York • Strategy should support priorities in the Regional Economic Strategy that are: food and drink, advanced engineering and metals, chemicals, bioscience, environmental technologies, healthcare technologies

Table 3.5. Summary of regional science and innovation-related strategies (cont.)

Region	Focus of strategy
North East	<p><i>Strategy for Success 2001/ 2004</i></p> <ul style="list-style-type: none"> • A strategy based upon the exploitation of the region's research base to generate innovation, competitiveness and growth (significant funding for which came from European Structural Funds) • Identifies an approach to cluster development, based upon the exploitation of the region's research base through Centres of Excellence supported by a finance company (currently NStar but changing its name) and guided by the region's Science and Industry Council • Centres of Excellence to support clusters in the following fields: life sciences, process industries and new and renewable energy. The other centres for nanotechnology and digital/ media are no longer prioritised but the Science City of Newcastle has taken an increasing prominence in the strategy's focus. The centres are private companies.

Source: Current Regional Innovation Strategies for the three regions.

The challenge for non-leading or “ordinary” regions in any country (the majority of regions generally) is to develop strategies in light of fewer available innovation-related resources in the region and hence bigger gaps to fill. In a review of ordinary regions, the focus for policy intervention may need to be on the regional systems and capacity (a systemic failure) which the UK market failure approach doesn't take into account (Benneworth, 2007). In addition to the relative lack of assets, less-favoured regions need to address the lack of sufficient inter-linkages among actors (Rosenfeld, 2002). In another categorisation of regions into three groups, the policy mechanisms are more interventionist the lower the level of development. The regions categorised as global cities regions are deemed to warrant a policy intervention confined to the creation of innovation and investment-friendly framework conditions. Those regions with important innovation networks need a balance of market forces and policy intervention. In the regions with undeveloped potential, such as those with industrial districts or undergoing economic transformation, to break away from path dependency there is a need for more interventionist policies (Koschatzky, 2005). Within a UK context, this suggests that the traditional excellence-based allocation of innovation-related public resources towards the more favoured (leading) regions could be complemented by other measures.

While the definition of innovation in the different RDAs is not explicit in the plans, the focus is clearly on science-based innovation. The North West has the most science-oriented approach to innovation. This is perhaps due to the strength of the science-related infrastructure, research excellence in local universities, and the orientation of the regional Science and Industry Council. To address this, NWDA plans to publish a broader innovation strategy to complement the existing Science Strategy. The North East also

has a strong science orientation, building on the limited resources available, but this is due to a policy focus on science as the path to transform the North. The exception in theory, although perhaps not in practice, is the stated approach of Yorkshire and the Humber which purports to be more focused on the innovation environment broadly.

The national-level definition of innovation is expanding, leaving some room for RDAs to take bolder steps in terms of innovation. This national change, thanks to the influence of NESTA and the new national approach as outlined in *Innovation Nation*, expands the science-based approach in theory to the public sector, areas of hidden innovation, etc. Expanding the innovation focus, however, is an understandably difficult task for the regions. The nature of the actions to be taken in the context of this broader approach is less clear and measurable, although there will be national efforts via NESTA to develop new indices that measure other forms of innovation. Furthermore, given the lack of fiscal autonomy at the sub-national level, it is important to tap into national funding streams that are still oriented to the science-focused definition for major financing, although demonstration projects and programmes could easily be sponsored by RDAs.

One OECD region example that has taken the initiative to expand to a broader definition of innovation is that of Catalonia (Spain). While maintaining its effort to strengthen R&D in this region with a history of manufacturing, and moving towards Lisbon targets for investment, the regional government has opted to develop a broad society-wide innovation charter that will be built on a shared commitment from the public sector, private businesses, social partners and the research and educational communities. Current innovation policy is seen as being too distant from citizens and not sufficiently responsive to the region's challenges.

North West Science Strategy

The North West Science Strategy 2007-2010, as its name implies, seeks to support science in the region. The weaknesses noted for the region include the low level of public sector R&D development, the concentration of business R&D, the low rate of HEI R&D investment as a share of GDP (despite strong institutions in the region), and insufficient recognition of the region with science investors from outside the region and country. There is a general explanation of the strengths and weaknesses of the four strategic sectors where science has an important role (aerospace, bio-health, chemicals and nuclear). There is a stated principle that the projects funded should be transformational (meaning relatively high risk), albeit this does not necessarily mean transformational for the regional economy. There is a desire to create centres of excellence around the pillars but these do not yet exist. There is an accent on “strategic science and technology sites” that can

serve as hubs for innovation activity in the region. A series of summary appendices offers a helpful overview of: progress since the last plan, a SWOT analysis, some key facts and figures, skill priorities for the targeted sector, a summary of the strategic priorities, and priority sector action plans.

There is no formal evaluation of the prior strategy, however a decision was made to make the strategy more explicit and targeted based on the prior version and to document achievements. In terms of progress, there is discussion of additional research grants leveraged, increases in the number of firms or employment in the sector, specific programmes launched, etc. In the aerospace sector, as the strategy acknowledges explicitly, successes have been limited such as the decision not to develop a particular technology centre, or the challenges in working with the supply chain in aerospace, but it is not clear why.

There have been some important actions in parallel to the Regional Innovation Strategy that support the region's innovation system. Local actors in some areas in the North have been able to experiment and seize new opportunities that had a strong potential payoff. The development of Manchester Knowledge Capital to support innovation in the metro Manchester area is one example. The attraction of parts of the BBC to the area will be a huge asset for the media and digital industries firms to support growth and innovation. The local support for the Daresbury campus has also been highly valuable, and the facility is recognised as playing an important role within both the Manchester and Liverpool city-regions. The challenge will be to ensure that the positive benefits of these significant local assets support other parts of the region.

North East: Strategy for Success

The North East's Strategy for Success is the most "transformational" of the three regions in its aims relative to assets and in its high level of integration in the RES. The focus of the strategy is straightforward with five pillars (subsequently reduced to three), independent Centres of Excellence for each pillar, and a finance company NStar (proof of concept and co-investment funds). The Centres address a significant gap in closer-to-market, translational, scale-up and demonstration facilities, for which there was in effect no national funding. The strategy document itself is only a few pages. However, a more detailed competence background report was developed during its preparation. The restricted number of pillars and programmes resulted in a large concentration of funding towards the strategy (initial public funds committed of over GBP 200 million for 6 years starting in 2001). Since 2004, the strategy has also re-oriented considerable effort and resources, including the new European programme, towards specific "Innovation Connectors", particularly the Newcastle Science City,

and sites at Blyth in Northumberland, Wilton in the Tees Valley and NETPark in County Durham.

Reassessment of the Strategy for Success led to this further focus of the priority from five to three pillars. Those three pillars include new and renewable energy, life sciences and process innovation (chemicals).⁶ The ICT pillar, as represented by the Centre of Excellence Codeworks, was determined to be of lesser priority going forward due in part to the lack of critical mass in the sector. Given the enabling technology focus it was deemed more appropriate for the Centre to focus on providing specialist business support services for the firms than sponsoring and application of research. CENAMPS, the Centre of Excellence for Nanotechnology, Micro and Photonic Systems, is now incorporated into the Centre for Process Innovation (CPI) after a period of working under a joint Board. As part of a recent review by the OECD focused specifically on the Newcastle city-region, it was noted that this focus on radical new technologies as an innovation strategy needed to be complemented in the overall RES by other economic development measures to support the less technology-intensive and lower skilled sectors of the economy that account for a significant amount of employment and GVA (OECD, 2006f).

The North East reports several measures of success of their strategy thus far. In terms of indicators, they note a doubling of business R&D expenditure between 2002 and 2003. It is not clear how the strategy could have had such a massive impact so quickly, but it illustrates a more general point that the output indicators for RDAs raise issues about causality and the influence of public action. The region has also experienced growth in the rate of technology start-ups that places the region from one of the lowest to one of the highest in the country. Other successes include globally significant scientific breakthroughs, international funding and the attraction of major private and public research and prototyping facilities. The latter measure is perhaps one which could be the most attributable to the region's actions.

Yorkshire Regional Science and Innovation Strategy

The Yorkshire Science Regional Science and Innovation Strategy takes a very different approach from the other two regions and has a very broad innovation environment focus and is thus more of a framework. One of the reasons for this broad approach could be due to a desire to change from a formerly cluster-based focus. In the late 1990s, there was a strong public-private collaboration for innovation strategy development, in part due to the cluster focus at the time, however the current strategy does not appear to build on this prior work. The current strategy doesn't help understand the region's needs or assets in terms of science, technology or innovation or

how the existing cluster groups will link to the proposed innovation hubs. It purports that the region needs to have a radical innovations strategy but it does not appear radical in its current form as it is not fully clear what it will do.

There have been studies to help identify the region's innovation assets; it is simply that the written strategy does not make this explicit.⁷ There is also an action plan in development to implement the strategy, albeit the strategy was finalised over 1.5 years ago. The Appendix explains how the Regional Economic Strategy items can fit with the goals of the RIS, but this is more of a retro-fitting summary given the timing differences. One interesting point that receives considerable emphasis in this region's strategy, and not in the others, is the importance of engaging in EU programmes. In fact, this RDA is the only one to have a full-time staff member focused on innovation based in Brussels to support this EU engagement agenda.

One of the lessons learned from an earlier innovation strategy for Yorkshire and the Humber was to be better targeted in terms of priority areas and interventions. Another concerns targeting of instruments. A study in the region indicated that only 7% of their funding for innovation went to the creativity part of the “creativity, design, exploitation” model, implying that there was insufficient effort on stimulating demand from firms through culture change. There is also a growing concern among actors responsible for the strategy that the higher education institutions may be playing too prominent a role in the innovation strategy and instruments supported by the RDA and therefore there needs to be a greater focus on firms.

Sectors, pillars, clusters and platforms: what to support for innovation?

The regional innovation strategies seek to support innovation in priority sectors for the region. The innovation strategies (at least of the North West and North East) use a different terminology, such as pillars. The choice of pillars is based on where the RDAs perceive a strength, or in some cases a possible strength in the future, in either an academic expertise or firm base. The term pillar itself is interesting for its imagery which connotes strength and verticality, as opposed to something more transversal or interactive like a cluster or platform. Both regions even graphically represent their strategy with the vertical pillars.

In terms of sectoral priorities, there are many commonalities across the North, and even across the UK (see Tables 3.6. and 3.7.). The concept of supporting clusters at the regional level was in fashion earlier in the decade and has since become less of a policy focus more recently in terms of

strategy. In practice, there are still cluster “champions” and other sectoral or cluster groups in the RDAs that liaise with firms in those areas. The accent on priority areas warrants continued support, in particular for identifying where support for innovation can be targeted. In the national landscape, there is no overarching priority cluster or sector strategy; rather there is a broad focus on channelling efforts and resources towards emerging technologies with strong commercial application or potential to solve societal problems. As such, the strategy is more about technologies than traditionally defined sectors or industries. Technology Strategy Board funding goes in this direction, though with some large sector-specific initiatives, notably in aerospace. BERR does have sectoral-based programmes but there is a strong aversion at the national level to “picking winners.”

Table 3.6. Sectoral priorities in economic and innovation strategies

Sector	NW	Y&H	NE
Digital and creative or new media industries	X	X (tech-based), mainly digital	X (mainly creative)
Food and drink	X	X (tech-based)	X
Advanced engineering and metals	X (competitive sector)	X (tech-based)	--
Process	--	--	X (tech-based pillars)
Chemicals	X (strategic sector)	X (tech-based)	X
Aerospace	X (strategic sector)	--	X
Defence	--	--	X including Naval
Auto	X (competitive sector)	--	X
Bioscience	X (strategic sector)	X (tech-based)	X (tech-based pillars) • Stem cells and regenerative medicine
Healthcare technologies	X (strategic sector)	X (tech-based)	X (tech-based pillars) • Ageing and health
Energy and environmental technologies	X (competitive sector) • Nuclear (strategic)	X (tech-based)	X (tech-based pillars) • New and renewable energy • Nuclear • Oil and Gas
Tourism	--	X (innovation)	--
Financial /business Services	X	X (regional significance)	X
Construction	--	X (regional significance)	--
Logistics	--	X (regional significance)	--

Note: Items in **bold** are also a focus of the regional innovation strategies. For Yorkshire and the Humber, the innovation strategy priorities are not explicit in the document but it is assumed that it supports the region’s priority sectors.

Source: Economic and science/ innovation strategies of the three regions.

The Regional Economic Strategies across England have had a high degree of commonality with respect to priority sectors (Table 3.7.). For example, out of the nine English regions, eight have given a priority to biotechnology or health sciences in their strategies, which the Regional Innovation Strategies generally seek to support. This is not only a problem for the UK. For example, three-quarters of the US biotechnology industry is located in just five urban centres, even though 41 out of 50 US states have established significant funding programmes to spur development of the life sciences industry (Cortright and Mayer, 2002). This kind of duplication is perhaps in part necessary. If there is to be a change in the path dependency of regional trajectories, there will be new players that emerge. On the other hand, this begs the question about the efficiency of public investment in supporting those sectors where the cost of achieving critical mass is very high.

However, within these broad priorities, regional authorities do recognise clear niches which reflect specific regional strengths. The niches in the North in the different sectors listed should be made explicit for national and international audiences. There are a number of documents that have been commissioned by RDAs for various purposes that seek to map these niche competencies but this has not been communicated to national policy makers in a clear way. As a result of the Technology Strategy Board alignment requirements across all RDAs (see Chapter 2), there is an increasing discussion across the country on these different specific areas of expertise that should be prioritised in national resources allocation.

Table 3.7. **Priority clusters identified by UK Regional Development Agencies**

Shaded areas indicate priority

Cluster	North East	Yorks.	East Mids.	Eastern London	South East	South West	West Mids.	North West
Biotechnology								
ICT								
Creative industries								
Advanced engineering								
Food/agro-food								
<...>								
Manufacturing								
Textiles								

Source: Adams, Jonathan and David Smith (2004), *Research and regions: An overview of the distribution of research in UK regions, regional research capacity and links between strategic research partners*. Higher Education Policy Institute, March 2004.

As the challenge for the North is to be visible both nationally and internationally, there needs to be mechanisms for these strengths to be recognised. There is no national system in the UK for denoting particular regional strengths given this hesitancy for “picking winners.” Nevertheless, UKTI, Technology Strategy Board and RDAs need to work together in promoting UK (regional) assets/strengths to an international audience.

The Technology Strategy Board makes visible via the internet the different areas of expertise and business-university collaborations that it seeks to support, albeit the text is more focused on explaining policy than promoting UK assets to an international audience. While there are multi-disciplinary Innovation Platforms that mix competencies to achieve a common goal of addressing a particular societal challenge, these platforms are national (virtual) and don't have a spatial dimension.

UKTI supports the regions through trade development, R&D advisors who bring regional strengths to the attention of inward investors, and international marketing that highlights R&D capabilities. UKTI's region websites provide general information but then refer to RDA websites for details. The regions are therefore responsible for promoting their innovation assets together with UKTI. Although with so many different centres and areas of excellence in each region, each with a different branding, the credibility of these regional designations is harder to market internationally.

Another aspect that is less straightforward is the analysis of global trends for the sectors being supported and how the innovation strategies support firms in this context. The general view of the *Sainsbury Review* was that the Technology Strategy Board should take a lead role in monitoring industry and technology trends, and that other actors including the RDAs should share in this intelligence. However, the RDAs need some capacity of their own. A better understanding of the global context for firm needs would serve to better inform how these efforts might be directed in a manner that is sustainable and adapts to global trends. Examples of radical changes in the seafood industry in Yorkshire and the Humber and the chemical industry in the North East illustrate this point. Increased opportunities to interface with firms strategically on such issues would support the Regional Innovation Strategies. This information is revealed in part from the work with cluster contacts of the RDAs and in sub-committees of the Science and Industry Councils focused on particular sectors or pillars. However, it is difficult from the existing procedure to know whether investment in, for example, a stem cell clean room facility is a worthwhile capital investment on the global stage.

In terms of determining the priorities for action in the strategies, it is important to keep in mind the nature of the innovation needs in each of the

“pillars” supported, however described. The type of policy support and instruments are linked to these types of innovation. For example, if the innovation is related to an input, such as an advanced material, then policies may want to focus on maximising linkages with other sectors. The advanced materials sector is a strength in the North, particularly in Yorkshire and the Humber. In the process industries, for example, a lot of the current work is on recombinant innovation, therefore again linkages with other sectors are vital. The strategies do not get into these specifics *per se*, and it is not clear that the targeting of innovation instruments is designed to meet those specific needs.

Expectations for HEIs very (too?) high

The strength of higher education institutions (HEIs) in the North is a core innovation asset. They are a stable and easily identifiable partner. They are also well-embedded in the region and therefore easy to interface with in terms of public initiatives. They play a leading role in key public and quasi-non-governmental organisation committees and councils, which reinforces the higher education focus in innovation. In fact, across the North there are 33 HEIs with a staff of 73 000, an annual income of almost GBP 4.2 billion and they train over 570 000 students.

Regional Innovation Strategies and programmes are generally focusing on HEIs because they are the main recipients of public innovation-related funds. Furthermore, as recent research in the UK has shown, there is a “tipping point” in terms of the clustering of R&D intensive firms. Unless a threshold of research excellence is reached, the clustering effect is not observed (Library House, 2007). The relevant questions for the strategies is whether they seek to simply capitalise on what is present in the region or serve in some way to help bring a particular area of research competence closer to that tipping point.

In terms of policy support to HEIs by regional and local governments, the different goals and time horizons should be borne in mind. HEIs are institutions with their own relationships, lobbies and self-interest in obtaining research and other funds. As many of these institutions are already convinced of the importance of trying to work with firms, their active engagement is increasingly assured. HEIs are also highly organised in a range of different consortiums and groups to support their different interests at national level and within regions (regional higher education associations).⁸ HEIs are being asked by Government as well as regional and local actors to be more engaged on many fronts for regional development.

There is a strategic over-emphasis on these “supply side” institutions for increasing innovation activity. The strategies should emphasise firms and overcoming the barriers that firms face. Accessing new knowledge and

technical support from HEIs is only one aspect of business needs. The output measure that the RDAs are using for their innovation strategies is often private R&D investment, which can only partially be addressed by HEIs. There are few studies on the demand by firms for the centres, advisory services, collaborations with universities, etc. While there is clearly work to do to stimulate this demand, this needs to occur for the firms to want to access the supply of services linked with HEIs. Some of the HEI advisory service programmes are seeking to stimulate this demand. In the past, approximately half of RDA business support budgets have been channelled through business-university collaboration projects relevant for science and innovation (ODPM, 2006).

The lack of diversity of institutions in the innovation landscape in the North is another reason for this over-reliance on the research-oriented HEIs. In Germany, there are institutions that carry out research, those that educate students, those that support further education (including unions, chambers of industry and commerce), and those that support knowledge and technology transfer. While the regions in the North are not able to change the overall structure of actors in the national innovation system, supporting the specialisation of responsibilities by type of institution could at least move more in this direction. Greater recognition of the value of what the *Sainsbury Review* referred to as the more “business-facing” universities (former metropolitan universities) may be needed. The climate in the UK is encouraging them to emulate the more research intensive universities instead of building on their uniqueness. Taking an example from Germany, the Fraunhofer Institutes, Steinbeis Universities and Transfer Institutes are highly respected for their applied focus.

Regions in the North could consider the creation of alternative institutions to HEIs in their innovation strategies. Regions that are not the leading hubs like the North suffer not only from an institutional thinness but also a lack of specialised service providers. The North East, for example, made a conscious decision to develop Centres of Excellence in the region that were separate from universities to increase the diversity of institution types and build critical mass in specific technological areas. There are lessons to be learned from those Centres that have proven most successful. The investments in Yorkshire and the Humber in the now Regional Technology Network are another example of these public investments resulting in durable alternative institutions. Such entities also have the opportunity to bring in more business leadership to support innovation. Examples of this kind of strategy are seen in many OECD countries, including the well-known examples of privately run Centres of Competence in Finland and Norway.

Linking the skills, training and education agendas with innovation needs

An innovation strategy cannot cover all topics, but should hit the key drivers, and one area that is particularly important for a successful regional innovation system is human capital. Insufficient educational attainment and skill levels are a challenge generally for the UK to support innovation, and this is even truer for the regions in the North. Furthermore, the North is a net exporter of students in part because of the need for graduates to minimise risk by going to the larger labour markets outside the North. The North West and Yorkshire and the Humber strategies do mention the importance of skills, notably as a foundation for the innovation system. The strategy in the North East does not explicitly mention skills but it is an area of focus for the Science and Industry Council and cluster (pillar) level actions.

There is an unusual mix of skills strategies as the skills agenda is managed by a number of other institutions and, despite different reforms, skills remains a highly complex and intractable issue. These institutions are outside the direct domain of the RDAs, and hence the RDA innovation teams, but there are numerous public sector attempts to co-ordinate. Local Learning and Skills Councils are responsible for initiatives targeted to: 14-19 year olds, adult learners and employers. They receive funds from Government and cover a geographic area smaller than a Government Office region. In the current reforms to skills provision in England, the Learning and Skills Councils are being abolished in favour of another delivery mechanism. There is also a Regional Skills Partnership in each region to support collaboration between the RDAs, the Skills for Business Network, the Learning and Skills Councils, Business Link and Job Centre Plus, among others in support of an employer-centred approach that also raises demand for higher skills. The various cluster-related efforts may take up the issue of skills, as could Sector Skills and Productivity Alliances. There are 25 national-level Sector Skills Councils that comprise an Alliance of Sector Skills Councils. Government is also seeking to promote more regional co-operation for skills via the new “University Challenge”, encouragement of RDAs, HEIs and Sector Skills Councils to work more closely together and Regional University Enterprise Networks.

On paper at least, the alignment of strategies to support innovation with skills appears to concern the priority sectors in the strategies and frequently with a focus on the lower end of the skills spectrum. This is understandable in the UK context as the performance targets for RDAs and the different skills bodies are focused on the lower skilled and this is where public money is directed. There are funding gaps when there is a need to retrain workers that stay within the same qualification level. The policy rationale for funding skills by level in the UK is that the lower end of the skills spectrum should

be mainly publicly funded, that the middle range should be a mix of public and private employer funds, and that for high skills it is the individuals who benefit most from the investment and thus should finance it (HM Treasury, 2006a).

While the innovation strategies strategically over-emphasise the role of HEIs in support of firm innovation through technology transfer, they appear to underestimate the primary role of universities in training the future high-skilled labour force. The North is actually a net exporter of students, and demographic projections anticipate a decline in the number of young people in the region relative to the national average. Therefore graduate retention and attraction of skilled labour both become increasingly important. Furthermore, firms reported that general business skills gaps are a problem, a measure the Northern Leadership Academy seeks to address in part.

Service-related sectors: the perennial challenge

Supporting innovation in the service sector is not a priority in the innovation strategies. While the economy of the North of England has a slightly larger manufacturing component than the South (albeit slightly smaller than the Midlands), the service sector remains the largest in terms of employment (between 76-78% across the three regions versus a UK average of 78% and an OECD region average of 70%). Additionally, many areas of the North are characterised by a high percentage of employment in public services, a theme which is also not addressed in the innovation strategies and is also dependent on direction from central government.

Policy actors in the North, as elsewhere in the UK, are seeking opportunities to support innovation in areas of the tertiary sector important to the region. Two stated areas of importance in the North include financial services and creative industries. Both are deemed important not only for the employment they are generating, but also for the image building effect that these industries can have. Both sectors are clearly present in discussion of the new regional economies of major northern cities, yet neither has a prominent place in innovation strategies. The financial services cluster in Leeds, for example, is an important regional asset. However, support for innovation in services is not discussed in the Regional Innovation Strategies. The move of parts of the BBC to the Manchester area is a highly significant event to support the media and creative services sector. But while it will undoubtedly create a buzz and help to anchor the creative industries sector in the North West, how it can be supported through the current strategy is not clear.

The needs for innovation in the service sector are different from those of manufacturing firms, as documented by studies and firm-level data on innovation practices. *Innovation Nation* stresses the need for an enhanced

service innovation policy, though offering few concrete policy ideas it proposes strong support and institutional incentives to promote innovation in the public sector. Work by NESTA and BERR is also exploring the service innovation agenda, with in-depth studies on certain sectors. The European Commission will soon prepare a Communication setting out a European Strategy in support of service innovation. OECD work on services has noted that success for large service firms is often based on: a) open markets, b) innovation and ICT and c) work organisation and human resources (OECD 2005b). Furthermore, studies of innovation in knowledge intensive service activities (KISA) show that such firms serve as sources, facilitators and carriers of innovation (OECD 2006c). As illustrated in Table 3.8., there are different possible policy levers for supporting innovation in KISAs. (For another listing of possible policy approaches in services, see Table 3A.1. in Annex.) Ultimately, the enabling environment for innovation in services, especially a skilled workforce, has one of the greatest impacts on the success of many service sector areas.

Table 3.8. Policies for innovation in knowledge-intensive service activities

Policy-related dimension	Examples of innovation policy measures
Direct policy intervention targeting businesses/organisations	<ul style="list-style-type: none"> • Securing service development-related private and public financing, grants and tax credits for businesses • Transfer of enabling technologies that can support the role of KISA in innovation
Indirect policy intervention targeting non-business actors within the innovation system	<ul style="list-style-type: none"> • Securing the skills base needed by service innovators • Widening the focus of RTOs towards non-technological innovations
Development of framework conditions facilitating the role of KISA in innovation	<ul style="list-style-type: none"> • Opening up of new markets for service providers • Cutting down the regulatory burden • Financing for the use of external KISA • Good practice development, standards for service quality • Cultivating services related to innovation culture
Development of existing innovation policies, more service-friendly	<ul style="list-style-type: none"> • Adopting the broad innovation concept, acknowledging the value of process innovations (technological and organisational), and product innovations (goods and services) • Adapting financing and assistance criteria so that services-related innovation projects get better access to existing policies • Training and skills development in service-related innovation for actors executing the innovation policy
Development of new policy measures targeting issues that are central to the development of KISA and services-related innovation	<ul style="list-style-type: none"> • Networks and customer interaction as innovation platforms • Developing organisations that are more capable of using internal and external KISA

Source: OECD (2006), *Innovation and Knowledge-Intensive Service Activities*, OECD Publications, Paris.

The lack of a service sector focus can be explained in part by the lack of easy to identify areas of public intervention where there is a policy rationale. Given this difficulty, the types of interventions to support different areas in the service sector are often focused on regulatory and procurement issues. As discussed in Chapter 2, there are other forms of failure with respect to innovation systems generally, and they are even more applicable when addressing possible policy options to support service sectors.

Another reason for the lack of attention to service-related sectors is that such actors are not typically involved in the science-focused innovation discussion. The Science and Industry Councils tend to focus more on science than innovation in general. There are some priority sectors in the Regional Economic Strategies but not in the Regional Innovation Strategies, such as creative and media or financial services, within which innovation could be supported. To identify concrete policy actions, the North West Universities Association (NWUA), for example, is running a HEFCE-funded project to develop innovation platforms in non-science research disciplines. Research is being undertaken in two pilot projects to identify the most effective mechanisms for knowledge transfer mechanisms to support innovation in the construction and finance/professional services sectors.

In the North of England, RDAs could seek to complement the recommendations of the recent NESTA report on services in addition to other new initiatives (see Box 3.1.). As discussed earlier in this chapter, a broader innovation focus in regional strategies and institutions (such as the Science and Industry Councils) is a strong step towards promoting innovation in services. The use of the Northern Leadership Academy and other vehicles to support advanced management skills for innovation in a service sector field is one possibility. The range of innovation advisory services already offered in some of the Northern RDAs could include specialists for prioritised services sectors. Ideas for knowledge transfer may flow from the current demonstration project of innovation platforms with NWUA that could be expanded on a larger scale.

Box 3.1. Taking services seriously: NESTA policy recommendations

A May 2008 report on services in the United Kingdom by the National Endowment for Science, Technology and the Arts (NESTA) had the following policy suggestions for the UK overall:

How innovation policy could do more to stimulate and support the innovation that matters to services:

- Support innovative people and not just firms (notably advanced management, which is neglected by the current focus either on low and intermediate skills or higher level science, technology, engineering and mathematics skills)
- Recognise that innovative firms integrate, not just invent, technology
- Stimulate innovation in existing sectors, not just emerging sectors and technologies
- Widen knowledge exchange between universities and firms to include the arts and social sciences, not just science and engineering
- Measure innovation in services, not just advanced manufacturing

Policy recommendations:

- An ambitious objective should be established to help drive the realisation of the broader vision presented by the DIUS White Paper
- Assess the impact of introducing a Learning Tax Credit for small firms
- Establish an Innovation Advisory Service to advise firms on the effective exploitation of technology for innovation (akin to the national Manufacturing Advisory Services)
- Ensure that planned mini-Knowledge Transfer Partnerships for shorter-term projects between universities and firms include disciplines relative to services firms
- Establish industry-led review groups for five services sectors (the value of which was demonstrated by the recent BERR-NESTA Innovation in Services project)
- Measure innovation in services equally to innovation in advanced manufacturing

Source: Abreau, Maria, Vadim Grinevich, Michael Kitson and Maria Savona (2008), *Taking services seriously: How policy can stimulate the 'hidden innovation' in the UK's services economy*, NESTA Research Report, National Endowment for Science, Technology and the Arts, London.

Beyond cities: innovation and rural areas

Attention to “rural” areas within the RDAs is generally managed by dedicated rural staff. In the past, rural was considered a separate area of programmes. More recently, the Department for Environment, Food and Rural Affairs (DEFRA) has encouraged rural staff to seek to mainstream the needs of rural areas into the work of other departments across the RDA. Furthermore, the perception of how to conceive of rural areas is changing somewhat as the spatial focus for economic development in the North is increasingly based on city-regions. The investments of RDAs are being framed in these terms. Rural areas are either outside of those city-regions (like Cumbria in the North West or parts of Yorkshire and North Yorkshire), or in the outer fringes of the city-regions. Finland, a country with vast remote areas, has nonetheless used a city-based approach to link urban and rural areas in their support of regional competitiveness (see Box 3.2.). Supporting innovation in rural areas is an even more difficult task than in city-regions.⁹

Box 3.2. City-based support of rural areas in Finland

Finland has approached regional specialisation and regional competitiveness through a couple of core programmes that are designed to support overall national competitiveness.

The *Centres of Expertise Programme* (CoE) is one of the four Special Programmes derived from the Regional Development Act. The centres are designed to develop regional innovation systems using the triple helix of university, industry and government. The Centres seek to capitalise on local assets and know-how and have a high-technology focus when appropriate (sophisticated technology is not a goal *per se*). The Centres promote collaborative public-private projects, often using a local technology centre or science park to house them. The programme has evolved significantly. The most essential change compared to the previous model is the encouragement of stronger national and international collaboration. There are 13 Competence Clusters and 21 Centres of Expertise.

The *Regional Centre Programme* (RCP) seeks to strengthen the linkages between cities and their neighbouring regions in 34 regional centres and one network pilot project. The stated objective is to “develop a polycentric regions structure based on a competitive capital city region and a network of regional centres, ensuring that all regions continue to be viable and enabling more even economic growth throughout the country.” Each region must include at least one centre that offers a competitive location for various types of businesses and a diversified local labour market. In addition, each region must include successful smaller urban areas, strong municipal centres and rural areas with effective networks of businesses both within the region and beyond.

Box 3.2. City-based support of rural areas in Finland (*cont.*)

From the perspective of rural policy, some observers had criticised the CoE and the RCP for promoting centralisation and competition among regions, leaving rural economies beyond commuting range to decline. To address these spatial considerations, changes to both programmes have proven helpful. In the latest version of the Centres of Expertise programme, there is a focus on “clusters” rather than on locations. Secondly, as the Regional Centre Programme did not cover all municipalities, there is now “seed money” of the regional section of the Special Rural Policy Programme to support the rural areas outside the Regional Centre Programme.

Source: OECD (2008), *OECD Rural Policy Review: Finland*, OECD Publications, Paris.

There is no specific mention of rural areas in the strategies of the three regions, but the renewable energy and nuclear sectors, priority sectors in the different regional plans, are industries that are often located in rural areas. In that sense, actors in some rural zones could be explicitly supported by the innovation strategies. However, the firms in these sectors themselves may not think in terms of rural areas and seek to have any particular linkages or spillovers with the local communities – there is less of a sense of engagement in the local buzz compared with an urban context.

In a report by the Rural Advocate to the Prime Minister, innovation is highlighted as one of the themes for boosting rural economies, many of which are found in the North (CRC, 2008). The analysis of the challenges is based on the five drivers of productivity discussed by Government as experienced in rural areas. It finds that the two most significant weaknesses in rural areas are investment in innovation (in part because investment in innovation in the UK is viewed in terms of science and not as much in people, ideas, the public sector, etc.) and, although firms in rural areas are just as likely to innovate as their urban counterparts, they suffer from weaker infrastructure and drivers and a lack of specialised service providers. There are notable parallels in these comments with sentiments in many parts of the North more generally. The recommendations of the report offer some lessons for the Regional Innovation Strategies, including efforts to address innovation in sparse or remote areas such as through a proposed Rural Innovation Initiative or partnership as well as the identification of strategies for innovation-related programmes, like Knowledge Transfer Networks, to engage more effectively in rural areas.

Innovation instruments

The distribution of national versus regional responsibilities for supporting innovation is framed in part by a nation’s constitutional framework. Generally, the greater the level of decentralisation in the

country, the wider the range of innovation instruments used at the regional level.¹⁰ The English regions, with flexibility on spending, do finance a range of innovation support instruments (see Table 3.9.). As is common in centralised country contexts (see Introduction), there is no sub-national influence on the regulatory framework. However, the national level does not directly share support for innovation poles and clusters outside of the research funding streams, therefore regions alone must finance such instruments that one would expect to receive greater national-level support based on examples of other centralised countries. The RDAs do not typically fund R&D research *per se*, but the North West RDA more actively supports R&D centres than the other two regions. To varying degrees the RDAs support technology transfer, innovation advisory services, innovation networks and innovation “places”. While they also support financing instruments for innovation, these instruments are typically managed by separate RDA teams.

Table 3.9. Instruments to support innovation in the UK by source of funds

Instruments	EU	National	RDA	Local
Regulatory framework				
Competition-restraining product market regulations	X	X		
Intellectual property rights		X		
FDI restrictions		X		
Employment protection regulations		X		
Capital gains taxes		X		
Bankruptcy legislation and procedures		X		
R&D investment				
On-going financing of R&D performed in public research or higher education institutions	X	X		
Seed funding/projects to support R&D centres		X	X	
Public subsidies for private R&D spending		X		
Tax advantages for private R&D spending		X		
Technology transfer and other innovation advisory services				
Programmes with HEIs	X	X	X	
Innovation advice and guidance			X	
Innovation networks and collaboration				
Support of cluster initiatives	X		X	X
HEI links			X	
Innovation support networks			X	
Innovation “places”				
Science parks, science cities, and similar initiatives		X*	X	X
Centres of excellence, technology hubs			X	
Incubators for high-technology firms		X	X	X
Public research facilities		X		
Financing				
Public venture capital funds		X	X	X (rare)
Investment readiness business support			X	
Investment fairs			X	

R&D investment

The North West has directly supported science via the North West Science Fund. The fund has financed six university-based projects thus far. Each project involves more than one university and all have a link with industry through a cluster network or specific industrial partners.¹¹ It should be noted that stem cell research, one of the areas funded, is a major area of investment by the North East RDA as well via its Centre for Life. The other Northern RDAs do not have a specific science fund for R&D projects or support centres unless there is a greater technology transfer component.

Innovation advisory and business support

Instruments to support innovation advice and guidance to firms in the North have taken the form of innovation advisory services to individual firms, more structured broadly based programmes and university-centred services. In addition, there are national programmes, like the Manufacturing Advisory Service, that support firms across the country for innovation adoption in manufacturing processes. Yorkshire and the Humber developed a programme for Innovation Promoters to provide innovation advice to firms. The programme is being modified and re-launched as the Innovation Specialist Service. The new programme will work with Strategic Cluster Champions to target support. The North West is launching an innovation advisory service that will be included in the range of business support options available through Business Link. As the primary gateway to public support for business, the emerging system in all three regions is placing increasing emphasis on the Business Link network, which in the past has enjoyed a mixed reputation. The improved quality of that engagement with firms is therefore crucial to the effective delivery of regional support for innovation, particularly for smaller firms.

In the North East, innovation-related advice is channelled through the North East Productivity Alliance (NEPA) to improve productivity in manufacturing firms. Established in 2001 and chaired by the private sector, NEPA has a broader sectoral approach, with experience in 10 sectors of relevance to the North East. NEPA has established four different programmes: NEPA Best Practice, NEPA Workforce Development, NEPA Digital Factory and NEPA Engineering Fellows. NEPA works in conjunction with the nationally-sponsored Manufacturing Advisory Service (MAS) programme with NEPA focusing more on larger firms and MAS on smaller ones.

There are quite a few initiatives to support knowledge transfer/innovation advisory services from higher education institutions. Actors in all three regions benefit from the longstanding national

programme Knowledge Transfer Partnerships. Now overseen by the Technology Strategy Board, this programme allows firms access to a Knowledge Transfer Partnership consultant that may come from either an HEI or a research organisation to support business needs in terms of innovation solutions or qualified staff to guide new projects.

Each of the three Northern regions has developed its own programmes with the support of the regional higher education associations and a contribution of EU funding, but with very different degrees of success. In the North East, *Knowledge House* has been in place since 1995 and links firms to the region's universities for developing ideas and solving problems through collaboration, consultancy, training and research. It also offers financial assistance to fund some small-scale collaborative projects. It has successfully continued operations despite having changed its financing and business structure several times. *KnowledgeRICH* in Yorkshire and the Humber has a similar model, providing a free brokerage service connecting businesses with a technical challenge to a network of experts in the region's leading universities. *KnowledgeNorthWest* ran from 2000-2006 with a similar format and a budget of GBP 2.3 million over the life of the project. The lessons from these experiences should be shared. For example, an evaluation of *KnowledgeNorthWest* noted that the costs to the universities of the brokering was high and that an intermediary organisation was needed for contact with SMEs (NWUA, 2007).

There is some clutter in the landscape of basic innovation advisory service delivery, and in some cases concern about service quality. As discussed in Chapter 2, the Business Support Simplification Programme explicitly aims to address the clutter in the services provided through the Business Link gateway.¹² There are two or three sets of entry points for innovation advisory services in any given region through the national programmes through Business Link, RDA-sponsored initiatives or through the University Associations. There may be comparative advantages to each of these different entry points but from a firm perspective it is confusing and increases the level of transaction costs. Some degree of duplication is unavoidable given different funding streams and institutions; however, perhaps a better cross-referral across the programmes (some already do so on their websites) or indications of their distinctiveness in the landscape of programmes would be useful.

The Centres of Industrial Collaboration (CIC) in Yorkshire and the Humber is a core initiative in the region to support university-industry collaboration to improve commercialisation activity. The programme was modelled after a similar initiative elsewhere in the UK. There is no equivalent programme in the other two regions in the North, however the N8 centres (described in a later section) appear to seek to perform similar tasks

but perhaps with a greater contract research than advisory role. There was a conscious effort to support a label effect for the Centres. The programme has received GBP 11 million from the RDA to set up 15 centres and after three years of initial funding (approximately GBP 300 000 total per centre) there are 12 that are self-sustaining and continue to operate. Each centre has an administrative structure with a dedicated Commercial Manager, a Centre Director and a Scientific Advisory Board. As of 2006, CICs are reported to have worked on more than 1 500 projects with business, grossed more than GBP 38 million of income and created or safeguarded 1 400 jobs.

The Centres of Excellence concept in the North East is one of the more unique initiatives to support innovation given their structure, high level of funding and boldness. To support the Strategy for Success, five Centres were created, each receiving GBP 30-40 million over that period. The legal structure of these centres required considerable hurdles for approval to overcome state aid rules. This was a strategic choice by the RDA to diversify the kinds of institutions in the region that relies heavily on HEIs to fill the gap. An early evaluation found several positive findings at that stage (Hodgson and Benneworth, 2004).¹³

Innovation “places”

In all three regions, there is a desire to have visible innovation sites both to enhance economic impact by co-locating key actors but also as an important symbol for the region. There is a value to such landmark projects for several reasons. They promote critical mass and reduce the transaction costs associated with a wider dispersion of resources. They also serve as a focal point for regional identity. They provide an opportunity for alignment of local, regional and sometimes national resources as well as a concrete role in marketing of the region. Having a location on or near such sites serves firms in both tapping into the “local buzz” and also in terms of credibility for working with other firms, seeking financing, etc. The success of the Daresbury Innovation Centre for tenant firms is particularly noteworthy (see Box 3.3.). In terms of supporting momentum, the success of a few key projects is also important to inspire future actions.

Given the infrastructure costs of such major sites, the challenge for the regions is proving that such a massive investment has measurable rewards. In the long term, that output is growth in the regional economy. However, there can be other intermediate output goals in the short to medium term. Across OECD regions, the results of these significant investments (in major research facilities or other technopoles) are mixed, in part due to the insufficient links with the local economy and the often the long time frames needed for the investments to pay off. Even the often cited Sophia Antipolis in southern France, which received considerable public funding, took

decades before it truly became a success, in part because it was built in a location with no industrial or university tradition and also because once the multi-nationals left it took time for endogenous development to occur. Overall, technology park-type locations appear to have performed best in three types of regions: 1) old industrial regions, which within the framework of industrial reconversion have sought to create technopoles as a way of changing their overall image; 2) urban locations offering economies of scale and a strong concentration of high-technology-based activities; and 3) new industrial regions, where initiatives have capitalised on the emergence of dynamic companies, particularly in high-tech sectors, in areas with little industrial tradition (OECD, 2005a).

In the North of England, the RDAs have invested in a few major innovation sites that serve as key elements in their efforts to transform their economies (Box 3.3.). As outlined in Table 3.10., some of these sites have received considerable RDA funding, but within a few years they have also leveraged funds from EU, national and even private sources. Successes related to the effective alignment of resources and the fact that they are all building on existing infrastructure or regional competencies. Where the locations in the North have not all been as successful is in the linkages with the local economy. The long-term impacts of the Daresbury Campus in the North West, initially the location of a national science facility, are the subject of an upcoming study by national and regional stakeholders so as to better understand the time dimension of major public investments in science facilities and the resulting dynamics for the local economy.

Table 3.10. **Financing of selected innovation sites in the North**

Region	North West	Yorkshire and the Humber	North East
Site	Daresbury Science and Innovation campus	Advanced Manufacturing Park	CPI/ Wilton Centre
Origin and evolution	Site of national synchrotron, designated in 2006 one of two national science and innovation campuses	Site of former open cast colliery	Former complex of ICI (construction dating back to the 40s)
Year RDA investment began	2003	2002	2004
RDA funds to date? • share from innovation budget (purpose) • share from other budgets (purpose)	GBP 50m - 100%	Approximately GBP 23m capital and revenue A further GBP 10m in investment has been made in the Factory for the Future	CPI - GBP 2m per year revenue funding NEPIC - GBP 1.4m revenue funding over 3 years

Table 3.10. **Financing of selected innovation sites in the North** (*cont.*)

Region	North West	Yorkshire and the Humber	North East
Other public funds leveraged <ul style="list-style-type: none"> • amount of local contributions (for what purpose) • amount of national public funds (purpose and source) • amount of EU funds (purpose and source) 	<p>UK Govt allocation of GBP 50m for science projects to Daresbury</p> <p>EU funds GBP 7m infrastructure</p> <p>STFC has committed to developing 2 further Technology Gateway Centres around super-computing and sensor detection systems on the campus</p> <p>Cockcroft Institute has raised GBP 30m in R&D grants</p>	<p>In total, ca. GBP 50m RDA funds, GBP 21m ERDF, GBP 6m DTI and GBP 9.5m private investment has been invested in land, capital and revenue</p>	<p>GBP 23.4m capital funds in place from RDA, EU & BERR</p> <p>(Also includes funding for National Industrial Biotechnology Facility of GBP 7.2m)</p>
Private funds leveraged <ul style="list-style-type: none"> • own revenues raised • real estate development • funds for other purposes 	<p>65 High technology companies have moved in to Daresbury, raising GBP 11m in investment finance with a combined turnover of GBP 10m</p> <p>Real estate development: potential for additional GBP 25m to be leveraged</p>	<p>This is a joint venture with UK Coal, sharing land and infrastructure costs 70:30</p>	<p>GBP 23m raised to undertake collaborative R&D projects with companies incl. GSK, Unilever, AZ</p>
Problem to solve and expected impact on region	<p>RDA investment was to act as a catalyst to develop a campus where basic scientists and entrepreneurial businesses are co-located in order to create jobs, knowledge-based firms and the economic regeneration of the area</p> <p>This vision was developed following the Government decision relating to the DIAMOND light source and the need for a regional response and vision for the future development of the Campus</p>	<p>Vision emerged from decline of South Yorkshire's traditional industries of coal and steel. Aim was to build on skills and knowledge in advanced manufacturing combined with material research expertise</p> <p>1st tenant of AMP – the Sheffield University's Advanced Manufacturing Research Centre has delivered GBP 19.4m in increased sales for local companies, GBP 25m in direct wealth created and over 70 new jobs created</p>	<p>Aim is to nurture and support world-class process industry sector in the region. Maintain existing companies and attract new investment - increasing GVA and numbers of technology jobs.</p> <p>Wilton site previously home to ICI who began scaling back operations in late 1980s. Centre was sold in 1999 and now managed as business and technical centre with multiple tenants. Cluster organisations established to create network of chemical companies</p>
How success is measured	<p>Short-term occupancy of Innovation Centre</p> <p>Long-term development of the master plan and expansion of campus and link to Daresbury Business Park</p>	<p>Stimulating growth efficiency, innovation and profitability in manufacturing and advanced materials sector. Engagement with regional and international businesses</p>	<p>Wilton Process Industries Cluster aims to increase regional process industries GDP from GBP 8.8bn to GBP 13.3bn by 2015</p>

Box 3.3. Select important innovation sites in the North of England

The Daresbury Science & Innovation Campus appears to have the highly effective combination of a science campus with active high-technology start ups. In terms of the innovation centre, what stands out is the inclusion of a number of highly skilled serial entrepreneurs who serve a mentoring role with the less experienced firms and a peer support role among themselves. The effectiveness of this network is also related to the high technology level of the firms. The selection mechanism for firm entrants as well as the impressiveness of the new facility is a reassuring signal to potential investors and clients that has a noticeable impact. The Centre also serves as a focal point for public programme delivery, such as monthly UKTI visits. The strategic location, in between Manchester and Liverpool on major road networks, is yet another advantage. The value of all of these factors is what has led firms to actually relocate from Leeds or Wales into Daresbury. The RDA has already invested over GBP 50 million and the latest private investment is GBP 25 million to develop 200 000 square feet.

The Manchester Science Park does not have the same degree of innovation-related support as the new Daresbury Centre. Started in 1984 in a period of decline for traditional industries, the Park is owned in thirds by the City of Manchester, the universities in Manchester and a consortium of local business. There are 100 tenant companies with 1 000 employees and approximately 40% of the tenants have been there for over five years. There are free business support services but it appears to serve a bit more of an industrial park than science/innovation campus.

The Advanced Manufacturing Park (AMP) in the Sheffield city-region was initiated in 2000, with its first anchor tenant in 2003, on the site of former coal mines. The facility is a manufacturing technology park that includes an Advanced Manufacturing Research Centre with international reach, the Innovation Technology Centre with office space and support services, and other contract research providers and firms. Technologies at the AMP centre on materials and structures, covering metallic and composite materials typically used in precision industries including: aerospace, automotive, sport, environmental and energy, oil and gas, defence and construction. RDA as well as EU funds contributed to the site. After six to seven years of investment, private developers are now investing in the site.

The New and Renewable Energy Centre (NaREC) was established in 2002 as a Centre of Excellence as part of One Northeast's Strategy for Success. It has been funded by over GBP 30 million of investment from One NorthEast, the North East's Regional Development Agency, and the European Regional Development Fund. It is located in Blythe along the coast on the site of former dockyards. NaREC serves as a research and development platform for new energy technologies that includes development, testing and consultancy services. It also supports the transformation of innovative new technologies into commercial successes and has a special legal structure to do so. While it co-operates with higher education institutions, it was set up separately specifically to diversify the range of institutions in the North East. It has speciality niches in particular with marine renewable energy given its wave and tidal services as well as wind energy testing facilities, high voltage and photovoltaic testing facilities. The site also seeks to attract foreign investment and firms who will take advantage of the assets of the Centre and has recently attracted a large firm involved in wind energy to locate there.

Innovation finance

In the North of England, there is venture capital funding available (albeit less is directed to the North relative to other parts of the country) but there are some specific gaps. The problem often cited was the availability of investment-ready projects (*i.e.*, the demand side). In all three regions it was reported, either in sessions with firms or other research, that the financing gap is more in the scaling up phase, as early-stage funds are readily available. However, it was also reported, even by those who had or have worked in the venture capital industry, that the investors out of London were biased against the North, which could be summed up by “If your investment near London fails, that is the nature of risk. If your investment in the North fails, it proves you should never have invested there in the first place.” The investors based in Manchester were reported to be less likely to have this perspective. In two regions, the need for tax changes or general availability of business angels was cited as a gap.

All three regions have some sort of early-stage venture capital type fund, hence expanding the supply of finance in that range. The same is true for a large number of OECD regions. The Regional Venture Capital Funds were established in each of the nine regions of England to support SMEs with up to GBP 250 000 initial investments. In addition, the RDA in the North East supports NStar Equity Investors which specialises in early-stage high-growth technology opportunities with two funds: a GBP 10 million Proof of Concept Fund for pre-seed stage of investment (up to 90 000) and a GBP 23 million Co-Investment Fund that specialises in high-growth investments of up to 1.5 million and will lead or participate in syndicates. In 2007, Yorkshire and the Humber launched Yorkshire Concept, a GBP 6 million fund (half from the RDA, half from the universities) to support academic researchers, staff and students demonstrate the commercial viability of their expertise and to support the creation of spinoffs. This programme follows from a pilot project that had been financed by the national Higher Education Innovation Fund.

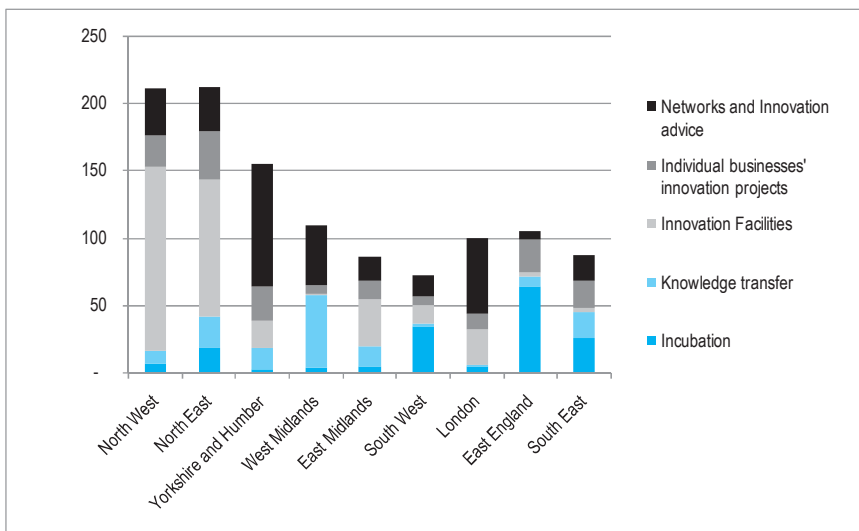
Spending on innovation instruments

There are obvious variations in the nature of RDA spending for innovation by category across the North and the rest of England. Both the North West and North East spent a significant portion of their innovation budgets over the last Corporate Plan period on innovation facilities, much more as a share and absolute value than any other region in England (64% and 48% respectively) (Figure 3.3.). A discussion of the investments in some of these major innovation sites is found in Table 3.10. as several have received considerable RDA investment. Yorkshire and the Humber stands

out as spending a higher percentage of its budget on networks and innovation advice, 59%. The only other RDA that comes close to this share of spending on the same category is London at 56%. A slightly different analysis of RDA innovation spending from an earlier time period revealed that about 20% of spending was for incubation, about 19% for knowledge transfer, and about 16.5% on innovation projects.

Figure 3.3. **RDA innovation spending by category**

GBP millions (sum of FY 05/06, 06/07 and 07/08)



Source: OECD calculations based on HM Treasury data.

The transaction costs to the programmes within these spending categories should be considered carefully by the RDAs. In some programmes the funds are distributed across a wide range of sites that each require considerable start-up costs, including consultants for business plan development, evaluations of spending, programme monitoring, etc. While a detailed review of spending on individual programmes is beyond the scope of the review, it is likely that if this criterion were more actively considered there may be a greater concentration of resources in specific programmes or sites that have a higher chance of achieving the transformational impact that the regions are seeking with their innovation strategies.

The allocation of RDA funds can play an important catalytic and signalling role to Government for alignment of resources across levels of government; the problem is the insufficient number of mechanisms for such alignment. The aforementioned Technology Strategy Board example concerns alignment on existing project proposals, but there are also examples where RDA funds are used strategically as a signal to Government of priority projects for the region outside of a specific national programme. For example, two sets of university mergers in the North West (in Manchester and Cumbria) both attracted GBP 10 million each of Higher Education Funding Council for England funding with investments of even greater sums on the part of the RDA.

As a benchmark, one can look at the spending on some key programmes to support innovation by regions across OECD countries. The challenge for mapping spending on innovation and comparing across countries is the lack of a universally accepted definition of what should be considered innovation spending. For example, calculations of regional spending on innovation with EU Cohesion policy funds is rather broad and includes not only research, technology, development and innovation (RTDI) but also entrepreneurship (including self-employment), ICT services to business and citizens and labour market relevant human resources expenditure (EC, 2007a).

To give a sense of perspective, a number of spatially based innovation networks or centres are supported across OECD countries (see Table 3.11.). While these are national-level budgets or national budgets with regional co-financing, they illustrate that many of these major innovation-related programmes receive significant resources. The *Pôles de compétitivité* programme had a three-year estimated public budget of 1.5 billion EUR to come from different agencies and ministries as well as through tax breaks. The amounts were spread across 67 clusters in the country, however given a financing priority for the few poles labelled “international”, that investment can reach millions of EUR per year per pole. The Korean Innovative Cluster Cities programme allocates EUR 150 million over four years to seven locations, an investment of between EUR 4-6 million per year per location. These examples come from countries with a more centralist approach to industrial planning than the UK, but they share a more centralised government structure and some clear challenges with planning and super-regions (Ile-de-France and Seoul respectively). In Italy, the Technological Districts with EU funding received approximately 50-60 million EUR per district over several years (OECD, 2007a).

Table 3.11. Per region spending on specific innovation programmes

Country	Programme / Policy	Primary instruments	Overall programme budget	Avg. annual spending per cluster	Co-financing (in addition to programme)
Broader spatial programmes					
Canada	NRC Technology Cluster Initiatives	Innovation (collaborative R&D, specialised R&D services and infrastructure, industry development)	342 million EUR over first 5 years (includes three five-year funding rounds)	Approximate range from 1.2 to 8.4 million EUR	yes (may be national or provincial sources)
France	<i>Pôles de Compétitivité</i>	Innovation (collaborative R&D); engagement of actors (development of cluster initiative)	1.5 billion EUR over three years	approximate estimated average 26.7 million for international clusters, 1.9 million for regional	yes
Italy	Technological districts	Innovation (collaborative R&D)	n.a.	Expected of 50-60 million EUR per district over the period	Private sector co-financing
Korea	Innovative Cluster Cities	Entrepreneurship and innovation (collaborative R&D, business services to existing and start-up SMEs)	Approximately 150 million EUR over four years	Approximately 3.6 million EUR in first year, up to 6.3 million EUR in later years	25% co-financing by private sector for technology projects
Netherlands	Key Innovation Areas	Instruments flexible, mainly: engagement of actors (cluster initiative and programme development) and innovation (joint R&D, research centres, SME technology support)	Approximately 200 million EUR per year (minimum of five years)	Will vary, but in the tens of millions per cluster annually	private sector contribution required
Specific Instruments (Centres of Expertise, large scale collaborative R&D projects)					
Finland	Centres of Expertise	Entrepreneurship and innovation (collaborative R&D, business services to existing and start-up SMEs)	1999-2005 totalled 46 million EUR (Approximately 8 million EUR 2003, 9.4 million 2004)	from 150 000 to 900 000 EUR per CoE (overall average approx 400 000)	50% regional government
Norway	Centres of Expertise (NCE)	Entrepreneurship and innovation (collaborative R&D, commercialisation assistance, incubators, internationalisation to become global players)	Approximately 4 million EUR first year, 6 million second year	Approximately 600 000 to 700 000 EUR	Minimum of: 25% private business / knowledge actors; 25% local or reg. gov't
Sweden	VINNVÄXT	Entrepreneurship and innovation (collaborative R&D)	n.a.	Approximately 800 000 EUR per year over 10 years	50% regional co-financing

Source: OECD (2007), *Competitive Regional Clusters: National Policy Approaches*, OECD Publications, Paris.

The sub-regional level

Limited but increasing scope for local action

The place-based dimension of innovation has been documented in the literature to operate and produce benefits that can occur at many levels. Those levels include that of a cluster, metropolitan area or larger region. This variable geometry is not easy to address. The role sharing across levels of government should therefore be based on which factors that support innovation are most susceptible to influence at which level (including the local level) within a country's governance context. In some circumstances there may be a need for entities that map better to these functional areas, whether public or private, and in other circumstances the existing context may allow for the design and delivery of policies that can take into account this more localised ecosystem footprint.

The North's economic geography suggests that the RDA regions in the North do not necessarily map to a regional innovation system (see Chapter 1). Furthermore, typically the core of a regional system is one or several urban areas in close proximity. The nature and footprint of a system will depend on the functional linkages across actors. In one typology of UK cities/city-regions where there is notable innovation activity, the distinction is made on the number and inter-relationships of innovation actors: strong hubs with strong linkages (e.g., London); strong hubs with weak links (e.g., Manchester, Birmingham); or weak hubs with strong links (e.g., Cambridge, Dundee) (Athey *et al.*, 2007). In terms of innovation performance, these urban areas vary on a number of parameters (those listed above being one example) that policy approaches would need to consider, regardless of which level of government or other institution plays what role in innovation support.

Metropolitan areas around the OECD are taking an increasingly active role in supporting innovation systems. Many of these local efforts tend to be bottom-up approaches with the goal of promoting the competitiveness of the city-region (OECD, 2006b). Generally in OECD countries, the tools used at the city or city-region level concern spatial planning aspects for facilities (science parks, incubators), cluster networking support and special programmes with higher education institutions. With larger metropolitan regions, that support may be more extensive given the greater scale and revenues available.

As a policy trend, some cities and city-regions in the North are including the concept of innovation as a priority area of action. Historically, even back in the 1980s, local authorities have had some form of remit for innovation

promotion and the enterprise agenda. The focus was not on the broad business environment as much as specific projects such as technopoles and business parks as additional funding (usually EU) became available. Today, the Sheffield city-region, for example, has listed innovation as one of its priorities. The reported focus there appears to be on business support. In Leeds, there are efforts to create innovation spaces in local institutions that will serve a cluster, business support and technology transfer role. Manchester Knowledge Capital is perhaps the most notable initiative in the North with a broad city-region level approach to supporting innovation (see Box 3.4.). Science Cities, discussed later, are one of the most prominent locally-based innovation-related initiatives and are active in Newcastle, York, and in Manchester in combination with Manchester Knowledge Capital. These city-region initiatives are partnerships, working in close collaboration with the RDAs and the Northern Way, and in the case of Science Cities, with the additional national-level designation.

In the UK, the scope for independent local action to support innovation is more limited than it is in other countries. Most of the strategic decisions that have an impact on the economic component of competitiveness are decided above the city level. These entities include central government departments and (for innovation, economic diversity and skills) the RDAs (OPDM, 2006). This may be why a recent study noted that English cities in particular have been successful in the regeneration agenda (where they receive considerable funds from the Department of Communities and Local Government, CLG), but compared to European peers they do not necessarily master the other key supports to competitiveness (drivers include innovation, economic diversity,¹⁴ skills, connectivity, place quality and strategic capacity) (COMPETE, 2007). Furthermore, local authorities raise less than 5% of total taxes in the UK, one of the lowest rates of OECD countries (OECD, 2008c). The lack of incentives for localities to promote an attractive environment for business is increasingly recognised and is the subject of the Local Area Business Growth Incentive (LABGI) scheme (see Chapter 2).

One challenge for locally-initiated support at a city-region level is the lack of a clear counterpart for leading that action. Local authorities in the UK are generally under-bounded; therefore in most cases they cover only a small part of a functional area that serves as an innovation system. The Core Cities group has done research for Government on the city-region concept (ODPM, 2004) and this has continued to gain ground through the Northern Way and CLG (CLG, 2006, HMT/BERR/CLG, 2007). Part of the development of the Northern Way strategy and programmes (for the area that maps to the three Northern RDAs) was based on economic strategies of

the eight constituent city-regions. Support for this greater accent on functional regions has also been suggested by the OECD (OECD, 2006f).

Efforts to promote co-operation across a functional area are likely to also serve sub-regional efforts at promoting innovation. This may be done through better identification of local needs, strategy development or project delivery. Multi-area agreements are a new vehicle for joint action across municipalities generally. However, they are only a mechanism for collaboration that works if there is already a strategy in place to guide those actions. There are sub-regional divisions within the RDAs and in some cases lead entities that co-ordinate across these jurisdictions, or there are simply sub-regional offices of the RDA itself, that support the development of joint strategy and action that could have an innovation support component.

In the North, the Manchester city-region has the longest history of co-operation which serves as a valuable example. Long-term political stability, strong leadership and an under-bounded Manchester City also contribute to its effective city-region collaboration. It should be noted that the footprint of the city-region for Northern Way purposes is a bit larger than the current 10 local authorities who collaborate most closely in this arrangement. As previously mentioned, leadership and co-operation in the city-region is also one of the drivers of its success. Other city-regions are organising themselves through different infrastructures, and through the Northern Way initiative there is an opportunity for sharing of best practice and peer reviews of progress.

Going forward, the SNR advocates a greater role for the local level in the development, scrutiny and delivery of regional strategies. What does that mean for innovation? The role for the local level is not yet determined. At a minimum, the RDAs in this new process can serve a strategic resource alignment role with city-regions, and for those city-regions with capacity, sub-contracting delivery when appropriate. Given the limited resources for most cities or city-regions, the actions that can be taken would need funding from other levels of government or considerable private sector mobilisation. In large metropolitan areas, like Manchester, there may be capacity, scale and resources for supporting innovation. In perhaps smaller-scale locations but with a very clear focus, such as Tees Valley, there are also opportunities for the local level to fully rally behind key initiatives and be effective at concentrating local efforts and attracting additional resources. In other areas the requirement for a more significant role for the regional tier in both identifying and funding projects is stronger.

Box 3.4. Manchester Knowledge Capital (M:KC)

Established in 2002, Manchester Knowledge Capital has a small Executive Team that reports to a high level, predominantly private sector Board at quarterly meetings. Leading partners in the organisation are the ten participating metropolitan authorities, four local universities, and several public sector agencies. Part of the success of the initiative may be attributable to the entity's ability to attract external attention and resources which builds momentum and can support co-operation. The three main programmes it oversees are:

Science City – Adding fuel to the knowledge economy by increasing levels of business R&D and making companies more competitive and innovative – by establishing Innovation Partnerships, encouraging public engagement with science and technology, and developing an innovation ecosystem that nurtures growing businesses.

Manchester is my Planet – Formerly the Manchester Green Energy Revolution, this programme is a partnership between the local authorities of the Manchester city-region and Sustainability Northwest to convince large organisations, businesses and households to radically reduce emissions and secure economic benefit through the innovations developed to do so.

Innovation Investment Fund – is an initiative aimed at catalysing innovation across the Manchester city-region. The founding investors are NESTA, the NWDA, Manchester City Council and the Manchester Knowledge Partnership. Their aim is simple, to make Manchester one of the most innovative cities in Europe. The Innovation Fund, launched in early 2007, aspires to reach a total of GBP 9 million before 2010 and supports projects in five categories:

- ***Understanding Innovation.*** Increasing the level of understanding of Manchester city-region's innovation ecosystem. This work will help to capture and analyse the current state of Manchester's innovation economy and its potential; providing a model of understanding that can be replicated by other cities.
- ***Inspiring Innovation.*** Galvanising stakeholders and the people of Manchester behind a unifying vision; boosting aspirations, inspiring and encouraging a culture of innovation and enterprise; increasing engagement with ideas, creativity and knowledge and generating new networks and opportunities for interaction.
- ***Embedding Innovation.*** Ensuring that the stimulation of innovation and creativity becomes an integral part of how the city-region develops. Using challenges and other opportunities to involve innovative local companies in major capital investments such as Oxford Road or mediacity.uk.

Box 3.4. Manchester Knowledge Capital (M:KC) (*cont.*)

- **Ideas to Investment.** Stimulating business growth through enhanced access to the support and finance required by innovative people and SMEs; developing the market offer that the city-region can present to the investment community both nationally and internationally to stimulate greater private sector activity.
- **Communities of Innovators.** Creating novel and interactive innovation generating groups; connecting innovators in Manchester with innovators around the world. This is about exploring the “chemistry” of innovation, getting the right environment for innovators to spark ideas off each other.

Source: www.manchesterknowledge.com/ and presentations to the OECD.

Science Cities: nationally inspired, locally developed

Three designated in the North of England...

There are six nationally-designated Science Cities in England: three in the North (Manchester, Newcastle and York – see Box 3.5.) and three in the Midlands and Southwest (Nottingham, Birmingham and Bristol).¹⁵ While each Science City is pursuing its own strategy, the six cities have formed a Science Cities Development Group to promote knowledge exchange among themselves as well as with public and private sector partners and at annual Summits held in each City. It has commissioned independent research on the value-added of the designation and engages with national government on innovation policy initiatives, their impact and method of delivery.

The broad aim of the Science Cities programme is to link public investment in science and urban revitalisation with business and innovation at the sub-national level. It is intended that the Science City designation will strengthen university, city, and business partnerships to achieve this aim. No specific funding is allocated to the Science Cities programme, nor is any Government department responsible for its oversight. Furthermore, the selection was made without clear criteria, the cities that were designated being thought to have the capacity to achieve the aims.¹⁶ The aspiration is that by designating these locations as Science Cities, local stakeholders will be motivated to develop their own partnerships, strategies and resources to leverage science, technology and innovation-driven economic development and promote innovation-embedding initiatives.

Box 3.5. Science Cities in the North of England

Manchester Science City is implemented as one of the programmes of another economic development and innovation partnership organisation, Manchester Knowledge Capital (M:KC). This is a metropolitan-wide organisation of Manchester local authorities, universities, the RDA, the health authority, business representatives, and other organisations. Accomplishments of the Manchester Science City are reported to include attracting a National Health Service technology adoption centre to Manchester, assisting in acquiring funds (from the Northern Way) for equipment for aircraft impact research, attracting funds (also from the Northern Way) to support a new Manchester cancer research centre, and extensive public participation in the Manchester Science Festival.

Three leading activities of the Manchester Science City are:

- ***Innovation Partnerships***, involving universities, industry, trade associations, and public agencies. These partnerships aim to identify gaps and opportunities and stimulate innovation activities in Manchester. Partnerships are being pursued in four areas: future of healthcare, design for sustainability, personal broadcasting and clean aviation.
- ***Real World Science***. Public engagement activities to increase awareness and interest in science, including a Science Festival and other public events.
- ***Innovation Ecosystem***. Efforts to improve physical infrastructure, partnerships, finance, attractiveness to talent and related measures.

Newcastle Science City (NSC) is implemented through a partnership of the city council, Newcastle University, the RDA, and business, with a private-sector led NSC Board. NSC's major strategies include:

- ***Investment in Science*** to strengthen world-class research capabilities in the region. Four research areas have been targeted: ageing and health, energy and environment, molecular engineering, and stem cell biology and regenerative medicine.
- ***Commercialisation***. Strengthening and co-ordinating support initiatives to commercialise science and develop new business in the city.
- ***Education and Public Engagement***. This includes activities to raise awareness of science in the city and encouraging young people to pursue science careers.
- ***Physical Space***. Developing attractive environment and facilities for science and business, including in central Newcastle in locations related to the university campus and medical facilities, the International Centre for Life, and the redevelopment of an old central city brewery site as a research and innovative business complex. Projects are also planned in other areas of the region, including Durham and Teesside.

Box 3.5. Science Cities in the North of England (cont.)

Newcastle Science City's reported accomplishments to date include the purchase and planning of the old brewery site (which is clearly a complex, long-term project), strategy development involving the university and other partners and project development. In the latter category, NSC reports involvement in a series of core projects, including support of R&D centres (including an Institute of Stem Cell Biology and Regenerative Medicine, Institute of Ageing and Health research labs, and a Centre for Nanoelectric Characterisation), research equipment procurement, and a science excellence fund, for a total of GBP 43.5 million through to March 2007. Of this additional funding, 44% (GBP 18.9 million) was provided by the RDA (One Northeast) to sponsor research with potential commercial outcomes. NSC has also been associated with the development of several other R&D centre projects as well as bids to attract additional national R&D programmes and funds to Newcastle and the Northeast.

Newcastle Science City has unveiled plans to establish a commercial entity to focus additional efforts on research commercialisation and technology-oriented property development. This would provide greater flexibility to work with public and private partners to attract and make investments, sponsor R&D commercialisation and support start-ups. The new organisation would seek to foster collaborative projects that would overcome barriers associated with linear models (where university R&D is rarely taken up by the private sector), raise funding and take equity positions. It would not seek to duplicate services (such as incubation) already provided by others in the region.

Science City York was established in 1998, not only predating but also serving as one of the models for what became the national Science Cities initiative in 2005. Science City York is organised as a company limited by guarantee with the University of York and City of York Council as its two main stakeholders, with the RDA represented at board level. Support is provided by an advisory board and by staff drawn from the RDA (Yorkshire Forward) and the business and the university communities. Science City York is pursuing five key strategies:

- **Business Development.** Fostering the attraction and development of technology-based businesses. Science City York operates as a portal to proof of concept and technology growth funding and technical assistance to start-up, early-stage, and existing technology businesses in York and the North Yorkshire sub-region.
- **Human Capital Development.** Working with education and industry partners to ensure that the area workforce has the knowledge and skills to match employment opportunities and sector-specific needs.
- **Partnerships.** Promoting public-private partnerships to create the infrastructure necessary for knowledge-driven economic development.

Box 3.5. Science Cities in the North of England (cont.)

- **Sector networks:** Development and management of networks in bioscience and healthcare (including environmental technology), IT and digital and creative industries sectors.
- **Public Understanding.** Promoting public understanding of science and technology. Activities include an annual York Festival of Science and Technology, Science Cafés (Café Scientifique), and public science workshops (Science Bite Size Tasters).

Science City York targets research and innovation activities in the clusters of bioscience and healthcare, information technology (IT), and the creative industries. It facilitates and links with three other entities: Bioscience York – a regional network of 80 bioscience businesses and about 50 other organisations (including research organisations) established in 1995 to support bioscience business enterprise and start-ups; IT & Digital York – a network for business support in the information, communication technology, electronics, software and other digital industries operating since 1998 (as ICT York and e-Science York) and re-launched in 2004 under its current name as network of nearly 150 businesses, freelancers, and other organisations; and Creative York – a network of about 100 business and other organisations which seeks to foster the growth, conservation and heritage of film, TV, music, communications, design, and other media business in York and North Yorkshire. In addition Science City York also provides specialist business support and advice to science and technology companies in the region. Services include business planning, mentoring and proof of concept funding, which are provided by Science City York “Business Promoters”. Science City York states that it has helped to create over 80 new technology companies and 2 800 new jobs since 1998 and aims to create a further 15 000 new science and technology jobs in York by 2021.

...with very different characteristics in international comparison

Although there is no universally agreed definition, in general a science city can be regarded as a delimited spatial area where science, technology and innovation is actively used to promote economic and business development. But the term has been very broadly applied to include: individual technology-oriented sites and buildings; prominent regional high-technology locations which have developed organically and where public intervention has been diffuse or loose; and explicit government-initiated efforts to foster science cities, including ambitious attempts to foster new agglomerations of scientific capability.

In terms of international comparisons, it is evident that the English initiative does have elements that are seen in other science cities around the world, but in its entirety is similar to none of them. There are also elements in other science cities not (yet) seen strongly in the English Science Cities. There are a number of significant points of contrast (see Table 3.12). One of the strongest contrasts between the English Science Cities and many other national examples is the far more modest level of public support available. It is project by project (rather than part of a larger plan), and in most cases has to be individually negotiated. The English Science Cities initiative has explicit regional development goals, including bolstering science and innovation outside the South East and linking with urban and regional regeneration (brown-field development), while most others are established in locations which are either the capital city or in leading economic and R&D regions with a greater presence of major research institutions, extensive international networking and a strong venture capital presence. Although the idea for Science Cities in England came from Government, it plays a very minor role compared to other examples. The major accent on public science education is a distinguishing component of the English initiative. In most other cases internationally, the science cities are unique ventures and not part of a network as in England.

Table 3.12. **Science Cities: an international comparison**

	Science Cities	Daedeok	Silicon Valley	Zhong-guancun Science Park	Hsinchu Science Park	Tsukuba	Kista	Oulu
	UK ¹	Korea	US	China	Taiwan	Japan	Sweden	Finland
Green-field location		●	○		●	●		
Regional development goals	●	●			●	●		●
Dominant national role		●		●	●	●	●	
Dedicated public investment		●		●	●	●	●	
National programme	○				●			
Major research institutions	●	●	●	●	●	●	●	●
National R&D leader			●	●		●	●	
Partnership models	●		○		●		●	●
Flexible network models	○		●	○	○		○	○
Orientation to innovation	●	●	●	●	●	○	●	●
“New Argonaut” links			●	●	●			
Strong venture capital presence			●					
Public science education	●							

Notes: 1) Northern England Science Cities of Manchester, Newcastle, York; 2) ● = Strongly present; ○ = partially present. More ●'s or ○'s denotes that more factors are present, not that more factors leads directly to better outcomes.

Progress and future possible scenarios

The devolved and experimental nature of the Science Cities initiative is refreshing. One of the most promising aspects of the Science Cities is its flexibility, and the opportunity it provides not only for each city-region to chart its own Science City course, but also to gain insights from other Science Cities through collective exchange and learning processes. There is also the possibility that Science Cities can become more than a brand, instead also leading to fundamental changes in research capabilities and the leveraging of research for innovation. They may also serve as demonstrators for specific initiatives.

However, it is important to probe the extent to which the programme is likely to meet the ambitious goals and aspirations that have been set for it, especially within the North. In none of the Northern Cities can it be said that the Science City is a path-breaking initiative: projects and activities being pursued as yet do not sum to step-wise changes in development trajectories, despite ambitious goals. However, this is not surprising, given the lack of dedicated resources and the need to negotiate on a project by project basis. While in several cases resources have been forthcoming (as in the case of Newcastle), significant transaction costs are involved. It remains to be seen whether the Science Cities initiative will be sustainable over the long term.

The designation of Science City has appeared to have the most catalytic impact in Newcastle, particularly in the area of regeneration. In Manchester, the designation has been incorporated into the existing reputation and programmes of Manchester Knowledge Capital, and has value locally through the opportunity to refresh the Knowledge Capital strategy, and strengthen links with national Government. The Science City in York was already in existence many years prior to the designation in 2005 as an initiative developed and funded by the City of York in partnership with the University of York and York businesses. The impact has been to create a number of sector network development initiatives in the bioscience, ICT and creative sectors around a common brand, and with a subsequent expansion (facilitated by RDA funding) to provide specialist business support for science and technology businesses in these sectors in York and the greater North Yorkshire sub-region. These variations speak both to the differing value of the designation across regions but also the flexibility with which the designation can be tailored to local needs. There are a number of interesting themes to explore in more detail with respect to Science Cities, including the additional leveraging of resources through branding, the impact of the particular programmes associated with the various Science Cities, the interesting role for local authorities in this venture, the links between innovation and urban regeneration, and acting as testing grounds for UK policy, among others.

In terms of opportunities for improvement, particularly in the North, there are several possible routes, only a few of which are discussed here. The learning and exchange role could be expanded to other cities in the North of England that are also pursuing similar strategies (even if not designated a Science City by Government) could be invited to join a learning consortium. The budgetary cost of this is marginal while the potential learning benefits are large. Another option is to enhance local strategic embedding of the Science City concept, and focus resources where strategic embedding is deepest. Methods to enhance strategic embedding might include significant additional multi-year Science City matching development funds, although, first making sure all stakeholders are aware of and commit to the prioritising of their Science City programmes is essential. Not all of the current Science Cities may wish to make this commitment, and there is an opportunity for other Northern cities (for example, Leeds, Sheffield, Teesside and Liverpool) to consider adopting similar approaches. This would involve a level of multi-year funding (since multi-year strategies should be developed) that could be manageable at the local and regional level. Finally, there could be a case developed for dedicated strategic plans and resources. If the intent is truly to develop world-class Science Cities in the North which can match the capabilities, attractiveness and dynamism of international competitors, then dedicated strategies and resources are surely required. This would require substantial new national funding for Science City development in the North, in addition to regional and local commitments.

Innovation Partnerships: a national designation under development

One of the core proposals in the regional section of *Innovation Nation*, the national innovation strategy, is that of Innovation Partnerships. The idea is based on the experiences of the Science Cities, a concept of national-level designation that had no prescriptive requirements and no national funding (see above). The form of such partnerships is currently undefined and will be clarified by fall 2008. The White Paper does not explain what the problem to be solved is or the opportunity to be seized by an Innovation Partnership. The current direction is towards a model that would focus on partnerships with public sectors actors, not firms, at the core. This approach could be promising to address the need to better understand public sector innovation through demonstration projects and serve as a vehicle for cultivating local public sector innovation entrepreneurs.

Based on the experiences with Science Cities, an experimental initiative,¹⁷ there are a number of key questions that the UK could ask itself in development of this new policy. First, what is the national interest in such partnerships if these could be developed by RDAs as they see the need, or

not? Is there a label effect sought by the designation, as a national-level label may carry more weight than a regional one? If the goal is to reward competence to attract resources, then a competitive selection process with clear criteria is the most effective way to ensure a legitimate label effect. Is it truly a path-breaking new mechanism or does it simply add another organisational layer to a landscape already replete with multiple overlapping intermediary organisations and extensive public sector to public sector negotiations? In part, the answer to this depends on the responses to related questions: are the selected partners motivated to make this experiment work and how will this be gauged? Will it be possible for the Innovation Partnerships to negotiate the resources necessary to implement their plans?

Pan-northern support of innovation

The Northern Way plays an increasingly strategic role

The Northern Way was created in 2004 at the impulse of Government as a vehicle to support the North in efforts to reduce the output gap with other parts of the UK. It is structured as a partnership between the three Regional Development Agencies in the North but works also with local authorities, universities and the private sector. The Northern Way's Growth Strategy was supported by a fund of GBP 100 million (50% from Government, 50% from the different RDA budgets), allocated to collaborative projects in ten different investment priorities including skills, transport, innovation, clusters, entrepreneurship, etc. There have been many questions about the the Northern Way in terms of its role and impact (Goodchild and Hickman, 2006), (OECD, 2006f). It appears to have had the most public success and concrete impact in terms of transportation, particularly in illustrating the need for greater national-level investment in the North, and in supporting the city-region concept at the national level.

Since 2007, the Northern Way has revised its approach to be more strategic than programme oriented. The budget provided by the RDAs for the next three-year period (FY 08/09-10/11) is GBP 45 million, to support an ambitious policy research programme (match funded by GBP 3 million from Government) and collaborative demonstration projects, including in the innovation field. This revision has resulted in a change in roles and priority areas. The refocused priorities for action fall under three categories: transportation, attracting private investment and innovation. There is also a stronger emphasis on providing an evidence base for policy with respect to the North, and in influencing national policy in areas of distinctive interest to the North. The split of the funds is approximately GBP 5 million allocated

for the research component and GBP 15 million for the innovation-related activities (approx. 5 million per year).

Within the innovation area, there are currently three areas of pan-Northern focus but the nature of possible collaborations is still to be developed. One focus is on common sectors across the North: energy and environmental technologies; creative and digital industries; healthcare science and technologies and medical devices; and advanced materials and engineering. Another goal is to support the three Science Cities and other innovation hubs located within the North. A third focus is the N8 research consortium. The Northern Way's strategy for innovation is under revision by the newly established Innovation in Industry Steering Group, therefore these three areas of focus or vehicles to support them may change in the near future.

Logic of pan-regional collaboration

There are several pan-Northern problems with respect to innovation, and actors within the North are considering what kinds of pan-Northern solutions are really appropriate. As with any collaboration, there needs to be a clear rationale for the participants to see the value in working together. The spatial scale is of course relevant, and ultimately the benefits need to outweigh the costs, notably transactions costs for co-ordination. In general, pan-regional co-ordination to support innovation could be relevant to address a range of different problems. A listing of these rationales and their relevance to the North are outlined in Table 3.13.

Table 3.13. **Rationale for pan-regional collaboration in the North**

Rationale	Application in the North
Functional area greater than the region	The relevant actors (firms, universities) span across regional boundaries. This is not quite as clear for the North given that the linkages across regions are not always strong but there are different axes of activity based on proximity and transport lines
Common problems	The three regions suffer from challenges in terms of: <ul style="list-style-type: none"> • Image • Skills • Industrial base (few large multi-nationals outside of parts of the Northwest) • Need for capacity building in the field of innovation
Increases critical mass	Increasing the number of firms, the size of the labour pool, the resources for innovation, etc.
Increases specialisation/complementarity within the territory	Strategic choices made to increase the level of specialisation among firms, universities and other actors in fields of expertise or market niches

Table 3.13. **Rationale for pan-regional collaboration in the North** (*cont.*)

Rationale	Application in the North
Economies of scale for joint action	In project implementation there may be economic benefits in terms of cost savings or a need to amortise the cost of a large facility that could be of shared need or have positive spillovers. Another area where there could be economies of scale is in research or analysis of themes of common interest
Overcomes institutional barriers or constraints	While there is a certain degree of RDA spending flexibility, the institutional processes are very rigid. This could allow the Northern Way to finance demonstration projects that are not integral to RDA strategies but are nevertheless important, or to incorporate more voices in the innovation discussions that are not engaged by current planning procedures
Opportunities for cross learning and overcoming the myopia of proximity	Increased opportunities for information exchange without being as large as a national scale. Given the extensive day-to-day obligations of the different teams, learning from actors beyond the immediate region can have a benefit

Examples of pan-regional co-ordination to support technology and innovation vary in terms of breadth and depth of collaboration (see Table 3.14.). Within the UK itself, the three RDAs in the greater London area are working conjointly on some innovation projects to better match services to the functional economic area. The Southern Technology Council in the “lagging” southern US spans a very large area (much larger than European countries) and tends to focus on information sharing, investment promotion and image/culture change to address common challenges. While the region has 20% of the US population and US GDP, it only has 9.5% of private R&D investment (SGPB, 2008). Nordregio is a European centre for research, education and documentation on spatial development in Scandinavia that has supported research and capacity building for regional innovation issues to address common challenges across those countries, even though they do not focus on joint projects *per se*. The Science and Technology Councils of Shanghai municipality and two neighbouring provinces are working to develop joint platforms to allow actors from across borders to participate in joint projects, which in the past has been inhibited by a lack of harmonisation in eligibility criteria (such as whether certain firms are classified in the same way across regions as a high-technology firm and hence eligible to participate) among other barriers. In this Chinese case, the primary motivation for collaboration is to support a functional region beyond administrative boundaries.

A number of other pan-regional co-operation arrangements with an innovation focus concern sectoral or cluster-specific focus and consequently a smaller spatial scale than the North of England. Medicon Valley in the Oresund (Denmark and Sweden) seeks to combine the resources of the two

into an increasingly linked functional area in support of biotechnology. In Stockholm, the small size of counties resulted in an artificial barrier to the development of the biotechnology sector present in several counties in the metro Stockholm area. The nature of public funding by county lines further contributed to the disruption rather than the linking of these resources.

Table 3.14. Examples of pan-regional collaboration to support innovation

Name	Scale	Focus	Instruments
Greater South East	Spans 3 RDAs of London, East England, and Southeast England	<ul style="list-style-type: none"> • Building on strong connectivity and critical mass 	<ul style="list-style-type: none"> • Joint innovation programmes • University business fellows and technology transfer programme • Innovation research map • Research excellence directory • Joint business support and knowledge networks in area of common strengths
Southern Technology Council (US)	Southern US states Alabama – Arkansas – Georgia – Kentucky – Louisiana – Mississippi – Missouri – North Carolina – Oklahoma – South Carolina – Tennessee – Virginia – West Virginia	<ul style="list-style-type: none"> • Information sharing • Investment promotion • Image/culture change 	<ul style="list-style-type: none"> • Publications such as “Innovation with a Southern Accent” to highlight facts about the South and areas of technical competency • Periodic theme meetings
Brainport – Eindhoven area (Netherlands)	21 municipalities that span parts of two Dutch provinces (much smaller scale than North of England but other parallels in terms of approach)	<ul style="list-style-type: none"> • Promoting the region as a knowledge hub internationally • Advocating to central government the importance of this region • Supporting business and technology efforts 	<ul style="list-style-type: none"> • Promotes the region as an attractive location to bring in high skilled labour • Support of High Tech campus with open innovation model • Knowledge transfer activities
Co-ordination across Bureaus of Science and Technology	Shanghai municipality with neighbouring provinces of Zhejiang and Jiangsu	<ul style="list-style-type: none"> • Supporting science and technology projects jointly for large economic zone • Mobilising greater national funds for research projects of joint interest 	<ul style="list-style-type: none"> • Harmonisation of policies for actors to engage across administrative boundaries

Scenarios for pan-regional action with the Northern Way

As the Northern Way shifts from a programme delivery to a strategy role, the range of options must fit this new organisational model and illustrate a clear value added to garner greater support for the Northern Way, both within and outside the North. Given the different areas of specialisation across city-regions, the North could also consider supporting greater specialisation in areas that could facilitate conditions for innovation. In the Randstad area of the Netherlands, there are four cities each with an identifiable role (see Box 3.6.). However, attempts to collaborate too much across a large area have proven very challenging, hence a focus on collaboration within each of the two “wings”. Furthermore, joint actions that could support innovation, such as greater complementarity among the area’s seven universities, have proven too difficult to achieve.

Box 3.6. Pan-Regional lessons from the polycentric Randstad, Holland

The Randstad is commonly understood to be the urban area in the western Netherlands, comprising the largest Dutch cities (Amsterdam, Rotterdam, the Hague and Utrecht) as well as several medium-sized cities. There are no official boundaries for the region and it remains an almost abstract concept for policy, nevertheless it contains 42% of the country’s population and approximately half of the national income.

Two entities have developed to focus on pan-regional co-operation. The Delta Metropolis Association is a public-private foundation created in 1998 by a professor of Delft University and four aldermen in charge of urban planning in the four major cities. It includes chambers of commerce, provinces, business associations, water associations, etc. and serves as a lobby group with a focus on transport. The Regio Randstad was created in 2002 as a deliberative body comprising only government representatives of the provincial and city governments. It works on themes of international competitiveness and quality of life and as a representative of the region to the EU and central government.

In terms of pan-regional co-operation, what has proven most successful in the Randstad is not co-ordination across the entire area but rather within two “wings” that link more than one city-region (North Wing and South Wing). Here the connectivity and relationships were easier to develop and proved more successful. The general focus for regional action has been on transport and spatial planning. In terms of innovation, for example, while there are seven universities in the area, efforts have not been able to reduce the significant amount of duplication across them to achieve greater complementarity.

Box 3.6. Pan-Regional lessons from the polycentric Randstad, Holland (*cont.*)

The Randstad programme of central government stresses the joint responsibility for implementation of the actions. Instead of trying to change government structures, such as creating a Randstad province, it aims at finding governance partnerships that will be able to achieve results. A new way of creating political commitment for implementation is organised by proposing responsible duo's per project. These duos consist of one government minister or state secretary and one regional politician. These duos are made responsible for the progress on the particular project. There are 33 projects formulated.

Source: OECD (2007), *OECD Territorial Reviews: Randstad Holland, Netherlands*, OECD Publications, Paris.

Creative and targeted evidence base

The first area where the Northern Way could play a key role is in building an evidence base – already a clearly stated priority. Research that has a public good aspect (on themes of benefit to all three regions) has clear value added as RDAs are increasingly viewing part of their role to be to build the evidence base to persuade Government. A note of caution regarding the evidence base is that in the UK this evidence is generally framed to respond to the Government's market failure approach only. At the national level, NESTA has played a key role in building an evidence base for central government innovation policy. They have, in particular, been supporting an expansion of the innovation focus beyond science, increasing the availability of indicators and reinforcing the concept of place in the national debate. Strategic collaboration with NESTA on key themes for the North is one vehicle for supporting that mission.

There are greater opportunities to learn from the different initiatives within the three RDAs in the North that can build an evidence base of cases of success stories and learning. For example, the lessons learned from the different approaches of centres of excellence across the three RDAs in terms of those that are university based (like the Centres for Industrial Collaboration in Y&H) or separate institutions (Centres of Excellence in the North East) could have a valuable role in informing RDA policy across the three regions on a very practical level. This kind of information sharing and joint evaluation with staff from across the three RDAs could serve a capacity building role as well.

Changing perceptions of the North to national and international audiences

The evidence base will also serve the North's needs for interfacing with Government on issues concerning innovation for the three regions to change perceptions at national level. While each region, and its regional Science and Industry Council, will continue to pursue their initiatives individually, the power that three regions can have exerting pressure on national policy is an opportunity that cannot be ignored. However, care must be taken so as not to be perceived as a substitute for the existing RDA relationships with Government or as a way for Government to delegate difficult prioritisation decisions to the Northern Way.

The Department for Innovation, Universities and Skills has made a specific commitment to work with the Northern Way as part of its Public Service Agreement commitments. While there is no funding associated with this, it does offer the Northern Way an opportunity to engage with Government on innovation in a formal way. This may also facilitate greater sensitivity to the needs of the North, and in some ways regions generally, at the national level.

National and international perceptions of the North of England and its industrial past do not valorise its existing assets and offer. There are already attempts for pan-Northern actions in offices abroad to support foreign direct investment, albeit Yorkshire Forward has withdrawn from these initiatives. Ottawa (Canada), for example, has been successful in bringing its firms to the attention of venture capitalists in California through organised events. Additional areas of support could include other awareness raising events, for example to the venture capital community. This could also support another of the three Northern Way priorities, attracting private investment. It has been noted by local actors that the North undersells its existing assets.

Capacity building: public and private

There exist capacity building needs for all three RDAs as well as sub-regional actors in the field of innovation, as is true for the majority of OECD regions. As a first step, learning from each other in the three regions has value added and this has only begun in the field of innovation. There is a tendency to engage consultants, which outsources the competencies that could be built up internally. Evaluation teams from across the three RDAs, perhaps with consultant support as a facilitator, could serve to effectively inform the RDAs on their respective activities and increase the knowledge and skills of RDA staff.

As many of the projects need private sector leaders, there is a need for development of innovation champions. As discussed above, the current process for strategy development is not compatible with engaging the younger and often dynamic future leaders. The different committees, such as the Science and Industry Councils, are composed of members that could be characterised as having a “mentor” profile more than an “entrepreneur” profile. The Northern Way could play an interesting role in leadership development outside of the current planning systems used by RDAs while at the same time thinking about cross-Northern interests. NESTA has established a programme in this direction to cultivate innovation leaders.

Supporting key sectors across the North

The four key sectors of priority for the Northern Way cover particular Northern strengths but also the same sectors prioritised generally by other English regions. There are several consulting reports commissioned by the RDAs that seek to identify strengths. However, across these four sectors, there is no clear mapping across the North that clarifies what the areas of competence are and where they are housed. A greater understanding of these potential areas for greater complementarity or critical mass would seem a pre-requisite for sector-based support. For example, the actors at NaREC are involved in a sector of priority for the North overall, but their linkages are more with actors outside of the North and UK than within the North.

Actions to support the North’s interests at a pan-Northern level would seem to best make sense if they meet an area of pan-Northern expertise. As there is more regional alignment with Technology Strategy Board priorities, RDAs are now trying to map their projects onto the various programmes (Knowledge Transfer Networks, Innovation Platforms, Key Technology Areas and Key Application Areas). If there are some that could be of greater pan-Northern benefit, then it would make sense for the Northern Way to take a lead in the advocacy role on behalf of the RDAs.

The risk for the Northern Way in terms of sector support is that it falls back into a programmatic role that divides the money across too many small projects with transactions costs. There is a regional distribution pressure with respect to the funding since all three RDAs contribute. Unless there is a visible pan-Northern benefit, the RDAs might as well just have used their respective contributions to fund a range of small projects themselves. There may be very large-scale projects for a particular sector that would benefit all three RDAs despite the location in only one region. The partial BBC move to the greater Manchester area, for example, is one of the rare occasions where the RDAs that don’t have jurisdiction over the location nevertheless see a positive spillover for their region. But that kind of positive benefit to

such a large territory is likely only to come from a major and rare investment or opportunity.

N8 research partnership

What is the N8 seeking to achieve?

The N8 research partnership, launched three years ago, is a grouping of eight of the North's leading research universities targeted to enhance research capabilities, university-industry links and innovation in the North of England (see Box 3.7.). It was established in 2005 by the leadership of the respective universities in conjunction with the Northern Way's strategy to narrow the output gap between the North and South of England and to promote science and innovation in the North. The broad aims of the N8 include: increasing the visibility of the North as a world-class research location, improving regional competitiveness in attracting research sponsorship and research infrastructure, fostering new or additional university collaborations in research themes of significance to the North and accelerating the transfer and commercialisation of research to assist regional business development. There is notable symbolic value to the N8 concept as a way to counter-balance the universities of the Golden Triangle and a strategic potential to address long-run innovation opportunities.

Box 3.7. What is the N8 thus far?

The N8 is a grouping of eight leading research universities in Northern England. The constituent universities are the universities of Durham, Lancaster, Leeds, Liverpool, Manchester, Newcastle, Sheffield and York. Taken together, these eight universities represent a significant set of regional assets, including sponsored research of over GBP 780 million annually, more than 8 000 academic staff and over 160 000 students. This compares favourably with the combined research income, staffing and students in the so-called "Golden Triangle" of Southeast England of the universities of Oxford and Cambridge, Imperial College and University College of London, as well as with major state-wide university systems in the United States.

A chief executive for the N8 was appointed in October 2005. At that time, five research themes for N8 collaboration were announced in ageing and health research, energy research and development, foresight for sustainable water use, molecular engineering and regenerative medicine. It is indicated that these research themes were identified based on university strengths, discussions with industry and potentials for impact and commercialisation. In August 2006, a corporate entity, N8 Limited, was established to manage N8 research funds and shared intellectual property developed through N8 research collaborations. The RFQ indicated that each of the five research themes (now identified as

Box 3.7. What is the N8 thus far? (cont.)

“virtual research centres”) had received a grant of GBP 323 000 for planning and development and that a consultant was sought to further help the centres in business planning and to organise a selection process whereby two of the five centres would receive additional funding of GBP 2 million. The centres were expected to develop business plans by November 2007, with decisions about which two of the centres would receive additional funding anticipated in January 2008. From the beginning, leadership co-ordination among the eight universities has been through a Pro-Vice Chancellors group.

The goals of the N8 (or those ascribed to it in public announcements) are ambitious and broad. They include to:

- apply research excellence to the industrial and social needs of UK plc in innovative and imaginative ways, providing more effective routes to realising the Government's plans;
- combine research excellence across the North and develop increased commercial activity;
- deliver fresh impetus to innovation with the potential to make a significant economic impact across the North; and
- match and complement the research power of the Golden Triangle of Oxford, Cambridge and London, leading innovation and boosting the economy.

In terms of innovation impact, the N8's most promising strategic potential may well be to address long-run innovation opportunities where added research collaboration by multiple universities will increase the chances of advantage or benefit to the North and which will result in capabilities that would not otherwise be present. In most cases, specific immediate innovation needs (of business) most probably can be met through existing arrangements, given the many schemes and programmes for technology transfer already on offer. In a few cases, there may be a tactical fit with immediate innovation opportunities where co-ordination among institutions will lead to the identification of expertise in one part of the region that might be useful in addressing a technological challenge in another part. But it would surely not lead to the desired major leveraging effect of the N8 if the alliance mostly focused on immediate opportunities.

There are other university research alliances in the North (for example, the White Rose University Consortium, comprising the Yorkshire universities of Leeds, Sheffield and York) and elsewhere in England (for example, a group of nine West Midlands universities collaborating around ICT) (Tysome, 2007). Other university research alliances are found around

the world. Of several that the N8 could be compared with, perhaps one of the most insightful is the Georgia Research Alliance (GRA) in the US state of Georgia (see Box 3.8.).

**Box 3.8. The Georgia Research Alliance (GRA):
Boosting technology in a lagging region**

Concerned about weaknesses related to the state's capabilities and attractiveness for technology-oriented economic development, the state of Georgia established the GRA in 1990. GRA is a non-profit, public-private partnership involving six leading research universities in Georgia, state agencies and private sector business representatives. The six universities are: University of Georgia, Medical College of Georgia, Emory University, Clark Atlanta University, Georgia Institute of Technology and Georgia State University. The GRA channels investments in strategic and emerging technological fields within the research universities to support eminent scholars, new research laboratories and equipment, research and innovation centres and technology transfer. A core aim of the GRA is to create pools of entrepreneurial scientific talent and research capabilities that can build up the state's research profile and stimulate the commercialisation of technologies by companies in the state. Since 1990, the state has invested more than USD 400 million (GBP 263 million) in the GRA (through tax revenues and bond proceeds), an annual average investment of about USD 26.7 million (GBP 17.5 million) annually. To date, nearly 60 eminent scholars have been appointed at GRA universities. It is estimated that since the GRA started, the state's investment has leveraged about USD 2 billion in new R&D funds (from the federal government and private sources), attracted 120 new university researchers, stimulated 100 new high tech companies, and added more than 2 000 private-sector high-tech jobs.

Compared with the GRA, the N8 is substantially under-funded (by an order of magnitude). But it also has fewer strategic tools. For example, while the N8 has developed strategic research themes, it has no direct ability to influence or add to capabilities to attract additional world-class researchers to its region, to alter the incentives for researchers to commercialise or to get new R&D going. The N8 to date appears to have a greater interest in co-ordinating shared intellectual property than the GRA. For example, while N8 has established a corporate structure to deal with shared intellectual property, the GRA has left intellectual property arrangements to the existing technology transfer offices (TTO) of member universities. The N8 shares with the GRA a minimal central administration, but the N8 board is exclusively comprised of university leaders, compared with the public-private board that oversees the GRA. The presence of high-

level private sector and foundation representatives on the GRA board adds credibility, private sector input and “clout” to the organisation. It is also not clear that the N8 has the long-term stability of political commitment and funding given to the GRA.

Table 3.15. **Comparison of N8 and Georgia Research Alliance**

	Georgia Research Alliance	N8 Universities
Established	1990	2005
State / regional population	8.8 m	14.3 m
University R&D (sponsored)	c. USD 1.2 b (GBP 786 m) / year	More than GBP 780 m / year
Total universities in region	36 public / 40 private	c. 35 (universities & campuses)
Universities in the programme	six	eight
Prime benchmark region	Research Triangle (NC)	Golden Triangle (SE UK)
Research themes	Biomedical research Electronics and ICT Nanotechnology, new materials Environment & energy Traditional industries	Ageing and health research Energy R&D Sustainable water use Molecular engineering Regenerative medicine.
Management structure	GRA President GRA Board (6 university presidents & 19 corporate / foundation)	Chief Executive Office N8 Board (8 VCs) Research Strategy Committee Other advisory groups
Programme initiatives	Eminent Scholars (58) Research labs & equipment Research & innovation centres Technology transfer Venture capital development	Virtual research centres
Total funding to date	USD 400 m (GBP 263 m) / 17 years	GBP 6 m / 3 years
Average annual funding	USD 26.7 m (GBP 17.5 m) / year	GBP 2 m / year
Term of the programme	Indefinite	3 Years
New R&D leveraged	USD 2 billion / 18 years	Unknown / 3 years
Shared IP function	No	Yes (N8 Limited)

Progress thus far and future possible scenarios

There are several possible benefits to the North associated with the N8. They include increased visibility of the universities to attract additional funding, new research collaborations and added take-up of N8 generated research. However, the research-intensive universities of the North already have visibility (although more is always desired), there are already research collaborations among faculty in the N8 universities and multiple

mechanisms already exist for university-driven technology transfer and commercialisation in the region.¹⁸

While an evaluation is not possible, the question may be asked as to whether the N8 is on a trajectory to meet the ambitious goals that have been set for it. Among the initial claims for the N8 was the assertion that it “promises to be one of the largest ‘research pooling’ exercises relevant to economic development in the UK.” On the face of it, based on evidence to date, it is not apparent that the N8 is on a trajectory that will give it the scale it needs to have major impacts on regional economic development. The actual investment in the N8 initiative is small with high transaction costs relative to the added resources made available.¹⁹ There is limited public visibility of N8 research initiatives. Moreover, it is also not apparent that any of the new research collaborations that have been promised through the N8 research centres are adding significant value to the research landscape or capabilities of the North, as they appear to be combinations of pre-existing centres. What does seem to be the trajectory being put in place is an initiative that will add in small ways to patterns of regional research collaboration. There also appears to be an emphasis on technology transfer mechanisms rather than ensuring that additional world-class research with regional innovation implications is leveraged. In summary, the N8 appears to be an initiative that is useful but not fundamental, with the potential to fall rather short of the ambitious goals set for it.

This is a useful juncture to take stock of where the N8 is headed. Possibly it is going in the right direction, but that needs to be better explained and communicated; or, alternatively, some review and course adjustment might be helpful. In terms of the future path of the N8 and opportunities for improvement, there are several possible scenarios, and some are not mutually exclusive, and other strategies can plausibly be developed. They include:

- ***The N8 is limited to the current level of funding*** - GBP 6 m over three years, and after the end of this term, continues as a loose collaboration of leading Northern research universities which manages to secure, from regional or national bodies, similarly modest levels of ongoing funding to maintain its co-ordination activities and to serve as an umbrella organisation for thematic research centres. Under this trajectory, the N8 will likely be a useful organisation with moderate added value for research or innovation, but would be unlikely to have major regional, national or international impact.

- ***Ambitions by the N8 itself and of others are scaled back.*** The N8 becomes primarily an exchange mechanism and advocacy organisation for the North's leading research universities. The universities could be expected to cover the costs themselves, without additional Northern Way funds. The Northern Way could then reprogramme any further funds available for regional universities into more focused initiatives and projects that build up targeted research and innovation capabilities (rather than added consultancy and planning).
- ***The N8 (and/or the Northern Way) refocuses its strategy less on top-level university co-ordination and more towards rising young entrepreneurial researchers.*** For example, rather than targeting multiple large research themes with small amounts of money, the N8 could establish a scheme advertised throughout the UK and internationally to attract leading young entrepreneurial scientific and technological researchers to the North. By bringing top young innovative researchers to the North, this would add directly to regional research and innovation capabilities at the N8 universities in ways that the current strategy seems less likely to do.²⁰ It would take a period of years for the accumulated effects of attracting more leading young researchers (who would likely then attract more resources) and building the region's research recognition to be fully evident. Higher levels of funding would increase the scale and possibly the pace of the effect.
- ***The N8 maintains its current goals, but is substantially increased in scale,*** with the ability to undertake long-term initiatives and fund (to a meaningful level) strategic collaborative research with regional innovation potential. This might mean a funding increase to the N8 by an order of magnitude, with no increase in central administration. Collaborative research between selected N8 members and leading international universities would be encouraged, i.e., it should not all be internally focused. This strategy, if it truly resulted in substantial new resources, would likely raise conflicts with other non-member research universities in the region.

Conclusion

The English Regional Development Agencies are given a mandate to improve productivity (GVA per hour worked) and to close the gap in economic growth rates (GVA per capita), among other goals. To achieve them, the RDAs in the North have been given a single pot of money that is estimated at less than 5% of the public funds flowing to the region overall

for regeneration and economic development purposes. Of that amount, approximately 12-19% of the budget has been spent on innovation instruments and sites, and a further 21%-25% on enterprise that may include some innovation-related components. Innovation is one piece of the support to firms in regional economic strategies.

While innovation is an important priority for RDAs, given their broad remit it is only one of many priorities competing for attention. The non-political approach to regional planning (economic and innovation) along with the need for more innovation strategy champions makes it difficult to take innovation higher on the agenda of actors in the region, including firms, political leaders and the general public. The degree of mobilisation, dynamism and commitment to the strategies is related in part to the more or less catalytic events surrounding their development, each region's innovation journey. In the North West, a government decision created a sense of crisis that served to bring actors to the table, raise attention, clearly identify strengths and create institutions. In the North East, while the sense of crisis was less present and it was more a problem of general economic decline and the lack of R&D spending (due in part to the lack of publicly funded R&D establishments or many firm headquarters), the region has taken a bolder step with transformational ambitions to a knowledge-economy backed by serious financial commitment. In Yorkshire and the Humber, the formal strategy in its current form and institutions were developed later than the other two regions which likely contributes to the strategy being less clear or bold than the others.

In terms of strategy content, the science focus reflects the UK context, the origins of the push by Government for innovation strategies, funding streams for innovation and the strong influence of higher education institutions. There are opportunities to expand the concept of innovation given the recent broadening of approach at the national level, but this will require creativity in projects and funding streams given the current funding and policy framework. There is a desire to expand the work to services but the current strategies and institutions do not support this.

There appears to be a strategic over-emphasis on HEIs to increase innovation in firms and support the innovation system more generally, particularly when aspirations are compared to current practice. Efforts could be focused on trying to increase the critical mass of research excellence on the one hand, and better serving the needs of technology transfer, but this does not necessarily need to occur through the same institutions. The ambitions for the N8 initiative appear to be overly optimistic based on the model and current level of funding and direction, albeit this is a very early stage in the process, but there are different scenarios for future development. It is also important to recognise the main role of universities, educating the

future work force, as the skills agenda is focused on the low-skilled component of the work force. RDAs may also consider supporting the diversification of institutions in the innovation system landscape beyond HEIs for several reasons.

The innovation instruments cover a range of programmes as well as investment in facilities, where the North tends to spend a greater share of its innovation budget than other RDAs. The transformational effects of these symbolic and large investments may require longer-term measures of success. It would appear that the system in the UK results in a proliferation of programmes with high transactions costs, and this should be considered in the funding of the different instruments by RDAs.

The city-region area may better map to a functional regional innovation system than an RDA level region, but the governance structures at the city-region level pose additional challenges for local action. UK cities are noted for their low fiscal autonomy, few incentives for promoting economic development and the fact that most strategic decisions affecting competitiveness are taken at other levels. Nevertheless, city-regions are seeking to play a more active role in supporting innovation and are stating this in planning documents. Some are even at an advanced stage in their thinking and action, like Manchester. In the context of the *Sub-national Review*, the role for the local level in innovation is not yet clear. However, with an increasing role in strategy oversight and implementation, RDAs will need to progressively support building capacity at the local level for implementing innovation-related projects that make sense at the spatial scale (networking and facilities at a minimum).

The Science Cities experiment has offered some very interesting lessons in local engagement and the combination of regeneration with science and science education (areas where the UK Science Cities distinguish themselves in international comparison). However, it is observed in Northern cities that they are unlikely to meet the expectations of a step-wise change in development trajectories. While in several cases resources have been forthcoming, as in the case of Newcastle, significant transaction costs are involved with the project-by-project funding negotiations. Part of the problem is that the RDAs who could support broader funding for projects like Science City are subject to shorter-term performance indicators for public spending.

The proposed national-level Innovation Partnerships programme is under development but with a likely focus on public and non-profit sector institutions, an area previously neglected in the UK's support of innovation, that could be fertile ground for new demonstration projects and learning. Based on the experience of Science Cities, it would be important to clarify

how this programme will address a clear need for the UK that requires a national initiative, without national funding, that does not involve considerable transactions cost for partnerships to find funding, and does not add another organisational layer to a landscape already replete with multiple public sector institutions.

Pan-regional collaboration makes sense only where there is a clear rationale for joint action. The challenge is that regional actors have agreed that innovation is important, but it is not obvious what that joint action should be. Given the privileged position of the Northern Way (explicitly recognised by DIUS in a Public Service Agreement), it can serve an important role for the region on the national stage. Some of these opportunities for action include a creative and targeted evidence base (which could support the common needs of the three constituent regions), capacity building in the public and private sectors, demonstration projects and more effectively telling the North's "story" with respect to innovation. Supporting projects in key sectors across the North will require careful analysis given the difficulty in finding specific common needs with benefits to all three regions, or if not that it is accepted that one region may capture more of the positive spillovers of the investment than the others.

Notes

1. In the North East an even larger process of consultation was developed for the latest RES via SHiNE (Shaping Horizons in the Northeast). Five full-time staff for 14 months was employed to engage over 1 000 stakeholders to increase the diversity of inputs via interviews, workshops and presentations. An evaluation of SHiNE noted that the process resulted in: an assessment of short-comings of the prior strategy, revelation of the key themes for the next strategy, generation of some more radical proposals that, even if not included in the RES, at least pushed the boundaries in regional thinking. The consultants that facilitated this consultation process then spun-out a new business model (OECD, 2006f, OECD, 2008b).
2. The North West RES refers to the Northwest Science Strategy under the Science/R&D strategy, with the responsible party being the Science and Industry Council. In the North East strategy, the subcategory of business entitled “preparing for structural change” includes the elements of the Strategy for Success with the focus on the core sectors and the associated projects of the RDA to support that innovation strategy. Yorkshire and the Humber’s RES mentions innovation in the context of Objective 2, competitive businesses, albeit due to timing the RIS does not receive explicit mention.
3. In North America, such strategies can be a more bottom-up initiative driven by private, not-for-profit regional development agencies. While many of these agencies started mainly by offering services to small firms or managing real estate operations related to economic development, some now have various local tax revenues at their disposal and have expanded their activities to include innovation-related measures such as working with universities, managing science parks and incubators, and offering research fellowships in applied research fields.
4. The expanded national mandate has not been met with additional funding.
5. Such champions include the Business Leadership Team in the North West, the Goldman Visiting Professors at Newcastle University in the North East, and the Regional Technology Network in Yorkshire and the Humber.

6. For NaREC, the New and Renewable Energy Centre, one of the barriers was getting more firms involved given the high barriers to entry for participating in the centre (Hodgson and Benneworth, 2004). An initial review of the Strategy for Success by the Northeast Assembly noted that while it was too early at the time to make a true evaluation, one of the comments was the evaluation's support of a bolder strategy that moves away from low-skilled labour (Northeast Assembly, 2004). This report was, however, not a critical evaluation but more of a progress report.
7. These documents include A Science Capacity Review in 2002 by Arthur D. Little, a Science and Innovation Footprint in 2005 by Yorkshire Science and Mapping Innovation Capabilities in 2007 by SQW Consultants.
8. The three organisations in the North are Universities for the Northeast, Yorkshire Universities and North West Universities Association.
9. A recent NESTA report outlines three types of innovations relevant for rural areas: innovations generated in rural areas but applied in non-rural areas, innovations generated outside of rural areas but that are applied in rural areas, and innovations of a universal quality that have strong impacts on rural life (Mahroom *et al.*, 2007).
10. Generally in centralised countries, the regions tend to have primary responsibility for knowledge transfer and technology diffusion to enterprises. Shared responsibilities with the national level tend to cover governance capacity, innovation poles and clusters and support for start-ups and firm growth. Those responsibilities exclusively in the national domain are generally the innovation-friendly environment and the support for applied research and development (Technopolis *et al.*, 2006).
11. They include: Northwest Composites Centre (four universities that will work with the Northwest Aerospace Alliance), National Centre for Zoonosis Research (two universities and agencies with a multi-disciplinary focus to include policy), the Northwest Laser Engineering Consortium (two universities), Northwest Stem Cell Centre (one main university – with links to others – and two NHS Trusts), UK Tissue Regeneration Centre (two universities, NHS and five industrial partners), and finally the Fourth Generation Light Source (national laboratory and two universities).
12. The Business Link Network will provide business support products that are undergoing streamlining in the national Business Support Simplification Programme that will reduce the number of products from approximately 3 000 down to 100 that fit in 17 product areas, two of which are considered to be directly innovation related (Innovation Collaborations and Innovation Finance). The Innovation Collaborations category is in the form of finance to assist collaboration to develop and

exploit new ideas for increased knowledge exchange and technological diffusion between business and knowledge base institutions. The second is Innovation Finance, which is finance to assist a business to develop and exploit new ideas in the form of grants or loans for single UK-based businesses, mainly SMEs. The other instruments that are considered to give wider support for innovation include many of the programmes in the North. These families include: business expertise for growth, business collaboration offers (support networks for clusters as well as shared support environments, like the Y&H Centres for Industrial Collaboration), skills offers (including the leadership academies) and debt finance/risk capital (like the NStar Co-investment fund).

13. First, it has formalised connections to form a well-developed network. Second, there is concern that the NaREC model, which required equity stakes from firms to receive assistance, made the Centre inaccessible to many. A third criterion for evaluation, deepening the research base, was not possible to assess at the time but the Centre has served to deepen the research base (Hodgson and Benneworth, 2004).
14. Another report on UK cities states that analysis suggests that specialisation is more likely to enhance economic performance than diversity (ODPM, 2006).
15. The Northern set of cities was announced by the Chancellor of the Exchequer in 2004. The second set of cities was announced by the Chancellor in 2005.
16. According to one of the prominent regional leaders of the current initiative, Science Cities was announced unexpectedly by Government and “as a label came out of a brainstorm at number 11 [Downing Street]”. Cited in “Northern negotiator,” *Regeneration and Renewal*, 9 March 2007.
17. In contrast to classical policy design processes where evidence is collected and objectives and plans formulated prior to implementation, the English Science Cities initiative arguably presents an example of “discursive” project experimentation built on local empowerment within a broader framework. The premise of this approach is that complex public problems cannot be solved at once or from the top, but require step-by-step local activities which are continuously reviewed, discussed and modified in interaction with regional and national stakeholders. This experimental approach to policy making has been viewed as analogous to collaborative production in industry (Sabel, 1996). This facilitates learning about what works (and what does not) and in turn using these insights to inform subsequent interventions and activities.
18. An analysis of publication records in the Web of Science, Science Citation Index indicates that the median proportion of co-authorships

between any N8 university and the other seven is 12.9% of all published articles during the period 2003-2007. By institution, the proportion of all articles co-authored with other N8 authors (2003-2007) is as follows: Durham 10.3%; Lancaster 20.3%; Leeds 11.3%; Liverpool 13.3%; Manchester 12.7%; Newcastle 13.2%; Sheffield 9.4%; and York 14.7%.

19. Moreover, of the GBP 6 million, one-third appears to have been allocated to planning and business development, leaving GBP 4 million to be shared between two selected centres. Assuming the two awards are allocated over three years, the actual net new funds amounts to about 0.2% of annual N8 research income. This is too small to have a notable system-wide effect.
20. Current academic salaries for such young researchers are typically much lower in the UK than in the USA. See the Technology Review 35 top innovative technologists and scientists under 35 for examples of the quality of young researcher that would be targeted. www.technologyreview.com/tr35/index.aspx?year=2006.

Annex 3.A1

Table 3A.1. Services innovation: EU policy areas

Policy Area	Type of policy (horizontal/deepening/broadening/targeted)
Encourage service sector firms to use intellectual property	<p><i>Deepening/ Targeted</i></p> <ul style="list-style-type: none"> • Attention to credence goods, where reputation is fundamental/ Brand awareness and trademarks registration • Sub-sectors with R&D component • SMEs
Public procurement (demand)	<p><i>Horizontal/ Deepening</i></p> <p>Indirect effect from policies in other areas:</p> <ul style="list-style-type: none"> • Creating a financial market-availability of credit • Reduction of regulatory burden to create conditions for firms to tap foreign demand • Clear regulations and creation of standards • Incentives for firms to compete/control of market power
Improve supply of qualified personnel	<p><i>Horizontal/ Targeted</i></p> <ul style="list-style-type: none"> • Private household as employer/ family policy measures supporting female labour force participation • Vocational training, training abroad, language, intercultural skills • New services skills
Improve use of and access to public science	<p><i>Horizontal/ Deepening/ Targeted</i></p> <ul style="list-style-type: none"> • Knowledge intensive business services • Incentives for public sciences to invest in research with intangible results that could be commercialised by the services sector
Support foundation of start-ups	<p><i>Horizontal/ Targeted</i></p> <ul style="list-style-type: none"> • Knowledge intensive business services • Internationally attractive conditions for venture capital • Availability of financing for start-up formation, development and investment in innovation activities
Improve support of innovation programmes for service sector firms	<p><i>Horizontal/ Deepening/ Broadening</i></p> <ul style="list-style-type: none"> • At EU level, development of common service markets and the accompanying measures
Reduce regulatory burden	<p><i>Horizontal/ Broadening</i></p> <ul style="list-style-type: none"> • Look at sub-sector level as regulation may be sub-sector specific • At EU-level, common ground for regulations and standards
Improve financing	<p><i>Horizontal/ Targeted</i></p> <ul style="list-style-type: none"> • Policy likely to benefit all sectors, not just services

Source: van Cruysen, Adriana and Hugo Hollanders (2008), *Are Specific Policies Needed to Stimulate Innovation in Services?* Final version for the Workshop “Towards a European Strategy in Support of Innovation in Services”, Workshop of DG Enterprise and Industry, 4 February 2008.

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NORTH OF ENGLAND, UK

With 14.5 million inhabitants and an economy worth over EUR 290 billion, the North of England is larger than many European countries. At the heart of the industrial revolution, the region has been a historic centre for world-changing innovation in transport, computing and in vitro fertilisation. Yet, in the wake of massive losses in manufacturing employment over the past few decades, the region is having to adapt in order to catch up to more prosperous regions in the UK and remain competitive globally.

Like many regions around the OECD, the North of England is seeking to support economic development through innovation, with strategies that build on the region's heritage whilst also looking to develop new strengths.

This report reviews how both national policy and regional strategies support innovation in the North and how these efforts could be improved. It will be of interest to policy makers, firms and others active in promoting innovation and regional economic development.

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