

D2N2 Strategic Priorities & Areas of Economic Focus

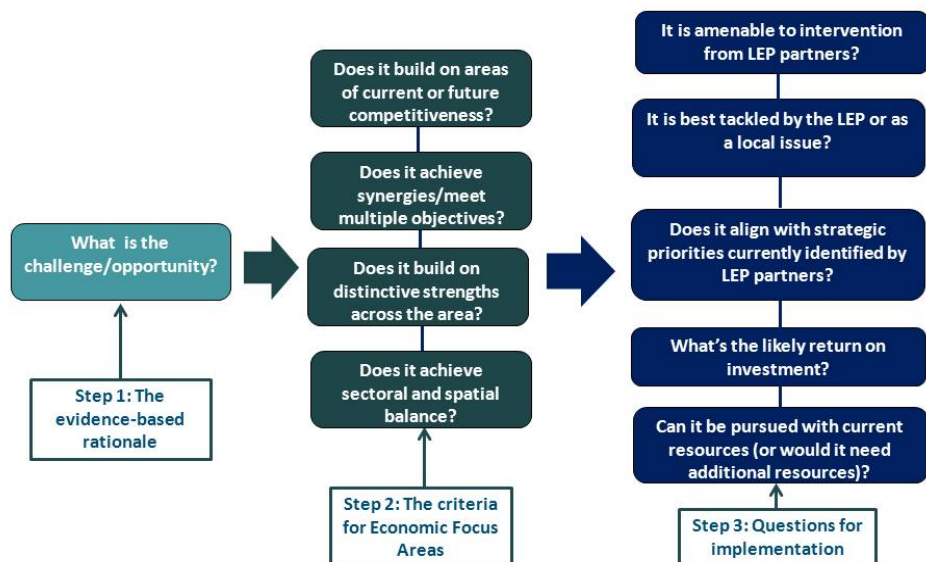


1. Introduction

At its meeting on the 28th of September, the D2N2 Board discussed research evidence compiled by the LEP Capacity Fund Project Team.¹ The Board were keen to identify areas of activity where most impact could be achieved given limited resources. The research evidence identifies many influences on the economic performance of the D2N2 area. In the context of fiscal consolidation by Government and the limited resources available to D2N2 partners, it was necessary for the Board to apply a clear set of criteria to ‘filter’ candidate priorities for D2N2 action. Figure 1 summarises the approach adopted by the Board to identify candidate priorities for further investigation. The approach adopted was sequential:

- **It started with an issue identified in the evidence**(e.g. that the Transport Equipment Manufacturing sector is extremely important to employment and economic output in the D2N2 area and is an area of local comparative advantage);
- **This was then considered in light of the objectives of the LEP** (e.g. support of the Transport Equipment manufacturing sector builds on advantages in innovation and skills – meeting multiple LEP objectives – and relates to a number of distinctive strengths in the area, such as key internationally competitive employers and a strong University base); and
- **The final stage involved consideration of the practicalities of intervention by the LEP –either in terms of influence or direct investment**(e.g. Transport Equipment has sufficient importance and critical mass to be a pan-LEP issue and evaluation evidence suggests that focussed intervention can result in a strong return on investment).

Figure 1 Criteria for Filtering Priorities

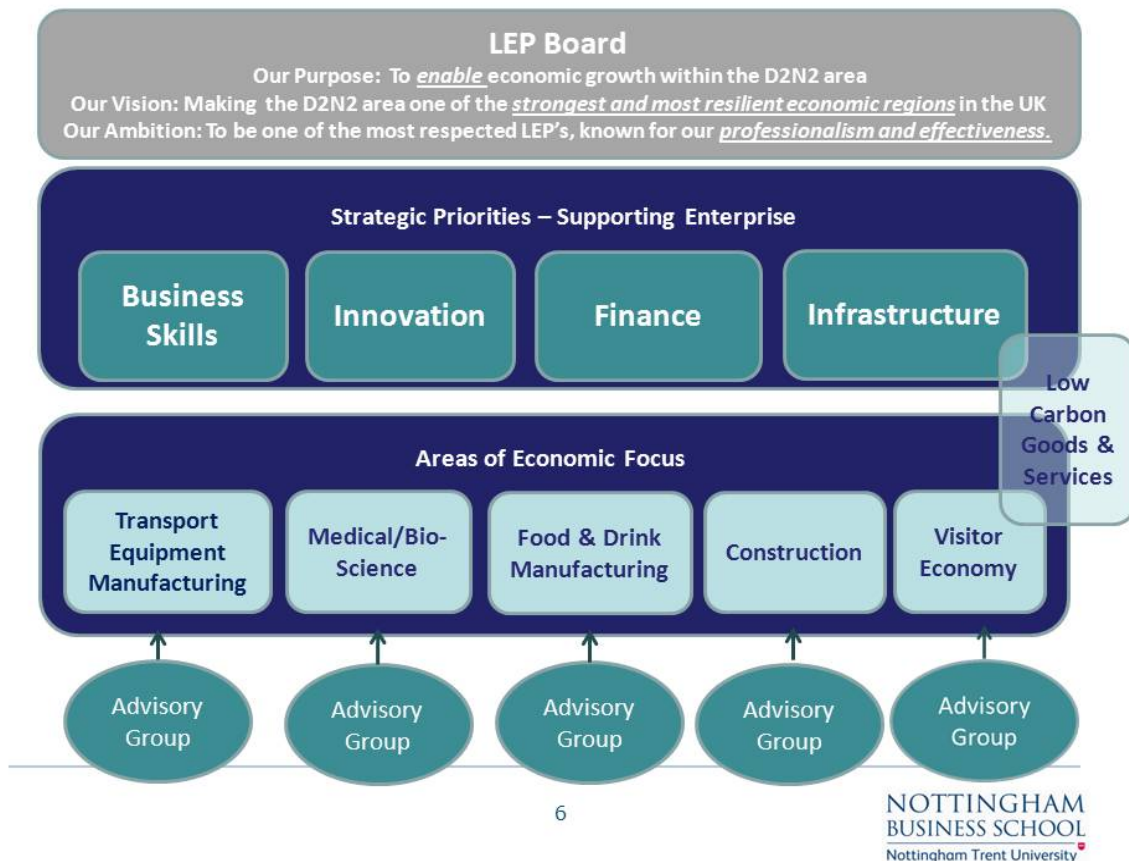


¹ In June 2011, Nottingham Business School successfully led a bid on behalf of D2N2 partners for Department for Business Innovation and Skills (BIS) ‘LEP capacity funding’ to support the LEP Board in engaging in a shared evidence base to identify, test and consult upon key strategic priorities/areas of partnership activity.

The process led to a proposed model for LEP activity, shown in Figure 2. This describes two linked layers of activity:

- **Strategic Priorities**—what the LEP can practically do to support enterprise in the area (the ‘what’ of LEP activity); and
- **Areas of Economic Focus** – describes the sector strengths/opportunities through which the LEP can implement Strategic Priorities (the ‘where’ or ‘with whom’ of LEP activity).

Figure 2



Each Board member has been allocated an Area of Economic Focus. Their role is to act as a sponsor for the Area and provide the link to the Board. The Board is proposing to establish Advisory Groups or, where an appropriate group already exists, to invite them to become an Advisory Group, for each Area of Focus. The Board lead's first task is to convene meetings with key specialists in their Area of Economic Focus, to check the evidence and definitions outlined in this paper and discuss how (and whether) the LEP can add value to current activity and the proposals for an Advisory Group. The Board lead will feed back the outcomes of these discussions to the LEP Board meeting in February 2012.

2. Definitions of Strategic Priorities

In identifying 'high level' strategic priorities, the Board has tried to strike a balance between factors that are relevant to all businesses in the D2N2 area and those that have particular

significance to the high growth businesses that research suggests are responsible for the bulk of private sector job creation.

2.1 Business Skills

Skills are a key determinant of productivity. A skilled workforce provides a pool of human capital that local firms can draw upon and can attract inward investment. Skilled workers may be better able to identify market opportunities, innovate and adapt to new technologies, facilitate investment and improve leadership and management. Skills are therefore important for an area's 'adaptive capacity'²- the ability to withstand economic shocks and take advantage of new opportunities.

The supply of skills is closely related to **economic history and path dependency**. An area's current skills profile results from the education and training decisions made by individuals over a number of generations, influenced by changing job opportunities in different sectors. The **quality and subject-specialisation of local schools and Further and Higher Education Institutions** also has an important impact, as does **the ability of the local area to retain and attract skilled workers**. Successful areas tend to display a high level of population 'churn', attracting and exporting individuals from and to other areas, whilst less successful areas can suffer from a static, ageing population and the out-migration of well-qualified young people.

'**Business skills**' are the skills employers need to produce or supply products and services. Many skills valued by employers – such as communication and team working – are particularly poorly reflected by qualifications. However, formal education, training and qualifications are often emphasised because they can be easily measured and, more importantly, they can be directly influenced by decisions made by Government, local partners and employers.

The Government believes **that LEPs should understand the nature of employer demand for skills and should influence providers to meet these needs, although they have stated that LEPs will have no formal powers to direct or control activity**. This means that LEPs will achieve objectives in business skills through:

- Strategic influencing; and
- Providing information on employer needs to improve training decisions made by individuals and providers – which could include shared approaches to Information, Advice and Guidance.

The evidence compiled by the LEP Capacity Fund Project Team suggest that in the D2N2 area:

- The most popular subjects chosen by young people (16-19) in Further Education include Hair & Beauty, Creative & Cultural and Sports & Leisure – subjects more closely related to personal interests than opportunities in the labour market.

² 'Adaptive capacity' can be understood as an area's ability to respond to external forces whilst creating new paths of economic development from within. See: Ron Martin, University of Cambridge, on behalf of *emda*, 'Thinking about regional competitiveness: Critical Issues', October 2005.

- Nationwide, research suggests that IAG for young people is not well-informed by employer needs. Young people in FE and other vocational routes are far less likely to receive the quality of advice received by university students (DEMOS refer to them as a “forgotten half”). When surveyed, employers are far more likely to feel that school and college leavers are poorly prepared for work compared to university graduates. Universities in the D2N2 area use ‘market signalling’ from independent sector specialists - to provide advice, arrange work-placements, and ensure employer involvement in careers fairs. This practice could be adapted and applied in schools and colleges.
- In Nottingham City in particular, there are relatively high proportions of employed adults with very low levels of education and qualifications, low progression rates for school leavers to university, and high proportions of local employers reporting that members of their current workforce ‘lack proficiency’ (many are in relatively low-skilled service sector jobs). This suggests the need to focus on transferable skills for employability and to raise the attainment and aspirations of young people.
- In Derby and Derbyshire, there is a strong demand for technician-level skills, closely associated with Transport Equipment Manufacturing. These areas have higher proportions of Apprentices working towards a Level 3 qualification than elsewhere, but many employers have raised concerns about taking on Apprentices in the future due to the impacts of recession. This could point to a need for concerted action from LEP partners to ensure that take-up is maintained in the future – and that young people are aware of the continued opportunities for high pay/high skill employment in manufacturing.

2.2 Innovation

Innovation is commonly defined as “the commercial exploitation of new ideas in the form of new products and processes, new organizational techniques, new markets and new sources of supply”. A distinction is commonly made between radical innovation and incremental innovation, where radical innovation represents a completely new product or process and the latter an improvement to an existing product or process. It is also common to think in terms of novel innovations that are new to the market and those that are new to the firm, which reflects the diffusion and transfer of knowledge.³

Innovation can enhance the quality of an area’s business stock and act as a spur to competition. Innovative activity can result in new entrants displacing incumbents. This process of churn is part of the way in which the market allocates resources towards more efficient firms and is a feature of high-performing local economies.

It is extremely difficult to measure innovation. Data that is available tend to be proxies for stages of the innovation process- for example inputs such as expenditure on research & development and outputs such as patents. It is also the case that innovative activity generates ‘spill over’ effects that mean others can benefit from innovative activity undertaken elsewhere. This suggests that, from the perspective of society more widely, a less than optimal amount of innovative activity may take place in an economy, prompting public policy interventions. This has been recognised by the UK government, which has tried to encourage innovative activity through schemes that provide grants for R&D or through tax breaks for R&D.

³ Innovation Policy Position Paper, C Oughton and M Frenz, Birkbeck, University of London, October 2005.

The 2010 R&D Scoreboard published by the Department for Business, Innovation and Skills, collects information on the top 1,000 UK companies by the size of their investment in R&D. The ranking is based on R&D expenditure in 2009. National statistics indicate that R&D spend is heaviest in London, the South East and the East of England. This is reflected in the content of the scoreboard. These three regions account for just over 80% of the total R&D spend of the top 1,000 companies in the UK. Twenty six companies in the East Midlands are among the top 1,000 in the UK. Of these, seven are in the D2N2 area. These seven companies spent a total of £63.7m on R&D in 2009. This is 30% of the total R&D spend identified by the 26 companies in the region that rank in the UK's top 1,000. These figures do not include Rolls Royce as the R&D scoreboard attributes R&D spend to the head office of a holding company and it is not possible to allocate Rolls Royce's R&D spend to the Derby site. Rolls Royce is the only company in the D2N2 area that is ranked among the top 1,000 companies globally in terms of R&D spend.

The universities in the D2N2 area are also a major source of innovative activity. All three universities produce research that is designated as "world leading in terms of originality, significance and rigour" according to the 2008 Research Assessment Exercise. The universities also play a key role in the diffusion of innovation through knowledge transfer schemes and spin outs. Spin outs are also a feature of large businesses that make significant investments in innovative activity. Investigating interventions that encourage knowledge transfer and spin out activity could be key actions for the LEP to consider.

2.3 Finance

Access to finance is critical if businesses are to invest in additional capacity, innovative activities, skills development or new capital equipment. When surveyed, businesses in the D2N2 area, in common with elsewhere, are still raising access to finance as a concern. The Derbyshire and Nottinghamshire Chamber of Commerce's Quarterly Economic Survey in September 2010 reported that a quarter of respondents were concerned over the availability of finance and 10% of respondents identified the terms on which finance is available as a barrier to growth. Other evidence suggests that little has changed in the intervening period and it remains the case that access to finance remains difficult for some businesses. Research on high growth firms suggests that access to capital for expansion is often a key constraint.

Opportunities for LEP action in finance are currently unclear, but could include identifying access to finance programmes previously administered regionally that could be delivered at a LEP level, as well as identifying any specific activities that can be delivered through the new Enterprise Zone around the Nottingham Alliance Boots site.

2.4 Infrastructure

Infrastructure- widely defined to include transport infrastructure, business premises and electronic infrastructure such as broadband-is key to delivering sustainable economic growth. The adequate provision of quality infrastructure that supports the requirements of industry and allows for the efficient movement of goods and people contributes to economic prosperity. There is a clear link between the provision of infrastructure, levels of activity in the construction sector

and, through sustainable design and construction practices, the achievement of the government's low carbon economy targets.

Within the parameters of the new National Planning Framework, there may be opportunities for the LEP to use the planning system more purposively to support economic development objectives. They will also be opportunities for shared LEP action related to the new Enterprise Zone around the Nottingham Alliance Boots site. The Government have also made statements about the possibility of LEPs working with private sector representatives to identify key infrastructure needs that could have most impact on enterprise generation and employment growth in the area.

3. Definitions of Areas of Economic Focus

The D2N2 Board are keen to focus upon economic sectors with distinct strengths in the D2N2 area. These can either be clearly defined industry sectors, such as Transport Equipment Manufacturing, or cross-cutting areas of activity and opportunity – such as Low Carbon technologies.

Evaluation evidence suggests that interventions targeted at areas of specific local advantage can have greater impact compared to more widely targeted activity. The Government advocates the importance of developing diverse local economies – but also argue that there is a need to focus limited resources on areas where greatest impact can be achieved. Specific tools – identified in the Strategic Priorities described above – also apply more to some sectors than to others. The Project Team applied the following criteria, summarised in Figure 2, to identify sectors to be considered by the Board. They should:

- Reflect distinct areas where D2N2 firms have current/could have future comparative advantages in a global market;
- Be closely involved in developing emerging technologies that offer significant potential when combined with advantages particular to locating in the D2N2 area (i.e. private sector and HE R&D strengths);
- Be sufficiently important, locally and nationally, to justify prioritisation at a LEP level, rather than a priority specific to one Local Authority area; and
- Tools for intervention available to D2N2 partners should be relevant to that sector – i.e. the sector should be able to benefit from the sort of interventions partners can implement, such as facilitating industry-university collaboration, and there should be an additional value for money justification for targeted intervention.

The sectors identified as 'Areas of Economic Focus' by the D2N2 Board are described below.

3.1 Transport Equipment Manufacturing

This sector describes the production of aerospace, automotive and rail transport vehicles. It is well described in available data, which demonstrates a strong concentration in the D2N2 area – especially around Derby City and South Derbyshire – and is significantly (40%) more productive

than elsewhere in the UK. Rapid growth is projected in the future for the UK, with the D2N2 area outperforming the national average. The sector includes a number of large, globally significant employers, such as **Rolls Royce, Toyota and Bombardier**. These companies have significant supply chains which overlap other industrial sectors (such as metals) where there are also local strengths.

Products and processes associated with this sector often have high value, and utilise technologies and components that can have multiple commercial applications – such as printed plastic circuit boards, fuel cell technology, or lightweight composite materials. **Composite materials**, for example, are important in automotive and aerospace manufacture, but are also applicable to wind and tidal energy generation, oil and gas extraction, and sustainable construction.

Innovation activity undertaken by employers in the sector is complemented by a number of university research strengths, such as expertise in fuel storage, composites and structures at the Advanced Materials Research Group (School of Mechanical Materials, University of Nottingham).

In addition to innovation, the sector has strong synergies with a number of other D2N2 Strategic Priorities. In relation to **Business Skills**, evidence suggests that Transport Equipment Manufacturing generates high quality employment opportunities, both for graduates and for vocational learners, such as Apprentices. Derby City has one of the highest work-based earning levels in the country, which is closely associated with highly paid Professional and technical jobs in the sector.

There is also anecdotal evidence suggesting that R&D projects within the sector's large employers can result in spin out enterprises, with technicians starting businesses related to a new technology or process and then becoming an SME within the supply chain of the wider sector.

3.2 Medical/Bio-Science

This sector describes 4 interrelated sub-sectors that together provide goods and services related to human health and medical care:

- Healthcare, much of which is delivered through the NHS, is the service element of the sector which also accounts for a far larger volume of employment as well as being the principal customer for the other elements of the sector. This sector accounts for 7.6% of GVA in the D2N2 area. The **QMC/Nottingham University Hospital Trust** is a significant employer and one of the largest teaching hospitals in the UK;
- The manufacture of medical devices, a relatively small, high value sub-sector of manufacturing with a high level of R&D activity. Disposable equipment and supplies (syringes, bandages, etc.) account for the largest market share, at 46% of the total UK medical devices market;
- Pharmaceuticals is a more significant sub-sector, in both employment and output terms, manufacturing products both for the NHS and other health care providers and for the

commercial 'over-the-counter' market. **Alliance Boots plc**, which has headquarters just outside Nottingham, is a very significant employer in the D2N2 area; and

- Life and bio-sciences, which describes research and development, manufacturing and marketing of products based on advanced biotechnology research. This sub-sector include often small, niche producers, which include university spin-outs. Bio-city, in Nottingham, is a nationally significant centre. **ClinPhone**, also based in Nottingham and now part of Perceptive Informatics Group, is a clinical technology company that supplies some of the leading global pharmaceutical and biotechnology organisations. ClinPhone employs 750 staff, and has an R&D investment of £7,800 per employee, compared to £3,800 in the UK.⁴

This sector is clearly very important in delivering interventions related to the **Innovation** Strategic Priority. The UK is a global leader in both pharmaceuticals and life sciences, ranking second in the world after the US in areas such as regenerative and stratified medicine. The pharmaceutical sector is the leading sector in R&D investment in the country, investing £4.5 billion in R&D in the UK in 2007, representing over a quarter of total UK Business Investment in R&D in that year. The medical devices sector is rapidly growing and the UK now accounts for the largest market share in Europe, with just over 2,000 companies employing almost 50,000 people.⁵

Other strategic opportunities relate to **Business Skills**, with healthcare in particular providing both entry level jobs (e.g. care assistants) alongside established progression routes, with associated training opportunities, to more highly skilled professions. Population ageing, affecting the UK more widely and parts of the D2N2 area in particular, also presents challenges and opportunities for all parts of the sector in the future – both in terms of increasing the demand for healthcare services and products, and also changing the nature of the services and products required.

The sector is also linked to other local strengths in the D2N2 area, such as '**technical textiles**', with technologies increasingly used in both healthcare procedures (surgical drapes etc.) and as components in the production of pharmaceuticals and medical devices. **Palmhive Technical Textiles**, based outside Nottingham, are an internationally leading manufacturer that supplies a range of products to the healthcare sector. **Agricultural** companies are also important customers for products and technologies developed through bio-science research. Medical devices manufacturers work closely with companies specialising in **digital technologies and software design**, especially in terms of diagnostic imaging and surgery imaging products.

Finally, **Investment** is an important Strategic Priority for Medical/Bio-science companies, as Government investment in R&D is relatively low in the UK in comparison to other countries. This means that companies often rely on Venture Capital. However, because Medical/Bio-science enterprises often have very long time frames for return on investment, they can be unattractive to private investors. Therefore this could represent opportunities for intervention by the LEP.

3.3 Food & Drink Manufacturing

⁴ BIS, '2008 R&D Scoreboard', 2008.

⁵ Office for Life Sciences, 'Life Sciences Blueprint', July 2009.

The manufacturing of food and drink products is important across the East Midlands, and to a number of local areas within the D2N2 LEP in particular – such as Newark & Sherwood, Bassetlaw, Amber Valley. The sector is important locally because of its close connection to agriculture and also because of the D2N2 area's good connectivity, enabling the rapid distribution of food and drink products nationally and internationally.

Food and drink manufacturing is the largest sub-sector of manufacturing, accounting for 3.8% of GVA in D2N2 area, and employment in the area is significantly more concentrated than nationally. Moreover, above average growth is projected for the sector in the future. Food and Drink Manufacturing is also relatively productive in the D2N2 area, with output per full-time employee estimated to be 5.5% higher than the sector in the UK overall.

Although the sector presents a number of opportunities to the D2N2 LEP, intervention needs to be carefully targeted. For example, niche high-skills areas do exist (such as food technologies – where business activity is closely related to international Higher Education research strengths in the Sutton Bonington campus of the University of Nottingham), but, in general, the sector is characterised by generally low-skilled employment with limited progression routes. Therefore, **Investment, Innovation and Infrastructure** interventions may apply to the sector, but there may be less of a case for D2N2 activity related to **Business Skills**.

Parts of the food and drink sector are closely related to the Visitor Economy in terms of 'food tourism', where local produce can be presented as an attraction in restaurants, food & drink festivals, etc., and can be used to market the LEP area to domestic and international visitors.

3.4 Construction

This sector describes activity relating to the preparation of land and the construction, alteration and repair of domestic and commercial buildings and infrastructure. It is well described in the data, which demonstrates that it is relatively important for employment across Derbyshire and north Nottinghamshire, with examples of large employers including Bowmer and Kirkland in Belper. Construction in the D2N2 area is relatively productive, with output per worker estimated to be 9% higher than in the UK overall. Construction accounts for 8.7% of GVA in the D2N2 area.

The sector has been badly affected by the recession, with steep reduction in demand across house building, commercial development, and public works (including infrastructure). However, population growth and latent demand for housing (plus policy priorities to increase house building), as well as possible plans for any infrastructure investment stimulus, represent opportunities for future growth. Local companies have been relatively successful in winning Olympics 2012 contracts.

There are strong arguments for the D2N2 LEP to consider activities related to construction, in addition to its relative importance to employment in the area. This relates to the sector's close connection to the Low Carbon agenda (i.e. 'sustainable construction'), where interventions related to the **Innovation** and **Investment** Strategic Priorities may assist in supporting the right environment for construction companies to take advantages of low carbon technologies. There

are particular opportunities related to the need to retrofit commercial and domestic properties, which also have **Business Skills** requirements for the trades involved to update training and product knowledge. The nature of employment in the construction sector also presents opportunities for Business Skills interventions, as it provides entry level employment with clear progression routes into the skilled trades. Apprenticeships are also a well-established route for intermediate skills in the construction trades.

The construction sector has close links to important service sub-sectors in the D2N2 area, such as planning and architecture consultancies. There are also Higher Education strengths, with Derby, Nottingham and Nottingham Trent Universities all having Schools of Architecture, Design and the Built Environment.

Given the importance of public sector investment in construction activity, the sector is particularly amenable to policy intervention. As Local Authority D2N2 partners are also major procurers of construction activities, they could consider collectively identifying skills and environmental outcomes that can be built into future construction projects (e.g. requiring a successful contractor to support a certain number of young people in the local area as Apprentices).

3.5 Visitor Economy

The visitor economy covers those activities directly associated with tourism, principally hotels and restaurants. It also expresses a wider field of assets and activity that includes the management and promotion of visitor attractions, which can be natural and heritage as well as other attractions (such as theme parks), and those elements of an area's sports, leisure, retail and cultural offer which attract and service domestic and international visitors.

The D2N2 area has a wide ranging tourism offer, and contains what is possibly the key tourism asset in the East Midlands and one of the most important in the UK- the Peak District National Park. In addition there are a range of contemporary and historical, urban and rural attractions that bring millions of visitors to the area. The 2009 English Visitor Attractions Survey suggests that a number of these buildings, parks and monuments are amongst the most visited attractions in the East Midlands. The list of the top 10 most visited attractions includes: Chatsworth House, Rufford Abbey & Country Park, Sherwood Forest Country Park, Wollaton Hall and Park and Nottingham Castle Museum. A more contemporary attraction, the QUAD in Derby also appears in the top 10⁶.

Tourism, like other parts of the economy has been hit by the recession. Recent (national) survey evidence suggests that, while conditions were reasonable during the summer⁷ (with 1/3 of tourism businesses reporting that business was better than in 2010), there is less optimism looking ahead⁸. Although domestic tourism has been sheltered somewhat by the 'staycation'

⁶ Note that newly established attractions such as Nottingham Contemporary do not appear in this data but are expected to appear in data for later years.

⁷Business Confidence Monitor 2011, Wave 4 September, Visit England.

⁸ Domestic Industry Panel, Wave 15, July-August 2011, Visit England.

effect- where people holiday in Britain rather than abroad, people are taking fewer and shorter holidays as a result of the current difficult economic conditions⁹.

Between 2006 and 2009 there were, on average, 3.8 million visits per annum to the D2N2 area (which is 42% of the total for the East Midlands region). Just over 51% of these visits were to Derbyshire. However, 56% of spend occurred in Nottinghamshire. This is a function of the very different profiles of visitors to the two counties. Ninety per cent of visitors to Derbyshire are domestic visitors and 10% inbound visitors, while 83% of Nottinghamshire's visitors are domestic and 17% inbound. Inbound visitors have higher levels of average spend than domestic visitors and both types of visitor tend to spend more in Nottinghamshire than in Derbyshire.

It is also possible to break domestic visitors down into holidaymakers and business visits. In Derbyshire a much higher proportion of domestic visitors are holidaymakers than in Nottinghamshire. Given the significant concentration of monuments, buildings and parks in Derbyshire Dales and the Peak District National Park, it is clear that the tourism offer in Derbyshire is different to the offer in Nottingham and Nottinghamshire.

The 'Hotels & Catering' sub-sector, which accounts for just under 3% of GVA and just under 5.5% of FTE employment, has lower productivity than the national average in the D2N2 area. Growth is forecast to be relatively low during the next decade. Tourism nevertheless plays an important, wider role in the D2N2 economy. Having a range of attractions in the area can attract people and businesses and contribute to the quality of life and wellbeing of residents in the D2N2 area.

LEP intervention related to tourism needs to be carefully targeted. In relation to **Business Skills** and **Innovation**, tourism generally describes relatively low-skilled activities (hotels and catering, sports and leisure, retail etc.) which have limited progression routes. Although there many of these businesses may be 'lifestyle businesses', with limited growth potential, the LEP could consider where **Investment** activities may create the environment necessary for higher growth tourism businesses to develop.

3.6 Low Carbon Environmental Goods and Services

The Government define the low carbon industry within the broad definition of 'Low Carbon and Environmental Goods and Services' (LCEGS), which includes traditional **environmental solutions** (such as control of air, noise and water pollution, waste management and recycling) along with **renewable energy technologies** (e.g. wind, tidal, geothermal and biomass) and '**emerging low carbon**' activities (such as road transport emissions reduction, nuclear energy, energy management, carbon capture and storage, etc).¹⁰ With the exception of energy generation and water/waste, most of these activities occur across many sectors – including Construction and Transport Equipment Manufacturing. **Low carbon is therefore proposed as**

⁹The Staycation Effect 2011 and Beyond, Visit England.

¹⁰Innovas, on behalf of BERR, '*Low Carbon and Environmental Goods and Services: an industry analysis*', March 2009.

a cross-cutting series of practices, technologies and opportunities for the D2N2 Board to consider and investigate further.

The D2N2 area has a number of important strengths in areas related to Low Carbon. **Power generation** is significant in D2N2, with three large power stations – the coal-fired Ratcliffe-on-Soar station, south of Derby and Nottingham, and the co-firing stations at Cottam and West Burton near Retford in Nottinghamshire. There is less renewable power generation in the area, largely related to topography, although some hydropower is produced locally.

A number of large Transport Equipment Manufacturers in the D2N2 area are international leaders in low carbon technologies, including Toyota and Rolls Royce in development of low carbon vehicles and fuels. Rolls Royce is active in R&D in technologies to reduce aviation emissions and in the production of components for the civil nuclear industry. All three universities in the area have interests in low carbon technologies, whilst the British Geological Survey (BGS), in Keyworth, south of Nottingham, is a globally recognised research centre.

The UK now has legally binding carbon emissions targets that will require a step change in technologies and practices. This policy precedent suggests significant opportunities for those companies and organisations that develop and adopt low carbon technologies at an early stage. There may be a ‘first mover advantage’ comparable to that gained by early-adopters of ICTs in the 1990s. As power stations are responsible for between 80 and 90% of CO₂ emissions, they will be key customers for new technical solutions in carbon capture and storage. Given the importance of power generation in the D2N2 area, this presents a significant local market as well as a source of investment. In relation to Construction, there will also be a significant demand for retrofitting of industrial and domestic properties to improve energy efficiency and reduce emissions.

Strategic Priorities related to low carbon environmental goods and services could cover interventions in **Innovation, Investment, Infrastructure and Business Skills**, that could build on the following existing strengths in the D2N2 area:

- The Energy Technologies Institute (ETI): an East Midlands/West Midlands collaboration between Nottingham, Birmingham and Loughborough Universities. It also draws input from energy companies like BP, Shell, E-ON, and EDF Energy. Nottingham University has additional specialisms in the Built Environment and Wind Energy and includes the Centre for Innovation in Carbon Capture and Storage;
- Nottingham Science City status (awarded by the Government along with five other UK cities) and Nottinghamshire Energy Partnership (NEP). NEP is an independent body that aligns activities with the ETI to drive forward the climate change agenda in the region. It provides information and advice to developers and the public sector¹¹; and
- E-ON engineering at Ratcliffe-on-Soar leads the global E-ON group for R&D.

¹¹ PERA Knowledge, on behalf of *emda*, ‘Energy Technologies in the East Midlands’.